

**KENYA
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MARSABIT COUNTY

Marsabit Forest Ecosystem

Management Plan, 2015-2025



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Marsabit Forest Ecosystem Management Plan, 2015-2025

Planning carried out by

MFE Managers
MFE Stakeholders
KWS & KFS Planning Departments

In accordance with the

PROTECTED AREAS PLANNING FRAMEWORK


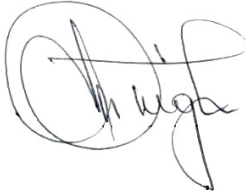



Acknowledgements

	<p>This General Management Plan has been developed through a participatory planning process involving a cross section of Marsabit Forest Ecosystem stakeholders, under the coordination of a Core Planning Team comprising representatives from Kenya Wildlife Service, Kenya Forest Service and Marsabit County Government</p>
	
	
	<p>Funding for the planning process has been provided by AFD-funded Northern Kenya Biodiversity Conservation Project.</p>

Approval Page

The management of the Kenya Wildlife Service, the management of Kenya Forest Service, and the County Government of Marsabit have approved the implementation of this management plan for the Marsabit Forest Ecosystem.

On behalf of the KENYA WILDLIFE SERVICE	On behalf of the KENYA FOREST SERVICE	On behalf of the COUNTY GOVERNMENT OF MARSABIT
		
William K. Kiprono Director General	Emilio Mugo Director	Omar A. Ali Deputy Governor
Date: 21.9.2015	Date: 27.10.2015	Date: 25.8.2015

Executive Summary

This 10-year management plan (2015-2025) for Marsabit Forest Ecosystem (MFE) is designed to be a practical tool supporting and guiding the integrated management of the MFE protected areas. These protected areas comprise of two components: the Marsabit Forest Reserve/National Reserve which is gazetted as a Forest Reserve and National Reserve under the Forests Act, 2005 and Wildlife Act, 2013 respectively; and the Marsabit National Reserve which is under the jurisdiction of Marsabit County Government but managed by KWS. The MFE is important because it is a critical water catchment as well as a rich biodiversity area hosting threatened species such as elephants. The local community depend on the MFE protected areas for various forest goods and services including livestock pasture, water supply, and fire wood, among other uses.

The management of the protected areas comprising the MFE will require a high degree of collaboration from the three institutions with entitled jurisdiction, namely: KFS, KWS and Marsabit County Government. The three institutions will have to agree on Memoranda of Agreements (MoAs) addressing the implementation of this management plan including:

- ▶ A definition of the roles and responsibilities of the KWS;
- ▶ A definition of the roles and responsibilities of the KFS;
- ▶ A definition of the roles and responsibilities of Marsabit County Government;
- ▶ Agreements on management of the MFE's protected area; and
- ▶ Agreements on sharing of management costs and benefits.

MFE Exceptional Resource Values

The MFE Exceptional Resource Values (ERVs) are natural resources and other features that provide benefits to local, national and international stakeholders. They are divided into four broad categories: **Biodiversity** (e.g. large tusked elephants, moss covered trees, endangered plant species and threatened and rare wildlife); **Scenic** (e.g. scenic crater lakes and deep valleys); **Social** (e.g. source of water and dry season grazing pasture); and **Cultural** (e.g. mixed culture of forest adjacent communities, cultural shrine and archaeological site).

Conserving the exceptional resource values in the ecosystem faces several challenges. First are issues affecting biodiversity conservation such as illegal harvesting of forest products, human encroachment, livestock grazing, wildlife poaching, water over-abstraction, invasive species, wild fire, infrastructural development, blockage of wildlife migratory corridors and dispersal areas, wildlife diseases and drought and climate change, all of which threaten ecological integrity and sustainable provision of ecosystem goods and services. Second are issues related to interactions between the protected areas and the local community. They include: Human-wildlife conflict, access rules for protected areas and low incentives to conserve. Third are issues relating to PA operations. These include: unclear management responsibilities on protection and management of the MFR/NR resources, inadequate management resources and infrastructure, low revenue generation capacity, lack of management presence in most parts of the MFE and lack of clear demarcation of the Forest and National Reserve Boundaries.

There are several actions the government has taken to address the management issues facing the MFE. The gazettement of the forest reserve and the national reserve was a major step towards conservation of the forest water catchment and the associated unique biodiver-

sity. However, more needs to be done to enhance conservation efforts in the MFE. Consequently this plan has considered four major options to help tackle the environmental problems facing the MFE. Option 1 focuses on *Maintaining the status quo*; Option 2 focuses on ***Establishing a Forest Reserve/National Reserve and maintain the current moratorium on consumptive use of natural resources in the FR/NR during the MFE management plan duration***; Option 3 focuses on establishing a Forest Reserve, Nature Reserve, and National Reserve; and Option 4 focuses on establishing a Forest Reserve, National Park and National Reserve. After analysing the merits and demerits of each option, stakeholders with mandate to manage natural resources in the Marsabit Forest Reserve/National Reserve agreed that Option 2 will be pursued during the 10-year management plan duration while feasibility of Options 3 and 4 are evaluated for possible adoption..

MFE plan

The MFE plan structure aims to ensure the plan is easily understood by stakeholders and MFE management. At the center of the plan are the **Zonation scheme** and the plan's five management programmes which are:

- ▶ ***Ecological Management Programme***
- ▶ ***Forest Resource Management Programme***
- ▶ ***Tourism Development and Management Programme***
- ▶ ***Community Partnership and Conservation Education Programme***
- ▶ ***Protected Area Operations and security Programme***

Zonation scheme

The MFE zoning scheme aims at supporting both decentralized management of the ecosystem and promoting allowable land uses in the area. Therefore the ecosystem has been divided into four land use zones and three management sectors. The Senior Warden remains the overall KWS officer in-charge of Marsabit National Reserve while the divided sectors will be managed by junior wardens at each sector headquarters. The four land use zones that have been designed to promote different types and levels of tourism are: the Low use forest zone, Low use shrubland zone, Wilderness zone and influence zone. In addition, to enhance forest security and management the Forest Reserve and adjacent areas are divided into five forest sectors (Badasa, Hula Hula, Karantina, Songa, and Karare) to facilitate forest patrols and thereby deter illegal forest activities.

Ecological Management Programme

The Ecological Management Programme aims “*to conserve and restore MFE’s ecological components and processes, and understand ecosystem functions and dynamics*”. In order to achieve this aim, the programme has identified eight (8) conservation targets that represent the biodiversity in the MFE and will be the basis for conservation management actions and ecological monitoring. The eight conservation targets identified for the MFE are:

1. Canopy Forest
2. Woodland
3. Shrubland/Scrubland
4. Wetlands
5. Olea spp.
6. Elephant
7. Grevy’s zebra
8. Large carnivores

The objectives of the Ecological Management Programme focus on ensuring that: threats to the MFE habitats are abated and all biological connections are maintained (specifically focusing on conservation targets Canopy Forest, Woodland and Shrubland/Scrubland); water availability for wildlife, livestock and the community is improved (targeting protection of wetlands); conservation of MFE threatened large mammal species is enhanced (targeting elephants, grevy's zebra and large carnivores); ecological monitoring and research information dissemination is strengthened (targeting all conservation targets); and climate change mitigation and adaptation measures are enhanced (targeting all conservation targets).

Forest Resource Management Programme

The purpose of the Forest Resource Management Programme is to “*conserve and protect the Mt. Marsabit Forest water catchment for sustained provision of environmental and socio-economic goods and services*”. The seven strategic principles underpinning this programme are: natural forest is providing socio-economic, cultural and environmental services; forest integrity is improved through restoration of degraded forest; local communities are actively involved in forest conservation and management; farm forestry and effective forest extension for improvement of livelihood is promoted; efficient use of alternative renewable energy sources is promoted; forest fires are effectively managed and monitored; and community livelihoods are enhanced. These principles are intended to guide the implementation of the Forest Resource Management Programme's four management objectives that, when combined, achieve the Programme Purpose. These four objectives are: the Marsabit natural forest is providing environmental goods and services sustainably; farm forestry and forest extension services promoted; community livelihoods enhanced through enterprise development; and forest research enhanced.

Tourism Development and Management Programme

The purpose of the Tourism Development and Management Programme is “*to ensure that the MFE is offering memorable visitor experiences based on the unique biodiversity, scenic and cultural values in the area*”. In implementing the MFE's Tourism Development and Management Programme, MFE Management will be guided by the following strategic principles: tourism is developed to augment natural resource protection and management; tourism is developed appropriately; the MFE offers attractive investment opportunities; and community participation in tourism is encouraged. These principles are intended to guide the implementation of the Programme's three management objectives that, when taken together, achieve the Programme Purpose. These three objectives are: tourism activities and attractions diversified in environmentally appropriate ways; tourism facilities improved and expanded to support an increased number of tourists; and tourism administration and management strengthened.

Community Partnership and Conservation Education Programme

The purpose of the Community Partnership and Conservation Education Programme is to “*enhance support and participation of MFE adjacent communities in conservation and sustainable use of natural resources*”. In implementing the MFE's Community Partnership and Conservation Education Management Programme, MFE Management will strive to adhere to the following principles: communities are actively participating in conservation and management of natural resources in the MFE; communities are receiving tangible benefits from conservation of natural resources in the MFE; Human-Wildlife conflicts are reduced for im-

proved PA-community interactions; and there is increase in community awareness of the value of MFE's natural resources and the capacity of the community to sustainably conserve and manage natural resources in the MFE; and gender is considered during implementation of programme activities. These principles are intended to guide implementation of the five management objectives that have been identified by stakeholders to achieve the Programme Purpose. These are: PA-community communication and collaboration mechanisms improved; conservation education and awareness programme strengthened; conservation-compatible community land uses and practises promoted; Human-wildlife conflict reduced; and opportunities for communities to benefit from the MFE improved.

Protected Area Operations and Security Management Programme

The aim of this programme is to ensure that *"MFE's operational systems and structures are effectively and efficiently supporting the achievement of the MFE purpose and the delivery of the MFE's management programmes"*. In implementing the MFE's Protected Area Operations and Security Management Programme, MFE Management will strive to ensure: management is integrated and unified across the MFE; there is good communications and access; there is sufficient and well-allocated human and financial resources; security presence is increased; and collaboration with key stakeholders is strengthened. These strategic principles are intended to guide the implementation of the Programme's four management objectives: institutional collaborations formalised and strengthened; performance and motivation of MFE staff improved; MFE natural resources and visitors safeguarded; and infrastructure to support PA management and tourism development improved.

Plan Monitoring

The plan is completed by a plan monitoring section that provides a framework for monitoring both potential impacts that may arise from the implementation of management actions contained in this plan. The plan monitoring framework includes measurable indicators for monitoring positive and negative impacts, and potential sources of this information.

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Acronyms

ADC	African District Council
AD-NCA	Assistant Director-Northern Conservation Area
AFD	Agence française de Développement
AGREF	Agricultural Research Foundation
AP	Administration Police
ASDSP	Agricultural Sector Development Support Programme
BoT	Board of Trustees
CAP	Conservation Action Planning
CBO	Community Based Organisation
CDE	Centre For Development And Environment
CFA	Community Forest Association
CGM	County Government of Marsabit
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CO	Commanding officer
CP & C E	Community Partnership and Education
CPT	Core Planning Team
CWS	Community Wildlife Service
DG	Director General
EC	Ecosystem Conservator
EIA	Environmental Impact Assessment
EMC	Environmental Management Committee
EOI	Expression of Interest
ERV	Exceptional Resource Value
FO	Forester
GIS	Geographic Information System
GIZ	Gesellschaft Für Internationale Zusammenarbeit
GPS	Global Positioning Systems
HC	Human Capital
HEC	Human Elephant Conflicts
HQ	Headquarters
HUZ	High Use Zone
HWC	Human-Wildlife Conflict
ILRI	International Livestock Research Institute
IPAL	Integrated Project On Arid Lands
IUCN	International Union for the Conservation of Nature
KARI	Kenya Agricultural Research Institute
KEA	Key Ecological Attribute
KEFRI	Kenya Forest Research Institute
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
LUZ	Low Use Zone
M&E	Monitoring and Evaluation
MAC	Management Advisory Committee
MESHA	Media For Environment, Science, Health And Agriculture
MFE	Marsabit Forest Ecosystem
MFEMP	Marsabit Forest Ecosystem Management Plan
MFR	Marsabit Forest Reserve
MIKE	Monitoring of Illegal Killing of Elephants
MIST	Management Information System
MNR	Marsabit National Reserve
MoA	Memorandum Of Agreement
MoU	Memorandum of Understanding
NCA	Northern Conservation Area
NEMA	National Environmental Management Authority

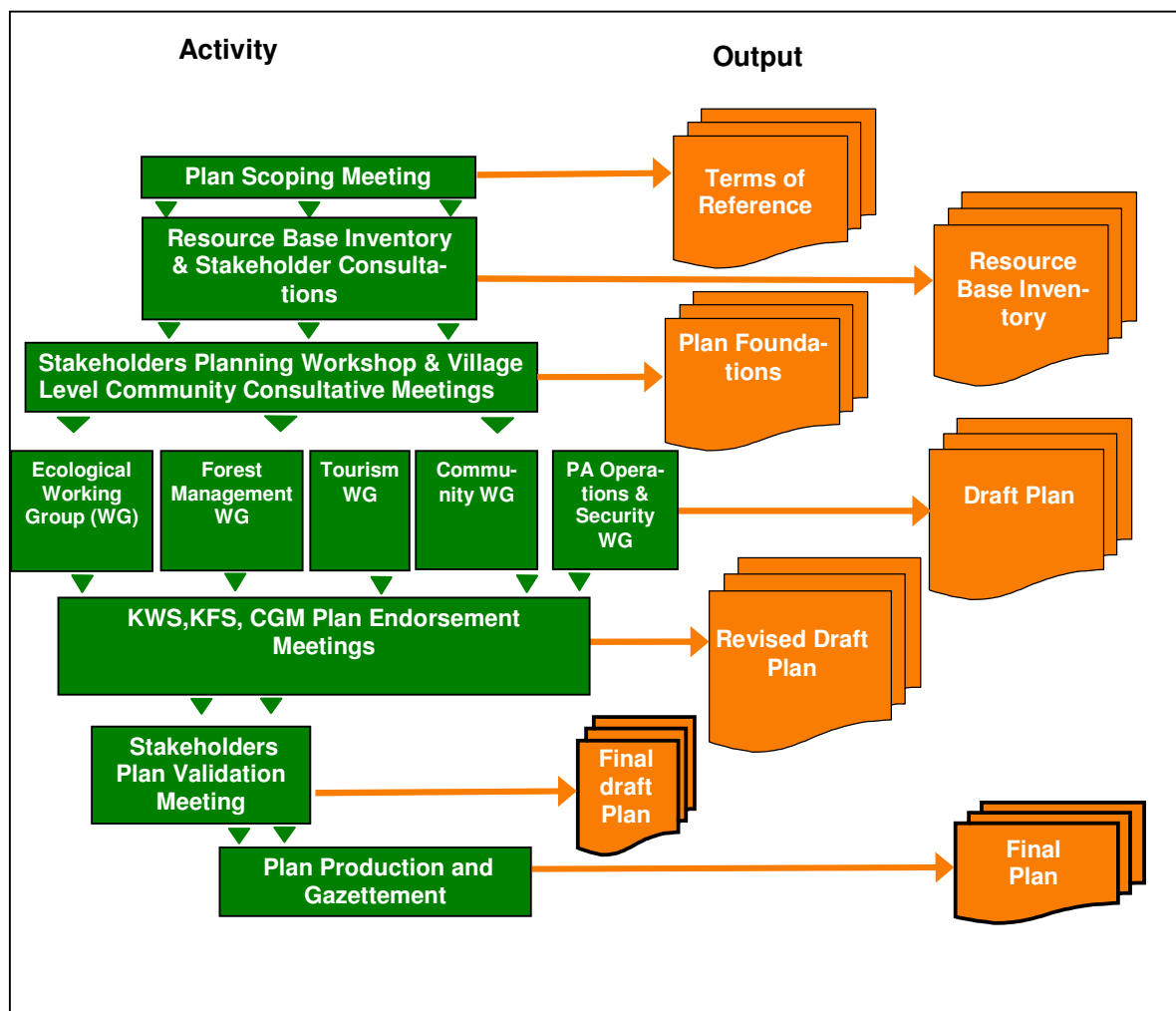
NGO	Non-Government Organisation
NKBC	Northern Kenya Biodiversity project
NMK	National Museums Of Kenya
NP	National Park
NRM	Natural Resource Manager
NRT	Northern Rangeland Trust
PA	Protected Area
PAC	Problem Animal Control
PAPF	Protected Areas Planning Framework
PPP	Public Private Partnerships
RSC	Research Scientist
SAD	Senior Assistant Director
SEAO	Strategic Environment Assessment Officer
SOP	Standard Operating Procedure
SRC	Senior Research Scientist
SW	Senior Warden
TNA	Training Needs Assesment
TNC	The Nature Conservancy
WG	Working Group
WPU	Wildlife Protection Unit
WRMA	Water Resource Management Authority
WRUA	Water Resource Management Association
WZ	Wilderness Zone

Plan Foundations

The Plan

This 10-year (2015-2025) management plan for the Marsabit Forest Ecosystem (MFE) has been developed in accordance with the *Protected Areas Planning Framework* (PAPF). In line with the PAPF, this plan has been developed in a highly participatory manner, incorporating and building on ideas from a broad cross-section of MFE stakeholders. The planning process followed in the development of the plan is summarised in figure 1.

Figure 1. The MFE planning process



Plan functions

PAPF-based plans are primarily designed to be practical management tools supporting PA managers in carrying out their duties. PAPF plans achieve this aim by providing strategic guidance on the goals towards which management is working, and a series of prescriptions and management actions that need to be implemented in order to achieve these aims. In line with this, the following points set out the key functions of the MFE Management Plan.

The MFE Management Plan (2015-2025) is designed to:

- ▶ **Vision:** Set out a common understanding between stakeholders of the purpose of the MFE protected areas and their most important values, towards which all management action will be focused
- ▶ **What:** Establish clear management objectives that are agreed by the MFEs stakeholders and managers and that, if achieved, will ensure the purposes for which the MFE protected areas were established will be fulfilled and exceptional values conserved
- ▶ **How:** Provide clear and unambiguous guidance and a rationale for the specific management actions that Protected Area (PA) Managers will need to implement over the 10-year timeframe of the plan to achieve the management objectives
- ▶ **Where:** Define a mechanism for MFE zoning to enable different types and intensities of use in different parts of the MFE, thereby facilitating reconciliation of the MFE's sometimes competing conservation and development objectives
- ▶ **When:** Provide a detailed activity plan for the first three years of implementing the management plan, thereby establishing a crucial link between the plan's long-term management objectives and the annual operational planning and budgeting routinely carried out by PA Managers
- ▶ **Who:** Provide a practical framework enabling the collaboration of PA managers and other institutions and stakeholders in implementing the plan
- ▶ **Rules:** Set out clear and unambiguous prescriptions and regulations on what can and cannot occur in different parts of the MFE in order to achieve the area's management objectives and fulfil the PA purpose.

The Plan is NOT designed to:

- ▶ Provide a comprehensive reference source for the MFE, with detailed background information on the area's biodiversity, ecology, geology, soils, etc
- ▶ Set out a detailed inventory of issues or problems impacting the MFE, that are not directly addressed through the plan's management objectives and actions
- ▶ Provide detailed descriptions of the PAs management, administration, and national policies, unless they are relevant to the plan's management objectives and actions.

Plan structure

In order to fulfil the Plan's functions, and in accordance with the PAPF, the MFE plan structure has been developed to be as simple as possible, and as such, easily understood by stakeholders and implemented by MFE management. Table 1 provides an outline of the plan structure.

Table 1: Plan Structure

Chapter	Function and contents
Plan Foundation	<ul style="list-style-type: none"> ► Provides an introduction to the MFE and its management ► Introduces the plan, and describes the plan's structure and the framework used in the process leading to the plan's development ► Sets out the MFE Vision and Purpose Statements, Exceptional Resource Values, conservation issues of concern and land use/tenure options in the MFE
Zonation Scheme	<ul style="list-style-type: none"> ► This is meant to enable different types and intensities of use in different parts of the MFE, and to help reconcile the sometimes competing and conflicting conservation and resource use needs ► Sets out areas of the MFE where different types of visitor use and tourism developments are permitted ► Ensures that the management extends its mandate by increasing management presence and infrastructure development across the entire ecosystem.
Management Programmes	<p>This section forms the bulk of the management plan and provides a framework to guide management activities in achieving a future desired state for specific aspects of the MFE management. As a result, five programmes have been proposed. These are:</p> <ul style="list-style-type: none"> ► Ecological Management Programme; ► Forest Resource Management Programme ► Tourism Development and Management Programme; ► Community Partnership and Conservation Education Programme; and ► PA Operations and Security Management Programme <p>Each management programme was developed in line with the Logical Framework Approach and has a programme purpose statement and guiding principles that define the desired future state for the MFE. In addition, each programme contains management objectives that set out the specific goals that MFE management aims to achieve and a set of specific management actions that management will implement to achieve these goals.</p>
Plan Monitoring	<ul style="list-style-type: none"> ► Provides a framework for the assessment of positive and potentially negative impacts of plan implementation ► Includes easily quantifiable indicators for assessing impacts, and potential sources of the information required
3-Year Activity Plans	<ul style="list-style-type: none"> ► These provide the link between the 10-year management actions and the annual work planning and budgeting of MFE management. ► Break down the programme's management actions into a series of tangible and explicit activities ► Allocate responsibility for implementation, set out the timeframe for activity implementation, and "milestones" for monitoring plan delivery.

Participation in planning

As discussed above, the PAPF planning process has been designed to ensure a high degree of stakeholder participation in the development of a PA management plan. This is achieved through a multi-layered approach involving a variety of mechanisms designed to ensure that all stakeholders can meaningfully contribute to the plan's development. The three principal mechanisms used to enable this participation are: the Core Planning Team, Stakeholder Workshops, and Expert Working Groups.

Annex 1 provides a detailed list of stakeholders who participated in the MFE plan's development, and the specific events that they contributed to.

The Marsabit Forest Ecosystem

Area description

Marsabit Forest Ecosystem covers two protected areas, Marsabit National Reserve and Marsabit Forest Reserve, and adjacent community land within 10 Kilometers from the National Reserve boundary. The ecosystem is defined by the wet season migration extent of Marsabit forest elephants as well as the residence of the local community that depend on the two protected areas for various forest goods and services including livestock pasture, water supply, fire wood, among other uses. Figure 2 shows the regional setting of the ecosystem while Figure 3 shows MFE's key components.

Figure 2. MFE's Regional Setting

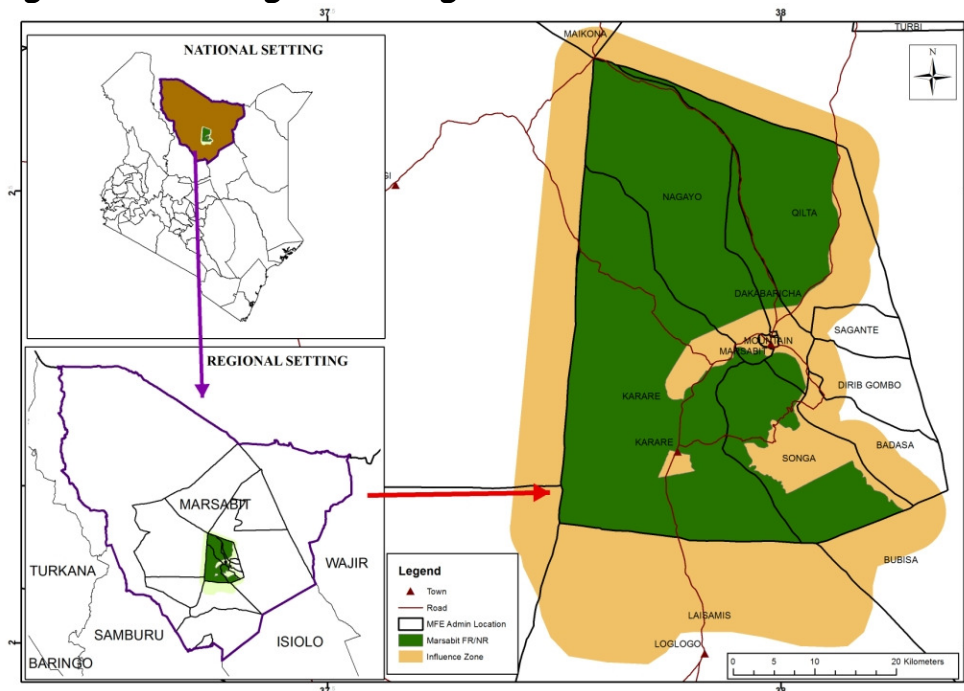
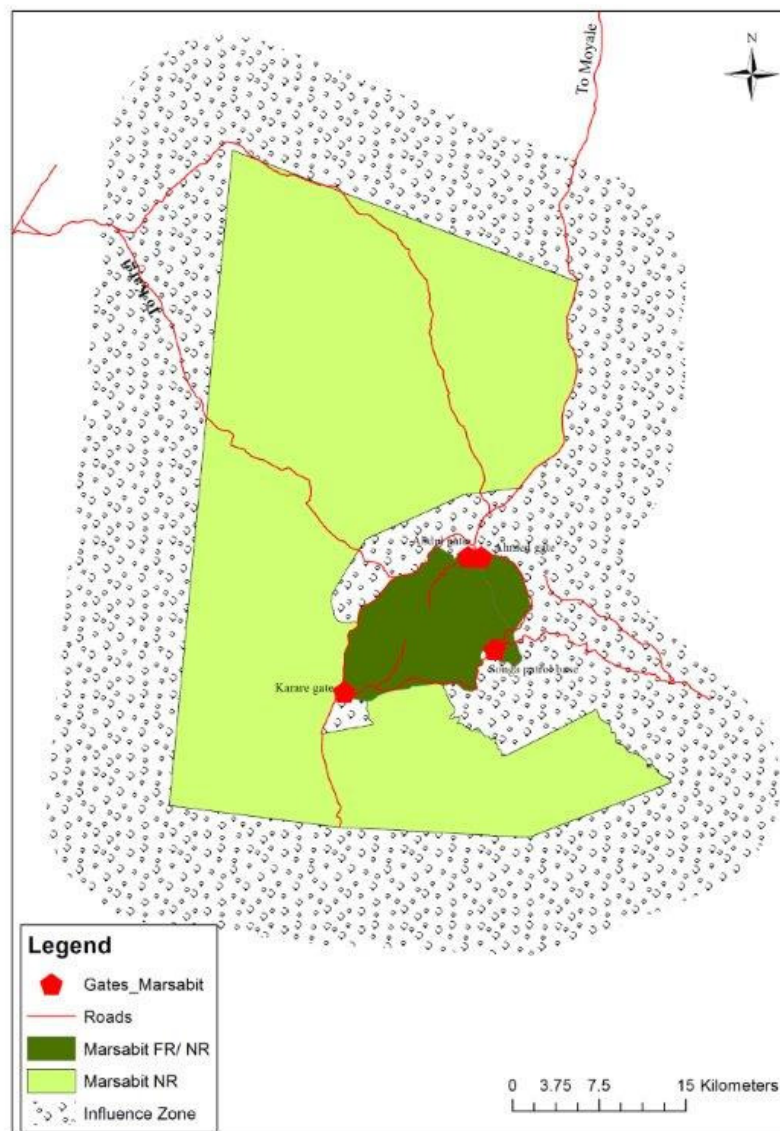


Figure 3. The MFE components



The following sections provide a brief overview of the MFE's two constituent PAs.

Marsabit Forest Reserve (MFR)

The MFR is a mountainous forest and covers an area of about 157 Km² within the National Reserve. The forest boundary is roughly 58 Km long. The Forest Reserve was first declared a forest reserve through proclamation No. 20 of 6 April, 1927 and later included in a schedule of government forest reserves gazetted through Proclamation No. 44 of 1932 (see Annex 2). The MFR is also a National Reserve having been gazetted on 24 September 1948. As such the MFR is jointly managed by Kenya Forest Service and Kenya Wildlife Service.

The forest offers several benefits, some of which are of a public good nature, such as biodiversity conservation, watershed protection and providing a habitat for wildlife, while others represent direct livelihood values such as inputs in (livestock) production and indirect support of farming activities on the mountain.

Marsabit National Reserve (MNR)

MNR was first declared a National Reserve through Government Notice No. 936 of 24 September 1948. MNR is community land that is held in trust for the community by the Marsabit County Government and managed on its behalf by the KWS. The national reserve covers 1,552 km² and, due to its location in the drier south and western parts of the Mt. Marsabit, it provides an important wet season dispersal area for elephants. The northern section of the reserve is very arid and the area is mainly covered by rocks making the area unsuitable for wildlife. The National Reserve has, however, been a traditional livestock grazing area for the pastoralist communities in Marsabit.

Institutional management collaboration

The implementation of a single management plan for the two PAs (Forest Reserve and National Reserve) making up the MFE will necessitate a high degree of collaboration between the three institutions with jurisdiction over the constituent PAs (i.e. KFS, KWS and Marsabit County Government). Such collaboration requires the clear allocation of roles and responsibilities for management plan implementation between these institutions, and necessitates agreement on a variety of issues such as sharing costs and benefits accruing from conservation and management of ecosystem resources. As such, Memoranda of Agreements (MoAs) concerning the implementation of this management plan will have to be agreed between KWS, KFS and Marsabit County Government. Specific issues to be addressed in these MoAs relating to the implementation of this management plan include:

- ▶ A definition of the roles and responsibilities of the KWS;
- ▶ A definition of the roles and responsibilities of the KFS;
- ▶ A definition of the roles and responsibilities of Marsabit County Government;
- ▶ Agreements on management of the MFE's protected area; and
- ▶ Agreements on sharing of management costs and benefits.

Vision Statement for MFE

This vision statement describes a desired future of what MFE should be like in 10 years after the implementation of prescriptions in this plan. It is an inspirational view of a future for the conservation area that helps to focus and guide the planning, management and operation while fostering closer cooperation and integration between people who care for, and use the conservation area.

In Ten Years...

MFE features a diversity of ecological systems and processes, with rich and varied biodiversity interactions. This has resulted in increasing healthy populations of threatened animal and plant species. The animal dispersal areas have been secured and their habitats maintained, resulting in free and safe movement of animals within their protected and dispersal areas. The protection of springs and other water sources has resulted in increased supply of water as well as a raised water table. The intact and fully functional forest ecosystem is providing a wide range of forest goods and services that adequately meet ecological as well as socio-economic needs of the community. Moreover, the local communities support conservation efforts through active participation in conservation programmes and they show case their rich and diverse cultures to diversify tourist attractions. Visitors are guaranteed a transformational

experience as they interact with the protected area in a peaceful, serene and secure environment. A variety of culture and nature based tourism activities are enjoyed in the unique tropical forest setting. Located to the north of Kenya, the ecosystem is at the core of the future of wildlife tourism in the region. Finally, the ecosystem has adequate, efficient, effective and modernized operational capacity, which include skilled and motivated human capital, efficient transport and communication network, reliable infrastructure (roads, fences, staff housing and offices) and security equipment.

MFE's Protected Area Purpose Statement

The MFE protected area's Purpose Statement summarises the importance of the MFE protected area, clarifies the reasons for its existence, and provides the overall goal that MFE managers are striving to achieve. The Purpose Statement is divided into a primary Purpose followed by a series of supplementary purposes that expand on and complement the primary purpose. Both primary and supplementary purposes have been defined by MFE stakeholders.

The Purpose of the MFE's protected area is:

To sustainably conserve and manage a critical afro-montane water catchment forest, and its associated rare and threatened species and scenic crater lakes, for the benefit of present and future generations.

Supplementary purposes of the MFE protected area are:

- ▶ ***To sustainably utilize natural resources within and around Mt. Marsabit Forest Ecosystem***
- ▶ ***To promote community participation in natural resource conservation and management***
- ▶ ***To develop sustainable nature-based tourism***
- ▶ ***To promote scientific research***

The development of the above Purpose Statement was based on the stakeholder identification of the MFE's "Exceptional Resource Values" (ERVs). These ERVs are shown in Table 1.

MFE Exceptional Resource Values

The Marsabit Forest Ecosystem Exceptional Resource Values (ERVs) describe the area's key natural resources and other features that provide outstanding benefits to local, national and international stakeholders and that are especially important for maintaining the ecosystem's unique ecological, scenic, and socio-cultural characteristics (Table 1).

Table 1. MFE Exceptional Resource Values

Category	Exceptional Resource Value
Biodiversity	Large tusked elephants
	Moss covered trees
	Endangered plant species
	Threatened and rare wildlife e.g. Grevy's zebra & Greater Kudu
	Large carnivores e.g. lions, leopards
	Carbon storage
	Endemic plant taxa e.g. wild coffee
Scenic	Scenic crater lakes e.g. Lake Paradise & elephant pools
	High altitude mist covered mountain
	Unique forest habitat surrounded by an arid environment
	Deep valleys
Social	Source of fire wood
	Source of water
	Dry season grazing pasture
	Medicinal plants
	Climate regulation
Cultural	Mixed culture of forest adjacent communities
	Cultural shrine i.e. fifty feet deep well shrine
	Archaeological site

Major Conservation Issues of Concern

The major conservation issues of concern in the MFE can be placed under three major categories. First are issues that are degrading biodiversity and threatening sustainable provision of ecosystem goods and services. Second are issues related to interactions between the protected areas and the local community. Third are issues relating to PA operations including adequacy of management resources and institutional collaborations for effective management of the PAs. These issues are discussed in the following sections:

Biodiversity Conservation issues

Illegal harvesting of forest products

Marsabit Forest Reserve is the main source of wood-fuel as well as construction and furniture making materials for the local community. Whereas there is KFS fire wood permitting system in place, a large number of fire wood collectors do not seek these permits. It is this group of illegal fire wood collectors and others that harvest poles for sale that have contributed to degradation of the forest cover particularly along the forest edge. Illegal harvesting of forest resources for poles and timber is a threat to forest integrity due to the selective harvesting high market value and energy output trees such as the *Olea* (brown olive) and *Teclea nobilis* which are used for, among other things, charcoal burning.



Plate 1: Illegal fire wood collection

Human encroachment on wildlife habitats

The massive settlements around Mt. Marsabit as a result of increased population have led to increased land fragmentation and subsequent environmental degradation. The demand for forest resources has increased while most settled farmers are participating in destructive forms of land use such as charcoal production and quarrying in the rangelands to meet their livelihood needs.

Alteration of protected area boundaries (e.g. at Gabbra and Karare schemes and Harry Thuku forest excision area) to accommodate increasing population has significantly reduced forest size. In addition, the area of the Marsabit National Reserve has been reduced over the years to accommodate human settlement. Despite these national reserve excisions, illegal settlements, some of which are permanent such as Segel, Karare, and Parkishon, have been established in recent years prompting a new political drive for further National Reserve Excisions (Figure 4). These excisions should, however, be carried out in accordance with the Wildlife Act, 2013 to ensure that wildlife corridors and dispersal areas are not interfered with.

Figure 4. Examples of human encroachment on the MNR

Plate 2: Segel settlement in MNR



Plate 3: Quarrying in MNR

Livestock grazing in the protected areas

Livestock incursion into Marsabit forest is one of the major causes of biodiversity loss in Marsabit forest. This mostly occurs during the dry season when the communities living adjacent to the forest have exhausted their communal grazing areas. When livestock enter into

the forest, the wildlife in the forest is usually in danger as the situation provides an excellent opportunity for poachers. Further, the large numbers of livestock and associated overgrazing have contributed to the degradation of the ecosystem. Cattle trample on regenerating tree species and destroy them together with their niche. Some pastoralists also prune some high branches to feed their livestock.

For effective conservation of Marsabit forest the threat posed by livestock grazing in the forest must be addressed. This is possible through proper identification and improvement of grazing pastures in the community land, provision of water for livestock and communities' domestic use outside the forest boundaries, as well as developing sound grazing guidelines.

On the other hand, since the section of Marsabit National Reserve on community land has not been managed for wildlife conservation and tourism since its gazettement, the local community has had uncontrolled livestock grazing in the national reserve resulting in evident overgrazing and displacement of wildlife. There is therefore urgent need to identify, secure and restore critical wildlife habitats in the national reserve given that there are areas, especially to the south of the National Reserve that are wet season foraging area for many wildlife including elephants.

To minimize pressure on the forest and improve security, the Marsabit County Security Committee has closed the forest and currently no grazing or consumptive use of forest resources is being permitted. This intervention measure has greatly reduced ethnic clashes in the forest reserve and forest ecosystem services are being restored.



Plate 4: Cattle in MNP/FR



Plate 5: Goats in MNR

Wildlife poaching

Poaching is a major threat to wildlife species of MFE. Elephant population declined from 900 individuals in 1973 to 219 individuals in 1992 due to poaching. From the year 2011 to the end of 2013, a total of 30 elephants were lost through poaching for ivory and cultural linked items (tails and ears). Traditionally, most of the ethnic groups' have hunted game such as giraffe, oryx and antelope to complement their livestock meat supplies at times of serious food insecurity, as well as for trophies. For example, Boran and Gabra use giraffe-tail wig as ornaments and make water-drawing or milking buckets from their hides. Other species poached include Grevy's zebra for meat, and ostrich for feathers and oil. Analysis of long-term wildlife census data (1978-2009) from the Department of Resource Surveys and Remote Sensing

shows that the trend of most wildlife in Marsabit County has declined by over 50%. This is attributed to poaching (elephant, giraffe, Grevy's zebra) among others factors.



Plate 6: Elephant poached for ivory in MNP/FR

Water over-abstraction

Water for Marsabit town and adjacent areas comes from the Marsabit forest. Studies have, however, predicted a water deficit of 44,000m³/year for human and livestock use. The deficit is blamed on livestock grazing in the forest, tree cutting and fire wood collection. Sinking of boreholes outside the forest is also believed to contribute to the drying up of mountain lakes; due to lowering of the water tables in aquifers. In view of this, it is vital that alternative water sources are developed outside the forest for the local community to meet the deficit and forestall forest degradation.

Invasive species

Invasive alien species are a major threat to the Marsabit Ecosystem particularly in the aquatic ecological systems and disturbed areas. Invasive alien species can transform the structure and species composition of ecosystems by depressing or excluding native species, either directly (outcompeting them) or indirectly (changing the way nutrients are cycled through the system).

Disturbed areas in the Marsabit ecosystem are vulnerable to invasion by non-indigenous species, notably *Lantana camara* and *Solanum* spp. The most common invasive species in the forest include *Cecropia peltata*, *Lantana camara*, *Senna spectabilis*, *Ocimum suave* and the aquatic Nile cabbage (*Pistia* spp).



Plate 7: Invasive species-Nile cabbage (*Pistia* spp.) at a forest stream

Wild fire

Forest fires occur on the mountain mostly when wild honey gatherers are harvesting honey in the forest and poachers leave fire unattended. Some pastoralists use fire as a management tool to control livestock pests which then get out of control and cause hazards. Forest fires may also arise accidentally as a result of other human activities such as burning of farm litter.

Given the comparatively small area covered by the forest, there is a considerable risk that a major fire would easily devastate the whole area. Moreover, because of the mountain's isolated location, once the fragile forest ecosystem has been disturbed, it can take a long time to recover. In recognition of the fire hazard, the forest has regularly been placed under alarm surveillance during dry seasons.

Unplanned or wild fires can alter structural and species diversity including proliferation of invasive species. The available data shows that grass and forest fires have occurred infrequently over the last 20 years.

Infrastructural development

Construction of infrastructure, such as dams and schools has reduced the area under forest cover. Some of the infrastructure projects that have impacted on the forest include Badasa dam, which is being constructed to supply water to Marsabit town; St Joseph primary school constructed to serve increasing numbers of school going children from the expanding Marsabit town; and the Bank Quarters intended to house bank employees.



Plate 8: Badassa dam under construction

Blockage of wildlife migratory corridors and dispersal areas

Increasing human settlement in wildlife migratory corridors and dispersal areas results in habitat loss and fragmentation reducing available food for wildlife. If this happens in MFE, wildlife, and particularly elephants, will be confined to the forest resulting in habitat destruction and degradation of the water catchment area. With settlement in wildlife migratory corridors and dispersal areas human-wildlife conflicts are bound to escalate.

The wildlife corridors linking Marsabit with the Mathews Range and the Buffalo springs-Shaba-Samburu conservation complex will cease to function if the water points that act as stepping stones between the wildlife corridors are no longer accessible to wildlife. It is imperative, therefore, that the integrity of the corridors and critical dispersal areas are maintained.

Wildlife diseases

Wildlife diseases, such as endemic anthrax and other diseases that can be transmitted from domestic stock to wildlife, pose a major threat to species whose populations are very low e.g. Grevy's zebra. Such diseases can cause local extinction of a species and therefore require cross sectoral collaboration in wildlife disease surveillance and prevention.

Drought and climate change

Frequent droughts have been a major direct or indirect cause of forest degradation. During droughts seedling survival rate is lowered, and livestock is grazed in the forest suppressing regeneration. Large numbers of livestock that are brought in the forest during drought contribute to degradation of water resources. Droughts are now becoming more frequent as a result of climate change and it is expected that pressure on forest resources will increase substantially if climate change mitigation and adaptation measures are not implemented.

Community –Protected Area interaction issues

Human-wildlife Conflict

There are three forms of human-wildlife conflicts that are of concern to the local communities that live in the MFE wildlife-human interface. These are the conflicts that arise from: i) the relatively rare but sad events when humans are killed by wildlife; ii) the damage that wildlife inflicts upon crops; and iii) depredation of domestic livestock by wild predators.

Elephants are the target of much conflict through crop raiding losses leading to an estimated loss of Ksh. 15 million to the community annually. Of 241 incidents reported to KWS – Marsabit in 2007-2009, 80.9% involved elephants (compared to baboons 16.7%, buffaloes 0.8%, monkeys 0.8%, and hyenas 0.4%). Crop raiding by elephants lead to retaliatory killing of elephants which impacts negatively on the small elephant population in the MFE. Fourteen per cent (14%) of elephants killed in the Marsabit area in 2005-2010 and recorded were as a result of conflict.

The new wildlife law has re-introduced compensation for crop raiding by elephants and other animals listed under the Third Schedule of the Wildlife Act, 2013. However, since compensation claims can outstrip available compensation funds leading to discontent among the affected members of the community, there is a need to put in place measures to minimize human-wildlife conflicts e.g. construction of fences in human-wildlife conflict hotspots.

Access rules for protected areas

Multiple land uses are practiced in the Protected Areas (Forest Reserve/NR). Land uses include tourism, firewood collection and water supply from the forest and livestock grazing. Access rules under KFS and KWS vary and conflict in terms of local community access rights and the associated use of resources. The Forests Act, 2005 allows controlled utilisation of forest products while the Wildlife Conservation and Management Act, 2013 disallows consumptive use. It is therefore critical that access rules are discussed and agreed by both KWS and KFS to ensure that the community continues to benefit from the forest resources.

Low incentives to conserve

Local communities derive several benefits and currently make intensive use of the forest. The forest and associated resources support the local economy in different ways, both directly and indirectly. The forest benefits the local economy and the rural households in terms of forest products, domestic water resources and source of water for livestock. These and more forest benefits altogether place a premium on local efforts that enhance forest conservation.

KWS has been sharing revenue accruing from tourism with the local communities around the Marsabit National Reserve through support of community projects such as schools. This has, however, been modest given that MFR/NR generates low revenue that does not cover its operational costs. However, to gain support for conservation efforts in the MFE, there is need to improve the local benefit sharing arrangements with the local community.

PA Operations Issues

Lack of management presence in most parts of the MFE

PA Management is mainly focused on the forest reserve. The rest of the National Reserve has no management presence making it prone to uncontrolled resource use and illegal activities such as poaching, livestock grazing, quarrying and illegal settlement.

Lack of clear demarcation of the Forest and National Reserve Boundaries

The boundaries of the protected areas have not been demarcated such that it is unclear where they lie. While the boundaries of the National Reserve are known, there are few markers on the ground indicating the boundary. Lack of clear boundary markers (e.g. cut lines or rock cairns) along the PA boundaries is leading to increased encroachment by resource users. Uncertain legal status and vague boundaries of protected areas pose a serious risk to forest conservation. To control encroachment on the protected areas, PA boundaries should therefore be surveyed and marked.

Unclear management responsibilities on protection and management of the MFR/NR resources

Marsabit Forest Reserve is under double gazette after being gazette as a Forest Reserve in 1927 to protect this critical water catchment, and as a National Reserve in 1948 to develop the tourism potential in the area. Since each type of legal status has its own access rules, such overlapping and unclear boundaries lead to the violation of access and resource use rules. The KWS and the KFS jointly manage the MFR/NR. The lack of a consensual vision of the desired state of the Marsabit forest, its role in terms of services delivered to local human population and its management have had profound consequences in terms of management of the area.

Inadequate management resources and infrastructure

In order to render forest protection more effective, the KWS and KFS should be better equipped with human, financial and material resources. The current manpower resources and potential requirements of the agencies indicate below-optimal monitoring and enforcement of the regulatory conservation laws. Again, the number of wildlife and forest rangers directly in charge of day-to-day patrolling of the MFR/NR resources is below the optimal staffing level for effective monitoring and efficient conservation of the area. The constraint of limited staff resources poses problems not only for enforcement of the conservation laws relating to resources in the protected areas, but also for the effective monitoring of wildlife outside the protected areas, such as the wildlife in dispersal areas.

In addition, apart from the two public roads (i.e. Hula Hula-Kargi road and Marsabit Town-Segel Airstrip-Kargi road) that traverse the National Reserve, there are no other roads in the national reserve to facilitate PA administration activities in the national reserve. Roads in the Forest Reserve/NR are in poor condition and they get worse particularly during the wet season. This state of roads constrains PA management and is a disincentive for tourism investors. For tourism to grow and security to improve, a good road network to facilitate viewing and security patrols is needed.

Low revenue generation capacity

The MFR/NR generates revenue from tourism and firewood permits. Tourism revenue is derived from entry fees, camping fees, and Marsabit lodge lease. However, the total revenue from the MFR/NR is very low compared to other protected areas that are popular with tourists. Several factors could be jointly responsible for the low amounts of revenue. First, the protected areas in northern Kenya - in contrast with easily accessible protected areas like Maasai Mara National Reserve and Amboseli National Park - are served by poorly developed recreational facilities and low density public road infrastructure. Secondly, the fact that road travellers are often exposed to risks of physical insecurity discourages recreational access to the protected areas in the region. The low revenue return has therefore led to the MFR/NR being given marginal consideration during funding allocation.

Actions taken by government to address natural resource management issues in the MFE

To address degradation of Marsabit Forest and address other issues outlined in the previous section, the Government of Kenya intervened in 1927¹ by declaring the Marsabit forest a Forest Reserve and placing the management of the area under the Forest Department (predecessor of KFS). According to official archival communications that recommended gazettement of the forest reserve, in 1927, *"Marsabit Mountain was fairly densely populated and the destruction of the forest was proceeding apace by the burning of trees, cutting of saplings and overgrazing by cattle. It was emphasized that if this was not stopped complete deforestation was inevitable and under the climate conditions of the area denudation and desiccation would be very rapid and the mountain would eventually be reduced to bare lava the condition of so many of the other mountains in the neighbourhood."*

On the other hand, MNR was gazetted in 1948 as *"it was considered home to unique sub-species like the greater kudu, reticulated giraffe, Oryx beisa and Grevy's zebra among other common mammals."* It was expected that these biodiversity values and scenic attractions would help in attracting tourists to the area. However, attempts by Wildlife Authorities to attract tourists to the MNR have all along been unsuccessful. The wildlife numbers have been decimated by poaching and displacement by livestock grazing making the area a marginal tourist destination. This is despite the establishment of tourism support infrastructure (accommodation facilities and tourist circuits) in MFR/NR.

To further curb environmental degradation of the forest reserve, there were attempts to establish a National Park at Mt. Marsabit in the early 1960s but this was not successful as the Royal National Parks lacked the financial capacity to establish a functional National Park. In addition, approval from the competent authority (Forest Department) was also not forthcoming.

In the early 1990's there was a proposal to have a National Park covering 360 Km², a National Reserve covering 1,129 Km² and a Forest Reserve covering 72 Km². However, this attempt was also not successful.

Unfortunately, the same environmental problems that prevailed during the gazettement of the Marsabit Forest Reserve in 1927 are still prevalent today. The human population around the forest has increased over the years necessitating excision of large swathes of land from

¹ See Annex 1

Marsabit National Reserve to settle local communities. There is also agitation for further excision of additional areas from the national Reserve for purposes of settling local communities. If this trend continues unchecked, critical elephant migratory corridors and dispersal areas will be lost. This, therefore, calls for a rethink of the land use and management policies applied in the Marsabit Forest Ecosystem with a view of adopting policies that will improve the ecological integrity, and are acceptable to management authorities and the local communities.

Proposed Land Use/Tenure Management Options for Enhanced Protection and Management of the MFE

In order to address the environmental problems facing the MFE, four options have been considered. A short description, the advantages and disadvantages, and legal and management requirements of each option have been outlined. The major issues addressed by these options include: averting forest degradation, securing wildlife corridors, minimising human-wildlife conflict, supporting community livelihoods, and improving Protected Area administration. The four policy options are: Option 1- Maintaining the status quo; Option 2: Establishing a Forest Reserve/National Reserve and National Reserve, and maintain the current moratorium on consumptive use of natural resources in the FR/NR during the MFE management plan duration; Option 3: Establishing a Forest Reserve, Nature Reserve, and National Reserve; Option 4: Establishing a Forest Reserve, National Park, and National Reserve.

Option 1: Maintaining the Status Quo: Forest Reserve/National Reserve, and National Reserve

This option assumes that the current management arrangements will continue (Figure 5). The legal status of the protected areas (Forest Reserve and National Reserve) will not change. KFS will continue licensing firewood collection, KWS will continue overseeing tourism development and management, and both KWS and KFS will provide natural resource protection separately. It also assumes that the current closure of the forest is short term and the forest will soon be open for consumptive use.

Advantages

- This option is the easiest to implement as it does not involve any change in the legal status of the protected areas or major changes to the management approach and structure.
- The community will continue with regulated firewood collection in the forest
- The forest will be accessible to livestock during severe droughts

Disadvantages

- Lack of synergy in forest protection will persist as two sets of security agencies (KFS and KWS) are deployed to protect forest resources.
- Degradation of forest resources will continue due to unclear management responsibilities among management agencies (i.e. KWS, KFS, Marsabit County Government)

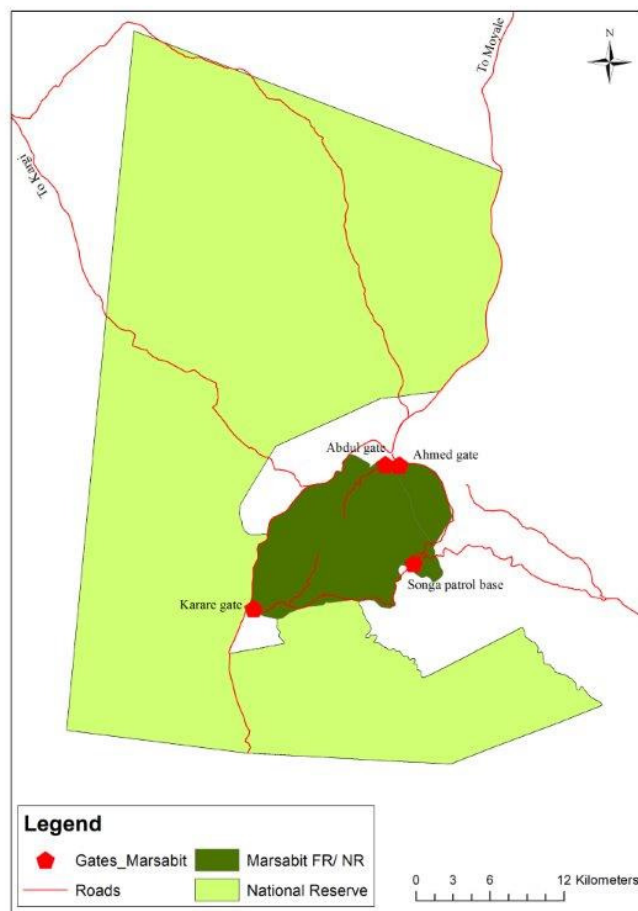
Requirements for implementation

- Memorandum of Agreement (MOA) for implementation of a joint management plan: Section 36 (1) of the Forests Acts, 2005 requires that the KFS Director, with the approval of the Board, enter into an agreement with any person for the joint management of any forests. Further, Section 35 (3) of the Wildlife Act, 2013 requires that the county government, with approval of the Cabinet Secretary after consultation with the National Land Commission, enter into a management agreement with any manage-

ment agent or the Service for the management of a national reserve. Therefore a memorandum of agreement between KWS, KFS and Marsabit County Government will be needed.

- Clear regulations on consumptive use of forest resources will have to be developed and disseminated to local communities.
- Regulations and guidelines to allow livestock grazing during extreme droughts

Figure 5. Marsabit Forest Reserve and National Reserve



Option 2: Establishing a Forest Reserve/National Reserve and National Reserve, and maintain the current moratorium on consumptive use of natural resources in the FR/NR during the MFE management plan duration

This option involves maintaining the status quo in the dual gazetted Forest Reserve/National Reserve and the rest of the National Reserve (Figure 6). However, to enhance security operations and maintain ecological integrity, this option proposes maintenance of the current moratorium on consumptive use of forest resources apart from water resource during the plan duration with periodic review of the impacts of the moratorium.

Advantages

- This option has the support of a section of the local communities as the moratorium has reduced banditry incidents.
- Through closure of the Forest Reserve/National Reserve, degradation of forest resources will decrease thereby enhancing the water catchment function of the forest.
- Closure of the forest will encourage communities to establish woodlots on their farms to meet their firewood requirements.

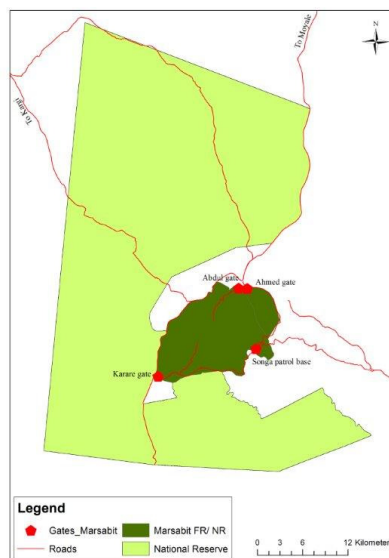
Disadvantages

- Local communities can not access forest products
- Participation of communities in natural resource management will be minimal as government agencies will be responsible for conservation work in the protected areas
- It will be difficult to control habitat degradation in the National Reserve if communities are not actively involved in the management of the protected areas

Requirements for implementation

- KWS, Marsabit County Government, and the local community will have to work closely to operationalize the National Reserve.
- Livestock grazing in the National Reserve will have to be controlled. Livestock will only be allowed in the National Reserve during drought periods.
- Infrastructure to support National Reserve administration and tourism will have to be provided.
- A Memorandum of Agreement (MOA) for implementation of a joint management plan will be entered between KWS, KFS, and Marsabit County Government.
- Maintain the current moratorium on consumptive use of forest resources during the plan duration, but review social and biodiversity impacts every three years. Based on the results of periodic reviews, decide whether consumptive use can be allowed or not.
- Meanwhile, harvesting of dead wood at specified sites of the National Reserve will be allowed under coordination and control of Kenya Forest Service and Environmental Management Committees (EMCs).
- Demarcate the boundaries of different protected areas in the MFE.

Figure 6. Maintain Marsabit Forest Reserve and National Reserve but maintain the current moratorium on consumptive use of forest products



Option 3: Establishing a Forest Reserve, Nature Reserve, and National Reserve

This option involves establishment of a Nature Reserve in a section of the Forest Reserve and retaining a small forest reserve where consumptive use will be allowed (Figure 7). Section 32(3) of the Forests Act, 2005 states that *“No cutting, grazing, removal of forest produce, hunting or fishing, shall be allowed in a nature reserve except with the permission of the Director granted in consultation with other conservation agencies, which permission shall only be given with the object of facilitating research.”* Hence consumptive use of forest resource will be prohibited in the Nature Reserve. However, the Nature Reserve will be available for tourism development as its status as a National Reserve will not be extinguished. In addition, the National Reserve boundary will not be altered.

Advantages

- Community access to forest resources will continue in the Forest Reserve's section that will not be gazetted as a Nature Reserve
- Since the Nature Reserve is being established from part of a state forest there will be minimal opposition, if any, for the Nature Reserve and it will take a short time to gazette
- Forest degradation in the Nature Reserve will be curbed

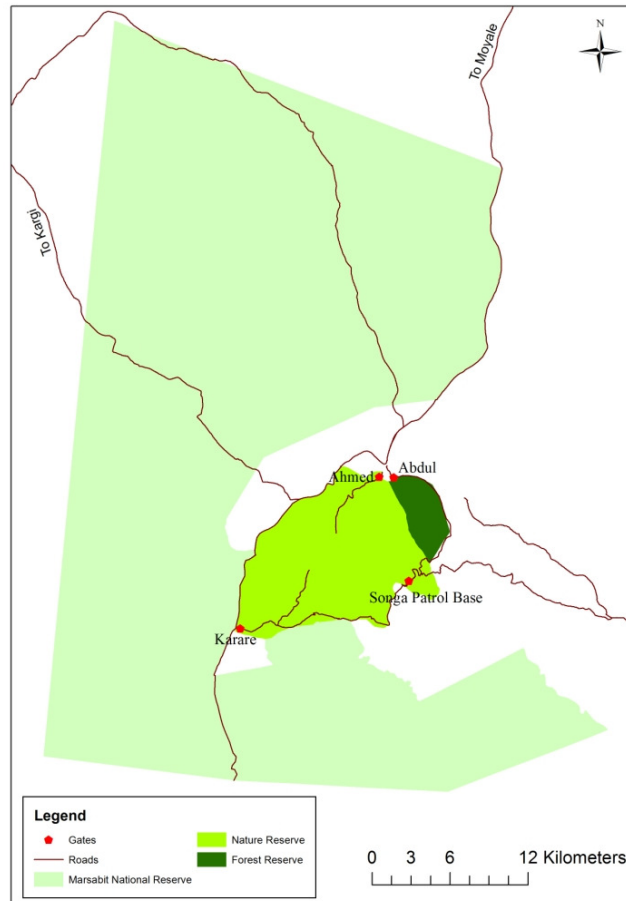
Disadvantages

- Upgrading the legal status of a section of the forest to a nature reserve might not be supported by some of the local community members who graze their livestock in the forest.
- Impacts on livelihoods, and especially on the capacity to cope with droughts, could be great if communities are alienated from the forest through establishment of a nature reserve.

Requirements for implementation

- Gazettement of the Nature Reserve in accordance with Section 32 of the Forests Act, 2005.
- Secure elephant corridors and dispersal areas through Wildlife Conservation Easements in line with Section 65 (4) (c) of the Wildlife conservation and Management Act, 2013. This will be necessary for dispersal areas located outside the PA boundaries e.g. Logo logo area
- Draw a Memorandum of Agreement (MOA) for implementation of a joint management plan between plan owners. This MOA will specify the obligations of each party (KWS, KFS and Marsabit County Government). The MOA will be entered in line with Sections 36 (1) and 41(3) of the Forests Act, 2005 and Section 35(3) of the Wildlife Act, 2013.

Figure 7. Upgrading a section of the Forest Reserve into a Nature Reserve and maintaining the National Reserve



Option 4: Establishing a Forest Reserve, National Park, and National Reserve

This option proposes dividing the protected area into three sectors that fall under different protection categories i.e. Forest Reserve, National Park, and National Reserve (Figure 8). The Forest Reserve will cover about 72 Km² and it will be managed by KFS in accordance with sustainable forest management principles. The National Park, which will be managed by KWS, will cover majority of the dry season elephant foraging area. It will include some parts of the national reserve and majority of the current forest area. The area to be retained as a National Reserve will be managed by KWS on behalf of the Marsabit County Government. The National Reserve encompasses majority of the wet season elephant range making it critical to maintenance of forest ecological integrity. However, the National Reserve has had no KWS management presence for a long time and is devoid of wildlife because of heavy human presence and livestock grazing.

Advantages

- The community will continue to access forest products from the forest reserve
- Forest degradation will reduce

- Enhanced legal protection will result in protection of the water catchment function of the forest
- There will be increased accountability among government agencies in regard to natural resource management as there will not be management overlaps
- National Park status will provide the Kenya Wildlife Service (KWS) with greater authority to protect the forest

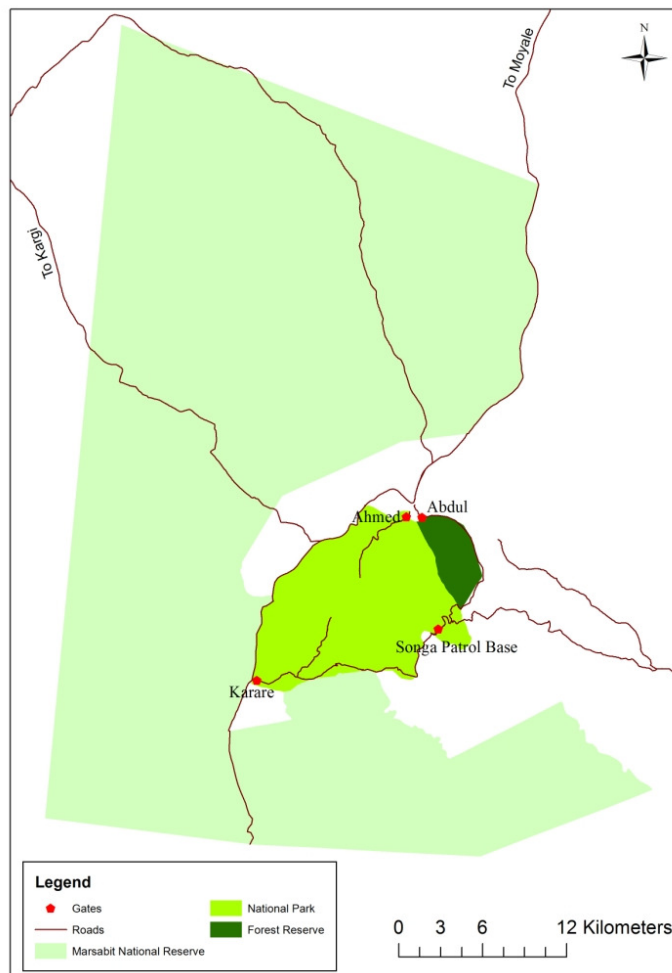
Disadvantages

- The establishment of the National Park might not receive support from the local community who would like to continue grazing their livestock and harvesting forest products from the forest
- Establishment of the National park might face resistance among local communities and the County Government considering that some parts of the national reserve will be converted from Community land to Public land
- Since the establishment of the National Park requires a participatory approach, the National Park establishment process might take long
- KWS might not maintain adequate water supply to the local community to prevent livestock incursion in the park. The national park is therefore likely to end up as a 'paper' national park as the strict national park rules and regulations are ignored by the local communities as is the case in Sibiloi and Amboseli National Parks

Requirements for implementation

- To establish a National Park from the Forest Reserve and National Reserve will require that the forest reserve boundary is excised in accordance with Section 28 (1) of the Forests Act, 2005.
- KFS will be required to carry out an Environmental Impact Assessment (EIA) on the National Park establishment proposal and hold public consultations. In addition, the proposal will have to be approved by the National Assembly.
- Similarly, Section 32 (1) of the Wildlife Act, 2013 also requires that establishment of the National Park out of the national reserve is carried out after consultation with the National Land Commission, and following proper public consultation, and with the approval of the National Assembly.
- Draw a Memorandum of Agreement (MOA) for implementation of a joint management plan between plan owners. This MOA will specify the obligations of each party (KWS, KFS and Marsabit County Government). The MOA will be entered in line with Sections 36 (1) and 41(3) of the Forests Act, 2005 and Section 35(3) of the Wildlife Act, 2013.
- Secure elephant corridors and dispersal areas through Wildlife Conservation Easements in line with Section 65 (4) (c) of the Wildlife conservation and Management Act, 2013. This will be necessary for dispersal areas located outside the PA boundaries e.g. Logo logo area

Figure 8. Upgrading a section of the Forest Reserve into a National Park and maintaining the National Reserve



Recommendation

The effectiveness of each of the four policy options in addressing critical conservation issues in the MFE was assessed to determine the best management approach. The issues included safeguarding the water catchment function, conserving wildlife corridors and dispersal areas, conserving threatened species, improving tourism development, enhancing community livelihoods, minimizing human-wildlife conflicts, enhancing synergy in natural resource management, and ease in implementation of the option.

During the stakeholder planning meetings, stakeholders acknowledged the conservation gains resulting from the moratorium imposed on consumptive use of forest resources. It was noted that banditry incidents in the forest have reduced and water yield from the forest springs has improved. The forest is also said to be regenerating. Hence, it is evident that enhancing the protection status of the forest will significantly contribute to achievement of the primary purpose of the forest reserve which is to protect and conserve this critical water tower.

In view of this, this plan proposes drastic management measures be implemented to safeguard the Marsabit water tower followed by equally drastic policy interventions. In this regard, the plan owners and stakeholders have agreed to implement option 2 during the 10-year plan duration. However, regular management reviews will be carried out to allow uses that are consistent with relevant laws (Forests Act 2005, Wildlife Act, 2013, EMCA, 1999, Water Act). It is expected that implementation of this option will not only help in enhancing ecological integrity in the MFR/NR, but it will also prompt communities to plant trees on their farms to meet their fuel wood needs. Option 2 is to be pursued in the short and medium term as the feasibility of implementing options 3 or 4 is evaluated for later adoption.

MFE Zonation Scheme

Introduction

Stakeholders deliberated on the MFE Zoning Scheme, and agreed on a MFE zoning scheme that provides a dual framework aimed at supporting both the decentralised management of the ecosystem as well as the regulation and promotion of allowable land uses across the area. To achieve this, the MFE has been divided into three land use zones and three management sectors. Each of the three management sectors will be managed from a Sector Headquarters, which will be delegated management authority over the sector concerned. Each land use zone will focus on providing a different type of tourism experience based on the unique tourism resources in each zone.

The following section provides further details on the location and management structure for each of the three management sectors. Following on from this, details of the land use zones are set out, including an overview of the rationale behind their development and details of the visitor activity and accommodation facilities prescriptions for each zone.

Management Sectors

Since its gazettelement in 1948, the County Government owned part of Marsabit National Reserve has been neglected resulting in human encroachment (e.g. human settlement at Segel) and overgrazing by livestock. Consequently, little wildlife remains in this part of the national reserve. To address these problems, stakeholders proposed to increase management presence in all parts of the ecosystem through decentralising management into three management sectors in line with the wider KWS Sectoral Management Strategy for large Conservation Areas. The Senior Warden (based at Abdul Gate) will remain the overall officer in charge of the MFE, while the sectors will be managed by junior wardens based at each sector headquarters. The location of the three proposed sectors, their headquarters, and principal ranger outposts are shown in Figure 9 while details of the management sector headquarters, sub-headquarters and ranger outposts are set out in Table 2.

In addition, the Marsabit Forest Station protects forest resources through regular patrols conducted by forest rangers. For effective coverage of the forest reserve, the forest is divided into five sectors (Badasa, Hula Hula, Karantina, Songa, and Karare) and each sector is assigned two forest rangers who are responsible for security of forest resources. These forest patrol sectors are shown in figure 10.

Figure 9. KWS Management Sectors

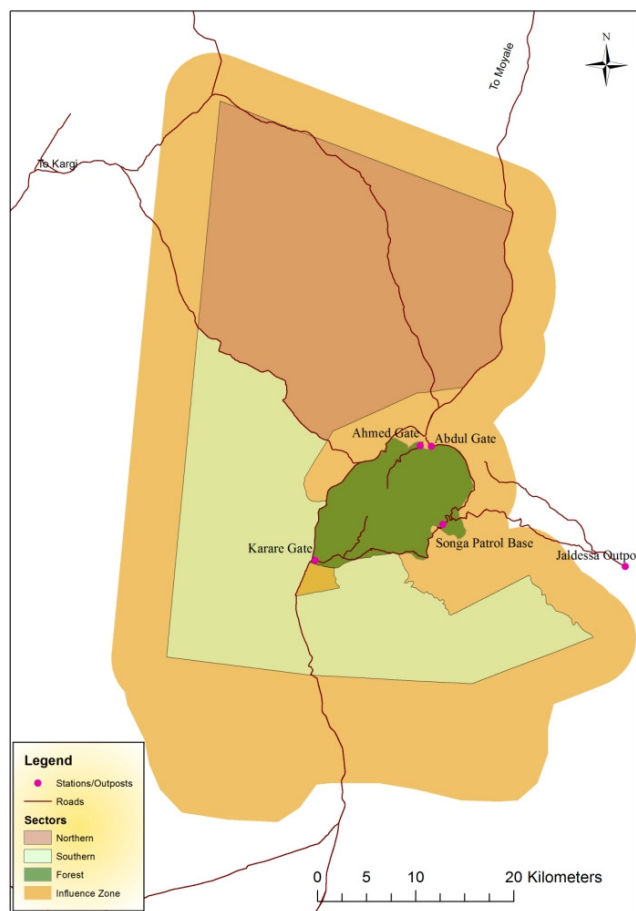


Figure 10. KFS Management Sectors

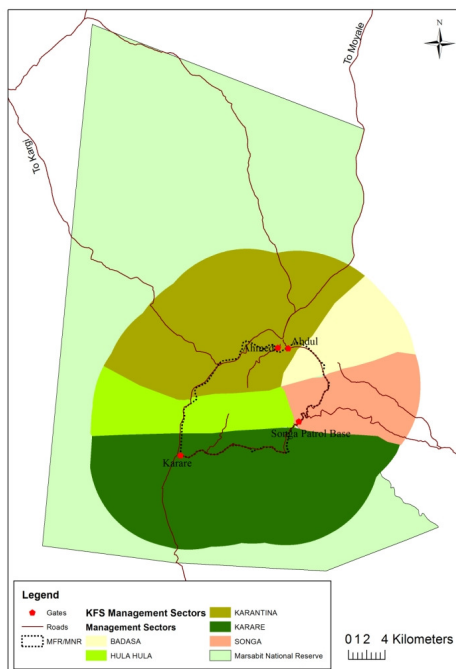


Table 2. KWS Management Sectors and Administration Stations

Management sector	Headquarters	Sub-Headquarters	Ranger Outposts	Management status
MFE HQs	Abdul Gate	--	--	
► Forest	Abdul Gate <i>Functions:</i> Tourism management; infrastructure development and maintenance; firewood control; forest extension; licensing of installations and water easement; forest protection; financial and human capital management; research & monitoring	--	--	This sector is managed jointly by KWS and KFS. KWS is responsible for tourism development and management while KFS is responsible for forest management. Both organisations are involved in natural resource protection.
► Southern	Karare Gate <i>Functions:</i> Tourism development and management; Problem Animal Control (PAC); controlling livestock incursion; fire surveillance & control; forest extension ; community conservation & Education)	Hula Hula (proposed for control of firewood collection, livestock incursion in PA and Problem Animal Control)	--	Currently, there is no KWS management presence in this sector. This part of the Marsabit National Reserve is therefore used by the local community for grazing.
► Northern	Songa Wildlife Protection Unit (WPU) <i>Functions:</i> Problem Animal Control; wildlife and forest security; forest extension; tourism development and management; community conservation and education	1. Songa 2. Jaldessa 3. Shurr	Songa WPU; Songa Conservancy; Jaldessa Conservancy; Shurr Conservancy	This part of the Marsabit National Reserve is arid and hosts few wildlife. As such, the area has been neglected and there is no management presence. Consequently, the area has been encroached by members of the local community who have settled and graze their livestock in this area.

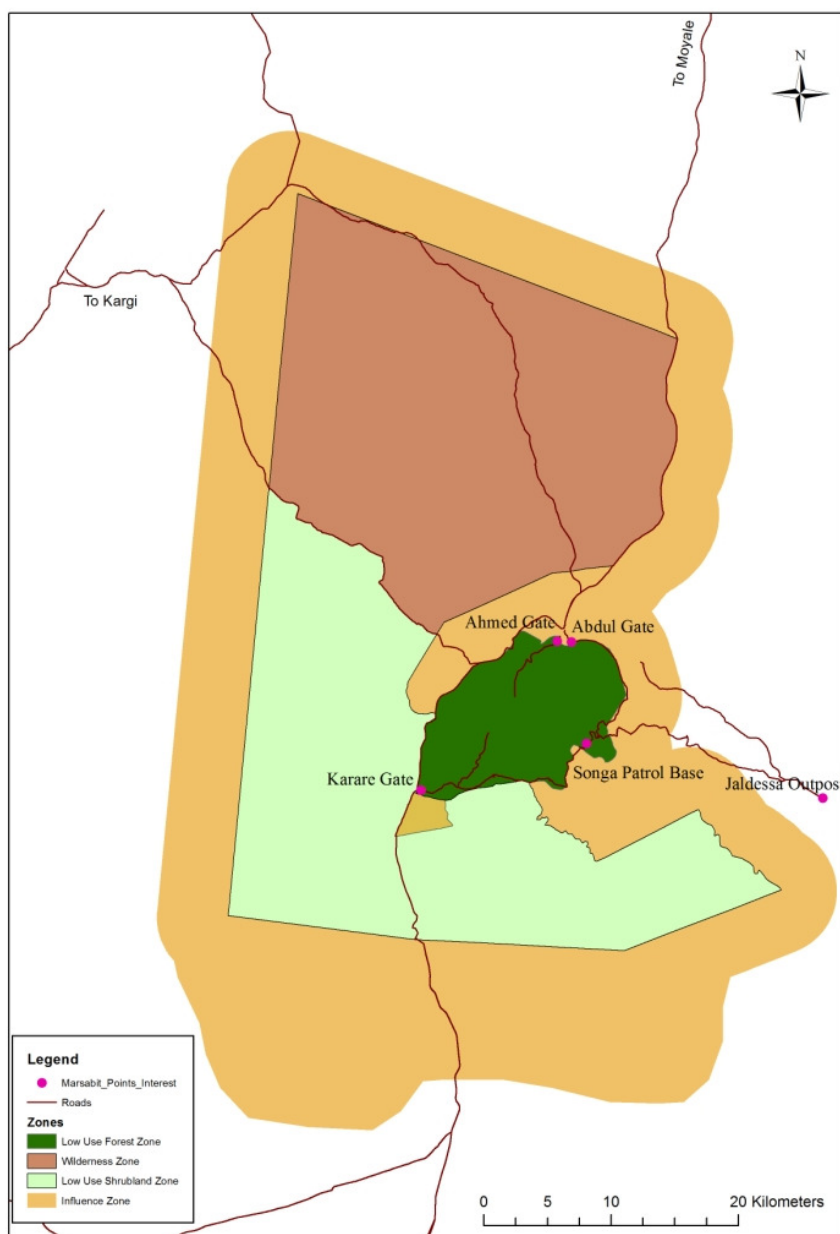
MFE Land Use Zoning

Currently, the land uses that are legally acceptable in the MFR/NR and the rest of the NR are tourism, conservation and controlled harvesting of dead wood only. However a moratorium imposed on consumptive use of forest resources limits current allowable land uses to tourism only. In view of this, the land use zoning scheme focuses on tourism use and how it can be expanded in the entire MFE.

Figure 11 shows the proposed tourism use zones, while details of the proposed prescriptions on tourist activities and infrastructure allowed in each zone are presented in Table 3. An

overview of the rationale behind the creation and the key features of each proposed land use zone are also provided in the paragraphs below.

Figure 11. MFE Land Use Zoning

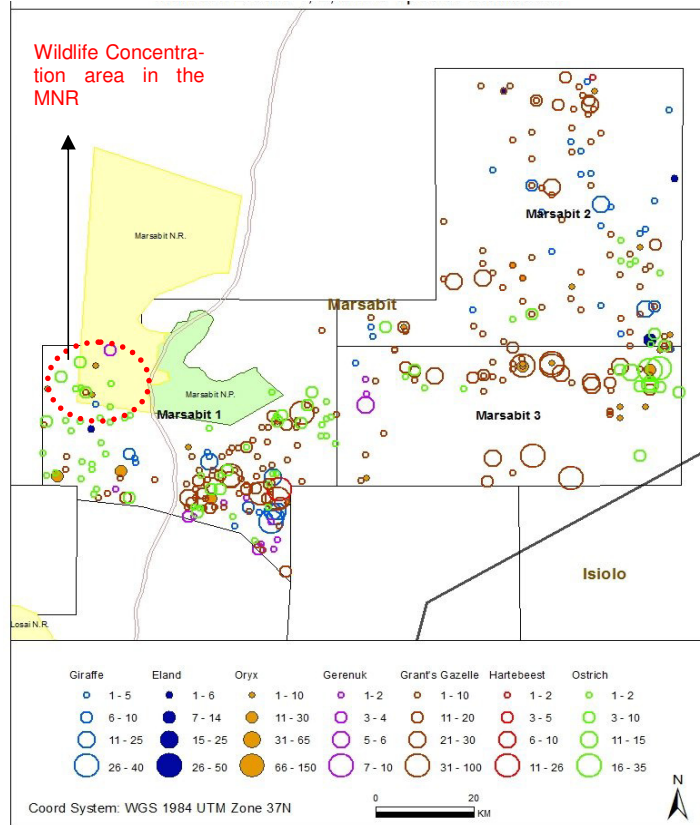


Zone descriptions

Low Use Forest Zone: This zone comprises the forested part of the MFE. The zone boundary follows the MFR/NR boundary. It contains all current tourism facilities (lodge and campsites), has well maintained tourist circuits, and has most of the tourist attractions. The zone contains the highest concentration of large mammals (elephants, buffaloes) in the MFE. This zone will continue to have the highest level of tourism use in the MFE.

Low Use Shrubland Zone: As shown in Figure 9, this zone covers the southern and western parts of Marsabit National Reserve. Its northern boundary follows the Hula Hula-Kargi road while the southern boundary follows the Marsabit National Reserve boundary. The zone boundary also corresponds to the Southern Sector boundary. This zone is characterised by dense shrubland in higher elevations and scrubland in low elevations. The zone has sparse wildlife mainly because of displacement by livestock. However, large wildlife of touristic importance such as ostrich, oryx, gerenuk and lions are found in the south western part of this zone (figure 12).

Figure 12. Species distribution in the Marsabit area in 2012



Wilderness Zone: As shown in figure 11, this zone covers the northern part of Marsabit National Reserve and the zone boundary corresponds to the Northern sector boundary. This zone is characterized by scrubland and volcanic rocks that are the dominant land cover. Potential for wildlife conservation is low because of lack of forage and water. However, there are scenic craters and inselbergs in this area that can attract adventure tourism.

Influence zone: This zone comprises community land within a 10 Km belt from the MNR boundary. The conservation aims of this zone are to increase farm forestry to reduce community reliance on the MFR/NR for forest products. The community living in this zone is the one that receives most of the benefits from the MFR/NR as well as losses caused by wildlife. Hence this zone will be the focus of a strong community outreach programme.

Table 3. Proposed zone activities and management prescriptions

Land use Zone	Activities permitted	Facilities Permitted ²
► Low Use Forest Zone	<ul style="list-style-type: none"> • Game drives • Sundowners/early evening drives (along specified routes, completed by 9 p.m.) • Short walks • Bird watching • Scenery viewing 	<ul style="list-style-type: none"> • Ecolodges • Permanent tented camps • Public campsites • Special campsites • Self-help bandas
► Low Use Shrub-land Zone	<ul style="list-style-type: none"> • Game drives • Sundowners/early evening drives (along specified routes, completed by 9 p.m.) • Short walks • Walking safaris • Camel safaris • Bird watching • Scenery viewing 	<ul style="list-style-type: none"> • Ecolodges • Permanent tented camps • Public campsites • Special campsites • KWS self-help bandas
► Wilderness Zone	<ul style="list-style-type: none"> • Walking safaris • Short walks • Camel safaris • Scenery viewing 	<ul style="list-style-type: none"> • Special campsites
► Influence zone	<ul style="list-style-type: none"> • Community outreach related activities 	<ul style="list-style-type: none"> • No restriction

Table 4. Low Use Zone: Permitted tourism facility types and maximum size

Facility type	Maximum size
► Eco-lodges	30 beds
► Permanent tented camps	30 beds
► Self-help Bandas	10 beds
► Public campsites	N/A
► Special campsites	N/A

² Facility bed limits and distance between facilities are defined in the KWS Tourism Facilities Development Procedures Manual

Ecological Management Programme

Programme Purpose and Strategy

The purpose of the Ecological Management Programme is:

To conserve and restore MFE's ecological components and processes, and understand ecosystem functions and dynamics

Over the past thirty years, the ecology of the MFE has altered considerably, with wildlife numbers being reduced by about 50%, mainly due to intense poaching pressure during the 1980s and early 1990s. Changes in the forest structure have also occurred as a result of illegal harvesting of trees with the forest thinning due to over harvesting of preferred hard wood species. In addition, livestock grazing has suppressed regeneration affecting tree recruitment. The rangelands adjacent to the Marsabit forest have also experienced pressure from charcoal burning, harvesting for fuel wood and construction materials. The permanent livestock grazing and settlement in the arid lowlands of the Marsabit National Reserve have also contributed to the decline in wildlife numbers through displacement of wildlife. Other threats to ecological integrity of the MFE include invasive plant species which out compete and replace other plant species; and over abstraction of water from boreholes which seem to impact on the MFE crater lakes by reducing the water levels in these lakes. Overall, threats are escalating, mainly as a result of increasing human populations and intensifying land uses in the areas around the MFE. The MFE Ecological Management Programme aims to address the threats that are impacting on the most important ecological features and values of the MFE, and to provide a guiding framework for the long-term ecological monitoring of the area.

The following paragraphs set out the guiding principles that were designed by the Ecology Working Group to guide MFE managers and stakeholders in the implementation of the Ecological Management Programme and the achievement of the Programme Purpose.

Guiding Principles

In implementing the MFE's Ecological Management Programme, MFE Management will strive to ensure that:

Critical habitat components are maintained and restored

Restoration of a degraded habitat to a healthy, self-sustaining condition that resembles as closely as possible its pre-disturbed state is essential in maintaining habitat diversity. Habitat diversity in turn increases species diversity which enhances ecosystem resilience. Therefore, MFE will place a high priority on efforts to restore natural habitats and the services they provide. Recognizing the importance of restoration in the overall toolbox of environmental stewardship, MFE will support a variety of programs and projects that focus on maintaining and restoring critical natural habitats, hence improving the health of the whole ecosystem.

Threatened and endangered species are conserved and monitored

The MFE has several key mammal species of conservation concern including the elephant and Grevy's zebra that are listed as threatened by IUCN. These species are threatened primarily by poaching and habitat loss or degradation. Under this management programme, management of threatened species will focus on population monitoring and establishing corridors to increase wildlife range and enhance ecosystem resilience.

The connectivity between MFE and adjacent areas is secured through an ecosystem based management approach

Large migratory mammal species (e.g. the elephant and Grevy's Zebra) that require a large foraging area depend on connectivity between MFE and adjacent savannah ecosystems to meet their physiological requirements. In addition, connectivity with other ecosystems increases ecosystem resilience by spreading risks and providing insurance making it possible for an ecosystem that is disturbed to recover. As such, as part of efforts to conserve natural population dynamics and processes, management activities under this management programme will aim to perpetuate the dispersal of animals into suitable conflict-free areas outside of the MFE protected areas.

The Marsabit Forest supplies sufficient water to neighbouring communities

Marsabit town community and the rural community living around the Marsabit forest and their livestock are dependent on water supplied by permanent springs or wells in the confines of the forest. However, increase in human population and subsequent increased demand for water has led to over abstraction of water affecting natural hydrological cycles in the MFE. Some springs have dried up as a consequence of increased extraction of water in the forest. As such, management actions under this programme will seek to maintain the area's natural hydrological cycles, and help ensure a consistent supply of water to the MFE community in collaboration with other key stakeholders.

Understanding ecological components and processes to support adaptive management

Reliable information generated according to well established scientific principles and methods is critical if environmental and natural resource management are to operate effectively. Without reliable information on changes in the environment and on the causes of those changes, timely and adaptive management interventions on perceived biodiversity threats cannot be made leading to ecosystem deterioration. Ecological monitoring can represent an important source of information in the decision-making process. It can provide early warning when ecosystem changes are discerned and help control degradation. As such, this programme will focus on developing a robust ecological monitoring programme and related database to track key elements of the ecosystem and major threats to ecosystem functioning to inform adaptive management and for assessing management effectiveness.

Targeting ecological management action

The Protected Area Planning Framework (PAPF), the Protected Area (PA) management planning standard, prescribes the use of a simplified version of the Nature Conservancy's (TNC) Conservation Action Planning (CAP) process as a foundation for designing the Ecological Management Programme. The rationale underlying this is that, with limited human and financial resources available to PA managers, it is impractical to attempt to manage and monitor every single aspect of the complex ecology of a protected area.

The first step in the TNC CAP methodology is the identification of a small suite of species, communities, and ecological systems that represents and encompasses the biodiversity found in the planning area and which form the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. The second step is the identification of characteristics or key ecological attributes (KEAs) that can be used to help define and assess the conservation target's ecological viability or integrity. These attributes are critical aspects of the target's biology or ecology that, if missing or altered, would lead to the loss of that target over time. The third step is to identify the various factors that immediately affect the identified conservation targets and then rank them to focus conservation actions where they are most needed. The fourth step involves developing strategies to counter the threats considering the need to get the most impact from the available resources. The final step involves measuring success to gauge whether the strategies are working as planned and thus whether adjustments are needed.

The identified MFE conservation targets, their key ecological attributes and major threats are presented in the following sections.

Conservation targets

A summary of the selected conservation targets, rationale for their selection, important subsidiary targets and key ecological attributes of the conservation targets is given in table 5.

Table 5. MFE Conservation targets

	Conservation Target	Rationale for Selection	Important subsidiary targets	Key ecological Attributes
Systems	Closed canopy forest	<ul style="list-style-type: none"> ➤ Closed canopy forest with unique and threatened species ➤ Water catchment area threatened by human activities ➤ Important for browse and graze 	<ul style="list-style-type: none"> ➤ Elephant ➤ Primates ➤ Birds ➤ Leopard ➤ Buffaloes ➤ Greater Kudu ➤ Bush buck ➤ Bush pig ➤ Aardvark ➤ Wetland habitat ➤ Croton, Podo, Olea Ficus tree species 	<ul style="list-style-type: none"> ➤ Forest stocking densities ➤ Forest species diversity ➤ Percentage crown cover ➤ Regeneration potential

	Conser- vation Target	Rationale for Selection	Important subsidiary targets	Key ecological Attrib- utes
	Woodlands	<ul style="list-style-type: none"> ➤ Important for browse and graze ➤ a buffer zone for high forest against human activities ➤ Important for breeding and wildlife cover 	<ul style="list-style-type: none"> ➤ Browsers: Bush buck, Duikers, ➤ Grazers: Grevy's zebra, ➤ Trees: <i>Olea europea</i>, <i>Melia volkensii</i> 	<ul style="list-style-type: none"> ➤ Species diversity ➤ Stocking density ➤ Species regeneration ➤ Percentage of the undergrowth cover ➤ Woodland size (spatial extent)
	Shrub- land/scrub- land	<ul style="list-style-type: none"> ➤ Important for browse and graze ➤ Important for breeding and wildlife cover ➤ Threatened by overgrazing, dryland farming and human settlement 	<ul style="list-style-type: none"> ➤ Browsers: Grant gazelle, gerenuk ➤ Grazers: Grevy's zebra, ➤ Birds: Ostrich, Kori Bustard ➤ Shrub: Sandalwood 	<ul style="list-style-type: none"> ➤ Species diversity (perennials & Biannual) ➤ Percentage ground cover ➤ Species dominance (alien/invasive)
Habitats	Wetlands	<ul style="list-style-type: none"> ➤ Source of water for local community and wildlife ➤ few springs and swamps remaining ➤ Critical habitats for wildlife and livestock ➤ Under severe threat from human activities 	<ul style="list-style-type: none"> ➤ Swamps and crater lakes within Marsabit forest ecosystem ➤ Bakuli dam ➤ Riparian habitats ➤ Reptiles and amphibians 	<ul style="list-style-type: none"> ➤ Water quality (turbidity, chemical composition & biological organisms) ➤ Water quantity
Species	Olea spp	<ul style="list-style-type: none"> ➤ Good water holding capacity for catchment ➤ Targeted for wood harvesting due to its medicinal properties and excellent fuel and building poles 	<ul style="list-style-type: none"> ➤ <i>Croton megalocarpus</i> ➤ Parasitic plants (Lichen, <i>ficus nataliensis</i>) 	<ul style="list-style-type: none"> ➤ Stocking density ➤ Regeneration status ➤ Population structure ➤ Distribution & abundance ➤ Species diversity
	Elephants	<ul style="list-style-type: none"> ➤ Keystone role of maintaining habitats ➤ Classified as threatened (vulnerable) by IUCN ➤ Of great tourism and scientific interest ➤ Threatened by closure of migration and dispersal routes outside MFR boundaries. 	<ul style="list-style-type: none"> ➤ Migratory grazers such as Grevy's zebra ➤ Greater kudu ➤ Bushbuck 	<ul style="list-style-type: none"> ➤ Population size and structure ➤ Temporal & spatial distribution ➤ Dispersal areas /migratory corridors
	Grevy's zebra	<ul style="list-style-type: none"> ➤ Declining population due to habitat loss and poaching for bush meat ➤ Classified as threatened by IUCN 	<ul style="list-style-type: none"> ➤ Gerenuk ➤ Dik dik ➤ Grant's gazelle 	<ul style="list-style-type: none"> ➤ Population size and structure ➤ Temporal & spatial distribution ➤ Dispersal areas /migratory corridors

	Conser- vation Target	Rationale for Selection	Important subsidiary targets	Key ecological Attrib- utes
	Large carnivores	<ul style="list-style-type: none"> ➤ Threatened, yet play an ecologically (and economically from a tourism perspective) essential role in the MFE. ➤ Lions are classified as vulnerable by IUCN while wild dogs are classified as critically endangered. ➤ Grouped together as they face common threats including human-wildlife conflict, poaching and closure of dispersal areas. 	<ul style="list-style-type: none"> ➤ Lion ➤ Leopard ➤ Cheetah ➤ Wild dog ➤ Hyena(spotted and striped) ➤ Genets ➤ Caracals 	<ul style="list-style-type: none"> ➤ Population size and structure ➤ Genetic diversity ➤ Habitat size and quality, and connectivity ➤ Prey species availability

Threats to conservation targets

The comprehensive definition of conservation targets and their KEAs enables the identification of the “**threats**” to these targets and attributes, and the subsequent prioritisation of these threats according to their significance. The PAPF defines a threat as any factor, resulting either directly or indirectly from human activities, which has the potential to destroy, degrade or impair a conservation target during the 10-year lifespan of the PA plan. **Table 6** shows the conservation target-threat matrix with threat rating.

Table 6. Conservation target/Threat Matrix

TARGETS	Canopy Forest	Woodland	Shrub land/Srubby land	Wetlands	Olea spp	Elephant	Grevy's zebra	Large carnivores
THREATS								
Illegal harvesting of forest products	Medium	Medium			High			
Livestock grazing	Medium	Medium		Medium	Low	Low	Low	Low
Invasive species	Low	Low	Low	Medium				
Human encroachment on wildlife habitats (settlement)	Low	Low	Low		High	Low	Low	Low
Wild fire		Low	Low		Low			
Infrastructural development		Low	Low	Low				
Land slides								
Mining (murrum, gravel)		Low	Low					
Human population growth				High	High			
Climate change		Medium	Low	Low	Low			
Water over abstraction		Low		High		High	High	
Catchment degradation				Medium				
Soil erosion			Low					
Over grazing			Medium					
Elephant confinement to the forest							High	
Blockage of wildlife migratory corridors and dispersal areas						High	High	Low
Human-wildlife conflict						Low		Low
Competition for resources							High	High
Poaching						High		High
Drought						High	High	High
Habitat degradation						High	High	High
Wildlife diseases							High	High

Ecological management objectives and actions

The identification and ranking of the threats to the MFE's conservation targets and their KEAs provides the basis for the development of the Ecological Management Programme's management objectives and actions. Objectives were developed to address the clusters of threats or conservation targets shown in **Table 6**. Five objectives have been developed addressing threats to MFE's critical wildlife habitats; addressing threats to critical wetlands; addressing MFE's threatened large mammals (covering conservation targets: Elephant, Grevy's zebra and large carnivores); addressing ecological monitoring and research information dissemination; and addressing impacts of climate change. The five objectives developed for the MFE Ecological Management Programme are:

- MO 1. Threats to the MFE Habitats are abated and all biological connections maintained**
- MO 2. Water availability for wildlife, livestock and the community is improved**
- MO 3. Conservation of MFE threatened large mammal species is enhanced**
- MO 4. Ecological monitoring and research information dissemination is strengthened**
- MO 5. Climate change mitigation and adaptation measures enhanced**

These management objectives and their subsidiary management actions are described in detail in the sections below. Under each management objective there is a brief description of the relevant management issues and opportunities, which provides the specific context and justification for the management actions.

Objective 1: Threats to the MFE habitats are abated and all biological connections maintained

The desired future state that this objective aims to achieve is one where the management and protection of key habitats within the MFE is improved, to maintain the area's natural vegetation composition and dynamics, support the ecosystem's wildlife species, and improve game viewing. In order to achieve this future desired state, four management actions have been developed that address key threats impacting on the forest and national reserves. These include, livestock incursions, blockage of wildlife migratory corridors, invasive species, and fire hazard. The four management actions are elaborated in the following sections.

Action 1.1 Carry out a study to establish impacts of livestock incursions on vegetation structure and composition

Various human activities including fuel wood collection, illegal grazing, tree cutting, and human settlement in the MFE's protected area continue to degrade the wildlife habitats. Additionally, sapling cutting for livestock fodder (from the *Olea* spp.) suppresses regeneration affecting the forest structure and composition.

As such, under this action a study will be carried out to establish the impacts of livestock incursions on the vegetation structure and composition of habitats in the MFE. The MFE management will monitor livestock grazing patterns, which will inform the development of herding management plans as well as water supply strategies. Livestock from the Rendille, Borana and Gabbra communities will be collared and their movement monitored. Participatory GIS will also be used to complement the collaring data. Importantly, the management will assess impacts of livestock grazing in the forest habitat, establish flora baseline exclosures in livestock prone areas in all vegetation communities and thereafter monitor during the

wet and dry seasons. Lastly, it will map land cover and land use and assess impacts of land use changes by acquiring and analysing satellite imageries, over a four-decade period, from 1970-2010.

Action 1.2 Maintain ecological connectivity in the greater MFE

Marsabit Forest is the dry season foraging range for the migratory Marsabit elephants. During the wet season when water and forage is plenty outside the forest, the elephants move to the adjacent lowlands adjacent to the forest reserve. This seasonal elephant movement is important as it allows the forest to recover from elephant impacts. Confinement of elephants in the forest would result in habitat destruction through tree felling by elephants. Maintaining connectivity between the dry season (the forest) and wet season (the lowland rangelands) elephant foraging areas will therefore forestall an ecological disaster in the MFE. Similarly, Grevy's zebra move between the forest reserve and the lowland rangelands seasonally.

Based on this, under this management action the MFE researchers will identify and map elephant and Grevy's zebra migratory corridors as a prelude to corridor establishment. Towards this, at least five elephants and five Grevy's zebras will be collared and their movement monitored for one year to ascertain movement routes. Additionally, MFE management will liaise with other conservation stakeholders such as NRT, in establishing conservancies in the wildlife corridors to secure space for wildlife and enhance ecosystem resilience.

Action 1.3 Develop and implement a site specific alien and invasive species management plan

Invasive species in the MFE pose a major threat to the quality of the ecosystem in relation to species diversity and distribution as they inhibit the growth and development of indigenous species. Species distribution is altered while diversity is reduced as invasive species out-compete indigenous species for the limited food available. Some of the alien or invasive species in the MFE include *Lantana camara*, *Caesalpinia decapetala*, *Eucalyptus spp*, *Senna spectabilis*, *Pistia stratiotes* and *Ocimum suave*.

To ensure effective management and control of invasive species, MFE management will develop and implement a local invasive species management plan. This plan will identify and map spatial distribution invasive species, and prescribe and implement suitable control methods in line with the National Invasive Species Strategy. With time, the efficacy of the implemented control methods will be monitored and evaluated. Finally, the management will create awareness on the impacts of invasive species among the local communities and monitor regeneration of indigenous species.

Action 1.4 Develop and implement a MFE fire management plan

Evidence suggests that the Marsabit forest is prone to fire hazards. Unprescribed fires in the MFE are primarily as a result of honey harvesting and efforts to improve grazing. Although a fire management programme has been implemented in MFE by the Kenya Forest Service, documentation of the programme is lacking. Fire towers and firebreaks have not been maintained increasing fire risk. As such, under this management action, an MFE Fire Management Plan will be developed to cover the entire MFE, with particular attention paid to conserving and protecting the forest. As an initial step, a literature review of existing national fire management guidelines and MFE documents will be carried out to ensure that the plan is based on the best available guidance and information. Results from the monitoring carried out under the MFE Ecological Monitoring Plan will provide the information on the impacts of

fire, and enable the plan to be adapted as necessary. As part of the plan's implementation, firebreaks will also be improved along the Marsabit forest reserve boundary in order to reduce the incidence of wildfire within the Forest.

Objective 2: Water availability for wildlife, livestock and the community is improved

The desired future state of the MFE is one where water is sufficient for wildlife, people and their livestock. Currently, this is hampered by water scarcity brought about by limited water sources, human-wildlife conflict and other factors related to water resource management.

This objective is therefore designed to ensure sustainable conservation and management of water resources in the MFE. This objective seeks to address the problem of water scarcity, poor water resource management and poor rainwater harvesting. The management actions that will be implemented to achieve this objective focus on assessing and modelling the status of key water sources; assessing the impacts of water abstraction on the ecosystem's water sources; evaluating potential water pan and dam sites to supplement existing water sources; supporting establishment of Water Resource Users Associations (WRUAs); and promoting rainwater harvesting as a supplementary source of water. These actions are expounded below:

Action 2.1 Collaborate with Water Resources Management Authority (WRMA) in assessing and modelling status of key water sources

Water scarcity is a major problem facing Marsabit, yet water is a key driver of the ecological processes. Water, too, determines distribution of human settlement and livestock, and the migration of wildlife in the area. The local communities particularly depend on groundwater from the few wells and boreholes dug around the ecosystem. The water proves to be insufficient for all components of the ecosystem, and thus indirectly aggravates the level of conflict among components of the ecosystem. As such, under this management action, MFE management will collaborate with the WRMA in assessing and modelling the status of the main water sources in the ecosystem to inform water resource management and allocation. Water sources will be identified and mapped, and water yield from each source determined. Additionally, the water quality of each source will be assessed and spatial and temporal uses of water determined. This information will be used to develop water allocation plans.

Action 2.2 Assess the impacts of water abstraction on the ecosystem's water sources

Increased water demand, due to road construction and a spike in human population, has led to the reduction in water supply to downstream users. In MFE, groundwater is the dominant source of freshwater for the community, their livestock and the wildlife. The limited water supply translates to reduced water available for wildlife and livestock. In a number of places, groundwater is pumped faster than it can be replenished thus leading to sinking of the water tables and empty wells. Sinking water tables can make wells and boreholes less reliable, especially during the dry season.

To address these challenges, the MFE management will invest in groundwater-related environmental surveys. Borehole records, spring abstraction records and surface runoff records for the past thirty years will be collected and analysed to discern water use trends. A socio-

logical survey on water use and community access to water will be carried out through questionnaires and observation. The survey will shed light on the conflicts associated with water scarcity.

Action 2.3 Evaluate potential water pan and dam sites to supplement existing water sources

Water scarcity in Marsabit is mainly as a result of the limited availability of groundwater sources, which the local communities predominantly depend on. Run-off water from flash floods or erratic rainfall goes to waste due to the absence of water-holding structures and the fact that the volcanic soils in the region have poor water retention capacity.

As such, to increase water availability in the ecosystem, MFE management will identify, map and model potential dam and water pan sites in the area. In regard to this, a detailed soil survey will be carried out to determine suitable sites for dams and water pans. Currently, there is a project underway for the construction of the Badassa Dam Reservoir. MFE management will assess the impacts of the dam on the ecosystem and seek to find appropriate solutions to encourage the development of the project. At the same time, Environmental Impact Assessments will also be carried out in relation to ongoing and future water projects.

Action 2.4 Support establishment of WRUAs

Management of water resource in the region is relatively poor leading to the emergence of conflicts between communities. As a result of these conflicts, some of the water sources have been abandoned. Additionally, livestock-wildlife conflicts are also rampant at these points, whereby the wildlife end up being the disadvantaged lot hence limiting their access to water particularly during the drought period.

WRUAs have not been embraced by communities in Marsabit. If the WRMA could be properly resourced to help facilitate those communities interested in having WRUAs, this would improve water resource management in the ecosystem. Hence, the MFE management will support WRMA-organised stakeholder meetings and advocate for wildlife water interests. Moreover, it will support the WRUAs registration process to encourage co-operative water resource management and conflict resolution which would consequently enhance community participation in water conservation in the ecosystem.

Action 2.5 Promote rainwater harvesting as a supplementary source of water

There is no structured method of rainwater harvesting in the MFE and surrounding areas. As a result, rainwater goes to waste leading to paucity of water for the communities, livestock and wildlife as they compete for the limited water available. The main aim of this action is to encourage rainwater harvesting as a supplementary source of water to increase water availability for wildlife and the community in general.

Under this action therefore, the MFE management will carry out a social survey to identify and map potential rainwater catchment areas in order to estimate the total amount of water that will be available for use. Additionally, it will promote the implementation of *Djabia* water harvesting system, which has been particularly successful in the north coast, promote sand dams, and rock and roof catchments.

Objective 3: Conservation of MFE threatened large mammal species is enhanced

The future desired state of the MFE that this objective seeks to achieve is one whereby the understanding of the population status and dynamics of threatened mammal species is enhanced and threats to these species reduced. Currently, achievement of this state is prevented by inadequate research and monitoring work in the MFE targeting these species, human-wildlife conflict that increase tensions between people and these species, and poaching. In regard to poaching, the three main species affected in this case are elephants, Grevy's zebras and large carnivores. The species are targeted by the local community due to cultural practices and the economical value of their trophies. It is therefore vital for the MFE management to implement suitable measures to ensure that these species are conserved along with their natural habitat. To achieve this objective, MFE management will monitor population size, structure and seasonal distribution of MFE Elephants; establish the elephant carrying capacity of the MFE; carry out research on approaches to reduce Human- Elephant Conflict (HEC); monitor impacts of elephants on the structure of critical habitat; carry out wildlife disease surveillance on species conservation targets; identify and monitor Grevy's zebra breeding hotspots; map distribution and monitor Grevy's and common zebra populations; monitor large carnivores; and conduct research on carnivore-local community interactions. These actions are discussed below:

Action 3.1 Monitor population size, structure and seasonal distribution of MFE Elephants

In the Marsabit Forest Ecosystem, elephants are the flagship species. However, they face several problems including declining populations, poaching, habitat fragmentation, loss of dispersal areas and corridor constriction, which result in human-elephant conflict and elephant confinement in the forest. Effects of elephant confinement are evident as they contribute to destruction of the ecosystem. Recent elephant censuses in the ecosystem are not forthcoming and the last populations estimates were deduced from the dung counts carried out in 1994 which showed that there were 400 elephants in the forest.

In order to understand the current status of the MFE elephant populations, the MFE management will establish a baseline by conducting an elephant census based on the dung count method to determine the population, the genetic distribution and the seasonal distribution of elephants in the ecosystem. Thereafter, elephant census will be carried every three years. The census will be carried out during the wet season when 80% of elephants are outside the park to get a better approximate of the numbers. Additionally, standardized and improved survey methods, for example, genetic survey will be applied. Moreover, the elephants will be collared to monitor their movement and range in the ecosystem.

Action 3.2 Establish the elephant carrying capacity of MFE

Marsabit Forest covers a relatively small area of land in the ecosystem. As such, establishing the carrying capacity will help prevent elephant overpopulation and consequent forest degradation through tree felling. Consequently, under this management action, MFE researchers will design and implement a study aimed at determining the elephant numbers that the ecosystem can support without adverse impacts on other ecosystem components. The study will determine the abundance and availability of preferred food plants for elephants in the forest and the general ecosystem. It will also assess the population of competing wildlife species,

assess the water availability for the elephants and thereafter this information will be used to model the carrying capacity of MFE for elephants.

Action 3.3 Carry out research on approaches to reduce Human-Elephant Conflict (HEC)

The elephant is among the most important key problem animals in the MFE. Problems arise due to elephant intrusion into agricultural land which leads to grave economic losses estimated at KSh1.5 million per month. The management has already established some wildlife barriers but they prove to be ineffective. This necessitates implementation of other new approaches to address the HEC. Further than that, the elephant corridors and dispersal areas have been encroached thus exacerbating the problem.

On the back of these problems, the MFE management will establish the effectiveness of existing HEC interventions. It will also test the effectiveness of elephant deterrent methods such as bee hives and chillies in minimising or controlling HEC. Chillies will be grown around the farms or lined on ropes to repel elephants.

Action 3.4 Monitor impacts of elephants on the structure of critical habitat

Confinement of elephants in the forest has a major impact on the structure of the critical habitat. Marsabit elephants are concentrated in the forest and immediate adjacent areas during the dry season with increased pressure on vegetation and water. There are evident signs of over browsing whereby some shrubs do not recover from the exerted pressure. The species that are mostly over browsed include *Grewia* spp., *Pyranthus sepialis*, and *Bauhinia tomentosa*.

To understand the impacts of elephants on the forest habitat, the MFE researchers will monitor elephant destruction of woody vegetation in the forest. Towards this, researchers will re-establish vegetation monitoring transects used during the AGREF-GEF project and monitor destruction along these transects. It will also establish random remotely monitored vegetation plots of 100X100 Metres in different vegetation strata to monitor elephant impacts on woody vegetation. This information will be important in determining the MFE elephant carrying capacity (see action 3.2 under ecology management programme).

Action 3.5 Carry out wildlife disease surveillance on species conservation targets

Livestock and wildlife share the same habitat, which implies that there is disease transmission from wildlife to livestock and vice versa. Monitoring of wildlife diseases is therefore vital as an epidemic of some diseases e.g. anthrax can wipe out small populations such as that of elephants or Grevy's zebra in the Marsabit Ecosystem.

To ensure that wildlife diseases are kept in check, MFE researchers will liaise with the County and KWS Vet departments in collecting blood, tick and tissue samples during collaring operations and routine surveillance for thorough analysis and also to ensure that infected animals are handled sooner than later. These samples will be analysed and results disseminated as appropriate.

Action 3.6 Identify and monitor Grevy's zebra breeding hotspots

The population of zebras in the MFE is estimated at 15 which ideally is not a viable population. Predator pressure and poaching threatens to wipe out the population. However, identification and securing breeding areas will enhance their survival and possibly increase their population to viable numbers.

The MFE researchers will thus use participatory GIS to gather information on breeding areas. They will employ the services of community scouts to monitor Grevy's zebras, in relation to breeding and predation. The researchers will also carry out an inventory of the breeding hotspots and model them in the greater ecosystem.

Action 3.7 Map distribution and monitor Grevy's and common zebra populations

The small population of Grevy's zebra and the fact that the genetic pool can be diluted through hybridisation with common zebras necessitates mapping distribution and monitoring numbers of the two species. Hybridisation between an abundant species and an endangered species is cause for concern particularly in relation to the Grevy's zebra. When such hybridisation is observed, it is both urgent and necessary to assess the level of threat posed to the endangered species.

Therefore, the MFE management will conduct ground and aerial surveys to establish the population size and distribution of the two species and note their interaction. It will also assess phenotypically whether there is hybridisation between Common and Grevy's Zebra and assess genetic diversity of the Grevy's zebra. Modelling suitable habitats for the Grevy's zebra and enhancing its genetic pool by translocating Grevy's zebras from other meta-populations in the Grevy's range are also other important activities that will be implemented.

Action 3.8 Monitor large carnivores

Carnivores are a major cause of human-wildlife conflict in the ecosystem. Many of them are killed due to livestock predation. Apart from the hyena whose population is significantly high, other carnivores, mainly in the cat family, are found in small numbers. This small population can become locally extinct due to the current intensity of human threats. Further than that, cultural activities among the local communities, such as hunting lions also contribute to the endangerment of the large carnivores locally.

The MFE management will thus identify information gaps on large carnivores and undertake targeted research based on identified gaps. It will also establish the population size of the large carnivores and map home ranges and distribution of carnivores. Furthermore, it will collar individuals from each species of large carnivores for monitoring purposes in collaboration with the other conservation stakeholders.

Action 3.9 Conduct research on carnivore-local community interactions

Due to a shared ecosystem, carnivores raid the communities' homesteads and attack their livestock. Further than that, rabies transmission from these carnivores, specifically the hyena, to humans has also been reported. Livestock is the mainstay of the locals, supporting the livelihoods of a large number of forest adjacent communities; hence the predation of livestock by large carnivores is a major concern.

In order to control this problem, the MFE management will assess livestock herding strategies including the herding calendar in order to understand interactions between livestock and carnivores. It will also collect, collate, package and disseminate all information on carnivores to various community strata. It will analyse human-wildlife conflict data and pilot lion-proof bomas in conflict-prone areas. It will also educate the public on conflict avoidance.

Objective 4: Ecological monitoring and research information dissemination is strengthened

This objective's key focus is on dealing with the problem of limited information relating to threats and drivers of the ecosystem, lack of an integrated approach to research and the non-existence of partnerships with other researchers and research institutions. The MFE requires effective and functional ecological monitoring and a proper system of research information dissemination. On the back of these setbacks, the MFE management will assess gap in biodiversity knowledge, establish partnerships for the implementation of research and monitoring activities, develop a research and monitoring program, and develop and equip a fully fledged research centre. All these actions are further elaborated below:

Action 4.1 Carry out biodiversity assessments in the MFE protected areas

The NKBCP has supported several biodiversity assessment studies in the Marsabit Forest Reserve but the National Reserve has not been covered by these biodiversity studies. Since, this plan proposes operationalisation of the National Reserve it is vital that these studies cover the National Reserve also as it contains unique flora and fauna not found in Marsabit forest. As such, KWS will expand the ongoing forest biodiversity assessments to include the arid and semi-arid parts of Marsabit National Reserve. This assessment will identify areas rich in biodiversity and may require special management intervention measures to protect it.

Action 4.2 Assess gap in biodiversity knowledge

There is limited information on threats to ecological integrity in the MFE. Additionally, ecological research available on the MFE is scattered in different institutions and hence not readily available to management. For further comprehension of the ecosystem components, processes and dynamics, the MFE management will review published and unpublished reports for the MFE and group research studies into two groups:

- i) Those dealing with fundamental research that helps to understand the structure, composition and functioning of the Marsabit ecosystem; and
- ii) Those designed to provide answers to immediate management issues.

Studies of the two groups will then be ranked by priority, with particular reference to the management plan. Terms of References of the most important studies will also be drafted. Furthermore, management will prepare an annotated bibliography of all published and unpublished papers and reports. It will also establish partnerships to enhance research with other organisations for the identification and prioritisation of research topics.

Action 4.3 Establish partnerships for the implementation of research and monitoring activities

In Marsabit Ecosystem, there is no integrated approach to research and no partnerships with other researchers and research institutions exist. There is need for consolidation of resources and avoidance of duplication. It is also important that synergy is created. Additionally, KWS research capacity is wanting and in order to address the diverse research themes, outside expertise is required.

For the execution of this action, scientific workshops to share the biodiversity knowledge with other related parties will be organised. At the same time, management will develop research related MOUs with relevant institutions, develop Terms of Reference for priority research activities and build KWS research capacity through knowledge transfer.

Action 4.4 Develop a research and monitoring program

In order to address KWS research priorities, there is need to have a formal monitoring system and research development plan. Therefore, the management will organise workshops to develop a research and ecological monitoring plan. Subsequently, a biodiversity assessment of the ecosystem will be carried out.

Action 4.5 Develop and equip a fully fledged research centre

There is a need to develop and equip a fully-fledged research centre and a digital library because the research infrastructure and equipment is virtually non-existent at the MFE. Hence, MFE management will seek to establish a GIS lab with a fully-equipped geodatabase, a water quality lab, a herbarium and a museum. A knowledge repository of all management data with all details of human-wildlife conflict, tourism statistics and animal population and distribution will also be established.

Objective 5: Climate change mitigation and adaptation measures enhanced

The future desired outlook that this objective seeks to achieve is one where climate change is mitigated in the Marsabit Forest Ecosystem and adaptation measures are enhanced. The main problems this objective seeks to address are the lack of awareness in climate change issues, water paucity and use of firewood as an energy source. In a bid to address these issues, the management will implement actions focussing on: creating awareness on climate change among the local community, improving water supply for people, livestock and wildlife in line with Marsabit water catchment management strategy, controlling habitat degradation, and providing alternative sources of energy. These actions are elaborated below:

Action 5.1 Create awareness on climate change among the local community

There is a general lack of awareness in climate change issues among the local community thus contributing to further stress on the ecosystem and climate change impacts. To improve awareness on impacts of climate change, the MFE management will carry out a climate change vulnerability assessment to analyse the ecosystem's vulnerability to climate change and the adaptive capacity at the community level. Moreover, it will combine community

knowledge and scientific data to yield greater understanding about the local impact of climate change, sensitise the community on preparedness on climate change and carry out civic education especially for leaders to reduce poor land use and settlement in wildlife corridors.

Action 5.2 Improve water supply for people, livestock and wildlife in line with Marsabit water catchment management strategy

Water supply in the MFE is an important aspect of consideration. Currently, there is water paucity brought about by increasing water demand and long spells of drought in the area. Improving this supply would be significant in maintaining an ecological balance and avoiding any forms of conflicts. Under this action, MFE management will provide water from shallow wells and boreholes using green energy-driven pumps e.g. solar and windmills. It will also construct water pans and sand dams as well as support rain water harvesting to increase the water capacity for domestic use.

Action 5.3 Control habitat degradation

Habitat degradation has greatly affected the ecological balance in the MFE. This is due to the fact that erratic rainfall patterns have affected the natural regeneration of the degraded land habitat which in turn interferes with the traditional grazing patterns. To counter this, MFE management will carry out reforestation and rehabilitation of Marsabit Forest, remove invasive species and establish tree nurseries to provide seedlings for establishment of woodlots.

Action 5.4 Provide alternative sources of energy

The main source of energy in the MFE is fuel wood. The communities are dependent on the forest ecosystem for the provision of firewood, which is sold in the local markets. The increase in population using fuel wood is indeed putting pressure on MFE. It is estimated that 600 women (300 licensed and 300 illegal harvesters) sell firewood from Marsabit Forest.

The MFE management will therefore promote the use of energy-saving methods and appliances such as green energy and energy-saving stoves within the local communities. It will also support poverty alleviation activities by introducing and encouraging livelihood improvement programmes such as beekeeping and slaughterhouses. Establishment of woodlots through farm forestry will also be of significance as it will ease the community dependence on the forest.

Action 5.5 Carry out a study on impacts of livestock and human settlement on the MFE protected areas

Conserving wildlife in human-occupied landscapes requires management intervention that is guided by an understanding of how anthropogenic factors influence ecosystem ecological processes. Human-livestock-wildlife interactions have increased in the MFE following human settlement in the Mt. Marsabit Area in the 1980s and 1990s. Currently, the Marsabit National Reserve is used by the local community for livestock grazing. If the National Reserve is operationalised and managed primarily for wildlife conservation and tourism as envisaged in this plan, livestock will be excluded from most of the protected area. In view of this, there is a need for better understanding of the interactions between humans, livestock and wildlife to inform the National Reserve operationalisation process. Under this management action, therefore, KWS researchers will design and implement a study aimed at determining the history, extent of livestock and human settlement in the protected areas, and discuss poten-

tial impacts associated with the resultant human-livestock-wildlife interactions in the MFE and its adjacent areas. In regard to this, researchers will review published and unpublished reports on similar studies and analyse traditional livestock grazing practices among different pastoralist groups in the ecosystem. Further, human-livestock-wildlife interactions will be assessed through a questionnaire survey administered in all the villages in the MFE to gather data on wild animal species commonly sighted in the settled and livestock grazing areas. The outcome of this study will then be used to design and implement a livestock grazing system that reduces grazing pressure on the National Reserve and one that allows wildlife to re-establish.

ECOLOGICAL MANAGEMENT PROGRAMME

Table 7. MFE Ecological Monitoring Plan Framework

KEA/Threat	Indicator of change	Method of measurement	Collection frequency	Data source	Responsibility	Data currently collected	Relevant action(s)
Conservation Target 1: Closed canopy forest							
KEA: Forest stocking densities, Percentage crown cover	Forest cover	Transects- Point Centred Quarter method	3 years	Monitoring reports	SRS-NCA	Some data is available	Action 1.1
KEA: Species diversity	Species richness	Transects- Point Centred Quarter method	3 years	Monitoring reports	SRS-NCA	Some data is available	Action 1.1
Threat: Illegal harvesting of forest products	Amount of illegally harvested wood	Socio-economic assessment of human activities and livelihoods	Annual		SRS-NCA	Some baseline data is available	Action 1.1
KEA: Regeneration potential	Tree recruitment	Transects- Point Centred Quarter method	3 Years	Monitoring report	SRS-NCA	Baseline data available	Action 1.1 Action 4.1
Threat: Livestock grazing	Number of illegal livestock units per time	Livestock counts	Continuous	Monitoring reports	SRS-NCA	Some data is available	Action 1.1
Conservation Target 2: Wetlands							
KEA: Water availability	Water level in key streams, Water supply from shallow wells, boreholes, water pans, dams, roof rain water harvesting	Water quantity monitoring	Wet and dry season annually	Water monitoring reports	SRS-NCA	Available baseline reports: Borehole, spring abstraction and surface runoff records for the past 30 years	Action 2.2 Action 2.3 Action 2.5 Action 5.2
Threat: Water over-abstraction	Number of water related conflicts	Socio-economic surveys	Annual	Water monitoring reports	SRS-NCA	Some baseline data is available	Action 2.1 Action 2.2 Action 2.3
KEA: Water quality	Odour, amounts of dissolved chemicals in water; bacteriological	Permanent sampling points and laboratory water analysis	Quarterly	Monitoring reports	SRS-NCA	Some baseline data available	Action 2.1

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KEA/Threat	Indicator of change	Method of measurement	Collection frequency	Data source	Responsibility	Data currently collected	Relevant action(s)
	level; turbidity, water colour and total suspended solid values						
KEA: Macrophyte cover	% Macrophyte cover	Analysis of satellite images and aerial photos; ground observations	3 years	Monitoring reports	SRS-NCA	Some baseline data is available	Action 5.1
Threat: Invasive/alien plant species	Invasive plant species cover	<ul style="list-style-type: none"> Invasive species inventorying, mapping and monitoring 	Dry and wet season	Invasive Species monitoring and control report	SRS-NCA	Some baseline data is available	Action 1.3 Action 5.3
Conservation Target 3: Woodlands							
KEA: Species diversity, Stocking density	Number of species and their % crown cover	Transects- Point Centred Quarter method	3 years	Monitoring reports	SRS-NCA	Some data is available	Action 5.5
Threat: Illegal harvesting of forest products	<ul style="list-style-type: none"> Number of stumps of characteristic species Amount of confiscated wood products 	Socio-economic assessment of human activities and livelihoods	Quarterly	Socio-economic assessment reports	SRS-NCA	Some data is available	Action 5.5
KEA: Species regeneration, undergrowth cover, Woodland size (spatial extent)	<ul style="list-style-type: none"> Recruitment Undergrowth cover Area (ha) of woodland 	Transects - Point Centred Quarter method	3 years	Monitoring report	SRS-NCA	Some baseline data available	Action 4.1 Action 5.5
Threat: Illegal livestock grazing	<ul style="list-style-type: none"> Number of livestock units per time 	Livestock counts	continuous	Livestock Monitoring reports	SRS-NCA	Some baseline data is available	Action 1.1 Action 5.5
Conservation Target 4: Shrubland/scrub-land							
KEA: Species diversity	Species richness	Vegetation transects	3 years	Vegetation monitoring reports	SRS-NCA	Some baseline data available	Action 1.1 Action 5.5
Conservation Target 5: Olea species							

ECOLOGICAL MANAGEMENT PROGRAMME

KEA/Threat	Indicator of change	Method of measurement	Collection frequency	Data source	Responsibility	Data currently collected	Relevant action(s)
KEA: Stocking density, Population distribution & abundance, Regeneration status	<ul style="list-style-type: none"> Number of individual stems Tree crown cover Tree recruitment 	Transects- Point Centred Quarter method	3 years	Vegetation monitoring reports	SRS-NCA	Some baseline available	Action 4.1 Action 5.3
Threat: Illegal harvesting of forest products	<ul style="list-style-type: none"> Number of stumps Amount of confiscated wood products 	<ul style="list-style-type: none"> Transects- Point Centred Quarter method Socioeconomic survey 	3 years	Vegetation monitoring reports	SRS-NCA	Some baseline data is available	Action 4.1 Action 5.3
Conservation Target 6: Elephants							
KEA: •Population size •Temporal & spatial distribution	Number of individuals	Dung count	3 years	Elephant census reports	SRS-NCA	Some baseline data available	Action 3.1 Action 3.2 Action 3.3
Threat: Poaching	Number of poached elephants	Mapping of carcasses through ground surveillance by security rangers	Continuous	KWS occurrence books	SRS-NCA	Some baseline data is available	Action 3.1 Action 3.2 Action 3.3
KEA: Available dispersal areas /migratory corridors	Size of corridor and Dispersal area	mapping of available habitat through satellite images	3 years	Elephant movement patterns reports; land cover changes report	SRS-NCA	Some baseline data available	Action 1.2 Action 3.1 Action 3.3 Action 5.1
Conservation Target 7: Grevy's zebra							
KEA: Population size and structure	Number of individuals and age and sex ratios	Ground count	Quarterly	Wildlife census reports	SRS-NCA	Some baseline data is available	Action 3.7
Threat: Poaching	Number of poached Grevy's zebras	Aerial census and ground counts	3 year	Wildlife census	SRS-NCA	Baseline data is available	Action 3.7

MFE MANAGEMENT PLAN (2015-2025)

KEA/Threat	Indicator of change	Method of measurement	Collection frequency	Data source	Responsibility	Data currently collected	Relevant action(s)
				reports			
Conservation Target 8: Large carnivores							
KEA: Population size and Structure	Number of individuals	Population surveys	3 years	Biodiversity assessment reports	SRS-NCA	Some baseline data is available	Action 3.8 Action 3.9
Threat: Poaching	Number of carnivores poached	Mapping of carcasses through ground surveillance by security rangers	Continuous	Wildlife monitoring reports	SRS-NCA	Some baseline data is available	
KEA: Habitat size and quality	Ranging area (ha)	Analysis of satellite images and aerial photos	3 years	Land cover Monitoring reports	SRS-NCA	Some baseline data is available	Action 3.8 Action 3.9
Threat: Drought	Rainfall variation	Analysis of climate data	Annual	Climate Monitoring reports	SRS-NCA	Some baseline data is available	Action 3.5
Threat: Wildlife diseases	Incidence of pathogens	Sampling for wildlife diseases	Continuous	Veterinary disease surveillance reports	SRS-NCA	Some baseline data is available	Action 3.5

Forest Resource Management Programme

Programme Purpose and Strategy

The overall purpose of the Forest Resource Management Programme is:

To conserve and protect the Mt. Marsabit Forest water catchment for sustained provision of environmental and socio-economic goods and services

Guiding Principles

In implementing the Forest Resource Management Programme, MFE Management will strive to ensure that:

Natural forest is providing socio-economic, cultural and environmental services

Kenya's natural forests represent some of the most diverse ecosystems found anywhere in the world. These forests supply important economic, environmental, recreational, scientific, social, cultural and spiritual benefits. However, some of these forests have been subjected to land use changes such as conversion to farmlands, ranches and settlements. This has reduced the ability of these forests to supply forest products, serve as water catchments, biodiversity conservation reservoirs, wildlife habitats and carbon sinks. It is against this background that all indigenous forests on public lands, like Marsabit Forest Reserve, remain reserved to allow continued supply of forest goods and services.

Under this management programme, Marsabit Forest Reserve will be put under efficient and sustainable multipurpose management, which combines biodiversity conservation and water-catchment functions together with the production of tangible benefits like firewood, seasonal grazing, non wood forestry products, seasonal employment and provision of water for forest adjacent communities. In doing so, forest principles will be employed to ensure application of science in forest conservation and management.

Forest integrity is improved through restoration of degraded forest

Indigenous forests like Marsabit Forest reserve are among the most complex ecosystems that need efficient management. However, these forests are faced by various threats (e.g. pests, diseases, fires, human encroachment and other illegal forest activities), which have been of management concern and need to be addressed.

To attain the purpose for which the Marsabit Forest was set aside as a protected area, threats to forest integrity need to be controlled or eliminated altogether. There is also need to determine the status of indigenous forests and appropriate restoration measures implemented. As such, under this management programme effective policy and management measures will be implemented to ensure that threats to forest integrity are controlled.

Local communities are actively involved in forest conservation and management

Kenya has embraced Participatory Forest Management (PFM) as an approach towards achieving sustainable forest management. This is out of realisation that involvement of the wider stakeholders contributes significantly to sustainable management of forests. In this approach, local communities and other stakeholders participate in management of forest resources as provided for by the Forests Act, 2005.

To enhance forest management at the MFE, the forest adjacent communities will be encouraged to form and register a Community Forest Association as a vehicle for enabling them to legally participate in all aspects of forest management including conservation, protection, and utilisation.

Farm forestry and effective forest extension for improvement of livelihood is promoted

Trees are an essential part of diversified farm production, providing both subsistence products and incomes while contributing to soil and water conservation, and soil fertility. Due to the increasing population, it is not possible for national forests to meet all the demands of forest products; hence alternative sources of these products are expected to come from farmlands.

The MFE is experiencing an increase in rural-urban migration leading to high increase in the population of Marsabit town. Consequently, demand for forest products such as firewood, water and building materials has increased exerting a lot of pressure on Marsabit Forest. As such, under this management programme, and in line with the Forests Act, 2005 that requires that farm forestry be promoted, MFE management will promote farm forestry interventions in forest-adjacent areas to address the increasing demand for firewood and timber.

Efficient use of alternative renewable energy sources is promoted

The main source of the energy requirement in the MFE is met from the forest reserve and mainly feeds into the inefficient *three-stone fire hearth* that is common in most of the rural homesteads. It has however been observed that there is now limited adoption of improved charcoal stoves among the urban dwellers. And although Marsabit enjoys substantial periods of sunlight, not much effort has been made to harness solar power. Under this management programme, MFE management will strive to ensure that alternative energy sources are promoted through adoption of appropriate charcoal production and energy conservation technologies for sustained energy supply and livelihood improvement of the forest dependent communities.

Forest fires are effectively managed and monitored

Forest fires cause significant forest degradation and deforestation leading to loss of biodiversity, critical water catchment functions and general forest degradation. Kenya is internationally considered to be a low forest cover country as it has less than 10% of its total land area classified as forest. Forest fires are one of the major threats of attaining the desired tree cover.

In the MFE, wildfire is one of the major threats to the ecosystem's integrity. Wildfires occur mainly at the periphery of the protected area and are in most of the cases caused by honey

harvesters and pastoralists. In the adjoining national reserve the fires are mainly attributed to pastoralists who set fires to improve pastures and control livestock pests like ticks. The sum total of these frequent fires is loss of biodiversity and conversion of woodland/bushland into grasslands. Hence, under this management programme a robust fire management programme will be put in place to ensure that fire-caused forest damage is minimised.

Community livelihoods are enhanced

The Forests Act, 2005 recognizes the participation of communities in sustainable management and conservation of forests as critical while the forest policy considers this engagement as essential to poverty reduction, employment creation and improvement of livelihoods. Community participation in forest management leads to development of forest based industries, intensification of farm forestry and commercial production of non wood products that support forest industries for increased incomes and employment. Various opportunities exist in the MFE for enhancing livelihoods through forest based enterprises. This may include production and sale of wood fuel, commercial honey production, ecotourism, commercial seedling production and tree/fruit farming. As such, under this management programme, MFE management will implement measures that will ensure that community livelihoods are improving through use of forest related products.

These principles are intended to guide the implementation of the Forest Resource Management Programme's four management objectives that, when combined, achieve the Programme Purpose. These four objectives are:

- MO 1. The Marsabit natural forest is providing environmental goods and services sustainably.**
- MO 2. Farm forestry and forest extension services promoted**
- MO 3. Community livelihoods enhanced through enterprise development**
- MO 4. Forest research enhanced**

Management Objectives and Actions

Objective 1: The Marsabit natural forest is providing environmental goods and services sustainably

The anticipated outlook of the MFE is whereby the forest is managed sustainably to provide environmental goods and services for the components of the ecosystem, for the present and future generations. Currently, the achievement of this state is inhibited by human activities such as illegal logging, livestock grazing in the forest, overgrazing during the drought season, agricultural encroachment and deforestation. Other factors contributing to this include increase in invasive species and forest fires. The gravity of these threats increases by the day due to the rise in human population and the need for more space for human activities. The actions expounded on below will seek to address these problems to achieve the desired future state.

Action 1.1 Secure Marsabit Forest

The forest reserve is currently encroached by the local people specifically through settlement. The construction of commercial enterprises, e.g. schools, bank quarters, county government offices and the Gabbra scheme, has increased the population surrounding the forest boundary further aggravating the situation. Additionally, there is boundary variation through different legal instruments controlling land use in the ecosystem. Implementation of effective strategies to safeguard the forest's future is vital as the forest is rich in biodiversity and is a lifeline for the local community and its loss will have a detrimental impact on the livelihoods of the local people.

To curb human encroachment on the forest, KFS management will document forest excisions, intensify forest patrols and improve law enforcement. At the same time, the management will repossess illegally acquired forest land.

Action 1.2 Carry out forest surveillance

In the Marsabit Forest Ecosystem, there are usually forest fires, plant diseases, pests and invasive species which could have a major negative impact on biodiversity. The impacts of forest threats such as fires are expected to increase in the face of climate change. Faced with these issues, the management will carry out surveillance on fires, diseases, pests and invasive plant species, maintain fire danger rating boards, declare fire season, provide fire fighting equipment and other logistics and sensitise the public on management of forest fires. Importantly, the management will collaborate with other stakeholders in fire fighting activities and report diseases, pests and invasive species to KEFRI for corrective action.

Action 1.3 Establish Community Forest Association(s)

This action is crucial because the local community and the general public can be partners in the conservation of the forest if they are aware of the benefits that accrue from the forest resource. However, vested interests are currently responsible for the increased pressure at the expense of the public good. The community has not owned the forest considering it as a government resource instead. To change this mindset and make the community feel like they own this critical resource, the management will organise community sensitisation forums and promote participatory forest management by forming and empowering community forest associations in development and implementation of Participatory Forest Management Plans (PFMPs).

Action 1.4 Regulate access to forest resources

Currently, there is a KFS permitting system that controls access to forest resources but it has been suspended by the Marsabit County Security Committee. This implies that no licenses are currently being issued for firewood collection. The permitting system, however, is not based on any resource inventory information and it is therefore difficult to determine whether there is over extraction or not. In order to base firewood extraction on sound data (when the extraction suspension is lifted) the management will carry out a resource inventory, determine off-take levels for each resource as well as assess environmental impacts of the off-take.

Action 1.5 Rehabilitate degraded forest areas

There are deforested areas that have arisen from forest fire impact, overgrazing or past cultivation and settlement. Some forest areas around Badassa had been settled at the current *Grevillea* forest stand adjacent to Gabra Scheme. At Hula Hula, overgrazing has led to degradation of the area as regeneration is suppressed.

To rehabilitate degraded forest areas, the MFE management will identify and map the deforested patches and determine the suitable rehabilitation methodologies to be implemented. These may range from fencing to keep off livestock, enrichment planting and reseedling. It will also restrict access to forest resources to allow for tree re-establishment and natural regeneration.

Action 1.6 Replace exotic plantations with suitable indigenous species

There are exotic plantations of *Grevillea* and *Eucalyptus* that were established several decades ago at Badassa and Hula Hula respectively. These exotic trees have matured and need salvaging. In addition, the *Eucalyptus* trees are dying and are susceptible to wind fall.

Under this action, management will salvage exotic plantations to avoid wastage and replace the exotics with indigenous trees.

Action 1.7 Control invasive species

Invasive species are a major problem, not only in MFE but also in other ecosystems nationally. This is because they can out-compete other indigenous species thus compromising the ecological integrity of the ecosystem. Some of the invasive species in the forest include: *Lantana camara*.

Effective mitigation measures will involve identifying and mapping the distribution of invasive species in the ecosystem. Additionally, the management will develop and apply appropriate suitable invasive control mechanisms, which will be monitored after implementation to determine effectiveness. Furthermore, the MFE management will create awareness about invasive species to the community.

Objective 2: Farm forestry and forest extension services promoted

The desired future state of the Marsabit Forest Ecosystem is where there is alternative wood fuel to reduce pressure on the forest. This objective has therefore been designed to provide alternative source of fuel wood and building materials on community land thereby relieving pressure from Marsabit forest. To achieve this objective, the MFE management will implement the following actions: establish on-farm woodlots and arboreta; promote forest extension services; promote commercial tree farming; collaborate with other stakeholders in forest extension services; promote efficient use of wood fuel and alternative sources of energy; and promote dry land forestry and natural resource management. These actions are as expounded below:

Action 2.1 Establish on-farm woodlots and arboreta

It is crucial that alternative fuel wood is provided in the area. This will reduce pressure on the forest as the communities adjacent to the forest extract building poles and firewood from Marsabit Forest thereby degrading it. Under this action, the management will develop a paper giving pros and cons of different woodlot establishments, establish demonstration plots, fodder banks and tree nurseries. At the same time, the management will enforce the constitution and Agricultural Act requirement of maintaining 10% tree cover on individual farms, build the capacity of the community to take up tree planting, establish tree growers association and identify and secure community land suitable for tree growing. The capacity of the County Government will also be built to secure hills for afforestation and protection. The targeted hills include Kidole, Milima Tatu and Jirime. Finally, the management will empower the community to manage the rehabilitated hills and share benefits. Each hill will have its own governance structure.

Action 2.2 Promote forest extension services

The potential of increasing tree cover in areas outside the protected area in the Marsabit Forest Ecosystem is immense. However, it has not been exploited fully. This action is aimed at reducing over-dependence on the forest for wood products requirements, thereby easing pressure on the natural forest. To attain this goal, the management will establish and run forest farmer field schools, identify organised groups, train groups in forestry and build the capacity of groups for livelihood improvement. The management, too, will promote school greening initiative, train KFS officers on forest farmer field schools methodology, develop or customise forest extension marketing and education packages and train trainers. Importantly, the management will create awareness through information dissemination via public gatherings such as barazas, field days, among other forums.

Action 2.3 Promote commercial tree farming

This action is fundamental as it will give tree growers an incentive to plant trees. As it is today, most timber requirements for Marsabit County are met by Meru County and beyond, more than 300 kilometres away. This makes the timber prices in Marsabit very expensive. To exhaustively address this problem, the management will endeavour to identify and support suitable farms where woodlots can be established, promote the planting of high-value tree species, establish incentive schemes such as award schemes and encourage large scale farms, for instance, Gol Lukesa, Badassa, Sagante and Songa to establish commercial woodlots. Last but not least, the management will reinforce value addition and marketing e.g. charcoal production, timber and orchards.

Action 2.4 Collaborate with other stakeholders in forest extension services

Although there are many agencies involved in some form of forest extension in the Marsabit Forest Ecosystem, there is currently no collaboration and synergy. This has resulted in the duplication of efforts and conflicting messaging. The agencies involved in forest extension services include Food for the Hungry (Kenya), GIZ, Action Aid, faith-based organisations, the County Government, among others. In a bid to have a well coordinated forest extension programme, the MFE management will organise a stakeholder forum for all forest extension partners to discuss and agree on a forest extension action plan, establish a Marsabit Forest Ecosystem conservation advocacy forum and develop common forest extension guidelines and extension packages for adoption by other stakeholders.

Action 2.5 Promote efficient use of wood fuel and alternative sources of energy

Currently, there is over-reliance on wood as the main energy source in Marsabit. Indeed, about 90% of the Marsabit population rely on wood energy and the use is not efficient as the communities still use the traditional open hearth system. There is also a rapidly increasing urban population in Marsabit town due to immigration and increased employment opportunities offered by the devolved governance system. These developments have resulted in an increased demand for fuel wood way above the sustainable fuel wood production from the Marsabit Forest.

To this end, the management will intensify awareness on various energy saving methods as well as alternative sources of energy through demonstrations, public gatherings, among others. Moreover, it will promote the adoption of energy conservation devices such as efficient stoves, promote efficient charcoal production technologies as well as promote alternative sources of energy, for instance, briquettes, biogas, solar and wind.

Action 2.6 Promote dry land forestry and natural resource management

There is very high reliance by the community on the MFE as a dry season supply for natural resources such as grazing, water and fodder. There is also over reliance on natural forest for domestic energy and construction materials resulting to perpetual conflicts due to competition for the forest resources by different communities. Therefore, there is need to integrate the different natural resource management systems. To tackle these issues, MFE management will collaborate with conservancies in promotion and adoption of dryland forestry. In addition, the management will provide structured access to the forest resources especially water and pasture. This will be done through the construction of check dams within the forest. The water will then be piped out to the community. The management will also encourage the sound management and utilisation of the dry land vegetation through dryland tree planting and species natural regeneration. Crucially, the management will encourage and promote adoption of soil and water conservation measures, such as reseeding tree and grass species.

Objective 3: Community livelihoods enhanced through enterprise development

It is aspired that Marsabit Forest Ecosystem will support and sustain community livelihoods in the near future, consequently empowering and improving the community's status. The current state with regards to this is whereby the community relies on the forest for both commercial and domestic purposes particularly for wood fuel. This objective has been designed to ensure that community livelihoods are improved thereby relieving pressure on forest resources. The management actions that will be implemented to realize this objective focus on promoting income generating activities; promoting forest eco-tourism; and promoting commercial insect farming e.g. apiculture, butterfly farming and sericulture.

Action 3.1 Promote income generating activities

The MFE community depends on limited sources of income. Consequently, firewood collection turns out to be one of the major sources of income for a large number of women from the

forest adjacent communities. Firewood collection, especially cutting of saplings, destroys the forest structure and regeneration process.

The implementation of this action will involve identification of prospective community income-generating activities to diversify income sources. Thereafter, the community will be assisted in developing and implementing business plans for the selected income generating activities. The MFE management will also provide economic assistance by training the communities in entrepreneurship, linking them with financial institutions for loans and linking the income-generating activities with potential markets. It will also promote the commercialization of non-wood products such as aloe and bee products as well as support assessment of the potential for payment of ecological services.

Action 3.2 Promote forest eco-tourism

The potential for eco-tourism in the ecosystem is relatively high due to the rich cultural heritage as well as the natural tourist attraction sites in the area. However, communities within the region lack the capacity to venture into this lucrative enterprise thus do not place much emphasis on it. However, there is presence of some activities related to eco-tourism including driving tour vehicles, selling cultural artefacts and traditional dance groups.

To further promote eco-tourism, the MFE management will identify and map tourist attraction sites within the ecosystem and the surrounding areas. It will also see to the development of tourism-support infrastructure in these sites. Youth groups will also be assisted to establish tour guiding groups. This action will be implemented in conjunction with Action 5.2 of the CP&CE Management Programme.

Action 3.3 Promote commercial insect farming e.g. apiculture, butterfly farming, sericulture

Commercial insect farming is a well developed industry in Kenya and on the global scale but is largely untapped in Marsabit. These are unique ventures with a potential to enhance conservation of the ecosystem. Insects play a prominent role in maintaining ecological processes such as pollination. Beehives can be used to mitigate Human Elephant Conflict. Sericulture and butterfly farming are also sources of income to many people in Kenya (e.g. Arabuko Sokoke and Kakamega Forest) and can also be practised in the MFE ecosystem with relative success if implementation is undertaken appropriately. To promote insect farming, the MFE management will train communities on insect farming and supply production material for start up. Management will specifically target women groups and other established associations that depend on wood fuel as a source of income. Additionally, it will support the acquisition of processing and value addition equipment, as well as the processing and marketing of insect products. These activities are expected to reduce the dependence of the communities on the forest.

Objective 4: Forest research enhanced and findings applied

The future desired state of the Marsabit Forest Ecosystem is where there shall be strong management-oriented research to boost the uptake of research results and robust linkages between managers and researchers. This desired state would also be where information to

support forest conservation is communicated via oral narratives, rituals, taboos and other traditional practices.

Achievement of this state has been impeded by the fact that despite there exists a lot of forest research carried out in the MFE, the outputs are hard to get as they are held by different researchers and organisations. There has also been a perception, especially among the current generation that traditional norms are "backward and primitive", yet elders communicated environment issues via this channel to communities. To address these problems, the management will develop a forest research plan to guide and focus research on key forest priorities. Management will also gather and document indigenous traditional knowledge and enhance adoption of research outputs. These actions are as explained in detail below.

Action 4.1 Develop and Implement a forest research plan

The major research projects that have been undertaken in the area include IPAL, AGREF, Ngurunit project and those implemented by institutions such as KARI, ILRI, NMK and GTZ. It is therefore imperative that previous research is reviewed, gaps identified and a research plan to guide forest research developed to focus research on key forest priorities. To do this, the MFE management will undertake inventory on past forestry research in Marsabit, identify and prioritise research needs and gaps, liaise with KEFRI and other research institutions to develop and implement the research plan. In addition, the management will disseminate research findings through workshops and appropriate media, knowledge repository, museums, field demonstrations, among other media.

Action 4.2 Gather and document indigenous traditional knowledge

The MFE natural resource use has been governed by respected traditional systems. These were regulated and implemented by the council of elders. The information was communicated via oral narratives, rituals, taboos and other traditional practices. However, there has been a breakdown of socio-cultural fabrics due to non-adherence to traditional norms. Today, the traditional norms are regarded "backward and primitive". To address this challenge, the management will identify and map preserved areas, mainly cultural and sacred shrines. It will also document and preserve the oral narrative and traditional dances using audio visual equipment and placed in the knowledge repository for ease of access.

Action 4.3 Enhance adoption of research outputs

Previous research projects have not disseminated their findings effectively. This could partly be attributed to weak linkages between managers and researchers. The lack of management-oriented research has also contributed to the low uptake of research results. Furthermore, acting on research findings has also been wanting amongst managers. Research findings have not been used to influence positive changes in the community. To change this trend, the management will mainstream science-driven management, disseminate research findings through workshops and appropriate media such as, knowledge repository, museums and field demonstrations. It will also liaise with the KFS HQ Research Liaison Office to ensure that research findings or recommendations are disseminated to field managers.

Tourism Development & Management Programme

Programme Purpose and Strategy

The purpose of the Tourism Development and Management Programme is:

To ensure that the MFE is offering memorable visitor experiences based on the unique biodiversity, scenic and cultural values in the area

The MFE receives low visitor numbers and consequently it has limited tourism infrastructure and facilities. Wildlife density in the forest is low and difficult to see because of the thick forest cover. In the lowland semi-arid and arid parts of the national reserve, wildlife has been depleted by impacts of poaching as well as livestock grazing. The Ecosystem is therefore unsuitable for traditional game viewing. On the other hand, the area undoubtedly has significant tourism potential, especially because of the scenic wilderness attractions that it offers which are becoming rare in other popular wildlife destinations.

In recent years, the Marsabit County has benefited significantly from donor funded infrastructural projects such as the Isiolo-Marsabit-Moyale road which is expected to improve road access to the MFE. If visitor and wildlife security can be assured and visitor support infrastructure improved, the area can attract visitors seeking adventure. This programme sets out a series of management objectives and actions that the MFE management will implement over the next 10 years aimed at realising the area's full tourism potential. It is based on a proactive and innovative tourism development and management strategy designed to overcome the obstacles that are presently holding back tourism development, by leveraging the area's many unique and presently underutilised attractions.

The following paragraphs set out the principles that will guide MFE Management in the implementation of the Tourism Development and Management Programme and the achievement of this Programme Purpose.

Guiding Principles

In implementing the MFE's Tourism Development and Management Programme, MFE Management will strive to ensure that:

Tourism is developed to augment natural resource protection and management

KWS incurs considerable resources in maintaining tourism management infrastructure in the MFE. However, the returns from tourism are minimal compared to the investments KWS incurs in managing the area and combating the major threats of poaching, insecurity, and livestock incursions. Low revenue attracts low levels of funding from KWS to support Protected Area management programmes. Hence, to ensure that MFE's revenue base improves and thereby attract adequate funds to support management, MFE management will promote tourism in the area. Furthermore, tourism use will be expanded in all parts of the Marsabit National Reserve to reinforce PA management activities and demonstrate that the protected area is being actively used. This, it is hoped, will help to forestall encroachment as well as

agitation for degazettement of the national reserve. For these reasons, the promotion of tourism development such that it strongly supports the MFE's conservation and management is a key aspect of the tourism strategy set out in this programme.

At present the vast majority of visitors to the MFE do not explore beyond the Low Use Forest Zone. As such, and in order to ensure that tourism is supporting conservation throughout the MFE, it will be a high priority to facilitate and promote tourism investment and visitor use in currently underutilised parts of the MFE, especially in the national reserve.

Tourism is developed appropriately

Most visitors to the MFE are presently attracted by the Marsabit forest's wilderness characteristics, pristine environmental quality and opportunities for solitude. The challenge therefore is to develop the capacity of tourism to support the long-term conservation of the area and contribute to national economic development, while continuing to ensure a top-quality visitor experience based on the scenic and wilderness values and opportunities for solitude that sets the MFE apart from its competitors. This balance is best achieved by fostering a high quality, low impact tourism product which is maintained and carefully managed through the management actions under this programme and zoning prescriptions.

The MFE offers attractive investment opportunities

The MFE's tourism product is presently in an embryonic stage of development, and it will be necessary for KWS and its partners to adopt an affirmative and innovative approach in order to kick-start investment, and thereby develop the MFE tourism product to the stage that it achieves necessary reputation and economies of scale. This will involve two complementary strategies: developing distinctive visitor activities, and providing investors with innovative tourism investment opportunities. Hence, the programme's tourism strategy aims to enable and support the development of a wide variety of distinctive visitor activities in the MFE, including walking safaris and camel safaris, especially in the presently little-used Wilderness and low use shrubland Zones to the north and south of the National Reserve respectively.

Community participation in tourism is encouraged

The continuing support of local communities and the County Government is vital for the long-term maintenance and conservation-friendly management of both the Forest and national reserves that make up the MFE. To maintain and enhance this support, it is imperative that the community and County Government are adequately benefiting from the existence of the protected area, and that communities neighbouring the MFE are provided with opportunities to participate in ecotourism activities. A key strategy of this tourism programme will therefore be to promote and support tourism investment and development in the national reserve and promoting direct community involvement in ecotourism and other community tourism-related activities.

These guiding principles are intended to guide the implementation of the Programme's three management objectives that, when taken together, achieve the Programme Purpose. These three objectives are:

- MO 1. Tourism activities and attractions diversified in environmentally appropriate ways**
- MO 2. Tourism facilities improved and expanded to support an increased number of tourists**
- MO 3. Tourism administration and management strengthened**

The following sections describe these management objectives and the management actions needed to achieve them. Under each management objective, there is a brief description of the relevant management issues and opportunities, which provides the specific context and justification for the management actions.

Management Objectives and Actions

Objective 1: Tourism activities and attractions diversified in environmentally appropriate ways

The future desired state of the MFE is where tourism activities in the ecosystem are diversified to increase visitation and visitor satisfaction. Increasing the number of visitors to the MFE can be a strong positive force in attracting support for long term conservation of the MFE protected areas. The present low visitation and marginal revenue accruing from tourism in the ecosystem could be contributing to lack of political interest or public support for conservation of the Marsabit National Reserve. Hence, an increase in visitors can generate much needed revenues from entrance fees, ranger guided tours, accommodation and concessions, which in turn can be invested in conservation and community development.

Currently, the MFE is confined to a restricted number of activities that limit the tourist experience in the area. Tourist activities include scenery and game viewing, bird watching and wilderness safaris. To achieve this objective and improve recreation experience of visitors, the management actions that will be implemented focus on: establishing walking and camel safaris; designing and establishing nature trails; establishing non traditional visitor activities such as night game drives and bush diners; and establishing visitor activities focusing on the local domestic market. These actions are elaborated in the following sections.

Action 1.1 Establish walking and camel safaris

Walking and camel safaris are popular activities with adventure seeking visitors in several ecosystems in the country e.g. Tsavo, Amboseli, and Laikipia-Samburu ecosystems. The MFE's large and currently underused wilderness areas, containing impressive scenic features, provide excellent opportunities for the development of diverse types of tourist safaris. Under this management action, the MFE Management will support the development of walking and camel safaris in collaboration with the community and tour operators. Safari routes will be identified, mapped and safari route associated features, such as picnic sites and special campsites designated at appropriate locations along the routes. Information on these routes will be compiled and included in the Marsabit Protected Area brochure for dissemination to visitors and tour operators.

Action 1.2 Design and establish nature trails

Good quality, well marked nature trails with a biodiversity or environmental focus can go along way in increasing the visitor's appreciation of the biodiversity values enhancing visitor experience. Under this action, the following nature trails will be developed: Marsabit lodge trail which is an existing but unofficial trail beginning from Marsabit Lodge to the peaks. It passes through the Crater Lake, canopy forest and ends at the highest peak. Bongole trail will also be developed at the Bongole Crater, where visitors and tourists can walk down the

crater and climb the adjacent hill. Another walking trail will be developed from Karare to Hurricane Hill, which will be short. A longer walking trail will be established from Karare gate to Bongole where visitors can walk enjoying beautiful sceneries. There are also many scenic craters and deep gorges in the national reserve where additional nature trails can be established for use by visitors during stop overs at these scenic features.

These will be walking trails designed with start/finish points in the same location which is convenient and popular with visitors. The trails will be developed to the appropriate standards that seek to minimise erosion and maintenance, protect biodiversity and landscape and maximise the scenic potential of MFE. Overall, the walking trails will offer variety of physical challenges utilising the diverse terrain and landscapes and have supporting facilities (e.g. picnic sites, latrines) and services (e.g. interpretation materials) for good quality walking experience. Additionally, trail brochure and map will also be produced and availed to visitors to enhance their experience. And to ensure that the trails are in good condition throughout the year, MFE management will ensure that all trails are always kept in good order through continuous trail maintenance such as replacement of missing or damaged signposts and cutting back vegetation.

Action1.3 Establish non traditional visitor activities such as night game drives and bush diners

A considerable number of animals come out at night to feed and these can be observed along the roads. Therefore, as part of efforts to diversify the visitor experiences, night game drives will be introduced in the protected area. Initially, this will be introduced on a pilot basis in view of security considerations and if the pilot case is successful, the night game drives will be continued. In addition, hoteliers will be encouraged to organise bush diners in designated camping sites and picnic sites in the forest and national reserve.

Action1.4 Establish visitor activities focusing on the local domestic market

As the population of Marsabit town increases, there is an increasing demand for recreation opportunities in natural settings. Requests have been received from Marsabit residents who want to hold their private functions in the forest. Some organisations would also like to use the forest to hold team building activities for their staff. In view of this, MFE management will carry out a survey to determine the preferred environmentally friendly non-consumptive uses that Marsabit residents would like introduced in Marsabit Forest. Based on the outcomes of this survey, efforts will be made to provide infrastructure (e.g. camp sites, picnic sites) to support the identified activities.

Action1.5 Develop distinct tourism products for each of the three MFE management Sectors

This management plan proposes to establish a functional National Reserve that will be divided into three management sectors (Northern, Forest, and Southern) that have varying potential for wildlife conservation. Majority of the Northern Sector is of marginal potential for wildlife. The area is arid, water is scarce and the land cover is dominated by volcanic rocks. The Southern Sector is moderately suitable for wildlife as a large part of this sector is covered by shrubland. The Forest Sector is highly suitable for wildlife because of the conducive humid climate, and abundant water sources and forage. The distinct natural resources in each sector can be exploited to develop unique tourism products for each sector. As such, the Northern Sector will be reserved for scenery viewing and adventure activities; the Southern Sector will be developed to support wildlife viewing; and the Forest Sector will support

scenery and wildlife viewing. However, before meaningful tourism can be developed in the Northern and Southern Sectors, tourism support infrastructure, such as viewing roads, view points, and picnic sites, will be established. In addition, once KWS has established management presence in the Southern Sector and livestock incursion is controlled, this sector can be restocked with species that are found in northern Kenya to enhance visitor experience.

Objective 2: Tourism facilities improved and expanded to support an increased number of tourists

The desired future state of the MFE is where adequate high quality visitor accommodation facilities are available. Currently, there is only one operational tourist lodge (Marsabit Lodge) in the Forest Reserve and an ecolodge under construction at the edge of Bongole Crater in the Marsabit National Reserve. There are a few other hotels in Marsabit town where tourists are accommodated but their standards are low. Hence, there is need to develop additional bed capacity in the ecosystem to accommodate the anticipated tourist increase once road access is improved through paving of the Isiolo-Marsabit-Moyale road. Further, if several tourism investors can be encouraged to establish facilities in the ecosystem, there is possibility of justifying air access as tourist numbers will be high. In addition, the additional visitor facilities will help market the MFE both locally and internationally increasing visitation.

As such, to realize the desired future state, MFE management will implement management actions focusing on: identifying and awarding tourism concessions; establishing KWS self catering Bandas; and designating and establishing campsites.

Action 2.1 Identify and award tourism concessions

Increasing the number of visitors, the length of stay and concession opportunities can enhance PA revenues and increase economic opportunities for local communities through employment and support of both community and private enterprises. Hence, this management action aims to provide concession opportunities to the private sector to develop tourist facilities outside the forest reserve (in the Low Use Shrubland zone).

As a first step in this process, MFE management will establish a site selection committee comprising KWS, KFS, NEMA, County Government, tourism industry experts and Community Representatives. This committee will assess and document potential visitor accommodation sites in the entire MFE based on criteria outlined in the *KWS Tourism Facilities Development Procedures Manual, 2006*. Once suitable sites are identified, a Tourism Prospectus will be developed to raise awareness and inform potential investors of the significant investment opportunities available in the MFE. The distribution of the MFE tourism prospectus will be followed closely by a formal Call for Expressions of Interest (EOI) in developing tourism accommodation facilities in the MFE. The EOI will invite proposals from potentially interested investors in accordance with the information provided in the MFE tourism prospectus, and will specify the general and MFE-specific criteria that KWS will use to assess proposals. The winning bidders will thereafter be awarded the sites for development of the visitor accommodation facilities. In addition, to ensure that the facilities do not have adverse impacts on the environment, development and operation of tourist accommodation facilities will be in accordance with the Environmental Management and Coordination Act, 1999.

Action 2.2 Establish KWS self catering Bandas

There is need to diversify visitor accommodation to cater for visitors who may wish to have some privacy. Such privacy can be offered in self catering accommodation (Bandas). Bandas have been established in many protected areas in Kenya and they are very popular with tourists. As such, the houses at the Old KWS Camp will be rehabilitated and converted to self catering Bandas. Once operational, the Bandas will be continuously maintained at high standards.

Action 2.3 Designate and establish campsites

In accordance with the MFE zonation scheme, campsites will be established in all management zones. As a start, MFE management in collaboration with tourism stakeholders will carry out an assessment of the need for additional camp sites and thereafter identify new sites if this is necessary. Campsites fall under two categories i.e. public campsites and special campsites. Public campsites will be provided with amenities such as fire places or fire pits, picnic tables, marked spaces indicating a boundary for one camper or a group of campers, pit toilets, and rubbish bins in which to place refuse. On the other hand, special campsites are exclusive sites which are booked in advance. Unlike the public campsites, no public amenities will be provided at the special campsites.

Objective 3: Tourism administration and management strengthened

Tourism volume in the Marsabit ecosystem is currently low therefore few challenges associated with managing visitors. However, despite this, there is need to ensure that the few visitors that are received in the area leave with memorable experiences of Marsabit so that they can come again and also market the destination to other potential visitors. This objective has therefore been designed to ensure that visitors appreciate and enjoy the diverse and unique biodiversity, scenic and cultural resources the ecosystem offers. In addition, the objective aims to promote and market the MFE both locally and internationally to attract more visitors to the area.

The management actions that will be implemented under this objective focus on: developing tourist information materials; developing visitor interpretation facilities; marketing the MFE through the internet and other media; organising promotional activities and events; developing and maintaining tourist information centres at the gates; branding the MFE to give it a distinct identity; and introducing and maintaining a tour bus service for local visitors. These actions are elaborated in the following sections.

Action 3.1 Develop tourist information materials

Interpretation materials are very important in promoting tourism resources in a tourism destination. They provide the much needed information on what is on offer, where it can be found, and how to get there. This information helps a visitor to understand the tourism products enhancing visitor experience and satisfaction. This information can be packaged in form of guide books, maps and brochures.

A tourist map exists at MFE but it does not cover the entire MFE and as such needs updating. As such, MFE management will liaise with KWS Business Development and Manage-

ment Section and other stakeholders in developing a guide book and tourist map for the area. Relevant information on the natural and physical features of interest will be collected, collated and packaged into a guide book, tourist map, and brochure with the help of out-sourced expertise in protected area interpretation. These tourist information materials will be produced and availed at relevant outlets e.g. gates and information centres.

Action 3.2 Develop visitor interpretation facilities

Informing and educating tourists and visitors about PA attractions, tourist activities and biodiversity values ensures that visitors get the most out of their visit, and provides a much-needed alternative activity to game viewing. Interpretation facilities also provide an opportunity for PA managers to communicate directly with visitors, for example to raise awareness of PA rules and regulations. This action therefore focuses on developing interpretation facilities at MFE that will include; education and information centre and a cultural centre. The cultural centre will be used by the local communities where they can display their wares and showcase their way of life to visitors.

The first step in establishing the new facilities will be the development of a design proposal for the facilities. Once the proposal has been finalised and approved, a tender process will be undertaken based on the proposal, to identify and secure the services of an appropriate firm to undertake the construction. MFE management and stakeholders will oversee construction of the new facilities, including liaising with the contractors concerning the design and materials, and will deploy staff to manage the facilities once they are operational.

Action 3.3 Market the MFE through the internet and other media

Marketing is a deliberate and orderly step-by-step process that begins with people and ends with programs, products, services and strategies. Successful marketing begins with the development of a quality marketing plan, which spells out the goals, strategies and tactics that will be used to reach targeted customers. In the case of the MFE, the management will develop a marketing plan that will employ wide and robust marketing strategies such as the use of social media (Twitter, Facebook, Blogs, Instagram) in promoting tourism in the area. Mainstream media such as national papers, community papers and radios will also be employed.

Action 3.4 Organise tourism promotional activities and events

To promote the MFE as a distinct tourist destination, MFE will apply a wide range of promotion strategies to reach both the local and international tourism markets. The promotion mix will include advertising MFE's unique tourism resources through magazines, newspapers, brochures, direct contacts and television coverage. The objective of the advertisements will be to foster awareness, change attitudes, or increase factual knowledge of natural resources and outdoor recreation opportunities in the MFE in the target market. In addition, one other promotional event that will be introduced in the area is an annual Camel Derby where the public will be invited to participate. Success of tourism promotion will thereafter be measured in terms of quantified attitude changes, visitation trends, increased awareness and knowledge levels of natural resources in the ecosystem.

Action 3.5 Develop and maintain tourist information centres at the gates

Tourist information centres can be instrumental in conveying protected area interpretation to visitors and hence influencing where they visit and what they look out for once they are in the ecosystem. Consequently, to enhance visitor experience, information centres will be established at the key entry points to the Ecosystem. These information centres will consist of one room at the gates where maps and guidebooks will be sold and brochures offered for free. Maps for safari/walking routes and nature trails will be available at these centres. The tourist information centres will be required to be proactive acquiring and providing up-to-date information on the ecosystem to visitors. Information will be acquired from stakeholders who have facilities or services to offer to tourists in the ecosystem.

Action 3.6 Brand the MFE to give it a distinct identity

The MFE has distinct attractions that are not commonly found in other protected areas in the country. The area has numerous magnificent craters and a unique mountain forest surrounded by arid lowland. Hence, there is need to highlight these values to show the specialness of the place thereby raising awareness on the importance of the area. These values will therefore feature as part of the branding exercise that is scheduled to take place in the MFE over the next few years. All products of the area's branding, such as the logos, slogans ("A bit of Mars unexplored") and other key features, will be incorporated into the development of all publicity materials, new PA signage, and visitor interpretation materials (such as the interpretation displays, guide book and map) developed under this objective and discussed in the actions above.

Action 3.7 Introduce and maintain appropriate transport services for local visitors

As part of the overall tourism promotion and marketing and in a bid to increase visitation, the MFE will liaise with KWS headquarters to have appropriate transport services introduced in Marsabit. The objective of introducing such a service is to promote domestic tourism in the area. The tour transport services which will include appropriate vehicles will run at specific times, for instance, weekends and public holidays. The vehicles will have central locations where potential visitors are picked from. To ensure that the service runs consistently without hitches, the tour vehicles will be maintained regularly. Such a consistency will see management win the loyalty of local visitors in the vicinity, and therefore boost tourism revenues.

Community Partnership & Conservation Education Programme

Programme Purpose and Strategy

The purpose of the Community Partnership and Conservation Education management Programme is to:

Enhance support and participation of MFE adjacent communities in conservation and sustainable use of natural resources

The majority of community members in areas adjacent to the MFE directly depend on natural resources for their livelihood needs. The type of natural resource use in this ecosystem specifically revolves around wood fuel and pastoralism in much of the areas surrounding the forest. These communities impact on the ecosystem particularly through encroachment into the wildlife habitat and overgrazing and the impacts of wildlife on the local communities lead to human wildlife conflict which may contribute to the loss of biodiversity and human life in general. The MFE Community Partnership and Education Programme will work towards the mitigation of these impacts; improve awareness of the MFE's values; and foster a constructive and supportive relationship between MFE management, its adjacent communities, and other involved stakeholders.

The key guiding principles, which will guide the implementation of the Community Partnership and Conservation Education Management Programme over the next 10 years and the achievement of the programme purpose, are set out below.

Guiding Principles

In implementing the MFE's Community Partnership and Conservation Education Management Programme, MFE Management will strive to ensure that:

Communities are actively participating in conservation and management of natural resources in the MFE

Protected areas are immensely impacted by surrounding and adjacent land uses, and, in turn, the management of these protected areas influences those surrounding areas. The demands of an increasing population, for forest resources at the MFE place enormous pressure on the MFE protected areas. As such, cooperative relationships need to be pursued to ensure that values for which the area is protected are maintained. Under this management programme therefore, MFE management will make concerted efforts to encourage compatible land use activities and to discourage incompatible ones, where practicable, within the MFE-adjacent areas.

Communities are receiving tangible benefits from conservation of natural resources in the MFE

The success or failure of a protected area is largely dependent on the support accorded by the local communities where it is located as well as the general public. Consequently, to realize sustainable wildlife conservation in protected areas such as MFE, local communities should become an integral part of conservation efforts and derive social as well as economic benefits from those efforts. It is best PA management practice to ensure that a PA brings tangible benefits to the local community. In this regard, under this management programme, management will strive to ensure that local communities derive a wide array of benefits from the conservation of MFE protected areas. This will include protection of the forest water catchment to ensure that the neighboring communities have regular water flow; employing members of the local communities when opportunities arise during PA management; and providing last resort grazing pastures for livestock.

Human-Wildlife conflicts are reduced for improved PA-community interactions

Human-wildlife conflicts are common especially in cultivated areas that are within the wet season elephant range or migratory corridors. Frequent conflicts create a negative attitude towards wildlife among the affected farmers leading to retaliatory attacks. To ensure that human-wildlife conflicts are minimized thereby improving PA-people interactions, this programme will endeavour to mitigate conflicts through separating marauding wildlife from cultivated areas. Further, effective intervention measures will be implemented to ensure that livestock predation cases are reduced.

There is increase in community awareness of the value of MFE's natural resources and the capacity of the community to sustainably conserve and manage natural resources in the MFE

Increasing pressures on land and other natural resources outside the MFE threaten to undermine both the ecology of the MFE, and the long-term sustainability of community livelihoods. Enhanced awareness of the values of the MFE protected areas among local communities and the general public can result in reduction of pressure on resources as well as increase support for the protected areas. When local communities are aware of resources being conserved and their environmental, economic and social values, they are more inclined to render their unwavering support for their conservation. As such, activities under this programme will aim to mitigate the negative impacts of unsustainable natural resource use on biodiversity and community wellbeing by improving the capacity of communities to sustainably manage land and natural resource uses. MFE management will work closely with other stakeholders in the conservation education sector to provide outreach programmes to local groups to increase conservation awareness.

Gender is considered during implementation of programme activities

Currently, a large number of women happen to be dependent on firewood collection from Marsabit Forest for their livelihood as well as for preparing family meals. Often times harvesting of dead and green wood is carried out interfering with natural forest regeneration proc-

esses. It is therefore critical that the role of gender in the conservation of the MFE is considered in order to achieve effective forest management. Under this programme, therefore, more attention will be given to gender to ensure that conservation activities do not disadvantage or undermine poor, vulnerable or marginalised people who are dependent upon or live adjacent to the MFE. MFE management will at all times endeavour to conserve natural resources in ways that enhance the community wellbeing and social equity.

These strategic principles are intended to guide the development and implementation of the five management objectives that have been identified by stakeholders to achieve the Programme Purpose. These are:

- MO 1. PA-community communication and collaboration mechanisms improved**
- MO 2. Conservation education and awareness programme strengthened**
- MO 3. Conservation-compatible community land uses and practises promoted**
- MO 4. Human-wildlife conflict reduced**
- MO 5. Opportunities for communities to benefit from the MFE improved**

The following sections describe these management objectives and provide an outline of the management actions needed to achieve them.

Management Objectives and Actions

Objective 1: PA-Community communication and collaboration mechanisms improved

The future desired state of the MFE is where there are proper mechanisms in place to enhance community participation in conservation efforts. However, this has been hindered by the lack of community involvement in tourism activities, few livelihood support options, unemployment, poverty, inadequate and low impact of Corporate Social Responsibility projects, and resource use conflict. Low awareness on biodiversity importance, negative attitude towards conservation, lack of KWS capacity in conservation education, conversion of forests to agriculture as well as uncontrolled charcoal production in communal land have further exacerbated the problem. To address these challenges, therefore, management will support establishment of location wildlife conservation associations with representation from all villages, strengthen the relationship between KWS and firewood collectors, farmers and pastoralist associations and use different communication platforms to highlight conservation issues. These actions are as expounded below:

Action 1.1 Establish location wildlife conservation associations

The local communities can play a significant role in management of wildlife and other natural resources if they are actively engaged by the natural resource managers. Currently, their participation in the conservation activities in the ecosystem is limited due to cultural beliefs and limited awareness about the importance of the sustainable management of natural resources. It is therefore important for the MFE management to integrate the community in specific ways that would allow them to show responsibility and interest in the ecosystem welfare. For this reason, community wildlife associations will be established for each administrative location in line with section 40 (1) of the Wildlife Act, 2013 to facilitate conflict resolu-

tion and cooperative management of wildlife. These Associations will have representation from villages in each location.

Action 1.2 Strengthen the relationship between KWS/KFS and firewood collectors, farmers and pastoralist associations

MFE is faced with the problems of firewood collection, crop damage, livestock predation and competition for resources between livestock and wildlife. These problems are brought about by the dependency of the local communities on the forest ecosystem for natural resources such as vegetation and water. Strengthening the relationship between the ecosystem management and community associations would go a long way to ensure that all stakeholders play their defined roles accordingly to guarantee positive progress. This would be in accordance with the Wildlife Conservation and Management Act, 2013, which calls for active community participation in wildlife conservation outside the protected area boundaries.

Under this action, the management will build the capacity of the associations for effective participation in natural resource conservation and management. The MFE management will also organise consultative meetings to understand the issues of concern of each association and find ways to address these concerns.

Action 1.3 Use different communication platforms to highlight conservation issues

There is great potential for highlighting different conservation issues through the use of the local media. Marsabit County has established local radio stations that convey information in local languages and magazines that can be exploited to improve the community's awareness about conservation issues. They can also be used to improve relations between the MFE management and the local communities and encourage their integration in the conservation of the MFE. Currently, KWS and conservancies communicate through mobile phones. However, some areas have no network constraining communication.

The MFE management will use local leaders such as religious and women groups to reach the community. It will also employ the services of the local media such as FM radio stations and Nuru magazine to disseminate information on compensation, human-wildlife conflicts, the new Wildlife Act, Forest Act and NKBC project. The management will also identify and engage resource persons who can transmit conservation messages through media. It will also collaborate with conservancies to strengthen KWS-Community relations. In this case, the Community Warden will participate in conservancy meetings where KWS agenda such as problem animal control (PAC) can be presented. Additionally, the management will focus on launching a shared radio frequency to enhance communication between the conservancies and KWS.

Objective 2: Conservation Education and awareness programme strengthened

The future desired state for the MFE that this objective seeks to achieve is one whereby there is robust awareness on the importance of biodiversity, positive community attitude towards conservation and KWS capacity in conservation education is enhanced. However, this has been impeded by the lack of a structured conservation education programme, low awareness of conservation issues and a lack of a central place where organised groups can

be educated. To address these hiccups, the management will implement the following actions: establish and equip a conservation education centre; redesign the MFE Education Programme to target key sectors of the community; develop a community outreach strategy; and collaborate with the local community groups in enhancing conservation education and awareness creation. These actions are discussed in the sections below.

Action 2.1 Establish and equip a conservation education centre

Awareness of conservation issues in Marsabit is significantly low due to the low literacy levels and the absence of a well-organised conservation education programme. Further than that, there is no distinguished education centre in the protected area to educate the public on conservation and the different ways in which they can contribute to the conservation of the forest ecosystem. Therefore, there is need to have a centre where organized groups from different age groups can be educated on the different conservation issues.

To address these challenges, the management will develop a proposal on the proposed education centre, liaise with KWS Headquarters to have the proposal approved and implemented. The educational centre will be strategically placed in a central location which will be easily accessible to all community members. Information will be provided in ways in which people from different age groups and literacy levels can grasp and comprehend the importance of conservation. It will also deploy a relevant human resource team, with the assistance of local community members, and equipment to the conservation and education centre.

Action 2.2 Redesign the MFE conservation education programme to target key community strata

To intensify awareness on conservation, information dissemination is critical. Currently, information on diverse themes exists but it needs to be packaged to make it easy to disseminate to the public. Additionally, the education programme in place is not specific about the key areas of concern to the community including the cultural aspects and their livelihood. Redesigning the education programme will see to the incorporation of a holistic understanding of the local community to achieve the conservation goals.

In a bid to address these issues, the management will endeavour to systematically collect and collate existing information on Marsabit covering diverse themes, and synthesise this into a compendium. Besides, the management will install banners with wildlife messages in strategic locations. These will be identified in collaboration with other stakeholders. Other measures to be adopted include the development of wildlife field guidebooks, maps for various themes and posters and digitisation of education materials for ease of dissemination to schools. It is anticipated that such materials should be targeted at different audiences. The management will also develop an education curriculum for MFE and come up with branded materials for distribution to the public.

Action 2.3 Develop a community outreach strategy

Currently in Marsabit, conservation education is ad hoc. Implementation of an outreach strategy will help to provide a strategic roadmap for bringing key stakeholders and underrepresented community groups into the planning process. It will also increase community awareness and provide opportunities for constructive citizen engagement and community input with regards to the effective execution of this plan.

Therefore, a clear roadmap is needed, which, if implemented, will yield measurable outputs in terms of support for conservation. Thus, the management will organise a workshop to discuss the objectives of the community outreach strategy and identify main issue areas that the strategy will target. It will also target the local community at different social strata and institutions/stakeholders for efficiency in the outreach programme.

Action 2.4 Collaborate with the local community groups in enhancing conservation education and awareness creation

Currently, there is need to inculcate community ownership of natural resources and conservation programmes in Marsabit. The local community groups are also in touch with the community and it is easier to reach it through them. More critically, these groups are beneficiaries of improved conservation and management of natural resources. They therefore have the capability of informing the public about the importance of conservation from an approachable perspective.

Therefore, the management will establish a working relationship with extension mothers (educators) especially from women firewood collectors association. Extension mothers have had success in the past, in relation to conservation education, and this could be exploited further for better results. The management will at the same time mark important trees that should not be cut as has been done in Korr, Laisamis in Marsabit South and educate the public on the importance of these trees.

Objective 3: Conservation compatible land uses and practices promoted on PA-adjacent areas

Habitat destruction, charcoal burning and human encroachment are some of the main issues that continue to dampen the long prospective outlook of MFE. To address these challenges, MFE management will implement management actions focusing on: development of alternative sources of livelihood for community members dependent on forest resources; development of water sources outside the protected area; improvement of the management of communal grazing areas; development of a local level land use plan focusing on securing wildlife corridors; supporting the establishment of conservancies; and promoting fuel-efficient stoves. These actions are further expounded on below:

Action 3.1 Develop alternative sources of livelihood for community members dependent on forest resources

In Marsabit region, firewood harvesting is a big menace to the ecological balance. Currently, it is estimated that more than 600 women depend on fuel wood from the forest for their livelihoods. To tackle this problem, the management will organise a consultative forum for the fuel wood collectors, support the fuel wood association in establishing a tree nursery and sensitise the women on potential alternative sources of livelihood. When there is potential for employment generating activities, there will be a strong emphasis put on those bids that employ large numbers of these women. Furthermore, the women, whether individually or in groups, will be guided to determine their needs to start up income-earning enterprises. Lastly, the women will be supported in starting alternative income generating activities.

Action 3.2 Supply water for domestic and livestock use to the local community

This action has been designed to minimise livestock incursion in the protected area; reduce conflicts between livestock and wildlife; prevent livestock pressure on the PAs vegetation allowing regeneration; and improve water sources and wildlife habitat. To minimise forest degradation wrought by livestock impact, MFE management will pipe water from the PA to community land. Karare Centre used to draw water from the forest at Lagga Mohammed spring; Kituruni Centre from Lagga Mohammed and Bakuli stream; Songa centre from Samachalle springs in the forest. Sagante wells can supply Gabra scheme/Boru Haro and Sagante. Hence, these prior water supply systems to neighbouring communities will be rehabilitated to ensure that piped water from the forest reaches the trading centres and villages. Further, Water Resource Users Associations will be strengthened to ensure sound management of water resources. In addition, MFE management will collaborate with the County Government to rehabilitate the Fifty Feet deep well water supply. This well requires desilting. At Karantina, near fifty feet deep, there are many springs that supply water to about 75% of people and livestock. MFE management will collaborate with the community, Water Resources Management Authority and the Marsabit County Government in piping this water to Manyatta Jillo, Jirime and Hula Hula residents who mainly bring their livestock to drink at these wells. Moreover, check dams will be constructed to augment natural water sources in the forest.

Action 3.3 Improve management of communal grazing areas

This action is aimed at reducing land degradation through overgrazing by promoting sound land use management, improving pasture availability and the reduction of conflicts in the area over resources. Currently, local communities have outlined a system governed by a council of elders, which specifies where the community is allowed to graze based on the season. In order to improve pasture management, the MFE management will work with the council of elders, grazing committees and other stakeholders e.g. conservancies in developing and implementing holistic planned grazing.

Action 3.4 Develop a local level land use plan focusing on securing wildlife corridors

It is critical to secure wildlife corridors by integrating wildlife conservation as a land use in the conservancies. To achieve this, the MFE management will collaborate with conservancies adjacent to the MFE (i.e. Songa, Jaldessa and Shur) to develop land use plans that preserve critical wildlife migratory corridors and dispersal areas. Further, during installation of HWC fences, caution will be taken to ensure that elephant corridors and dispersal areas are not interfered with. During the land use planning, the southern part of the National Reserve (Karare-Bongole-Kamboya area), which is a critical dispersal area for elephants should be protected as a national reserve and tourism products and infrastructure developed in this area.

Action 3.5 Support establishment of conservancies

Establishment of more conservancies in the MFE is important for securing wildlife corridors and dispersal areas, expansion of wildlife space; improving community livelihoods and minimising human-wildlife conflict. More so, it promotes sustainable utilisation of land resources

and secures land ownership hence promoting peace and social cohesion among the local communities.

Therefore, MFE management will support the registration of new conservancies and subsequent development of management plans as required by the Wildlife Conservation and Management Act, 2013. It will also give assistance to the organisation of conservancy meetings and strengthen the community involvement in running of their conservancies through consultative forums.

Action 3.6 Promote fuel-efficient stoves

At present, firewood is sold to individuals and institutions in Marsabit town. Unfortunately, they use cooking devices that waste a lot of energy. Availing fuel-efficient stoves will ensure that the amount of wood used for cooking reduces and consequently impacts on the forest are reduced.

On the back of this argument, the management will procure a few stoves for demonstration to target institutions and thereafter donate these to schools or hospitals. The management will also sensitise and create awareness of these energy-saving stoves. It will introduce hospitals, schools, hotels, churches, government and non-government agencies to these fuel-efficient stoves and means of acquiring them. It will also work with NEMA and the Marsabit County Government to seek mechanisms that will ensure increased adoption of energy saving devices in the MFE-adjacent areas.

Objective 4: Human-wildlife conflict reduced

The future desired state at the MFE is where human-wildlife conflict (HWC) around the MFE, in particular crop raiding, livestock attacks/predation, disease transmission, and human injury or loss of life, are minimised in order to improve MFE-community relations. The major problem animals include Elephants that cause crop raiding at Songa, Daka-Baricha, Kituruni, Badassa, Karare, Leyai (Songa) and Hula Hula; hyenas that attack livestock mainly in Songa, Bubisa, Karare, Kubi-Bagasa/Dirib, Jaldesa, and Kituruni; lions that prey on livestock in Shurr; Gudas Soriadi; and leopards that kill livestock at Daka-Baricha. Desert snakes are also responsible for many human injuries and deaths and baboons also raid crops in the cultivated areas of the ecosystem. To address the HWC problem and thereby improve PA-community relations, four management actions will be implemented under this objective. These relate to: installing an electric fence in Human-Elephant Conflict-prone areas; improving problem animal control strategies; improving the wildlife damage compensation processing system; and establishing and maintaining a human-wildlife conflict database. These actions are elaborated below.

Action 4.1 Install and maintain electric fences in Human-Wildlife Conflict-prone areas

Marsabit elephants raid the local farm establishments leading to huge economic losses to Marsabit agropastoralists. To robustly bring this problem to a stop, the management will identify human-wildlife conflict hotspots which will assist in the alignment and installation of electric fences around these areas. It will also educate the affected community on simple measures that can be put in place to ward off elephants and avert crop raiding. Some of the conflict-prone areas include farms at Songa, Daka-Baricha; Kituruni; Badassa; Karare; Leyai (Songa); and Hula Hula villages. During the village level planning meetings in these villages

the local community recommended that electric fences should be installed in areas outlined in table 7. The fences will, however, be designed and aligned in such a way that critical elephant movement corridors, particularly the southern and south western corridors, are left open. Since the FR/NR-Bule Marmar corridor passes through cultivated areas, this corridor will be closed. Elephants will have to access Bule Marmar through the southern (Bongole area) corridor.

To ensure that fences do not break down because of lack of maintenance as happened to previous electric fences installed in the area, KWS will establish a fence maintenance unit and make necessary budgetary allocations to this unit to make it functional and effective.

Table 8. Recommended HWC fence alignment

Village Name	Recommended fence alignment
Hula Hula	No fence is needed as the mainstay of the community is pastoralism, which, if well managed, is compatible with wildlife conservation
Karare	-do-
Kituruni	The fence alignment should follow the old fence alignment which enclosed the farmed area. However, it should be extended to enclose new farms that have been established in recent years.
Songa	-do-
Sagante	The fence alignment should follow the old fence alignment along the FR/NR boundary
Badasa	-do-
Daka-Baricha	-do-
Jirime	-do-
Nangayo	-do-

Action 4.2 Improve problem animal control (PAC) strategies

The scarcity of PAC rangers in Marsabit has compelled its residents to rely on the security rangers based at Songa. The shortage prevents rangers from preventing crop raiding appropriately. To address these challenges, the management will strengthen the PAC in Marsabit, provide appropriate equipment, for example, thunder flushes and tents. Furthermore, the management will collaborate with community wildlife conservancies in PAC activities and strengthen the Songa and Karare PAC outposts by providing vehicles. At the same time, it will establish a PAC hotline to boost communication and promote establishment of other wildlife barriers such as Kai apple and lion-proof bomas. Other methods that can scare animals such as flickering torches will also be employed. It will also identify and recommend gazettement of honorary wardens from the community to further strengthen wildlife conservation and management.

In regard to hyenas that are the major problem animal in the Sagante, Kilita Korma, Badassa and Songa areas, management will trap and translocate the hyenas from these areas. In addition, a population survey of hyenas in the ecosystem will be carried out to understand their numbers and distribution. Based on the results of this survey, problem hyenas will be trapped and translocated to other protected areas that harbour abundant prey or alterna-

tively, if translocation is not feasible, the trapped hyenas will be dispatched to minimise conflicts.

Action 4.3 Improve the wildlife compensation claims processing system

The KWS Marsabit Station often receives cases of people who have been bitten by snakes. However, it is quite a challenge to verify some claims due to the huge distances involved and poor communication in the Marsabit County. In addition, cultural and religious practices, such as that a dead body be disposed as quickly as possible, makes verification of compensation claims a bigger challenge. To facilitate community compensation claims for community members who are far away from KWS offices, MFE management will work closely with the County Wildlife Conservation and Compensation Committee in identifying government officials who can be used to verify validity of such compensation claims. The management will also sensitise and create awareness among the community on the wildlife compensation regulations to ensure that communities are aware of what is expected of them in case of HWC cases that warrant compensation.

Action 4.4 Establish and maintain a human-wildlife conflict database

A well organised database can be a valuable source of information to support planning and decision-making. A significant amount of HWC data is available at the MFE, but it is not organised and stored in a format that can facilitate quick analysis to discern nature, extent, spatial distribution and trends of the conflicts. To effectively correct this problem, the management will provide a computer and relevant software to support HWC monitoring and evaluation. A GPS camera for collection location data will also be provided. Subsequently, this information will be linked to a GIS database to facilitate analysis of spatial distribution of claims and causes. This would eventually improve the regular assessment of conflict reduction activities and facilitate adaptive management.

Objective 5: Opportunities for local communities to benefit from the MFE improved

The desired future state of the MFE is one where MFE-adjacent communities are benefiting directly from support given through KWS' corporate social responsibility projects or income-generating conservation projects. This, it is hoped, will enhance community support for conservation and management of natural resources in the ecosystem. Three management actions have been developed to achieve this objective, focusing on: employment of local community members in the wildlife and forest sectors; development of community nature-based initiatives and supporting enhancement of other livelihood activities; and supporting production of 'eco-friendly' charcoal. These actions are discussed further in the following sections.

Action 5.1 Employ local community members in the wildlife and forest sectors

MFE-adjacent communities bear many of the direct and indirect costs of wildlife conservation, both through human-wildlife conflicts and the loss of access to land and natural resources. If these costs are not offset, community support necessary for the continued survival of the MFE as a functional ecosystem will not be sustainable. As such, activities under this action will aim to provide practical ways of giving direct benefits to communities

neighbouring the MFE. In this regard, when opportunities for jobs that can be filled at the ecosystem level arise, priority will be given to local community members. The MFE protected areas already provide a variety of such employment opportunities e.g. in maintenance of fences, roads, tree nurseries, buildings or compounds.

Action 5.2 Develop community nature-based initiatives and support enhancement of other livelihood activities

The MFE management aspires to increase income-generating opportunities for the local communities to reduce their dependence on the natural resources in the Marsabit Forest. With this in mind, the management will strive to support the establishment of eco-tourism ventures and initiate a camel derby to promote cultural activities with tourism benefits. It will also help the community members in venturing in eco-friendly, income-generating activities such as soil-block making, bead making, bee keeping, butterfly farming, poultry and fish farming as well as other acceptable and viable enterprises. The management will also promote agro-forestry, focusing on fruit trees, improve livestock production through support of cross-breeding programmes and support livestock marketing. These projects will be carried out in collaboration with relevant government agencies.

Action 5.3 Support production of 'eco-friendly' charcoal

There is a unique opportunity to produce charcoal from weed species e.g. *Prosopis juliflora* as well as those species that have increased dramatically in abundance as a result of over-grazing (e.g. some *Acacia* species). Eco-friendly charcoal production will initially be supported on pilot basis in the three community conservancies adjacent to Marsabit Forest Reserve (Songa, Jaldessa and Shur). This, the management anticipates, will be carried out through an established charcoal producers association established in accordance with the Forests Act, 2005. Efficient charcoal kilns will be introduced whereby the management will collaborate with other stakeholders in training the local community on the efficient use of kilns and identification of appropriate tree species for charcoal production.

Action 5.4 Develop a mechanism to enable regulated access to cultural sites

A number of sites of cultural importance are known to exist within the FR/NR including: Badassa old source, Mado Ajoflu, Boji Springs and Karsa wells for Borana community, and Lake Paradise and Chute wells for the Rendille community. However, due to entry restrictions, these sites are not accessible to community members for traditional cultural practices. To ensure that the local community is able to access the forest for traditional cultural practices without any negative impacts on the security or integrity of the MFR/NR's natural resources, first, all sites of cultural importance in the MFE will be identified and documented by MFE management, working in close collaboration with local community representatives. Second, MFE management and community members will work together to develop the rules and regulations that will govern community visits to these sites. Finally, after these regulations have been agreed, community visits will be facilitated on a pilot basis, and rules and regulations subsequently adjusted as necessary according to these experiences and any lessons learnt.

Protected Area Operations & Security Management Programme

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Programme Purpose and Strategy

The purpose of the PA operations and Security Management Programme is:

To ensure that MFE's operational systems and structures are effectively and efficiently supporting the achievement of the MFE purpose, and the delivery of the MFE's management programmes

The MFE faces many conservation challenges mainly emanating from the interaction between the local community and the MFE protected areas. Many of these threats, such as livestock incursion in the protected area and illegal harvesting of forest products had been impacting the forest ecosystem even before the establishment of the protected areas. Indeed the protected forest reserve was established to minimise these impacts and forestall destruction of the Marsabit forest which is a critical water catchment area for Marsabit area. As populations of people and their livestock increase, there is corresponding increase in pressure on the forest for forest products. It is expected that unless drastic measures, such as the current closure of the forest, coupled with increased forest surveillance are maintained, pressure on the forest will intensify during the 10-year duration of this plan. Strong stakeholder collaboration is therefore needed to ensure that agencies that have management responsibility for the protected area, KWS and KFS, are working in tandem to ensure that the forest is safeguarded.

This plan sets out many management actions which, if implemented, will ensure that the water catchment functions of the ecosystem and biodiversity is maintained. However, delivering these management actions in a remote area as is the MFE is a huge undertaking. Sufficient management resources and appropriate organisational structures are therefore required to ensure that management is effective. In particular, the effort spearheaded through this management plan to manage the MFE as a single management unit will require the establishment of effective collaboration mechanisms between KWS and KFS and the expansion and strengthening of PA operations to fully encompass the entire MFE as currently, management is focused on the forest reserve only. The Protected Area Operations and Security Management Programme provides the means for strengthening the MFE's management systems, structures and human resources to support the implementation of the other four management programmes, and the overall achievement of the MFE Purpose Statement.

The following section set out the guiding principles that will guide MFE Management in the implementation of the Protected Area Operations and Security Management Programme and the achievement of the Programme Purpose.

Guiding Principles

In implementing the MFE's Protected Area Operations and Security Management Programme, MFE Management will strive to ensure:

Management is integrated and unified across the MFE

A fundamental premise of this management plan is that the MFE will be managed holistically as a unified and integrated single management unit. This approach will maximise the efficiency and effectiveness of the area's administration and management, ensure the conservation of the area's Exceptional Resource Values, and facilitate the development of tourism across the entire ecosystem in an appropriate and compatible manner. As such, this programme will aim to ensure that agreements and mechanisms to enable the effective management of the MFE as an integrated and unified management unit are put in place, and that KWS, KFS and Marsabit County Government are collaborating together in the management of the MFE.

Good communications and access

The MFE is a large and remote area that has been traditionally beset by problems of access to the area. Good communications and access throughout the entire MFE is essential to support the effective and unified management of the area and enable MFE management to respond rapidly to specific issues as they arise (most notably issues relating to security and HWC). As such, this programme will emphasize the continuing improvement of communication systems in support of management activities as well as cooperation between MFE Management and other stakeholders, such as neighbouring conservancies and tourism industry partners. In addition, improvements in infrastructure across the area will be planned and targeted to provide maximum support for the effective management of the MFE, and to support tourism development across the area.

Sufficient and well-allocated human and financial resources

Underpinning every management action designed to achieve each of the management objectives outlined in this management plan, and thus achieve the desired future condition of the MFE, are the MFE staff that will be responsible for implementing them. These staff not only require conducive working conditions and facilities, but also the necessary equipment and training to carry out their duties. As such, this programme will aim to ensure that MFE human resources are of sufficient number and efficiently allocated in order to implement this plan's management actions, and that the financial resources required to deliver the plan's management actions are made available.

Security presence is increased

The significant human and financial resources that MFE management have invested in law enforcement and security have only so far prevented some illegal activities in MFR/NR, with the rest of the MFE still being significantly impacted by livestock grazing and other illegal activities that have displaced wildlife in large swathes of the Marsabit National Reserve. As such, a high priority of this management programme is the intensification and extension of security and management presence across the entire MFE. This will be supported by the decentralised sectoral management of the area, which aims to increase management pres-

ence and infrastructure development across the MFE, and the establishment of new ranger outposts in line with the sectoral management strategy.

Collaboration with key stakeholders is strengthened

Communication and collaboration with key stakeholders in and around the MFE will remain essential to improve security responses, strengthen the deterrent against illegal activities in the area, and improve the overall effectiveness of security operations. As such, and in particular to deter illegal activities, this programme will strengthen security collaboration with key stakeholders, such as the local police and local wildlife conservancies.

These strategic principles are intended to guide the implementation of the Programme's four management objectives that, when taken together, achieve the Programme Purpose. These four objectives are:

- MO 1. Institutional collaborations formalised and strengthened**
- MO 2. Performance and motivation of MFE staff improved**
- MO 3. MFE natural resources and visitors safeguarded**
- MO 4. Infrastructure to support PA management and tourism development improved**

The following sections describe these management objectives and provide an outline of the management actions needed to achieve them. Under each management objective there is a brief description of the relevant management issues and opportunities, which provides the specific context and justification for the management actions.

Management Objectives and Actions

Objective 1: Institutional collaborations formalised and strengthened

The future desired state at the MFE is where stakeholders are actively involved in the management of the ecosystem to ensure that the ecosystem continues to provide the much needed goods and services. This desired condition can be achieved if stakeholders with legal jurisdiction over the MFE protected areas and other conservation partners are working in tandem to achieve the protected areas management objectives. This objective has therefore been designed to address problems that hinder effective participation of key stakeholders in the management of the MFE protected areas. These problems include: overlapping mandates at the forest reserve where both KFS and KWS have legal mandate to carry out their functions; natural resource use conflicts; and biodiversity degradation due to uncontrolled livestock grazing, among others. The management actions that will be implemented under this objective will focus on: drawing and implementing a Memorandum of Agreement on the implementation of the management plan, collaborating with the National land commission and Marsabit County Government to secure critical wildlife habitats, establishing and operationalising a resource users forum, collaborating with National and County administration in management of natural resources in the MFE, collaborating with other stakeholders in maintaining the current moratorium on consumptive use of forest products in the MFR/NR, collaborating with Marsabit County Government to control livestock incursion and human encroachment in the MFE protected areas, and implementing rules and regulations for

livestock grazing in the National Reserve. These actions are elaborated in the following sections.

Action 1.1 Draw and implement a Memorandum of Agreement regarding the implementation of the MFE management plan

Resource utilisation in the Marsabit Forest Ecosystem is uncoordinated due to overlapping mandates. For instance, the Kenya Forest Service oversees use of forest products such as firewood collection, licensing of installations (communication masts and water abstraction) and law enforcement in the Forest Reserve. KWS is responsible for tourism development and management and providing security in the MFE. On the other hand, the forest-adjacent communities graze and water livestock in the forest conflicting with national reserve management. This is exacerbated by poorly marked protected area boundaries.

To address this challenge, a memorandum of Agreement will be drawn between KWS, KFS and the County Government on the implementation of the MFE management plan. The MOA will specify the role and obligations of each institution in the implementation of the management plan as well as management of MFE's natural resources.

In addition, the success of this plan hinges on stakeholders' commitment to follow through with implementation of activities outlined in this plan. Therefore, to facilitate plan implementation, an MFE Management Plan Implementation Committee will be formed to coordinate and oversee the implementation of the Plan. The Committee will be an advisory body comprising representatives from Kenya Forest Service, Kenya Wildlife Service, County Government of Marsabit and other government and nongovernmental agencies co-opted by these three organizations. The Committee shall meet regularly to review progress in plan implementation and make adjustments needed to enhance achievement of MFE's management objectives. The Committee will be Chaired jointly by the KWS Senior Warden, Marsabit and the KFS Marsabit Ecosystem Conservator. Progress in plan implementation will be communicated with other relevant stakeholders with enough frequency to ensure that the plan remains a living document.

The Committee shall perform the following functions:

- a) Co-ordinate the implementation of the Plan;
- b) Mobilize resources for Plan implementation;
- c) Monitor and evaluate the progress of activities;
- d) Identify constraints in plan implementation;
- e) Produce annual progress reports on plan implementation; and
- f) Recommend review of the management plan.

Action 1.2 Collaborate with the National land commission and Marsabit County Government to secure critical wildlife habitats such as corridors and dispersal areas located outside the PA boundary

A large part of the Marsabit National Reserve can be regarded as a "paper protected area" meaning that although the area is legally protected, it does not achieve the biodiversity conservation objective for which it was established. Wildlife has been displaced from most of the National Reserve by livestock grazing and human settlement and significant wildlife populations are now to be found in the forest part of the national reserve and immediate surrounding areas. As human population increases in the Karare area, there is corresponding increase in pressure on the elephant corridor and dispersal areas and if the dispersal area is

not secured now, it might be very hard to reclaim it once the area is settled. It is therefore important to revise the boundary of the national reserve taking into consideration the wildlife concentration areas, wildlife corridors and dispersal area and the area that KWS and its partners can effectively manage to realize conservation objectives. In this regard, it would be prudent to consider revising the national reserve boundary to include majority of the critical wet season elephant migration area located to the south of the current national reserve boundary.

Action 1.3 Establish and operationalise a resource users forum to encourage participatory natural resource management in the MFE

Currently, natural resources are scarce. The little that is available faces conflicts in use and ownership. In addition, there are cases of poor resource use and development controls and lack of a buffer zone.

In order to tackle this problem, a Mt. Marsabit Natural Resources Forum will be established. Towards this, the MFE management will identify and mobilise key stakeholders to form the forum. Workshops will be organised to develop terms of reference of the forum and sensitise stakeholders on the role of the forum in promoting sustainable utilisation and management of biodiversity in the MFE.

Action 1.4 Collaborate with National and County administration in management of natural resources in the MFE

The threats to the MFE's integrity are complex hence calling for interventions from a wide range of stakeholders both at the national and county level. At the County level Marsabit County government requires participation of government agencies, such as KWS and KFS, in the development and implementation of a participatory 5-year County Environment Action Plan. Currently, the national government represented by the County Commissioner coordinates security issues related to natural resource management through the County Security Committee

To further encourage collaboration between the County and the National government, the Senior Warden and the Ecosystem Conservator will participate in the County Development Committee and the County Security Committee. This will help in the implementation of effective security and development measures in the MFE for positive development. Other important committees include the County Steering Committee, which is responsible for the agricultural and rural affairs of the county, the County Wildlife Conservation and Compensation Committee as well as the County Environment Committee. The SW and EC will also be involved in Water, Environment and Sanitation Coordination in the county and other relevant platforms. Prior to the meetings, they will be briefed accordingly by the relevant section heads.

Action 1.5 Collaborate with other stakeholders in maintaining the current moratorium on consumptive use of forest products in the MFR/NR

The MFR/NR has been a site for clashes between various ethnic groups in the area. The clashes are prompted by competition for natural resources such as livestock pasture as well as water. Due to these frequent clashes, the Marsabit County Security Committee has instituted a moratorium consumptive use of forest resources thereby banning entry of local communities and their livestock in the MFR/NR. Moreover, KFS is no longer issuing permits for firewood collection in the forest. As a result of this intervention measure stakeholders allege

that water quantity and quality from forest springs and wells has improved significantly. Forest degradation has also declined and the forest cover is improving. Ethnic clashes in the forest have also stopped. Hence, to maintain peace among the local community as well as improve the water catchment function of the forest, the moratorium on consumptive use of forest resources will be maintained during the plan duration. However, a review of the status of security, water and forest biodiversity will be carried out after every three years to help the Marsabit County Security Committee decide on whether to extend or suspend the moratorium. Baseline biodiversity assessments have been carried out under the Northern Kenya Wildlife Conservation Project and this information will be compared with the biodiversity assessment information that will be generated after five years.

On the other hand, during the village level planning meetings, all villages prioritized insecurity in the forest wrought by bandits as the main issue that needs to be addressed by MFE management. Bandits attack community members who enter the forest for firewood or water. Community members have been sexually assaulted and some have been killed by these bandits. These bandit attacks are also said to spark ethnic clashes that leave many dead. Flashing out bandits from the forest will, however, be difficult if local community members are also accessing the forest as it is impossible to tell a bandit from other innocent members of the community. Whereas some villages supported the forest closure on security grounds, there were others that felt that they should have access to the forest, but security should be provided to them. Unfortunately, it is not possible for rangers to accompany all community members who would wish to enter the forest because of the low staff strength. Hence, the moratorium is a positive measure that will help to enhance security in the MFE. However, despite the moratorium, controlled livestock grazing will be allowed during extreme droughts to save livestock and thereby protect the community livelihood.

Action 1.6 Collaborate with Marsabit County Government to control livestock incursion and human encroachment in the MFE protected areas

Due to lack of active management of the section of Marsabit National Reserve that is under the jurisdiction of the Marsabit County Government, members of the local community have encroached on the National Reserve and established villages such as Parkishon and Segel. Karare scheme has also expanded into the National Reserve. Another village around Jirime is also in the National Reserve. The local community also graze their livestock in the National Reserve and over the years, wildlife, which was scarce due to the arid environment in the most parts of the National Reserve, has been depleted. Some parts of MFR/NR adjacent to Marsabit Town have also been converted to high end residential areas. In addition, provision of utilities, such as electricity and water to villages along the Isiolo-Moyale road, is attracting people to the area close to the road and if this continues wildlife corridors will be threatened.

Hence, to ensure guided land use development and achievement of the National Reserve's management objectives, KWS and the Marsabit County Government will work closely to find a long term solution on the future of illegal settlements and livestock grazing in the National Reserve. In seeking to resolve these issues, the two institutions and the local community will be guided by the need to maintain a functional ecosystem.

Action 1.7 Implement rules and regulations for livestock grazing in the National Reserve as per the Wildlife Act, 2013

Currently livestock grazing in the National Reserve is uncontrolled. This could be attributed to the fact that the National Reserve has never been functional since its establishment. As such, to control livestock grazing in the National Reserve, KWS will work closely with the

Marsabit County Government and the local community in the Implementation of rules and regulations that will control livestock grazing in the National Reserve. The rules will specify where grazing can occur and under what conditions.

Objective 2: Performance and motivation of MFE staff improved

The future desired state of the MFE in regards to staff and personnel is where by an adequate skilled and motivated workforce is deployed at the MFE to facilitate conservation and management of the ecosystem. Currently, the MFE experiences staff shortages in many cadres hindering effective management. Other problems facing the MFE include: lack of adequate management and administrative support infrastructure, inadequate staff training in relevant management fields, and poor provision of staff welfare services, amenities and facilities. Under this objective, therefore, KFS and KWS will endeavour to address staff issues by implementing actions focusing on: implementing the sector-based management organisational structure, strengthening staff capacity at the MFE, training staff in relevant skills and improving staff welfare and motivation. These actions are discussed in the following sections.

Action 2.1 Implement the sector-based management organisational structure

Apart from the MFR/NR where KWS has some management presence, the rest of the national reserve has no management and administrative infrastructure. The only ongoing management is wildlife protection in form of security operations to counter wildlife poaching, and particularly of elephants. This management action therefore recommends establishment of a sector based administrative structure similar to the ones established in Mt Kenya, Tsavo, Aberdare and Meru Conservation Areas to expand management presence in the entire MFE.

With the completion of the ongoing paving of the Isiolo-Moyale road, it is expected that visitors to the MFE will increase. Hence, there is need to expand management to other parts of the National Reserve to diversify tourist attractions. In addition, to ensure that there is strong and effective management system that is able to develop tourism opportunities and at the same time offer security to visitors and wildlife, a new management structure is proposed. In this regard a Senior Warden will oversee the management of the MFE while Wardens will be posted to each of the three management sectors (Northern, Forest and Southern) to oversee management of these sectors. Relevant staff will also be posted to the new sectors according to each sector's optimum staffing levels.

Action 2.2 Strengthen staff capacity at the MFE

The MFE is faced with deficits in some staff cadres. For instance the KWS ranger and research scientist cadres are inadequate. To address this shortfall, MFE management will liaise with KWS/KFS headquarters to ensure that adequate staff are deployed to the area in line with the identified optimum staffing levels.

In addition, the anticipated merger of KWS and KFS to form Kenya Wildlife and Forest Service is bound to substantially alter the organisational structure at the MFE. A single officer will be in charge of the FR/NR unlike the current situation where there are two parallel ad-

ministrations: one from KFS and the other from KWS. The optimum staffing levels will therefore be determined after the merger of the two organizations.

Action 2.3 Train staff in relevant skills

Training needs assessment (TNA) has been carried out for all relevant MFE stakeholders. Training needs assessment is a systematic process for determining and addressing gaps between current conditions and desired conditions. The discrepancy between the current condition and desired condition must be measured to appropriately identify the need. The need can be a desire to improve current performance or to correct a deficiency. It can be an effective tool to clarify problems and identify appropriate interventions. By clearly identifying the problem, finite resources can be directed towards developing and implementing a feasible and applicable solution. Hence, MFE staff will be trained in various skills specified in the TNA report. Under this management action, MFE management will liaise with the training manager to develop a programme for staff training according to the priorities/needs of the MFE, or make provisions for “on-the-job” training.

Action 2.4 Improve staff welfare and motivation

Staff welfare is a comprehensive term including various services, facilities and amenities provided to staff for their betterment. Welfare measures are in addition to regular wages and other economic benefits available to staff under legal provisions and collective bargaining. The basic purpose of staff welfare is to improve the lot of the working class and thereby make a worker a good employee and a happy citizen. Staff welfare is an essential part of social welfare. It involves adjustment of an employee's work life and family life to the community or social life.

To develop an effective staff welfare programme, a staff survey will be conducted to understand their needs and expectations to be followed by identification of key areas of building skills. Moreover, to enhance staff morale and improve productivity, management will liaise with KWS/KFS Human Capital (HC) departments to create awareness on medical ex-gratia payment, organise team building and social events, establish staff canteens, provide sporting facilities and organise sporting events, liaise with HC to implement the Human capital policy concerning deployment period in hardship areas, and liaise with the National Authority for the Campaign Against Alcohol and Drug Abuse to counsel staff on drug abuse. Management will also provide recreation facilities e.g. DSTV and consider social and psychological needs of staff during deployment.

Objective 3: MFE natural resources and visitors safeguarded

The MFE natural resources face a lot of threats from human encroachment, livestock incursion and poaching. Limited water supply outside the Marsabit Forest Reserve, particularly during the dry season, prompt the local communities to move into the forest for both water and pasture thereby displacing wildlife from some areas as well as degrading the forest. Conflicts between the local pastoralist communities who graze in the forest further worsen the situation making the area unsafe for visitors. The future desired state at the MFE is therefore where natural resources in the protected areas are protected through legal enforcement and the area is safe for visitors. This objective has therefore been designed to achieve this desired state. The management actions that will be implemented to achieve this objective

focus on: intensifying security patrols, collecting and analysing intelligence information, strengthening security capacity and training security staff in court procedures and relevant laws. These actions are discussed in the following sections.

Action 3.1 Intensify security patrols

Patrols within the MFE would be significant in monitoring potential threats to the ecosystem on a frequent basis and guaranteeing that these threats are mitigated as early as possible. Currently, overgrazing and overstocking is impacting negatively on the ecosystem's integrity. There are specific routes to water points designated to livestock in Chuta, Badassa, Sagante, Hula Hula and Karantina that have not been mapped, hence leading to livestock straying and destroying the forest. Additionally, there is limited water supply outside the protected area, which causes the local communities to further encroach into the ecosystem. In most cases, these wells are owned by specific clans, making it difficult for different communities to access them. Further, conflicts between the pastoralist communities aggravate the security situation in the ecosystem.

Intensification of patrols in the area will involve improvement of security presence in livestock incursion areas and areas prone to illegal extraction of forest products. This will deter those who are inclined to commit illegal activities from entering the forest. To focus the patrols, MFE management will identify and map security hotspots within the ecosystem to support effective deployment of ranger patrols. Ground and aerial survey will also be intensified through joint patrols by both the KFS and KWS. The management will also establish common patrol sectors and harmonize security Standard Operating Procedures to enhance joint patrols. The management will also map out and mark the existing livestock water access routes and work with community leaders to ensure that livestock is restricted to these routes. Collaboration with community scouts will also be sought to enhance security in the surrounding communities. It will also establish additional outposts and provide adequate logistics (equipment and supplies such as tents) to support security patrols.

Action 3.2 Strengthen security capacity

Security is an important aspect of sustainable development in the Marsabit County, particularly in relation to the fragility of the ecosystem. Improvement of security will increase tourism in the area and also reduce the communities' impacts on the ecosystem. Currently, the security capacity in MFE is hampered by inadequate security staff and lack of the necessary tools and equipment to support security operations.

With this in mind, the MFE management will enhance the current strength of the KWS security manpower to full platoon. It will also collaborate with local conservancies and community members within the region in order to acquire intelligence information that would help in improving security. Further, security staff will be trained in tour guiding, visitor handling and interpretation with regards to emerging security challenges such as terrorism. The management will also provide screening equipment for this staff. Liaising with other security agencies will also be mandatory in relation to security of access routes.

Action 3.3 Collect and analyse intelligence information

Intelligence information gathered from the public or other reliable sources is significant in improving security measures in the ecosystem. However, the MFE is faced with inadequate intelligence capacity in terms of financial and human resources; hence collection of intelli-

gence information is inhibited. Additionally, the information collected is in most cases stale and inaccurate and as such, it is futile for security enhancement. Despite the existence of a security database, it is not well developed due to lack of capacity in database management. Further than that, intelligence SOPs hinder effective information gathering.

To address the highlighted issues, the MFE management will recruit and train informers from the local communities in information collection. It will profile criminals, with regards to their identification, their activities and possible linkages. It will also liaise with other security agencies in information gathering and dissemination. Information will also be verified and if accurate, disseminated to the relevant officers in a timely fashion to ensure that intervention measures are undertaken promptly. Finally, the security staff will also be trained in security database development and management.

Action 3.4 Train security staff in court procedures and relevant laws

Security staff should be trained in court procedures to increase convictions in the courts of law. The current situation in the MFE is one whereby many cases are lost as a result of inadequate capacity of the security staff to present the cases in courts. The security staff requires training with regards to prosecution and presentation of evidence. In an attempt to mitigate these hindrances, the MFE management will establish an investigation and prosecution unit. The unit will be responsible for carrying out investigations based on the information gathered and follow through to the prosecution of suspects. It will also carry out in-house training of Non Commissioned Officers and security officers in prosecution of court cases. The other arms of the government, particularly the judiciary, will also be sensitized on threats to ecosystem integrity to increase appreciation of impacts of illegal activities on the fragile MFE.

Objective 4: Infrastructure to support PA management and tourism development improved

Provision of conservation facilities and management services is important in supporting tourism activities and increasing the number of tourists to the MFE. Currently, infrastructure, and especially roads, in the MFE protected areas are in poor condition. This can be attributed to low tourism revenue accrued from the MFE; hence little funds allocated to the reserve for development. In addition, poor condition of residential accommodation for KWS and KFS staff, poor telecommunication, lack of necessary utilities such as water supply in some stations, and destruction of wildlife barriers all hinder effective management of the MFE protected areas. As such, this objective has been designed to ensure that adequate administrative and tourism infrastructure is developed and maintained in the MFE. The management actions that will be implemented to achieve this objective will focus on: construction and rehabilitation roads, buildings, and gates; providing utilities to PA staff; improving telecommunications; procuring and maintaining vehicles, plants and equipment; and developing and implementing an emergency and disaster preparedness plan.

Action 4.1 Construct, rehabilitate and maintain MFE roads

The objective of road works is to improve tourist roads within the MFE to a level generally accessible with two wheel drive vehicle, and open areas outside the park for basic patrol access. The forested area of Marsabit National Reserve is served by two main roads. The main tourist road is approximately 22 Km from Ahmed Gate through Marsabit Lodge and

Lake Paradise to Karare junction. The second road is approximately 35 Km and runs along the eastern and southern margins of the forest from Abdul Gate, through Badassa, Songa, Kituruni to Karare gate.

These two roads are in fair condition of service, cleared and graded throughout their length, and mainly needing placement of murram soils to render the road surface all-weather passable. However, there are two sections of the road that may become hazardous during wet weather because of the incline at specific points; the uphill section past Marsabit lodge towards Lake Paradise and the downhill section after Kituruni. These sections require concrete apron.

Several other subsidiary roads are overgrown with bushes and generally in very poor state of repair and therefore not currently in use. Others require murram on the surface for all-weather driving surface. Roads in the rest of Marsabit National Reserve are also required to facilitate security patrols in these areas and rapid response to distress calls in event of problem animals and also to improve transport within conservancies.

Sites and location for the roads to be rehabilitated and those to be constructed and maintained are already identified and some of the roads given priority include: Ahmed Gate-Karare Gate, Lake Paradise-Ajarmako Junction, and Abdul Gate-Old AP camp, Lake Paradise-Chop Junction, and Old Camp-Marsabit Lodge. Some roads will be murramed to upgrade them to all-weather riding surface while others especially those overgrown with bushes will be cleared, graded and upgraded with concrete apron.

Patrol track from Chafachachane to Bule MarMar will be developed as well to facilitate elephant security in the Bule Marmar wet season elephant range. To support diversification of tourism activities, new viewing circuits will be designed. A crater viewing circuit linking major craters and a patrol/viewing road in the elephant corridor will be established while the Old Camp to Songa patrol road will be rehabilitated.

Action 4.2 Construct, rehabilitate and maintain buildings

All existing staff accommodation facilities for both KWS and KFS are in poor condition and require urgent refurbishment to get them to acceptable standard. Some of the staff lack accommodation and are forced to rent outside, hence need for additional buildings to be able to accommodate all. Accommodation for rangers at Songa outpost is made of very basic construction of tin metal on the sides and roof and with limited amenities. Karare and Laisamis accommodation facilities need rehabilitation.

Under this management action therefore, refurbishment and improvement of existing junior staff accommodation and provision of additional new accommodation houses for officers and rangers will be carried out. An office building and 2 semi-detached blocks each accommodating 2 double bed-room units at Karare outpost will be rehabilitated. Other important buildings which will be built include a Museum and resource centre, KWS Northern Kenya Region Office, Marsabit National Reserve office, research unit, motor vehicle garage, entry gates at Karare and Abdul, forest guard housing and self-catering bandas with amenities. On the other hand, KWS and KFS senior staff quarters will be refurbished using internal funds.

Action 4.3 Procure and maintain vehicles, plants and equipment

Alongside the construction and upgrading of the various management facilities necessary for effective management of the MFE, additional office, research, and communication equipment is needed to facilitate effective management.

On the other hand, currently the MFE has to rely on contractors for the provision of some essential heavy plant, which has the potential of seriously delaying work. As such, steps will be taken to procure heavy plant to develop and maintain the road network and other essential services.

There is also a heavy burden on the vehicles available. In most cases, priority allocation is given to security staff, especially if there is an ongoing operation, and in the past this has severely handicapped the operations of other MFE sections, in particular finance and administration. To alleviate vehicle shortage, four 4-Wheel Drive pickups (2 for KFS and 2 for KWS), one Minibus to support finance and administration offices and six Motorbikes (175cc) to boost security will be procured.

Action 4.4 Improve telecommunications

Kenya Forest Service -Marsabit is not linked to the radio communication network and KWS radio communication system components need maintenance. Some parts of the ecosystem (e.g. dead grounds) are not covered by the radio communication network. Hence, security teams undertaking patrols are not able to communicate with each other and share security information especially during emergencies, posing a major security threat.

Therefore, in order to improve the efficiency of the MFE security operations, radio network will be upgraded by installing a repeater to enhance communication. A booster will be provided which will be shared between KWS and KFS. Other communication accessories e.g. VHF radios, 20 Hand Held radio sets, 2 Base radios (shared between KFS and KWS) 5 Man pack radios mounted on vehicles (1 KFS, 4 KWS) will be provided.

Action 4.5 Construct and maintain other essential infrastructure e.g. gates, sign posts, fire towers, fire rating boards

Today, there is only one fire tower in the forest, but it requires rehabilitation while sign posts require regular maintenance. On the other hand, there is a fire rating board at Karare but there is need to train KWS personnel on maintenance of the board.

To address these challenges, the management will upgrade the Karare, Abdul and Ahmed gates-guard room and ticketing office, install signposts and maintain existing ones, install fire towers and fire rating boards (two additional fire rating boards in strategic areas- Songa-Badassa, HQ) and sensitise the community on the fire rating boards.

And in order to reclaim the neglected parts of the national reserve, a new gate will be established at Kamboy at the southern boundary of the Marsabit National reserve.

Action 4.6 Provide utilities e.g. water, electricity and sanitation to offices and residential houses

For effective measures to be executed, it is important that the PA staff have all the necessary utilities both for work and for their comfort. Water shortage is a major problem in Marsabit County, particularly in the outposts. Several efforts have been made to ensure adequate water distribution; Karare gets its supply from a water bowser while Songa platoon gets its supply from Songa Springs. However, this supply is not enough. The supply of water to the KFS headquarters is also insufficient for the staff. In relation to electricity, Songa, Karare and Laisamis are not connected to electricity thus inhibiting effective implementation of security

measures; there is, however, power at the headquarters. Ngurunit, which mainly functions as a security outpost has neither electricity nor water, thus making security a major challenge.

To address these challenges, the MFE management will seek to install solar power at Ngurunit, to improve their security responses. Solar power will also be sought as an alternative energy source in the area, in order to reduce the cost of electricity distribution in all outposts within the ecosystem. The management will also install a rain water harvesting system (*Djabias*) at Ngurunit and other strategic locations to supply water to the staff as well as the local communities. The rainwater harvesting system will also be implemented in KFS/KWS headquarters to supplement the piped water.

Action 4.7 Construct and maintain fences

Fences around the MFE function as the PA boundary and as effective barriers for human wildlife conflict, human encroachment and livestock overgrazing. They also function as fire-breaks and effective measures against poaching. Currently, in the MFE, some fences have been destroyed around the protected area and require reconstruction and maintenance. The protected area has a 15.7 km electric fence along the KWS headquarters-Badassa road, but most parts of the electric fence are in poor condition. Additionally, some areas completely lack a fence, thus making it difficult to control and monitor threats to the forest. The cleared track along the fence also functions as a firebreak to prevent wildfires from spreading into the protected area from adjacent forest farms in hotspots such as Songa, Badassa, Karare and Hula Hula.

To improve on security along the PA boundary, the MFE management will demarcate and clear the forest boundary to fire break standards. This will help to prevent the spread of fires from within Marsabit Forest or the adjacent farms. The present fences and firebreaks will also be maintained accordingly through regular vegetation clearing. Additionally, fences around the residential and office compounds will be rehabilitated and maintained to an acceptable standard.

Action 4.8 Develop and implement an emergency and disaster preparedness plan

Emergency preparedness is the discipline of dealing with and avoiding both natural and manmade disasters. It involves mitigation, preparedness, response and recovery in order to lessen the impact of disasters. Successful preparedness requires detailed planning and cooperation among different departments. This action is therefore important for it will play a critical role in mitigating against threats of wildfire, terrorism, banditry, arson, poaching, inter-ethnic conflicts etc. The management will identify threats and stakeholders, identify disaster experts to prepare the plan and organise a stakeholder workshop to sensitise participants on the disaster preparedness plan.

Plan Monitoring

PLAN MONITORING

The plan monitoring framework set out in the following tables has been designed to provide guidance for the assessment of the potential impacts resulting from the implementation of each of the five management programmes. The framework sets out the desired positive impact of each programme's objectives, as well as any potential negative impacts that may possibly occur. The framework also includes easily measurable and quantifiable indicators for assessing these impacts, and potential sources of the information needed. Monitoring the impacts of the plan implementation is a key aspect of the ultimate success of the plan and for informing adaptive management of the area, and as such ensuring that overall benefits from plan implementation are maximised, and that any negative impacts are appropriately mitigated.

Table 9. Ecological Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective 1: Threats to the MFE habitats are abated and all biological connections maintained	Composition of natural vegetation is understood and improved	Composition and dynamics of vegetation	Higher plants inventory (MFE Ecological Monitoring report)
	Connectivity of migratory corridor between Marsabit forest and adjacent lowland is understood and maintained	Map of functional elephant and Grevy's zebras migratory corridors and dispersal areas	Elephant and Grevy's zebras distribution report
	Settled sections of NR such as Parkishon, Karare, and Jirime will be lost	Area (km ²) of NR lost	Digital maps
Objective 2: Water availability for wildlife, livestock and the human community is improved	Sufficient water availability outside the protected areas	Amount and quality of water available per capita	Surface and ground water survey
	Construction of check dams in PA entails removal of desired vegetation	Vegetation cover %	Environmental audit reports
Objective 3: Conservation of MFE threatened large mammal species is enhanced	Population status and dynamics of threatened mammal species understood	Population size and distribution of elephants and Grevy's zebras	Large mammal census
	Threats to elephants, Grevy's zebras and large carnivores minimized	Number of anthropogenic caused mortality, status of animal home range, human-wildlife conflicts, population size Vulnerability rate (exposure, threat sensitivity, coping capacity)	Human-wildlife conflicts, mortality report, large carnivore-community interaction research report, disease surveillance

<i>Objective</i>	<i>Potential Impacts (Positive and Negative)</i>	<i>Verifiable Indicator</i>	<i>Sources and means of verification</i>
Objective 4: Ecological monitoring and research information dissemination is strengthened	Ecological structure, composition and functions of MFE understood	Collaborative research and monitoring programme	Biodiversity assessment reports (MFE ecological monitoring report)
	Functional research centre developed at Marsabit NR headquarters	Biodiversity inventory	Biodiversity inventory report
Objective 5: Climate change mitigation and adaptation measures enhanced	Improved local communities' awareness on: climate change, water stress, firewood as energy source	Number of local community members newly involved in climate change mitigation and adaptation initiatives including publicity, training, action oriented activities	Awareness creation and training reports, Monitoring and Evaluation reports
	Sustainable domestic water and energy supplies	Solar, wind mill pumped shallow wells, boreholes.	NKBC Project reports
		Water pans and sand dams, roof rain water catchments	
		Number of green energy and energy-saving stoves adopted among local communities	
		Number of functional bee keeping enterprises established	
		NKBCP tree seedlings purchases from local CBOs	
		Area of established woodlots	
	Conflicts among potential beneficiaries over project participation quotas	Number and nature of disputes	Water component M&E reports

Table 10. Forest Resource Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective 1: The Marsabit natural forest is providing environmental goods and services sustainably.	Understanding of Marsabit forest Reserve (MFR) capacity for sustainable firewood, livestock grazing off take gained	Firewood and grazing levels in MFR	MFR firewood extraction and livestock grazing capacity report
	More MFR area under exclusive in situ forest conservation	Area recovered from encroachment Area under integrated forest composition rehabilitation Length of boundary secured by re-alignment, electric fencing	KFS survey records
	Balance between forest use and resource base	Resource stock and off-take	KWS/KFS NKBCP resource inventory and off take report
	Eruption of stakeholders conflicts over relocation from irregularly occupied PA land	Dispute resolution decisions	KWS/KFS incidence reports
Objective 2: Farm forestry and forest extension services promoted	Increased forest cover both on medium potential forest and dry-land	Area and progress of established on-farm woodlots and arboreta; commercial tree farms; Number of people reached through forest extension services	KWS/KFS NKBCP resource inventory and off take report
	Availability of alternative wood fuel and reduced pressure on the forest	Number of efficient wood fuel use and alternative energy options	KWS/KFS NKBCP resource inventory and off take report
Objective 3: Community livelihoods enhanced through enterprise development	Improved livelihoods	Amount of income accruing to local community from forest eco-tourism; commercial insect farming and others	KWS/KFS NKBCP M&E reports
Objective 4: Forest research enhanced and findings applied	Modern scientific, traditional knowledge and research outputs adopted	Planned key forest research priorities Documented annotated indigenous traditional knowledge	KWS/KFS Research databases

Table 11. Tourism Development and Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective 1: Tourism activities and attractions diversified in environmentally appropriate ways	Increased tourist use of the forest and bush land areas	Percentage of MFE visitors staying overnight in the LUZ and WZ	KWS HQ visitor database and concession holder records
	Increase in the number of tourists visiting the MFE	Tourist numbers in the FR/NR, community conservancies	FR/NR, and the MFE community conservancies visitation data
	Increased visitor insecurity incidences as a result of using remote parts of the MFE	Number of visitor safety and insecurity incidences in FR and NR	Incidence reports
	Environmental degradation from new tourist activities and/or supporting infrastructure	Evidence of pollution/litter or habitat degradation at sites where activities or infrastructure are located	Targeted inspections reports by MFE staff
Objective 2: Tourism facilities improved and expanded to support an increased number of tourists	Improved financial sustainability of MFE	Annual revenue	KWS HQ, KFS, community conservancies visitor databases
	Increased length of visitor stay in MFE	Average number of nights spent in the MFE per visitor	Concession holders, conservancies records and bed night fees
	Infrastructural developments likely to degrade MFE's wilderness characteristics	MFE visitor and investor satisfaction	Environmental Audit reports Feedback from MFE investors
Objective 3: Tourism administration and management strengthened	Improved visitor understanding of the MFE's ERVs, conservation issues and history	Number of guidebooks and maps sold	KWS HQ tourism records
	Increased public private partnerships (PPP)	Number of investors participating in conservation initiatives	PPP reports
	The MFE's wilderness and environmental qualities are compromised around attractions	Evidence of litter and environmental damage at MFE attractions	Targeted inspections by MFE staff

PLAN MONITORING

Table 12. Community Partnership and Conservation Education Programme Monitoring Plan

Objective	Potential Impacts (<i>Positive</i> and <i>Negative</i>)	Verifiable Indicator	Sources and means of verification
Objective 1: PA community communication and collaboration mechanisms improved	Enhanced relationships between MFE management and surrounding communities	Incidences of PA management - community conflict	Community Wildlife Service and KFS records
Objective 2: Conservation education and awareness raising programme strengthened	Improved understanding of the MFE's conservation importance	Number of participants on sponsored MFE tours	Community Wildlife Service records
	Increased community awareness of and respect for MFE rules and regulations	Change in number of conservation offences around PA	KFS, KWS, community conservancies Security Records
Objective 3: Conservation compatible land uses and practices promoted	Decreased conversion of wildlife habitat to permanent agriculture around the MFE	Change in area (km ²) under settlement or agriculture	PA land cover change maps
	Functional community wildlife conservancies established	Change in area under conservancies	KWS records
	Improved pasture availability		
	Improved livelihoods base	Change in number of alternative nature-based livelihoods Change in number of water easements	KWS/KFS/NKBCP M&E reports
Objective 4: Human - wildlife conflict minimized	Reduced costs of wildlife to PA adjacent communities	Change in number of human-wildlife conflicts incidences	Community Wildlife Service records (monthly reports and occurrence books)
Objective 5: Opportunities for communities to benefit from the MFE improved	Benefits sharing scheme	Tourism benefits share ratio	KWS/Marsabit County Government Finance records
	Increased value and importance of the MFE to surrounding communities	Income from activities linked to the conservation of the MFE	Community Wildlife Service records
	Benefits exacerbate inequalities within the surrounding communities	Socio-economic make up of beneficiaries from schemes supported by MFE CWS	Community Wildlife Service records

Objective	Potential Impacts (<i>Positive</i> and <i>Negative</i>)	Verifiable Indicator	Sources and means of verification
	Increased immigration to MFE adjacent areas as a result of benefits	Trends in population growth and immigration in MFE adjacent areas	county records, national census, community surveys

Table 13. Protected Area Operations and Security Programme Monitoring Plan

Objective or Sub-objective	Potential Impacts (<i>Positive</i> and <i>Negative</i>)	Verifiable Indicator	Sources and means of verification
Objective 1: Institutional collaborations formalised and strengthened	Achieve synergy in stakeholder implementation of MFEMP Reduced institutional conflicts	Percentage of joint responsibility 3-year activity plan milestones achieved	KWS, KFS, Marsabit County Government legal office records
	Improved ecosystem health	Area of National Reserve converted to conservancies	Survey of Kenya Reports, Marsabit County Land Registration Office or National Land Commission
		Elephant population status Local community attitude towards conservation	KWS/KFS biodiversity assessment reports
Objective 2: Performance and motivation of MFE staff improved	Staff productivity improved	Staff performance against 3 year activity plan performance Number of poor morale related incidences	KWS/KFS NKBCP capacity evaluation reports
	Staff morale enhanced	Change in poor morale related incidences	MFE annual reports
	Living and working infrastructure and condition improved	Number of houses in PA upgraded or constructed Number of vehicles or plants procured	KWS/KFS, NKBCP stock inventory reports

PLAN MONITORING

Objective or Sub-objective	Potential Impacts (<i>Positive</i> and <i>Negative</i>)	Verifiable Indicator	Sources and means of verification
Objective 3: MFE natural resources and visitors safeguarded	Improved security in MFE	Number of joint security operations carried out Level of security capacities strengthened Change in security incidences Number of repeat offenders caught in the MFE	MFE Security Section records (patrol records and monthly, quarterly and annual reports)
Objective 4: Infrastructure to support PA management and tourism development improved	Environmental disturbance and pollution during road construction	Evidence of litter, pollution or excessive environmental damage	Environmental impact assessment and environmental audit report
	Staff living and working condition improved	Number of houses in PA upgraded or constructed	KWS/KFS, NKBCP stock inventory reports
	Improved visitor and management access across the MFE	Kilometres of roads built and/or improved	MFE management records and KWS HQ GIS database
	Improved efficiency in management operations (especially security and PAC responses)	Ratio of operational to non-operational vehicles	MFE management records and/or periodic surveys
	Improved management response to security or HWC incidents	Number of security and HWC incidences successfully responded to	Community surveys and investor feedback
	Enhanced visitor use of the Low use shrub land and Wilderness Zones	Percentage of MFE visitors staying overnight in the LUZ (shrubland) and WZ	KWS HQ visitor database and concession holder records
	Enhanced ability of MFE management to implement the plan	Percentage of 3-Year Activity Plan milestones achieved	MFE annual reports
	Increased external financial support for MFE management	MFE revenue sources	MFE annual budget reports

Plan Annexes

Annex 1. Three Year Activity Plan 2015 – 2018

The following pages set out the first 3-Year Activity Plan for the MFE plan. The activity plan details the activities, responsibilities, timeframe necessary for the delivery of each management action over the first 3-year timeframe of this management plan. In addition, the plan sets out specific and time bound “milestones” that MFE management aims to achieve in implementing the plan.

ECOLOGICAL MANAGEMENT PROGRAMME

ECOLOGICAL MANAGEMENT PROGRAMME														
Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: Threats to the MFE Habitats are abated and all biological connections maintained														
1.1 Carry out a study to establish impacts of livestock incursions on vegetation structure and composition														
1.1.1 Monitor livestock herding patterns	SRS		X		X									Livestock herding pattern Study report available by December 2016 Landover/use map available by December 2015
1.1.2 Assess impacts of livestock grazing in the forest habitat	SRS			X										
1.1.3 Map land cover/use and assess impacts of land use changes	SRS		X											
1.2: Maintain ecological connectivity in the greater MFE ecosystem														
1.2.1 Identify and map wildlife migratory corridors	SRS				X									Map showing the wildlife corridors available by June 2016 Maps of Collared Animal Movement available by March 2017 Suitability assessment report available by September 2016
1.2.2 Collar and monitor elephants(5) and Grevy's zebra	SRS					X				X				
1.2.3 Establish conservancies in wildlife corridors	SRS						X							
1.3: Develop and implement a site specific alien and invasive species management plan														
1.3.1 Identify and map invasive species	SRS			X										Checklist and Map of Distribution of Invasive Species available
1.3.2 Prescribe and implement suitable control methods in line with the invasive species strategy	SRS				X	X	X							

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
1.3.3 Monitor and evaluate efficacy of the control methods	SRS			X										December 2016
1.3.4 Monitor regeneration of indigenous species	SRS				X									
1.3.5 Create awareness on the impacts invasive species	SRS						X							
1.4 Develop and implement a MFE fire management plan														Report on MFE fire Management Plan by March 2016
1.4.1 Develop an MFE Fire Management plan	OM/SRS				X									
1.4.2 Review existing national fire management guidelines and MFE documents	OM/SRS				X									
1.4.3 Improve firebreaks along the Marsabit forest reserve boundary														
Objective 2: Water availability for wildlife, livestock and the community is improved														
2.1 Collaborate with Water Resources Management Authority (WRMA) in assessing and modelling status of key water sources														Map of Available water sources of MFE available by September 2015 Report on Water use and quality of MFE available by September 2015
2.1.1 Assess and model the status of the main water sources in the ecosystem	SRS/WRMA				X									
2.1.2 Identify and map water sources	SRS/WRMA		X											
2.1.3 Assess the quality and quantity of water availability	SRS/WRMA			X										
2.1.4 Identify spatial and temporal uses of water	SRS/WRMA	X												
2.2 Assess the impacts of water abstraction on the ecosystem's water sources														Report on status of Groundwater Resources in MFE by December 2015 Report on Sociological Issues relating to water in MFA, by December 2015
2.2.1 Carry out ground water survey, looking at borehole records; spring abstraction records	SRS/WRMA				X									
2.2.2 Carry out a sociological survey on water use and access and conflicts	SRS/WRMA			X										
2.3 Evaluate potential water pan and dam sites to supplement existing water sources														Map of the potential Sites of Water pans and Dams by December 2015
2.3.1 Identify, map and model potential sites	SRS/WRMA			X										
2.3.2 Carry out a detailed soil survey for potential sites	SRS/WRMA			X										

PLAN ANNEXES

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.3.3 Carry out EIAs in relation to ongoing and future water projects	SRS/WRMA				X									EIA Report on the potential Water pan and Dam Sites available by March 2016
2.4 Support establishment of WRUAs														
2.4.1 Support WRMA-organised stakeholder meetings; and advocate for wildlife water interests in collaboration with CWS	SRS/WRMA				X									WRUA registration Certificates by July 2016
2.4.2 Support the WRUA registration process	SRS/WRMA					X								
2.5 Promote rainwater harvesting as a supplementary source of water														
2.5.1 Carry out social survey to identify and map potential rainwater harvesting sites	SRS/WRMA			X										Report & map on the identified potential rain-water harvesting sites
2.5.2 Promote implementation Djabia water harvesting system	SRS/WRMA				X									
2.5.3 Promote sand dams and rock catchment and roof catchment	SRS/WRMA					X								
Objective 3: Conservation of MFE threatened large mammal species is enhanced														
3.1 Monitor population size, structure and seasonal distribution of MFE Elephants														
3.1.1 Conduct elephant counts every four years during the wet season when 80% of the elephants are outside the Marsabit Forest.	SRS/STE								X					Report on the population size, structure and distribution of MFE Elephants available by March 2017
3.1.2 Collar and monitor 5 elephants	SRS/STE					X								
3.1.3 Apply standardised improved survey methods e.g. Dung genetic survey	SRS			X							X			
3.1.4 Maintain MIST database.	SRS	X	X	X	X	X	X	X	X	X	X	X	X	Updated MIKE database on Elephant mortality in MFE
3.1.5 Monitor and report elephant mortality using MIKE standards	SRS	X	X	X	X	X	X	X	X	X	X	X	X	
3.2 Establish the elephant carrying capacity of MFE														

Management Action and Activities	Persons Responsible	Timeframe												Milestones	
		FY 2015-16				FY 2016-17				FY 2017-18					
		1	2	3	4	1	2	3	4	1	2	3	4		
3.2.1 Examine the density of preferred food plants for elephant in the forest and ecosystem.	SRS				X									Report on elephant carrying capacity of MFE available December 2016	
3.2.2 Assess the density of the competitors.	SRS						X								
3.2.3 Assess the water availability for the elephants.	SRS			X											
3.2.4 Design and implement a study to determine elephant numbers	SRS			X											
3.3 Carry out research on approaches to reduce Human-Elephant Conflict (HEC)															Report on the effectiveness of the existing deterrent methods available by December 2016
3.3.1 Establish effectiveness of existing HEC interventions	SRS/STE						X								
3.3.2 Test effectiveness of elephant deterrent methods such as bee hives, and chillies and minimizing or controlling HEC	SRS/STE														
3.4 Monitor impacts of elephants on the structure of critical habitat															Report on the impact of Elephants on vegetation, available by July 2017
3.4.1 Re- establish vegetation monitoring transects used during the AGREF-GEF project	SRS					X				X					
3.4.2 Establish random remotely monitored vegetation plots of 100X100 M in different vegetation strata	SRS			X			X				X				
3.5 Carry out wildlife disease surveillance on species conservation targets															Report on Wildlife Diseases as seen on collared animals available by March 2016
3.5.1 Collect blood, tick and tissue samples during collaring operations	SRS		X			X			X						
3.5.2 Analyse samples and disseminate results in various forums	SRS							X					X		
3.6 Identify and monitor Grevy's zebra breeding hotspots															Report & map of the breeding areas of the
3.6.1 Use participatory GIS to gather information on breeding areas	SRS/GZT	X				X				X					

PLAN ANNEXES

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.6.2 Use community scouts to monitor Grevy's zebra	SRS/GZT		X	X	X	X	X	X	X	X	X	X	X	Grevy Zebra available by September 2017
3.6.3 Carry out a species inventory of the breeding hotspots	SRS/GZT	X				X				X				
3.6.4 Model breeding hotspots in the greater ecosystem	SRS/GZT				X				X				X	
3.7 Map distribution and monitor Grevy's and common zebra populations														
3.7.1 Conduct ground and aerial surveys to establish the population size and distribution of the two species	SRS/GZT		X											Report on the population and Distribution of Grevy's and Common Zebra available by March 2016
3.7.2 Assess phenotypically whether there is hybridization between Common and Grevy's Zebra	SRS/GZT			X			X							
3.7.3 Assess genetic diversity of the Grevy's zebra	SRS/GZT		X					X						
3.7.4 Model Grevy's zebra suitable habitats	SRS/GZT					X								
3.7.5 Enhance genetic pool by translocating individuals from other meta populations in the Grevy's range	SRS/GZT							X						
3.8 Monitor large carnivores														
3.8.1 Identify information gaps	SRS/NRT		X											Report on the information gaps in carnivore research available by December 2015 Report on carnivore population size, home ranges and distribution available by July 2016
3.8.2 Undertake targeted research based on identified gaps	SRS/NRT			X					X					
3.8.3 Establish population size and map home ranges and distribution of carnivores	SRS/NRT			X			X			X				
3.8.4 Collar individuals from each species of large carnivores	SRS/NRT					X								
3.8.5 Collaborate with stakeholders in monitoring efforts	SRS/NRT			X		X		X		X		X		
3.9 Conduct research on carnivore-local community interactions														
3.9.1 Assess livestock herding strategies including herding calendar	SRS/NRT		X				X							On going process to develop information packages
3.9.2 Collect, collate, package and disseminate all information on carnivores for various levels of education	SRS/NRT		X		X		X		X		X		X	
3.9.3 Analyse HWC data	SRS/NRT			X				X			X			Report on carnivore HWC, available by July 2016
3.9.4 Pilot lion proof bomas in conflict-prone areas	SRS/NRT				X									

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.9.5 Educate the public on conflict avoidance	SRS/NRT		X			X			X				X	On going process, workshop reports will be key indicators
Objective 4: Ecological monitoring and research information dissemination is strengthened														
4.1 Carry out biodiversity assessments in the MFE protected areas														
4.1.1 Expand ongoing forest biodiversity assessments	SRS	X			X		X							Report on the Biodiversity Assessment available by June 2016
4.1.2 Carry out special management intervention measures in areas rich in biodiversity	SRS		X				X					X		Report on the progress of the management intervention measures, report on the biodiversity richness indices available December 2017
4.2 Assess gap in biodiversity knowledge														
4.2.1 Prepare an annotated bibliography of all published and unpublished papers and reports	SRS		X											Annotated Bibliography available by September 2015
4.2.2 Identify and prioritize research topics	SRS		X											
4.2.3 Develop a research plan	SRS	X												Research Plan Developed, available by July 2015
4.2.4 Establish partnerships to enhance research with other research organizations	SRS	X			X			X			X			
4.3 Establish partnerships for the implementation of research and monitoring activities														
4.3.1 Organise scientific workshop to share the biodiversity knowledge gaps with relevant institutions.	SRS		X											Workshop proceedings, available by December 2015 Research related MOU's TOR's for priority Research Activities, by September 2015
4.3.2 Develop research related MOU's with relevant institutions.	SRS		X				X				X			
4.3.3 Develop ToR's for priority research activities.	SRS		X											
4.4 Develop a research and monitoring program														
4.4.1 Develop an Ecological Monitoring Plan	SRS		X											Ecological Monitoring Plan developed, by

PLAN ANNEXES

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
4.4.2 Carry out biodiversity Assessment	SRS		X				X							available December 2015 Biodiversity Assessment report by July 2016
4.5 Develop and equip a fully fledged research centre														
4.5.1 Establish a GIS lab with a fully-equipped geodatabase, a water quality lab, a herbarium and a museum	SRS/POM		X		X		X		X		X		X	The buildings constructed and equipped June 2018
4.5.2 Establish a knowledge repository of all management data with all details of human-wildlife conflict, tourism statistics and animal population and distribution	SRS		X		X									Knowledge repository in place June 2016
Objective 5: Climate change mitigation and adaptation measures enhanced														
5.1 Create awareness on climate change among the local community														
5.1.1 Carry out a climate change vulnerability assessment	SRS			X										Report on Climate change vulnerability in place December 2015
5.1.2 Sensitise the community on preparedness on climate change	SRS/SW					X								Baraza reports March 2016
5.1.3 Carry out civic education	SRS/SW							X						Baraza reports June 2016
5.2 Improve water supply for people, livestock and wildlife in line with Marsabit water catchment management strategy														
5.2.1 Provide water from shallow wells and boreholes using green energy-driven pumps e.g. solar and windmills.	KWS/WRMA/NRT				X			X						Report on Number of Wells and boreholes supported with Solar and Windmills available December 2016
5.2.2 Construct water pans and sand dams	KWS/WRMA/NRT						X			X				Report on number of water pans and sand dams constructed available July 2017

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
5.2.3 Support rain water harvesting	KWS/WRMA/NRT		X			X			X				X	Report of number of households using rain-water harvesting in MFE available January 2018
5.3 Control habitat degradation														
5.3.1 Carry out reforestation and rehabilitation of Marsabit Forest	KWS/KFS		X			X			X				X	Report on the extent of rehabilitation of Marsabit forest December 2018
5.3.2 Remove invasive species	KWS/KFS			X			X			X			X	Maps of the area that the invasive species have been removed available march 2018
5.3.3 Establish tree nurseries	KWS/KFS				X			X			X			Report on the number of tree nurseries established December 2017
5.4 Provide alternative sources of energy														
5.4.1 Promote the use of energy-saving methods and appliances such as green energy and energy-saving stoves	KFS/NRT		X				X				X			Progress report on the use of energy saving methods available in MFE available December 2017
5.4.2 Introduce and encourage livelihood improvement programmes such as beekeeping and slaughterhouses	KFS/NRT/MCG			X				X					X	Report on the uptake and development of beekeeping and live-stock slaughter house construction. Available March 2018

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
5.4.3 Establish woodlots through farm forestry	KFS/NRT		X			X			X				X	Report of the Woodlots and tree species developed through farm forestry available December 2017
5.5 Carry out a study on impacts of livestock and human settlement on the MFE protected areas														
5.5.1 Design and implement a study aimed at determining the history, extent of livestock and human settlement in the protected areas	KWS/NRT			X										Report on the history and extent of livestock and human settlement in the protected area available march 2017
5.5.2 Review published and unpublished reports on similar studies and analyse traditional livestock grazing practices	KWS/NRT/KARLO						X							Report on the progression of traditional livestock grazing practices available December 2016
5.5.3 Administer a questionnaire survey to assess human-livestock-wildlife interactions	KWS/NRT/KARLO							X						Report on the Human-livestock-wildlife interactions in MFE available March 2017
5.5.4 Design and implement a livestock grazing system	KWS/NRT/KARLO								X				X	Report on the design and implementation of the livestock grazing system June 2018

FOREST RESOURCE MANAGEMENT PROGRAMME

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: The Marsabit natural forest is providing environmental goods and services sustainably														
1.1 Secure Marsabit Forest														
1.1.1 Give a chronology of excisions from the Forest Reserve and the National Reserve	EC, SNR Warden	X												A report on the chronology of excisions available by September 2015 Revocation and relocation notice issued by June 2017 Fence EIA report by December 2015
1.1.2 Intensify forest patrols	EC, SNR Warden	X	X	X	X	X	X	X	X	X	X	X	X	
1.1.3 Improve law enforcement	EC, SNR Warden	X	X	X	X	X	X	X	X	X	X	X	X	
1.1.4 Fence the forest reserve	EC, SNR Warden							X	X	X	X	X	X	
1.1.5 Repossess illegally acquired forest land	EC, SNR Warden, NLC, NEMA, CGM	X	X	X	X	X	X	X	X	X	X	X	X	
1.2 Carry out forest surveillance														
1.2.1 Maintain fire danger rating boards and sensitize the public on the boards	EC, SFM		X	X			X	X			X	X		Fire response time reduced from a four hours to an hour by June 2017
1.2.2 Declare fire season	EC		X	X			X	X			X	X		
1.2.3 Provide fire fighting equipment and other logistics	EC, PM-NKBCP						X							Report on fire fighting equipment procurement and construction of fire towers by December 2016
1.2.4 Collaborate with other stakeholders in fire fighting activities	SFM, Snr Warden, CGM, CFA		X	X			X	X			X	X		
1.2.5 Detect and report diseases, pests and invasive species to KEFRI	SFM, Snr Warden, CFA	X	X	X	X	X	X	X	X	X	X	X	X	
1.3 Establish Community Forest Association(s)														

PLAN ANNEXES

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
1.3.1 Organise community sensitization forums	SFM, CGM, NG	X	X	X	X	X	X							CFA registration certificate by December 2016
1.3.2 Promote Participatory Forest Management-empowering Community Forest Associations	SFM, EC, AG							X	X					
1.4 Regulate access to forest resources														A study report on off take levels by September 2016
1.4.1 Determine off take levels for each resource	SFM, Snr. Warden, CFA						X							
1.4.2 Assess environmental impacts of off take									X	X	X	X	X	
1.5 Rehabilitate degraded forest areas														50% of degraded area rehabilitated by December 2018
1.5.1 Identify and map degraded forest areas	SFM, CFA	X												
1.5.2 Determine the rehabilitation methodologies needed; these may range from fencing, enrichment planting, reseedling, and planting	SFM	X				X				X				
1.5.3 Rehabilitate the targeted area	SFM		X		X		X		X		X		X	
1.5.4 Restrict access to allow for tree establishment and natural regeneration	SFM	X	X	X	X	X	X	X	X	X	X	X	X	
1.6 Replace exotic plantations with suitable indigenous species														Report on plantation area replaced with suitable indigenous species by March 2016
1.6.1 Salvage from over mature plantations from wastage	SFM, EC			X										
1.6.2 Replace with suitable indigenous tree species	SFM, EC						X		X		X		X	
1.7 Control invasive species														Area under invasive species reduced by 40% by March 2017
1.7.1 Identify and map distribution of invasive species	SFM, CFA, KEFRI				X									
1.7.2 Develop and implement appropriate invasive species control mechanisms	KEFRI					X	X	X	X					
1.7.3 Monitor effectiveness of control mechanisms	SFM, CFA, KEFRI									X	X	X	X	
1.7.4 Create awareness on invasive species	SFM, CFA, KEFRI	X	X	X	X	X	X	X	X	X	X	X	X	

Management Action and Activities	Persons Responsible	Timeframe												Milestones	
		FY 2015-16				FY 2016-17				FY 2017-18					
		1	2	3	4	1	2	3	4	1	2	3	4		
Objective 2: Farm forestry and forest extension services promoted															
2.1 Establish on-farm woodlots and arboreta															
2.1.1 Review different woodlot establishment approaches through the woodlot consultancy	EC, SFM		X	X										Report on the area established under woodlots and arboreta by December 2017.	
2.1.2 Establish demonstration plots	EC, SFM,CGM, Comm.				X		X		X		X		X	No. of Farms with fodder banks established increased from 1 to 10 by December 2017.	
2.1.3 Establish arboreta (plant gene pool)	EC,KEFRI CGM				X		X		X		X		X		
2.1.4 Negotiate with CG to provide land for parks and arboreta	EC,CGM				X	X									
2.1.5 Establish fodder banks	EC CGM,COMM				X		X		X		X		X		
2.1.6 Establish tree nurseries	EC, SFM Comm				X	X									A tree nurseries established in each of the following areas Karare, Badasa, Songa and Haite by April 2016
2.1.7 Enforce the constitution and Agricultural Act requirement of maintaining 10% tree cover	EC, CGM				X	X	X	X	X	X	X	X	X		
2.1.8 Build the capacity of the community to take up tree planting	EC, CGM				X	X	X	X	X	X	X	X	X		
2.1.9 Establish tree growers association	EC,Com CGM				X	X	X	X	X	X	X	X	X	Two tree growers associations formed within Songa and Daka-baricha/ Sagante locations by December 2017	
2.1.10 Identify and secure community land suitable for tree growing	EC, CGM				X	X	X	X	X	X	X	X	X		

PLAN ANNEXES

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.1.11 Build the capacity of the county government to secure hills for afforestation and protection; [hills to target – Kidole, Milima Tatu, Jirime etc]	EC, KEFRI				X	X	X	X	X	X	X	X	X	One Hill secured and afforested by December 2017. 3 Hill Community management committees formed by April 2017
2.1.12 Empower the community to manage the rehabilitated hills and share benefits; each hill with its own governance structure	EC, CGM				X	X	X	X	X	X	X	X	X	
2.2 Promote forest extension services														Two FFFS established by January 2016 Forest Ext. packages being applied by extensionists by July 2016 At least 10 farmers trained as TOTs by June 2018
2.2.1 Establish and run forest farmer field schools	EC, SFM				X	X	X	X	X	X	X	X	X	
2.2.2 Promote school greening initiative	EC, SFM				X	X	X	X	X	X	X	X	X	
2.2.3 Train KFS officers in forest farmer field schools methodology	EC, FESD				X									
2.2.4 Develop or customize forest extension marketing and education packages	EC, FESD				X	X								
2.2.5 Train of trainers (farmers)	EC,SFM				X	X	X	X	X	X	X	X	X	
2.2.6 Create awareness through information dissemination through public forums and other means e.g. Barazas, field days, open days, forest clinic, demonstration plots	EC SFM				X	X	X	X	X	X	X	X	X	
2.3 Promote commercial tree farming														150 ha of commercial woodlots established by Dec 2018 Value added products e.g. honey, mangoes and paw paws available in the market by Dec 2018
2.3.1 Identify and support suitable farms where woodlots can be established	EC,CGM	X				X				X				
2.3.2 Identify and promote planting high value tree species	EC		X		X		X		X		X		X	
2.3.3 Establish incentive schemes- e.g. award schemes	EC, CGM	X	X	X	X	X	X	X	X	X	X	X	X	
2.3.4 Encourage individual large scale farms (e.g. Gor lukes, Badasa, Sagante, Songa) to establish commercial woodlots	EC, CGM	X	X	X	X	X	X	X	X	X	X	X	X	
2.3.5 Support value addition and marketing e.g. charcoal production, timber, fruit orchards	EC, CGM					X	X	X	X	X	X	X	X	

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.3.6 Promote suitable multipurpose tree species	EC, KEFRI, KALRO, CGM	X	X	X	X	X	X	X	X	X	X	X	X	5 medicinal plant spp domesticated by Dec 2018
2.3.7 Encourage domestication of medicinal plants	EC, KEFRI, KALRO, CGM	X	X	X	X	X	X	X	X	X	X	X	X	
2.4 Collaborate with other stakeholders in forest extension services														
2.4.1 Organise a stakeholder forum for all forest extension partners	EC, CGM			X	X									A functional stakeholder forum established by June 2016
2.4.2 Form a Marsabit Forest Ecosystem conservation advocacy forum	EC, CGM					X	X							Forest extension guidelines developed and adopted by May 2016
2.4.3 Develop common forest extension guidelines and package for adoption by other stakeholders	EC, FESD				X	X								MOUs and MOAs prepared and signed by July 2018
2.4.4 Develop MoUs and MoAs with partners	EC, NGOS, CGM									X				
2.5 Promote efficient use of wood fuel and alternative sources of energy														
2.5.1 Raise awareness about various energy saving methods as well as alternative sources of energy. E.g. Demonstrations, field days, public gatherings.	EC, CGM, NGOs					X	X							20 % of house holds adopted energy conservation devices by Dec 2018
2.5.2 Promote the adoption of energy conservation devices (Efficient stoves etc)	EC, CGM, NGOs						X	X	X	X	X	X	X	10% of households have adopted solar and wind as alternative sources of energy by Dec 2018
2.5.3 Promote efficient charcoal production technologies	EC, FESD, KEFRI						X	X	X	X	X	X	X	
2.5.4 Promote alternative sources of energy (briquettes, bio-gas, solar, wind)	EC, FESD, MOE, CGM						X	X	X	X	X	X	X	
2.6 Promote dry land forestry and natural resource management														

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.6.1 Promote adoption of dry land forestry.	NRT, CGM, KFS, KWS				X									3 conservancy management plans developed and operationalized by June 2018 3 check dams constructed and water piped to neighbouring community by June 2018
2.6.2 Integrate various NRM systems (community based and modern) to ensure synergy.	NRT, CGM, KFS, KWS, NGOs					X			X					CPAs registered and operational by June 2018
2.6.3 Provide structured access to the forest resources especially water and pasture.	KWS, KFS, CGM									X	X	X	X	2 reseeded demonstration plots established per conservancy by June 2018
2.6.4 Encourage sound management and utilization of the dry land vegetation	CGM, KWS, KFS				X	X	X	X	X	X	X	X	X	
2.6.5 Promote adoption of soil and water conservation measures	CGM, NGOs, KFS, Community				X	X	X	X	X	X	X	X	X	
2.6.6 Reseed both trees and grass	NRT, community, CGM				X		X		X		X		X	
2.6.7 Regulate charcoal industry	KFS, CGM	X	X	X	X	X	X	X	X	X	X	X	X	
Objective 3: Community livelihoods enhanced through enterprise development														
3.1 Promote income generating activities(IGAs)														At least 5 IGAs adopted by the community by Dec 2018
3.1.1 Identify potential IGAs	EC, CGM, NGOs					X								Value added products e.g. honey, mangoes and pawpaws available in the market by Dec 2018
3.1.2 Develop and support community action plans	EC, CGM, NGOs							X						
3.1.3 Train communities in entrepreneurship	EC, CGM, NGOs						X	X	X	X				

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.1.4 Link communities with financial institutions for business loans	EC, CGM, NGOs, Financial institutions							X	X	X	X	X	X	150 ha of commercial woodlots established by Dec 2018
3.1.5 Link IGAs with potential market	EC, NGOs, CGM								X	X	X	X	X	
3.1.6 Promote non wood forest products (Aloes, bee products)	EC, KEFRI	X	X	X	X	X	X	X	X	X	X	X	X	
3.1.7 Support assessment of potential for payment of ecosystem services	EC, KEFRI, CGM									X	X	X	X	
3.1.8 Support processing and value addition ventures	EC, CGM, NGOs								X	X	X	X	X	
3.1.9 Promote growing high value trees of commercial value	EC, CGM, NGOs	X	X	X	X	X	X	X	X	X	X	X	X	
3.2 Promote forest eco-tourism														2 ecotourism sites developed and operational by 2018
3.2.1 Identify and map tourist attraction sites	SFM, EC, Snr Warden					X	X	X	X					2 youth tour guiding services operational by 2018
3.2.2 Develop essential tourism support infrastructure	SFM, EC, Snr Warden							X	X	X	X			
3.2.3 Market the eco-tourism products e.g. Culture, trails	SFM, EC, Snr Warden CGM								X	X	X	X		
3.2.4 Support youth groups to establish tour guiding services	SFM, CGM								X	X	X	X		
3.3 Promote commercial insect farming e.g. apiculture, butterfly farming, sericulture														At least 5 community groups trained and adopted new IGAs by Dec 2018
3.3.1 Sensitize and train communities in these new IGAs	SFM CGM, Snr Warden						X	X	X	X				
3.3.2 Supply production materials	SFM CGM, Snr Warden						X	X	X	X				

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Management Action and Activities	Persons Responsible	Timeframe												Milestones	
		FY 2015-16				FY 2016-17				FY 2017-18					
		1	2	3	4	1	2	3	4	1	2	3	4		
3.3.3 Support acquisition of processing and value addition equipment	SFM CGM, Snr Warden									X	X	X	X		
3.3.4 Develop and enhance market linkage of products	SFM CGM, Snr Warden										X	X	X	X	
Objective 4: Forest research enhanced and findings applied															
4.1 Develop and implement a forest research plan															
4.1.1 Undertake inventory on past research undertaken in Marsabit related to Forestry.	EC KEFRI KALRO					X	X								Research needs for MFE are identified and prioritized by June 2016 Research plan developed and implemented by July 2017
4.1.2 Identify and prioritize research needs and gaps	EC KEFRI						X	X							
4.1.3 Liaise with KEFRI and other research institutions to develop the research plan	EC FESD KEFRI KALRO						X	X	X						
4.1.4 Implement the research plan in collaboration with forestry sector research stakeholders	EC KEFRI KALRO FESD							X	X	X	X	X	X	X	
4.2 Gather and document indigenous traditional knowledge															
4.2.1 Identify and map cultural and sacred shrines - these are preserved areas	EC KEFRI KALRO						X	X	X						Report on traditional uses of the forest generated and applied by June 2016
4.2.2 Document the traditional uses of the forest resources	EC KEFRI KALRO						X	X	X						
4.2.3 Document and preserve the oral narrative and traditional dances using Audio Visual equipment.	EC KEFRI KALRO						X	X	X						
4.2.4 Strengthen and support the traditional governance institutions by promoting synergy between the traditional and current governance systems relating to NRM	EC KEFRI KALRO							X	X	X					
4.3 Enhance adoption of research outputs															

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
4.3.1 Mainstream science driven management	EC KEFRI KALRO								X	X	X	X	X	Scientific guidelines and technical notes on NRM availed and applied by resource managers by January 2016
4.3.2 Disseminate research findings through workshops and appropriate media, knowledge repository, museums, field demonstrations	EC KEFRI KALRO									X	X	X	X	
4.3.3 Liaise with the KFS HQ Research Liaison Office to ensure that research findings or recommendations are disseminated to field managers.	EC KEFRI KALRO									X	X	X	X	

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TOURISM DEVELOPMENT AND MANAGEMENT

TOURISM DEVELOPMENT AND MANAGEMENT														
Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: Tourism activities and attractions diversified in environmentally appropriate ways														
1.1 Establish walking and camel safaris													Walking and camel safari routes identified, mapped, and signages installed by June 2016	
1.1.1 Support development of walking and camel safaris	T O, SW				X	X								
1.1.2 Identify and map safari routes and designate associated features such as picnic sites at appropriate locations	T O, SW				X	X								
1.1.3 Compile and include information on safari routes in the MFE brochure	T O, SW						X							
1.2 Design and establish nature trails													Nature trail route identified and mapped by June 2016 Nature trail developed by November 2016 Brochure developed by November 2016 Quarterly Maintenance report	
1.2.1 Develop nature trails: Marsabit lodge trail, Bongole trail, a walking trail from Karare to Hurricane Hill, a longer walking trail from Karare gate to Bongole and nature trails in the craters and gorges.	T O, SW					X		X						
1.2.2 Produce and avail a trail brochure and map to visitors	SW,TO						X							
1.2.3 Ensure continuous trail maintenance						X	X		X					
1.3 Establish non traditional visitor activities such as night game drives and bush diners													New game viewing tracks developed by september2017 Quarterly Report on bush dinner visitation	
1.3.1 Introduce night game drives									X					
1.3.2 Encourage hoteliers to organize bush diners in designated camping sites and picnic sites in the forest and national reserve.	SW, TO					X		X		X				
1.4: Establish visitor activities focusing on the local domestic market													Report on the preferred	

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
1.4.1 Carry out a survey to determine the preferred environmentally friendly non-consumptive uses that Marsabit residents would like introduced in Marsabit Forest	SRS, SW				X									non consumptive use developed by December 2016
1.4.2 Provide infrastructure (e.g. camp sites, picnic sites) based on outcomes of survey						X		X						Campsite picnic sites put in place by December 2017
1.5: Develop distinct tourism products for each of the three MFE management Sectors														
1.5.1 Establish tourism support infrastructure, such as viewing roads, view points, and picnic sites	SW ,TO					X		X						Campsite, picnic sites put in place by December 2017
1.5.2 Restock the Southern sector with species found in northern Kenya	SRS, SW										X			Translocation report and species status report in place by June 2018
Objective 2: Tourism facilities improved and expanded to support an increased number of tourists														
2.1 Identify and award tourism concessions														
2.1.1 Establish a site selection committee comprising of KWS, KFS, NEMA, County Government, tourism industry experts and Community Representatives	SW, TO				X									Committee in place by January 2016
2.1.2 Assess and identify visitor accommodation facility sites in the MFE	SW, TO				X									Site identified and mapped by January 2016
2.1.3 Raise awareness and inform potential investors on investment opportunities in the MFE					X									Investment conference held by June 2016
2.2 Establish KWS self catering Bandas														
2.2.1 Diversify visitor accommodation to cater for visitors who may wish to have some privacy														Identify and map sites for new bandas by June 2017
2.2.2 Identify a suitable site for establishment of bandas					X									
2.2.3 Maintain bandas continuously at high standards														
2.3 Designate and establish campsites														
2.3.1 Establish campsites in all management zones	SW, TO					X		X						Campsites identified and mapped by June

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.3.2 Identify new sites for additional camp sites	SW, TO					X		X						2016
Objective 3: Tourism administration and management strengthened														
3.1 Develop tourist information materials														Updated tourist map developed by June 2016
3.1.1 Update the tourist map of the MFE						X								
3.1.2 Collect and collate relevant information on the natural and physical features of interest and package it into a guide book, tourist map and brochure	SW, TO					X								Marsabit forest ecosystem guide book developed by December 2016
3.2 Develop visitor interpretation facilities														Brochure developed by June 2016
3.2.1 Inform and educate tourists and visitors about PA attractions, tourist activities and biodiversity values	SW, TO				X									
3.2.2 Develop interpretation facilities at MFE including an education and information centre and a cultural centre	SW, TO											X		Education and information centre developed by June 2018
3.3 Market the MFE through the internet and other media														Twitter, Face book, Blogs, Instagram accounts for Marsabit forest ecosystem established by June 2016 Radio programmes conducted quarterly
3.3.1 Develop a quality marketing plan employing wide and robust marketing strategies such as the use of social media (Twitter, Face book, Blogs, Instagram) and mainstream media such as national papers, community papers and radios	SW, TO				X		X		X		X			
3.4 Organise tourism promotional activities and events														Brochure developed by June 2016
3.4.1 Advertise MFE through magazines, newspapers, brochures, direct contacts and television coverage	SW, TO				X									
3.4.2 Introduce an annual Camel Derby and invite the public to participate						X								Annual camel derby for Marsabit started by September 2016
3.4.3 Measure success in terms of quantified attitude changes, visitation trends, increased awareness and knowledge of natural resources	SW, TO				X									Visitor satisfaction survey introduced by June 2016
3.5 Develop and maintain tourist information centres at the gates														Tourist information

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.5.1 Establish information centres at key entry points	SW, TO					X	X	X	X					centres operational by June 2017
3.5.2 Avail maps for safari/walking nature trails at the centres	SW, TO					X	X	X	X					
3.6 Brand the MFE to give it a distinct identity														Report on the branding themes for Marsabit forest ecosystem developed by June 2016
3.6.1 Highlight distinct MFE attractions in the branding experience	SW, TO				X									
3.6.2 Incorporate all products and key features in all publicity materials, new PA signage, and visitor interpretation materials (such as the interpretation displays, guide book and map)	SW, TO					X								
3.7 Introduce and maintain appropriate transport services for local visitors														Update MFE interpretation materials by September 2016 Visitor transport established and maintained by June 2016
3.7.1 Liaise with KWS headquarters to introduce appropriate transport services for visitors	AD-NCA													
3.7.2 Maintain tour service vehicles regularly	SW, TO				X									

PLAN ANNEXES

COMMUNITY PARTNERSHIP AND CONSERVATION EDUCATION PROGRAMME

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: PA-Community communication and collaboration mechanisms improved														
1.1: Establish location wildlife conservation associations														-Quarterly meetings and barazas held in all locations -Community Engagement strategy -village level meetings -Implementation plan matrix -Include women in meetings ting
1.1.1 Define the objectives /TORs of the committee e.g. Plan implementation, education and awareness	KWS/KFS	X		X	X		X		X	X		X		
1.1.2 Sensitize local communities at village level	KWS/KFS	X	X	X	X	X		X		X		X		
1.1.3 Ensure gender balance i.e. 1/3 women	KWS/KFS													
		X	X	X	X	X	X	X	X	X	X	X	X	
1.2: Strengthen the relationship between KWS/KFS and firewood collectors, farmers and pastoralist associations														-Exposure tours and trainings conducted by June 2017 -MoU among these Associations developed
1.2.1 Carry out capacity building activities of the associations through exposure tours, training in entrepreneurial skills; (profit from firewood collection is used to support welfare activities such as merry go rounds)	KWS/KFS						X	X						
1.2.2 Organise consultative meetings to understand concerns of each association	KWS/KFS			X		X		X		X		X		
1.2.3 Follow-up on the issues raised by the associations	KWS/KFS				X		X		X		X		X	
1.3: Use different communication platforms to highlight conservation issues														Barazas proceeding reports developed Radio talk shows conducted by June 2016 Report on Radio talk
1.3.1 Use local leaders, women groups (religious, traditional dancers' e.g. and others) to reach the community.	KWS/KFS			X		X		X		X		X		
1.3.2 Use local media (FM radio stations, Nuru magazine) to disseminate information on compensation, HWC, the new Wildlife Act, Forest Act)	KWS/KFS				X		X		X		X		X	
1.3.3 Identify and engage resource persons who can transmit conservation messages through the media.	KWS/KFS				X									

Management Action and Activities	Persons Responsible	Timeframe												Milestones	
		FY 2015-16				FY 2016-17				FY 2017-18					
		1	2	3	4	1	2	3	4	1	2	3	4		
1.3.4 Participate in conservancy meetings	KWS/KFS/NRT			X		X		X		X		X		shows developed by June 2016 Quarterly consultative meetings held Radio frequency identified and shared between KWS and Conservancies	
1.3.5 Install a shared radio frequency to enhance communication between the conservancies and KWS	KWS/NRT				X										
Objective 2: Conservation Education and awareness programme strengthened															
2.1 Establish and equip a conservation education centre															Proposal on education centre developed and funded June 2017 Centre established by December 2017 Mechanisms for encouraging Local interns and volunteers put in place
2.1.1 Develop a proposal on the proposed Education Center	KWS			X											
2.1.2 Liaise with KWS Headquarters to have the proposal approved and implemented	KWS						X								
2.1.3 Deploy relevant human resource and equipment to the Conservation and Education center	KWS								X						
2.1.4 Use local interns and volunteers to offer conservation talks and interpretation services	KWS	X	X	X	X	X	X	X	X	X	X	X	X		
2.2 Redesign the MFE conservation education programme to target key community strata															Compendium on MFE prepared and placed in the knowledge repository Banner developed and placed in strategic points Field guide books, maps and posters developed
2.2.1 Collect and collate existing information on Marsabit covering diverse themes and synthesise this into a compendium	KWS/KFS/NRT	X	X	X	X	X	X	X	X	X	X	X	X		
2.2.2 Install banners with wildlife messages in strategic locations	KWS/KFS/NRT				X				X			X			
2.2.3 Develop wildlife field guidebooks, maps for various themes and posters	KWS/KFS/NRT			X				X			X				

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.2.4 Digitise education materials for ease of dissemination to schools; such materials should be targeted at different audience	KWS	X		X		X		X		X		X		Developed in conjunction with the database
2.2.5 Develop a wildlife education program for MFE	KWS													-Wildlife program developed -Education curriculum developed -Education program implemented on quarterly basis
2.2.6 Develop branded materials for distribution to the public	KWS	X	X	X	X	X	X	X	X	X	X	X	X	-Branded materials developed
2:3: Develop a community outreach strategy														-Workshop report available September 2015
2.3.1 Organise a workshop to discuss the objectives of the community outreach strategy	KWS/NRT		X											-Community outreach strategy developed
2.3.2 Identify key issue areas that the strategy will target	KWS/NRT		X	X		X		X		X		X		-Stakeholder Analysis conducted
2.3.3 Identify the target local community at different social strata and institutions/stakeholders	KWS/NRT		X		X		X		X		X		X	
2:4 : Collaborate with the local community groups in enhancing conservation education and awareness creation														Updated register of Firewood collection groups, ongoing process
2.4.1 Liaise with extension mothers (educators) especially from the women fire wood collector’s association	KWS/KFS		X		X		X		X		X		X	-Trees proposed not to be cut marked
2.4.2 Mark important trees that should not be cut as done at Korr, Ngurunit, Laisamis Marsabit South	KFS			X		X		X		X		X		-EMC identification documents developed
2.4.3 Provide identification documents for EMC enforcers	KWS/NEMA				X									
Objective 3: Conservation compatible land uses and practices promoted on PA-adjacent areas														
3.1 Develop alternative sources of livelihood for community members dependent on forest resources														

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.1.1 Organise a consultative forum for the fuel wood collectors	KFS		X											Consultative forum with firewood collectors conducted. Tree nurseries established
3.1.2 Support fuel wood association in establishing a tree nursery	KFS			X			X				X			
3.1.3 Sensitize the women on the potential alternative sources of livelihoods	KFS/KWS	X		X		X		X		X		X		Quarterly sensitization meetings
3.1.4 Employ large numbers of women in conservation projects	KWS/KFS/NRT	X	X	X	X	X	X	X	X	X	X	X	X	Women considered in employment as opportunities emerge
3.1.5 Mentor and build the capacity of the women and/or their associations to run the institutions sustainably	KWS/KFS/NRT			X			X		X		X			Capacity building conducted to women and their associations conducted on quarterly basis
3.1.6 Negotiate an agreement with women to facilitate phasing out harvesting of fuel wood	KFS/KWS	X		X			X		X					Agreement developed by June 2017
3.1.8 Support establishment of woodlots on farms	KFS	X		X		X		X		X		X		-Woodlot established on farms
3.2 Supply water for domestic and livestock use to the local community														-Check dam constructed and water piped out to community land by June 2017. -WRUAs strengthened -Collaboration mechanisms established -Djabias constructed
3.2.1 Pipe water from the PA to community land	KWS				X									
3.2.2 Support strengthening of WRUAs	WRMA/KWS		X			X		X		X		X		
3.2.3 Collaborate with the County Government to develop the <i>Fifty Feet deep well</i> water supply	KWS/CGM			X			X				X			
3.2.4 Construct <i>Djabias</i>	KWS		X		X		X		X		X		X	
3.3 Improve management of communal grazing areas														-Grazing plans devel-

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.3.1 Develop traditional grazing plans	NRT/CGM			X			X			X				oped
3.3.2 Establish and strengthen grazing committees	NRT/CGM	X					X							-Grazing committees established
3.3.3 Promote destocking of livestock	NRT/CGM	X			X			X			X			-Destocking programs initiated
3.3.4 Adopt holistic grazing management	NRT/CGM	X	X	X	X	X	X	X	X	X	X	X	X	-Holistic grazing management adopted
3.4: Develop a local level land use plan focusing on securing wildlife corridors														Land use Zoning map developed
3.4.1 Support and develop a local level land use zoning scheme with prescriptions	KWS/NRT/CGM		X			X			X			X		
3.4.2 Negotiate with community members settled on corridors	KWS/NRT/CGM			X			X			X			X	Wildlife corridors opened up
3.4.3 Mark the corridors	KWS/NRT/CGM		X											Map of the corridors
3.4.4 Enter into easement agreements with community members along the wildlife corridors	KWS/NRT/CGM		X			X			X			X		Easement Agreements for the conservancies
3.5: Support establishment of conservancies														Conservancies registration document
3.5.1 Support the registration of the conservancies through the Wildlife Act	KWS/NRT/CGM		X			X			X			X		
3.5.2 Support organisation of conservancy meetings	KWS/NRT/CGM			X			X			X			X	Quarterly conservancy meetings
3.5.3 Strengthen the community involvement in running of their conservancies through a consultative forum	KWS/NRT/CGM		X			X			X			X		Formation of Conservancies management team.
3.6: Promote fuel-efficient stoves														-Fuel efficient stoves procured and distributed to targeted institutions
3.6.1 Procure a few stoves for demonstration to target institutions.	KFS/CGM	X				X				X				-Quarterly sensitization meetings
3.6.2 Sensitize and create awareness on these energy saving Jikos	KFS/CGM	X	X	X	X	X	X	X	X	X	X	X	X	
Objective 4: Human-wildlife conflict reduced														

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
4.1 Install and maintain electric fences in HWC Conflict-prone areas														
4.1.1 Align the fence following the old fence alignment (Songa, Sagante, Ilpus, KWS HQ-Badasa) but leave the corridor open	S/W, CWO survey team	X		X			X							
4.2 Improve problem animal control (PAC) strategies														
4.2.1 Strengthen the PAC in Marsabit	S/W, CWO	X				X				X			X	Procure equipment
4.2.2 Collaborate with conservancies in PAC activities	S/W, CWO		X		X		X		X		X			Collaboration mechanisms established
4.2.3 Strengthen the Songa and Karare PAC outposts by providing vehicles	KWS,AFD					X								Procure vehicle for PAC
4.2.4 Establish a PAC hotline	SW, CWO	X												PAC hotline established
4.2.5 Promote other wildlife deterrent methods e.g such as Kai apple; lion proof bomas; flickering torches; scaring	SW, CWO,NRT	X				X				X			X	Other wildlife deterrent methods promoted
4.3 Improve the wildlife compensation claims processing system														
4.3.2 Sensitize and create awareness among the community on the compensation regulations	CCCM	X	X	X	X	X	X	X	X	X	X	X	X	-Quarterly programs on awareness creation
4.4 Establish and maintain a human-wildlife conflict database														
4.4.1 Provide a computer and relevant software to support HWC monitoring and evaluation.	SW	X												Human wildlife conflict database developed
4.4.2 Link this information database to a GIS to facilitate analysis of spatial distribution of claims	SW, SRS	X	X	X	X	X	X	X	X	X	X	X	X	Analysis on human wildlife conflict conducted on quarterly basis
Objective 5: Opportunities for local communities to benefit from the MFE improved														
5.1 Employ local community members in the wildlife and forest sectors														
5.1.1 Source unskilled labour from the local community	KWS/KFS	X	X	X	X	X	X	X	X	X	X	X	X	Local communities employed whenever opportunities arises

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
5.1.2 Source seedlings for woodlot establishment from the community	KWS/KFS	X			X			X			X			Community supported to establish seedling nurseries
5.1.3 Train community members and support them to establish tree nurseries	KWS/KFS	X		X		X		X		X		X		Training conducted at community level on tree nurseries management
5.2 Develop community nature-based initiatives and support enhancement of other livelihood activities														
5.2.1 Support establishment of eco-tourism ventures-cultural sites	KWS/NRT/CGM	X												Eco-tourism ventures identified
5.2.2 Initiate a camel derby to promote cultural activities with tourism benefits	KWS/NRT/CGM			X				X				X		Camel derby initiatives started at the conservancies
5.2.3 Support enterprise establishment e.g. soil block making; bead work; bee keeping; butterfly farming; milk production; poultry keeping; fish farming; green house farming; leather tannery	CGM/NRT/NGO/KWS		X			X			X		X			IGA enterprises established by December, 2017
5.2.4 Promote agro-forestry focusing on fruit trees	KFS/CGM	X		X		X		X		X		X		Agro forestry programs promoted
5.2.5 Improve livestock production through supporting cross breeding programmes	NRT/CGM/NGOs	X			X				X					Cross breeding program initiated at the community conservancies
5.2.6 Support livestock marketing	NRT/CGM/NGOs	X	X	X	X	X	X	X	X	X	X	X	X	Marketing strategy developed
5.3 Support production of 'eco-friendly' charcoal														
5.3.1 Pilot eco-friendly' charcoal production in the three community conservancies adjacent to Marsabit National Reserve.	KFS	X	X	X	X	X	X	X	X	X	X	X	X	Piloting program developed and implemented
5.4 Develop a mechanism to enable regulated access to cultural sites														
5.4.1 Identify and document all sites of cultural importance	NMK/KWS/CGM	X			X									Cultural sites identified

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
5.4.2 Develop the rules and regulations to govern community visits to these sites	NMK/KWS/CGM			X			X							Rules and Regulations developed through consultative process
5.4.3 Facilitate community visits on a pilot basis	NMK/KWS/CGM								X		X		X	Community visits conducted
5.4.4 Adjust rules and regulations as necessary	NMK/CGM/KWS												X	Rules and regulations document

PA OPERATIONS AND SECURITY PROGRAMME

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: Institutional collaborations formalised and strengthened														
1.1 Draw and implement a Memorandum of Agreement on the implementation of the MFE management plan														MoA developed Roles and obligations of each institution specified and agreed upon MFE management committee established
1.1.1 Draw a memorandum of Agreement between KWS, KFS and the County Government on the implementation of the MFE management plan	KWS/KFS/CGM	X												
1.1.2 Specify the role and obligations of each institution	KWS/KFS/CGM	X												
1.1.3 Establish a MFE management committee and hold regular committee meetings	KWS/KFS/CGM			X										
1.2 Collaborate with the National land commission and Marsabit County Government to secure critical wildlife habitats such as corridors and dispersal areas located outside the PA boundary														Boundary survey conducted and critical ele-

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
1.2.1 Revise the boundary of the national reserve to include critical elephant dispersal areas	KWS/KFS/Survey Team/CGM													phant dispersal areas identified
1.3: Establish and operationalise a resource users forum to encourage participatory natural resource management in the MFE														-Resource Users Forum established -Stakeholder analysis and mobilization carried out. -Workshop conducted by December, 2015 -Sensitization meetings carried out
1.3.1 Establish a Mt. Marsabit Natural Resources Forum	KWS/CGM/KFS	X												
1.3.2 Identify and mobilise key stakeholders to form the forum	KWS/CGM/KFS	X												
1.3.3 Organize workshops to develop terms of reference of the forum	KWS/CGM/KFS				X									
1.3.4 Sensitise stakeholders on the role of the forum	KWS/CGM/KFS					X			X				X	
1.4 Collaborate with National and County administration in management of natural resources in the MFE														Relevant county committee meetings attended on quarterly
1.4.1 Participate in relevant County committee meetings	KWS/CGM/KFS	X	X	X	X	X	X	X	X	X	X	X	X	
1.5 Collaborate with other stakeholders in maintaining the current moratorium on consumptive use of forest products in the MFR/NR														-Moratorium effected Status review on annual basis Livestock control strategy developed
1.5.1 Effect the moratorium on consumptive use of forest resources	KFS				X									
1.5.2 Carry out a review of the status of security, water and forest biodiversity	KWS/KFS				X				X				X	
1.5.3 Control livestock grazing during extreme droughts	KWS/KFS/NRT			X					X			X		
1.6: Collaborate with Marsabit County Government to control livestock incursion and human encroachment in the MFE protected areas														-Partnership strengthened and sustained on quarterly basis
1.6.1 Ensure partnership between KWS and the Marsabit County Government	KWS/CGM	X	X	X	X	X	X	X	X	X	X	X	X	
1.7 Implement rules and regulations for livestock grazing in the National Reserve as per the Wildlife Act 2013														

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
1.7.1 Implement rules and regulations that will control livestock grazing	KWS	X	X	X	X	X	X	X	X	X	X	X	X	-Sensitization of the new rules to the key stakeholders and local communities and implemented
1.7.2 Specify where grazing can occur and under what conditions	KWS			X				X					X	-Mapping out and Zone grazing areas and conditions stipulated
Objective 2: Performance and motivation of MFE staff improved														
2.1: Implement the sector-based management organisational structure														
2.1.1 Expand management to other parts of the National Reserve to diversify tourist attractions	KWS	X				X								-Management sectors in other parts Established and conditions improved.
2.1.2 Post the relevant staff to the new sectors	KWS								X					-Relevant staff posted in the new sectors by June, 2017
2.2 Strengthen staff capacity at the MFE														
2.2.1 Update previous staffing assessment, or prioritise recruitment of new staff to address specific MFE management issues	KWS	X												-Staff Assessment report
2.2.2 Employ additional staff in the ranger cadre	KWS	X												-Rangers recruited and posted to Marsabit PA
2.2.3 Enhance collaboration between KWS, KFS and conservancies	KWS/KFS/NRT	X	X	X	X	X	X	X	X	X	X	X	X	-Collaboration mechanisms sustained
2.3 Train staff in relevant skills														
2.3.1 Train staff in various skills specified in the Training Needs Assessment report	KWS	X	X	X	X	X	X	X	X	X	X	X	X	-Staff trained as per TNA report
2.4 Improve staff welfare and motivation														
2.4.1 Liaise with NACADA to counsel staff on drug abuse	KWS/HCO/SW	X			X				X					-Staff counselled by NACADA annually
2.4.2 Liaise with HC to create awareness on medical ex-gratia payment	KWS/HCO/SW	X	X	X	X	X	X	X	X	X	X	X	X	-Awareness creation on

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
2.4.3 Organize team building and social events	KWS/HCO/SW				X				X				X	quarterly basis -Team building and social events conducted annually -staff canteen established and operationalized -Sporting facilities and events organised -Deployment to hardship areas done as per the recommendations of Human Capital Policy -Other recreational facilities provided -Quarterly staff meetings conducted -Staff welfare association
2.4.4 Establish staff canteens	KWS/HCO/SW			X										
2.4.5 Provide sporting facilities and organise sporting events	KWS	X												
2.4.6 Liaise with HC to implement the Human capital policy concerning deployment of staff in hardship areas	HCO/KWS	X												
2.4.7 Provide other recreation facilities e.g. DSTV	SW/HCO	X												
2.4.8 Consider social and psychological needs of staff during deployment	HCO/KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	
2.4.9 Organise regular staff meetings	HCO/SW	X	X	X	X	X	X	X	X	X	X	X	X	
2.4.10 Establish a staff welfare association	HCO/SW	X												
Objective 3: MFE natural resources and visitors safeguarded														
3.1: Intensify security patrols														
3.1.1 Improve security presence in key visitor focal points (view points, campsites, exit routes and gates)	KWS	X	X	X	X	X	X	X	X	X	X	X	X	-Security presence and vantage points enhanced
3.1.2 Identify and map security hotspots outside the PAs	KWS/County Commissioner	X				X				X				Security hotspots identified at least annually
3.1.3 Carry out ground and aerial patrols	KWS	X	X	X	X	X	X	X	X	X	X	X	X	Quarterly aerial and ground patrols
3.1.4 Map livestock watering routes	KWS/NRT	X				X				X				Livestock watering routes mapped out annually
3.1.5 Carry out joint patrols	KWS/KFS/NRT	X	X	X	X	X	X	X	X	X	X	X	X	Quarterly joint patrols

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.1.6 Establish common patrol sectors	KWS/KFS/NRT	X				X				X				Common patrol sectors established
3.1.7 Harmonize security SOPS	KWS/KFS/NRT	X												Security SOPs established
3.1.8 Define the command structure	KWS/KFS/NRT	X												Command structure defined
3.1.9 Carry out joint KFS/KWS training to build a unified team	KFS/KWS	X												Joint trainings conducted
3.1.10 Establish additional outposts	KWS					X								Additional outposts established
3.1.11 Provide adequate logistics (equipment and supplies) to support security patrols e.g. tents,	KWS	X												Equipment and supplies provided
3.1.12 Collaborate with community scouts to enhance security outside the PA	KWS/NRT	X	X	X	X	X	X	X	X	X	X	X	X	Collaboration enhanced and sustained
3.2 Strengthen security capacity														-Staff strength enhanced
3.2.1 Enhance current (section) strength to full platoon	KWS	X												
3.2.2 Explore collaboration with tour operators especially in intelligence information sharing	KWS/OC-CLIC	X	X	X	X	X	X	X	X	X	X	X	X	-Collaboration established and sustained
3.2.3 Train security staff in tour guiding, visitor handling, interpretation, and emerging security challenges (e.g. terrorism) and provide screening equipment	KWS	X				X				X				-Relevant trainings to staff provided
3.2.4 Liaise with other security agencies as regards security of access routes.	KWS/KPS	X	X	X	X	X	X	X	X	X	X	X	X	
3.3 Collect and analyse intelligence information														Informers recruited and trained
3.3.1 Recruit and train informers from the local communities in information collection	KWS/OC-CLIC/NIS	X	X	X	X	X	X	X	X	X	X	X	X	
3.3.2 Liaise with other security agencies in information gathering and dissemination	KWS/KPS/NIS	X	X	X	X	X	X	X	X	X	X	X	X	Liaison activities improved
3.3.3 Train security staff in security database development and management.	KWS	X				X					X			Security staff trained

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.4 Train security staff in court procedures and relevant laws														
3.4.1 Establish an investigation and prosecution unit	KWS				X									-Investigation and prosecution unit established
3.4.2 Carry out in-house training of Non Commissioned Officers and security officers in prosecution of court cases	KWS	X												-in-house trainings conducted
Objective 4: Infrastructure to support PA management and tourism development improved														
4.1 Construct, rehabilitate and maintain MFE roads														
4.1.1 Develop a patrol track from Chafachachane to Bule MarMar	KWS/NRT			X										Patrol track developed
4.1.2 Rehabilitate roads and tracks	KWS	X												Roads and Tracks rehabilitated
4.1.3 Establish a crater viewing circuit linking major craters	KWS				X									Crater viewing circuit developed
4.1.4 Establish a patrol/viewing road in the elephant corridor	KWS/NRT				X									Patrol road developed
4.1.5 Rehabilitate the Old Camp to Songa patrol road	KWS	X												Road rehabilitated
4.1.6 Rehabilitate roads in the forest reserve	KWS/AFD	X												Roads rehabilitated
4.2: Construct, rehabilitate and maintain buildings														
4.2.1 Construct Residential and non residential buildings	KWS/AFD				X									Buildings constructed
4.3 Procure and maintain vehicles, plants and equipment														
4.3.1 Procure fire fighting equipment	KWS	X												Equipments procured
4.3.2 Procure a tractor and trailer for seedling production	KFS				X									Tractor procured
4.3.3 procure tractor mounted soil augurs	KFS				X									Tractor procured
4.3.4 Procure mechanized tree nursery kit	KFS			X										Mechanized tree nursery kit procured
4.3.5 Procure office equipment	KFS	X												Office equipments procured
4.3.6 Maintain roof catchment for seedling production	KFS	X												Roof catchments maintained

Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
4.3.7 Maintain existing plants(Tractor-driven lawn mower)	KFS	X												Existing plants main- tained
4.4 Improve telecommunications														
4.4.1 Upgrade the radio network by installing a repeater to enhance communication	KWS	X												Radio network upgraded
4.4.2 Provide other communication accessories e.g. VHF radios	KWS	X												Communication accesso- ries provided
4.5 Construct and maintain other essential infrastructure e.g. gates, sign posts, fire towers, fire rating boards														
4.5.1 Upgrade the Karare, Abdul and Ahmed gates-guard room and ticketing office	KWS	X												Gates upgraded
4.5.2 Install signposts and maintain existing ones	KWS	X												Signposts installed and maintained
4.5.3 Install fire towers and fire rating boards (2 additional fire rating boards in strategic areas e.g. Songa-Badassa, HQ)	KWS					X								Fire towers and rating boards installed and maintained
4.5.4 Sensitize the community on the fire rating boards	KWS/CWO						X			X				Community sensitized annually
4.6 Provide utilities e.g. water, electricity and sanitation to offices and residential houses														
4.6.1 Install solar power at Ngurunit	KWS					X								Solar power installed
4.6.2 Install a rainwater harvesting system (Djabia) that will also serve the local community at Ngurunit	KWS					X								Djabia installed
4.6.3 Install rainwater harvesting systems at the KFS/KWS HQ to supplement the piped water.	KWS/KFS	X												Rainwater harvesting systems installed and maintained
4.7 Construct and maintain fences														
4.7.1 Demarcate and upgrade the forest boundary to fire break standards	KWS/KFS				X									Forest boundary demar- cated
4.7.2 Maintain fences and firebreaks through regular vegeta- tion clearing	KWS/KFS	X	X	X	X	X	X	X	X	X	X	X	X	Quarterly vegetation clearing

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Management Action and Activities	Persons Responsible	Timeframe												Milestones
		FY 2015-16				FY 2016-17				FY 2017-18				
		1	2	3	4	1	2	3	4	1	2	3	4	
4.7.3 Rehabilitate fences around residential and office compounds	KWS/KFS	X				X				X				Fences rehabilitated
4.8 Develop and implement an emergency and disaster preparedness plan														
4.8.1 Identify threats and stakeholders	KWS/KFS/CGM	X												Threats and stakeholder analysis conducted
4.8.2 Identify disaster experts to prepare the plan	KWS/KFS/CGM			X										Experts identified
4.8.3 Organise a stakeholder workshop to sensitize participants on the disaster preparedness plan	KWS/KFS/CGM					X								Stakeholder workshop organised

Annex 2. Stakeholder participation in plan development (workshops/meetings, working groups, and Core planning Team)³

Name	Organisation	Position	Stakeholder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
A.A Guleid	CGM	Chief officer Env & NR		X							
A.Galsaracho	Office of the President	Senior Chief	X	X							
Abdikadir Chari	Starfm	Rep		X							
Abdikadir Kafile	County Govt	O.o.g		X							
Abdo Ala Gacha	C.g.m	Sub county admin		X							
Abdub .H.Libar	Jaldesa conservancy	Driver		X							
Abduba Umiro	County government	Ward Admin		X							
Adan Bocha	KWS	Ass War-den 11	X	X							
Adan Tele	Dakabaricha	Village Elder		X							
Adan Wako	Office of the President	Assistant Chief	X	X							
Ailo Adan	Burji	Chair		X							
Aisha Mato	Dakabaricha	Village rep		X							
Ali Fernandes	Office of the President	Assistant Chief	X								
Ali Jirmo	O.O.P	Snr.chief		X							
Ali Mohamed	Shurr Con-servancy	Manager	X	X							
Andrew Jaldesa Abduba		Ass Chief		X							
Apollo Kariuki	Kenya Wildlife Service	Senior Resource Planner	X	X	X	X	X	X	X	X	X
Arero fayod	Farmer	Farmer		X							
Asha Jibriel	KWS	Secretary		X							
Barako Golia-cha	Jaldesa conservancy	Manager	X	X							
Benedict Musyoka	National Drought Management Authority	CDC	X								

³ Eleven (11) village level meetings, with about 40 participants in each meeting, were also held in the villages adjacent to the Marsabit forest to solicit community contribution to the development of the management plan.

Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
Benjamin Wako	Northern Rangeland Trust	Chair fields	X								
Benson Kinyua	Equity Bank	Manager	X								
Bernard Kaaria	Kenya Wildlife Service	Head Biodiversity and Eco-system	X		X						
Charity Gombamal	O.O.P	A/chief		X							
Charity Tarwen	Hula Hula	Secretary		X							
Charles Otieno	Kenya Forest Service	Forester						X		X	
Clement P.Ngoriareng	Kenya Forest Service	Senior Assistant Director Drylands	X		X		X				
Dahabo Darro	Bank-Kenya Commercial Bank	Manager	X								
Dairo Chudugle		Member	X								
Damaris Lochi	OOP	Ass/chief		X							
Daniel Eisimbasele	Songa Conser-vancy	Manager	X								
Daniel Letoiye	Northern Rangeland Trust	Research and Moni-toring office	X		X						
Daniel Muteti	Kenya Wildlife Service	Senior Research Scientist	X		X						
Darmi Soole	Waato W/Group	Chair	X								
Davise Ssnibassel	Conser-vancy	Manager		X							
Diba Jaliso				X							
Diba Jalo		Ass/Chief		X							
Did Rigatu	Jirime	Elder		X							
Dida Dalacha	Jaldesa	KPR		X							
Douglas Erika	Jirime	Youth		X							
Dubguyo Barfatta	Community	Herds man		X							
Elizabeth Esiromo	Kenya Wildlife Service	CPO	X		X						
Emmanuel Kochalle	Kenya Wildlife Service/AFD	Deputy Project Coordinator	X								X
Enoch K.Tadi	National	Chief		X							

Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
	government										
Eric Chemitei	Kenya Forest Service	Ecosystem Conserva- tor	X								
Esther E. Shiwe	Dept of Social Develop- ment	County director for social develop- ment	X								
Evans Muriithi	Kenya Wildlife Service	RS	X		X						
Fatuma D. Umuro	Jaldesa community	Member	X								
Fatuma Godana	Maendeleo ya Wanawake	Chair Lady	X								
Fatuma Nane	Office of the President	Assistant Chief	X								
Fatuma Osman	Jirime	Elder		X							
Fatuma Wario	Women Group	Chairlady	X								
Fatuma Wario	Artha Gada- noji	Secretary		X							
Francis Kariuki	Kenya Forest Service	SAD	X		X		X	X		X	
Gallo Jars				X							
Galma Boru	O.O.P	Assistant chief		X							
Geoffrey Bundotich	Kenya Wildlife Service	Research Scientist	X		X						
George Merele	Africa Inland Church/ME GOLI	Pastor	X								
Godana Lekisat	Maziniru	Committee		X							
Godwin Leslie Muhati	Kenya Wildlife Service/AFD	Project Coordinator	X	X							X
Gubo Leitoron	Karare	Environ- mentalist		X							
Guyo Abdi	Mecog	Member	X								
Guyo Gababa	Jaldesa Conser- vancy	Board Member	X								
Habiba Fayol	Air-strip/Kiwanja	Member	X								
Hakule Dida	Women group	Chairlady		X							
Halima Huka	Tonppi	Member		X							

<i>Name</i>	<i>Organisa- tion</i>	<i>Position</i>	<i>Stake- holder Meeting</i>		<i>Working Groups</i>						<i>C P T</i>
			<i>#1</i>	<i>#2</i>	<i>EWG #1</i>	<i>EWG #2</i>	<i>FWG</i>	<i>TWG</i>	<i>CWG</i>	<i>S/PAO WG</i>	
Halkano Halake	Star FM	Reporter	X								
Hassan Bulge		Elder		X							
Hawo Galgalo	Environ- mental manage- ment Com- mittee	Member	X								
HE.O.A. Ali	CGM	Deputy County Governor	X	X							
Hebert A. Kombo	CC	ACC		X							
Huku Guyo	Shurr Con- servancy	Manager		X							
Hussein Chargy	Office of the President	Chief	X								
Hussein Galgalo	Office of the President	Chief	X								
Ibrahim A.Gakonono	Chari peace	Chairman		X							
Ibrahim Sessane	Office of the President	Chief	X								
Iltelei Nayaba	Karare	EMC chairman		X							
Isaac Mugo	Kenya Wildlife Service	S/W	X					X		X	X
Isacko G.Bonaya	PACIDA	PO		X							
Israel Makau	KWS	Research Scientist		X							
J.M Maina	Kenya Forest Service	Ecosystem Conserva- tor	X	X			X	X		X	X
J.W Muciunyi	Kenya Forest Service	Forester	X								
Jackline Mutwiri	Kenya Wildlife Service	Planner	X	X	X			X		X	X
Jackson K.Nzou	Kenya Forest Service	Ecosystem Conserva- tor	X								
Jamal Rashid	KWS	Ass Warden 11		X							
James Jarso	Sagante	Ward Admin		X							
James Ki-mondo	Kenya Forestry Research Institute	Principal Research Scientist	X		X						
James L.Orre	CGM	Chief Officer,		X							

Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
		Land									
James Njogu	Kenya Wildlife Service	Area Ac- countant	X								
Jane Duba	Sagante	member		X							
Jane Wamboi	Kenya Wildlife Service	Forest Coordinator				X					
Jarso Godana	DWVA	Farmer	X								
Jattani Ab- duba	Badassa	Environ- ment Manage- ment Committee	X	X							
Jeremiah Nakwan	Songa	Chairman		X							
John K.Macharia	Kenya Forest Service	Assistant Director	X	X	X		X				X
John Kubo	Karare	Environ- ment Manage- ment Committee	X								
John W.Duba	Forest Conserva- tion com- mittee Ewaso	Member	X								
Joseph Edebe	Kenya Wildlife Service	Senior Research Scientist	X	X	X	X	X				X
Joseph Hal- kano	Mecog	Manager	X								
Joseph Onyuka	Kenya Wildlife Service	M/Supt	X								
Joyce Dafar- dai	Songa Conser- vancy	Committee		X							
Kabade Halakhe	Dakabaricha	Daka- baricha		X							
Kabale Isako	Meccog	Treasurer									
Kano Dida	Jaldesa conservancy	Chairman		X							
Katero Gal- gallo	O.O.P	A/chief		X							
Kennedy Kijana	Howard Humphreys	Environ- mental		X							
Kennedy Odhiambo	NEMA	CDE	X								
Kihanya Rera	Kenya Wildlife Service/AFD	FO	X								

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Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
Kulu Soma	Office of the President	Chief	X								
Lapazumat L. Paul	Adeso	Programme officer		X							
Lepakio Lechipan	Songa Conser- vancy	Songa Conser- vancy Chairman	X								
Lepakiyo Patrick	Songa conservancy	Chairman		X							
Leria Dokole	Hula-hula/Karatin a EMC	Chair	X								
Liban Boru	D/Conserva ncy	Member		X							
Linus Chirchir	Marsabit lodge	Mgr		X							
Loklo Diba	Borularo	Community Member		X							
Ltrakna Lito	Conser- vancy	Committee		X							
Lydia Njeru	Howard Humphreys	Sociolo- gists		X							
M.Lenepe	Crater Com	Chairman	X								
M.Ndiritu	K.f.s	Technical officer		X							
Magdaline M. Ilimo	Starfm	Rep		X							
Male Riare	Farmer	Ledar		X							
Mamo B.M	National Environ- mental Manage- ment Au- thority	SEAO	X								
Mario Rab- hayo	Hula-Hula	Elder		X							
Mark Kap- changa	Standard media	Media consultant				X	X	X	X	X	
Martin Ng'ethe	Kenya Wildlife Service	Company Com- mander						X		X	
Mary Qabale	Ki- wanja/Airstri o	Conserva- tionist	X								
MaryEmma Wangari						X	X	X	X	X	X
Michael Wanjau	Kenya Wildlife Service	AD-NCA	X								
Mohamed Adan	Jirime	Elder		X							
Mohamed Omar	Kenya Wildlife	Head Conserva-	X		X						

Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
	Service	tion Pro- gramme									
Moses Nde- ritu	Kenya Forest Service	F.O	X								
Muma Abelle	CGM	Co Admn		X							
Ngasepicho loriboma	Jirime	Elder		X							
Omar A.Ali		DG	X								
Omar J.Sage	Office of the President	Assistant Chief	X	X							
Omar Kutala	MESHA	Chairman	X								
Oshe chupo	Farmer	Farmer		X							
Peter Lekeren	KWS	SW Marsabit NR		X							
Peter Mbote	Kenya Wildlife Service	Warden	X								
Peter Njoroge	Kenya Wildlife Service	Assistant warden II	X		X				X		
Peter Nur Galma	Pic Mecog	Project implemen- ting comt		X							
Philip Gayere	Kenya Wildlife Service	Office Assistant	X								
Philip Wario Guyo	Dakabaricha	Farmer		X							
Rahma Ka- bunge	Nagayo	Village rep		X							
Rahma Shariff	Women Group	Chairper- son	X								
Regina Or- doya	Hiriyo Women Group	Member	X								
Roba Galma	fit-Kenya	Project officer		X							
Roba Guyo	Farmer	Farmer		X							
Salad Ibrahim	Central	Driver		X							
Samwel K.Moi	Kenya Forest Service	Forester	X		X				X	X	
Shadrack Ngene	Kenya Wildlife Service	Assistant Director				X					
Sisae Bogalla	Badassa	Forest Farmer	X								
Sora J.Danso	CGM	CO	X								
Stephen Lerapo	National government	Chief		X							
Steve	Kenya	Community	X	X			X		X	X	X

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Name	Organisa- tion	Position	Stake- holder Meeting		Working Groups						C P T
			#1	#2	EWG #1	EWG #2	FWG	TWG	CWG	S/PAO WG	
Kamerino	Wildlife Service/AFD	Liaison Officer									
Talaso Elema	Malbulti W/group	Chair	X								
Tarry Johns- tone	CIFA	P.O	X								
Thomas Koitimet	Kenya Wildlife Service	AWIII	X					X		X	
TN Kinyua	WRMA	SRM		X							
Tuna Wako	Dakabaricha	Member		X							
Umuro Dido	ASDSP	NRM	X								
Waithaka Mugunyi	Kenya Forest Service	Senior Ecosystem Forester	X	X	X				X	X	
Wako Ali	Karare	Member	X								
Wako Duba	FCC	County rep		X							
Wako Galma	National government	Chief		X							
Wario D.Abdi	Shurr	Member	X			X					
Wato Racho	Women Group	Member	X								
Wochino Abdullahi	KWS/studen t	Student		X							
Zeinabu Esimfecha	Songa conservancy			X							

Annex 3. Overview of legal status of MFE protected areas

Protected area	Legal protection and excisions	Legal instrument	Boundary plan	Competent Authority
Marsabit Forest Reserve	First declared a forest reserve through proclamation No. 20 of 6 April, 1927 and later included in a schedule of government forest reserves gazetted through Proclamation No. 44 of 1932	<p>Section 3 of the Forest Ordinance (Chapter 149)</p> <p>Section 21 of the Forests Act, 2005 states “<i>All forests in Kenya other than private and local authority forests, are vested in the State, subject to any rights of user in respect thereof, which by or under this Act or other written law, have been or are granted to any other person.</i>”</p> <p>According to The Constitution of Kenya, 2010 (Article 62 (1) (g)), Marsabit Forest Reserve is a government forest and the section of Marsabit National Reserve overlapping with the forest reserve (government game reserve) are categorized as <u>Public Land</u>. Under Article 62 (3), this category of land “<i>is vested in and held by the national government in trust for the people of Kenya and administered on their behalf by the National Land Commission.</i>”</p>	Boundary plan No. 37 and later boundary plan No. 75/14	Forest Department and currently the Kenya Forest Service (KFS)
Marsabit National Reserve	First declared a National Reserve through Government Notice No. 936 of 24 September 1948.	Section 8 of the National Parks Ordinance 1945	Boundary plan No. 216/1	Marsabit African District Council (the colonial equivalent of the Marsabit County Government) for land outside the Forest Reserve and Forest Department for the Forest Reserve
	Excision of much of the National Reserve leaving the Marsabit and Uaso Sectors. This was done through legal notice No. 16 of 1961	Section 8A of the Royal National Parks Ordinance (Cap. 215)	Boundary Plan No. 216/13	Marsabit African District Council (ADC) and Forest Department for the Forest Reserve
	Uaso Sector was excised from the National Reserve through legal notice No. 366 of 1962	Section 8A of the Royal National Parks Ordinance (Cap. 215)	Boundary Plan No. 216/13	Marsabit African District Council and Forest Department for the Forest Reserve
	Excision of 524 Km ² of	Section 7 (2) (a) of the Wildlife Conservation and	Boundary	Marsabit County Council the Predecessor

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Protected area	Legal protection and excisions	Legal instrument	Boundary plan	Competent Authority
	the National Reserve through Gazette notice No. 3962 of 13 October 1983.	Management Act. Cap 376	Plan No. 216/48	of Marsabit African District Council, and Forest Department for the Forest Reserve
	Excision of 9.6 Km ² in the Karare Area through Gazette Notice No. 1982 of 5 April 1991	Section 7 (2) (a) of the Wildlife Conservation and Management Act. Cap 376	Boundary Plan No. 216/56	Marsabit County Council the Predecessor of Marsabit African District Council, and Forest Department for the Forest Reserve
		Under Article 63 (2) (iii) of the Constitution, land that is lawfully held as trust land by the county governments is categorized as <u>Community Land</u> . Consequently, since the Marsabit National Reserve (excluding the area designated as Marsabit Forest Reserve) was alienated from trust land and the competent authority ⁴ in regard to this category of land at the time was the Marsabit African District Council (renamed Marsabit County Council after independence), then this part of the National Reserve falls under community land and is held in trust by the county government on behalf of the Marsabit communities.		

According to the Wildlife Act, Cap 376 (revised 2009):

"Competent authority" means:

- (a) ⁴ in relation to Government land, the Minister for the time being responsible for matters relating to land;
- (b) in relation to Trust land, the county council in which the land is vested;
- (c) in relation to any other land, the owner thereof or the person for the time being entitled to the rents profits thereof;

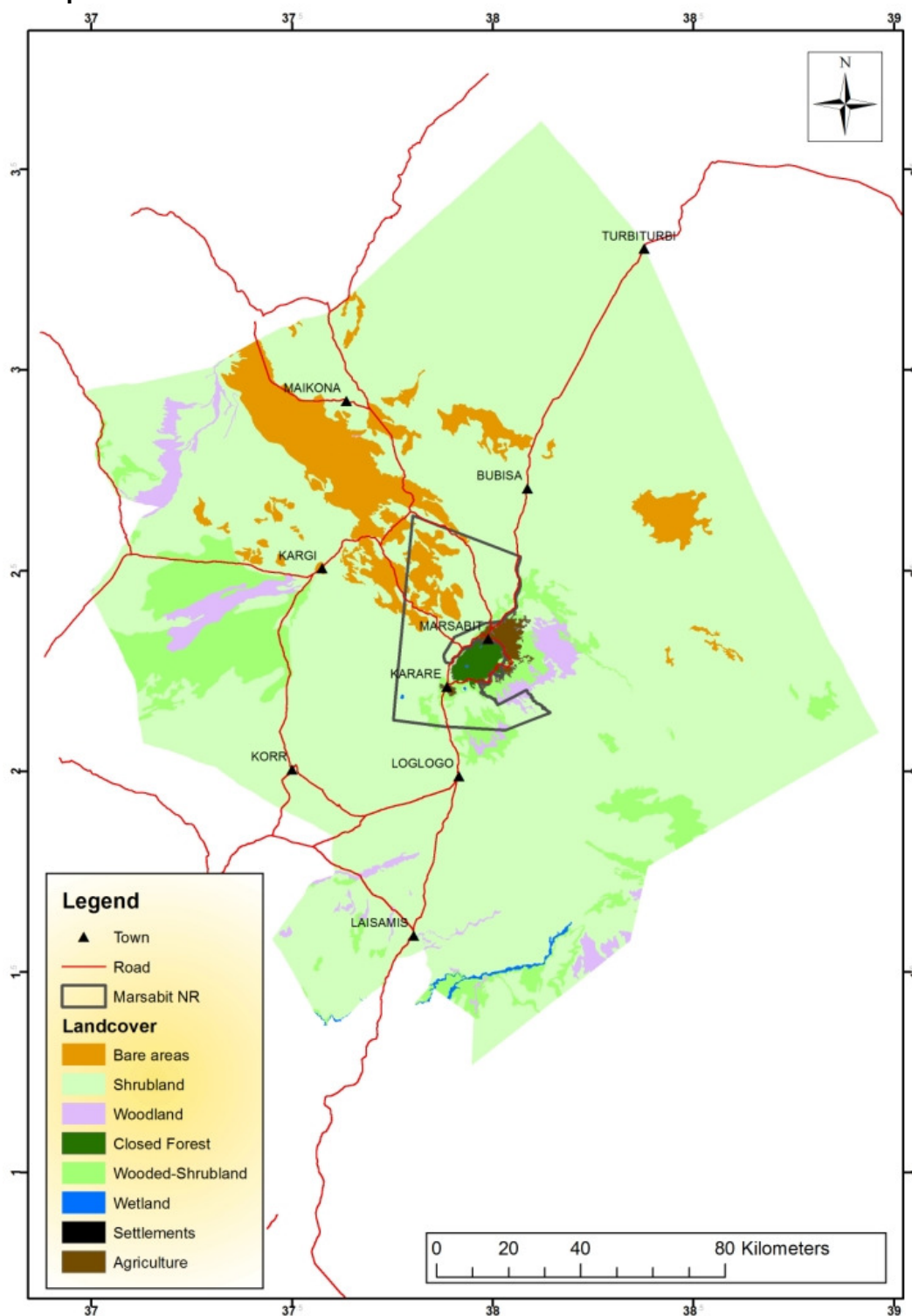
According to the wildlife Act, 2013

"competent authority" means-

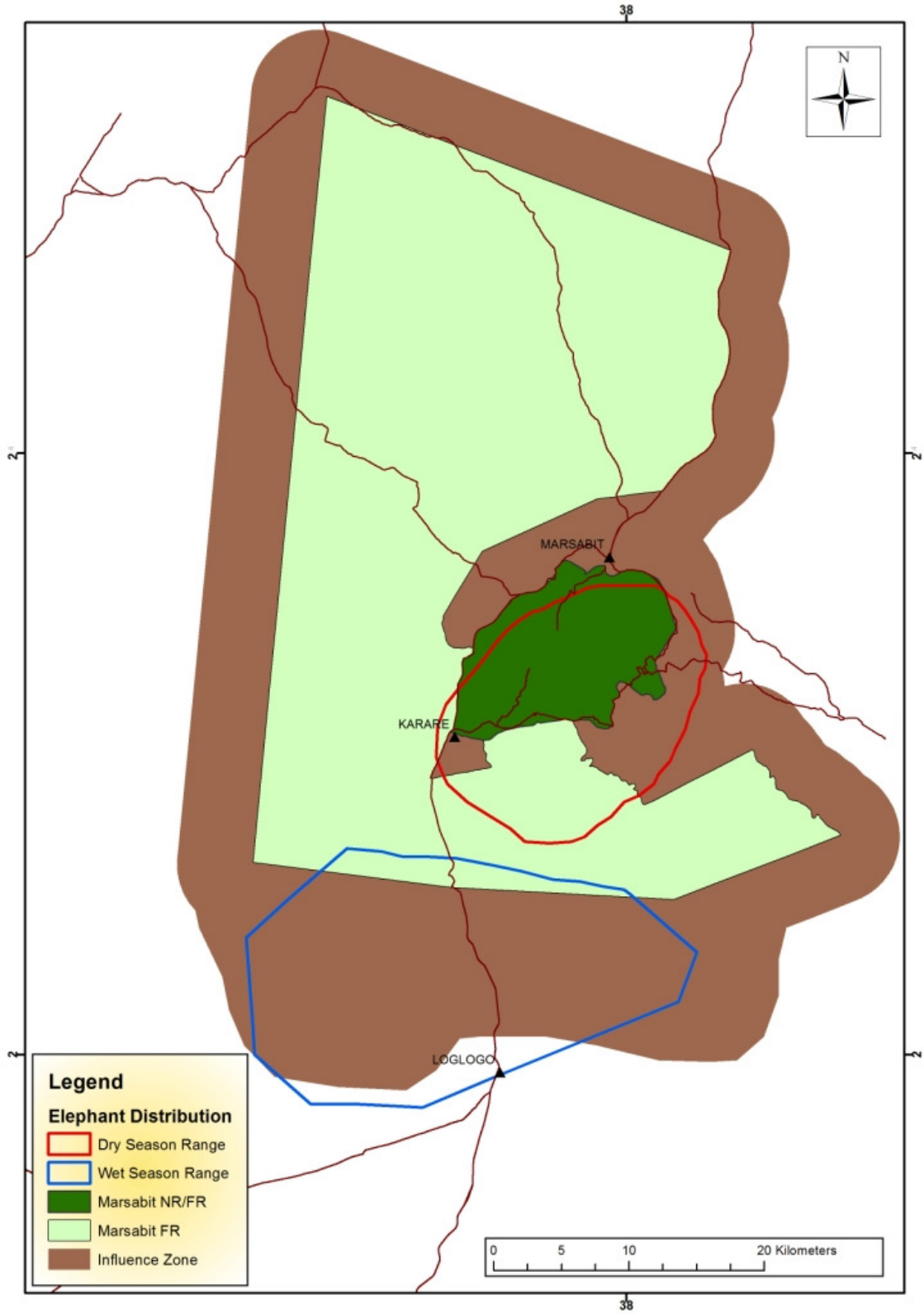
- (a) in relation to public land, the National Land Commission;
- (b) in relation to any other land, the owner thereof or the person for the time being entitled to the use, rents and profits thereof;

Annex 4. Maps

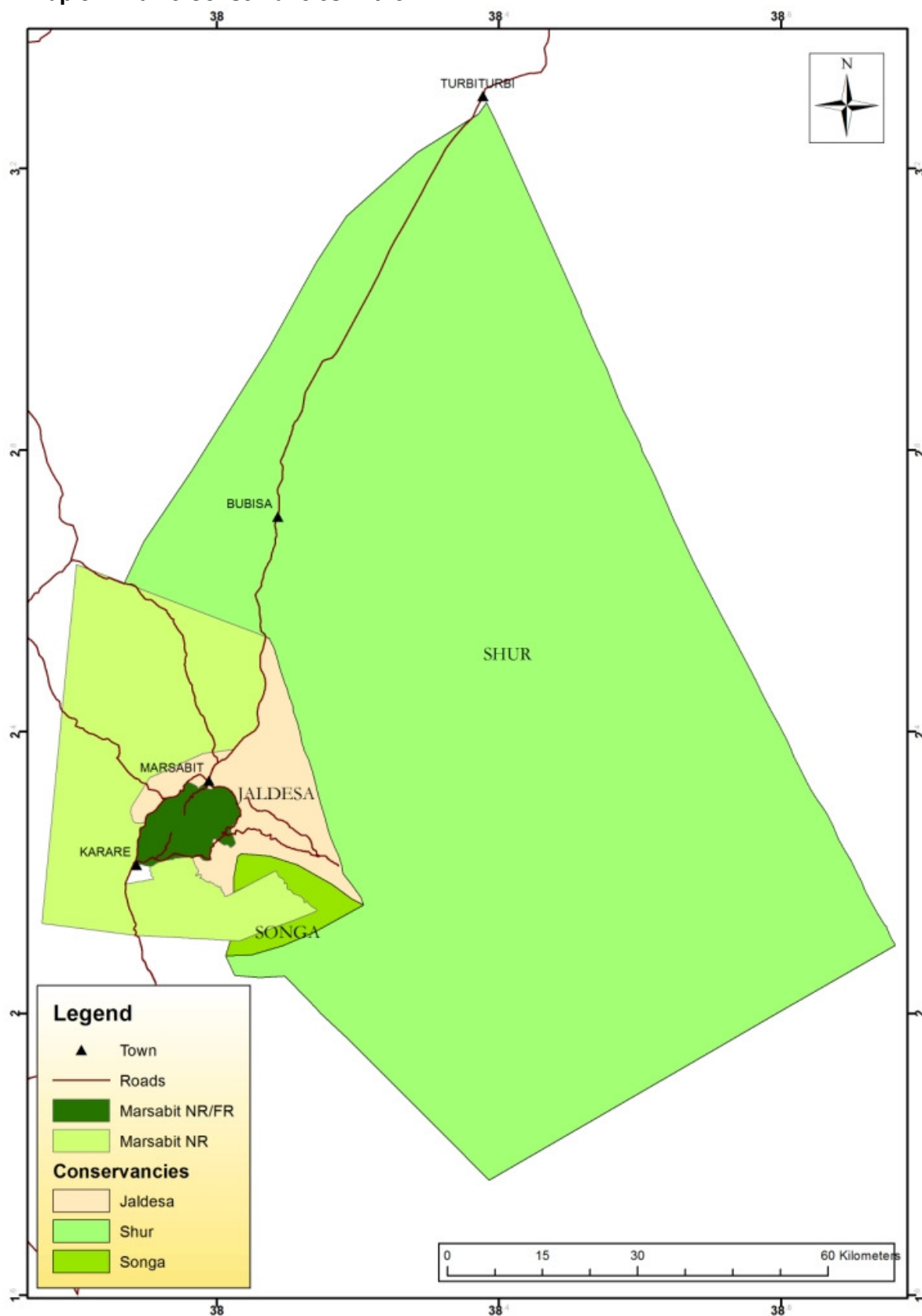
Map 1: Land Cover of the Greater MFE



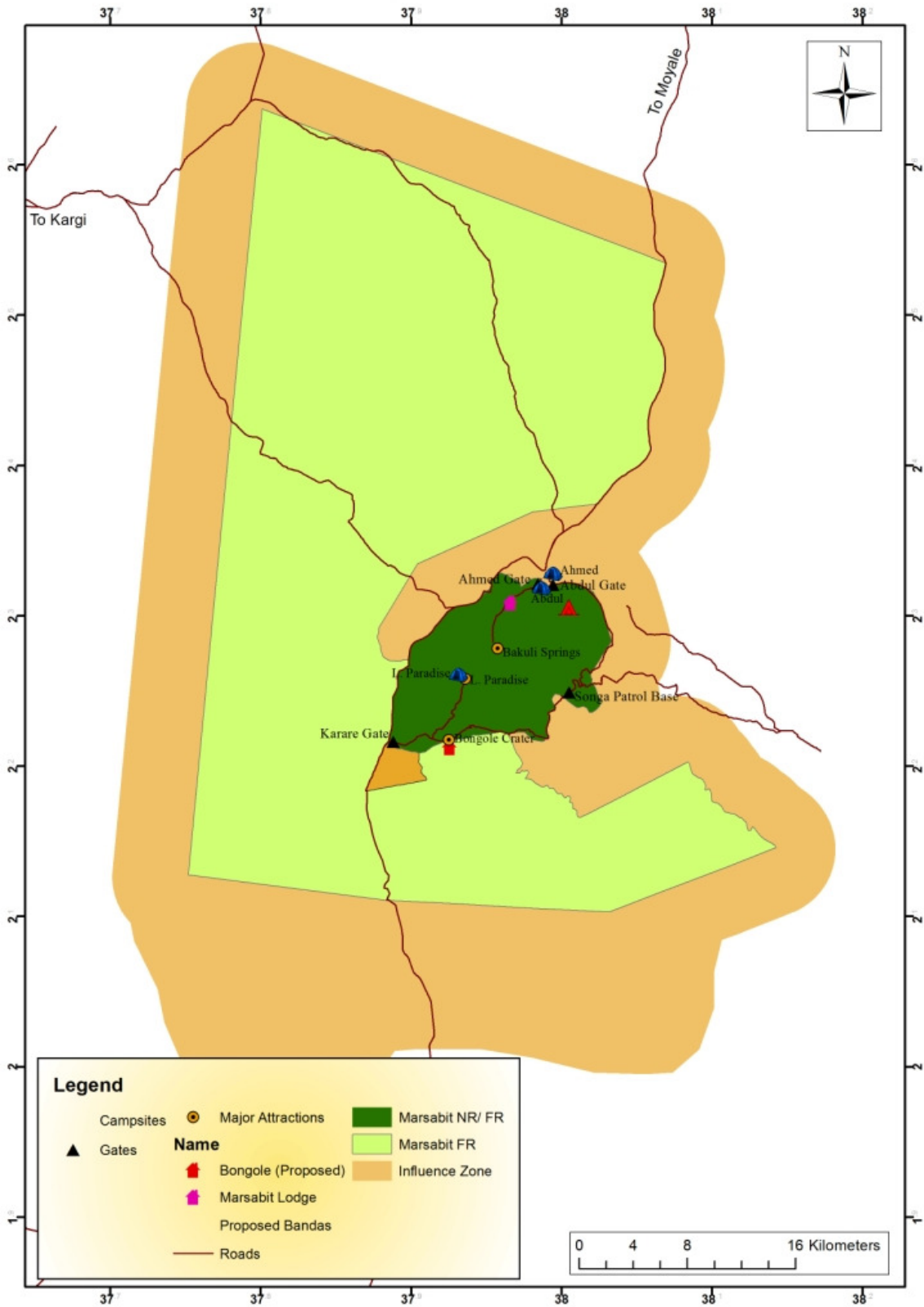
Map 2: Seasonal Elephant Distribution



Map 3: Wildlife Conservancies in the MFE



Map 4: Tourist Facilities in the MFE





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