



MALINDI MARINE PROTECTED AREA MANAGEMENT PLAN 2016-2026

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MALINDI MARINE PROTECTED AREA

MANAGEMENT PLAN, 2016 - 2026

Planning carried out by

MMPA Managers

MMPA Stakeholders

KWS Planning & Environmental Compliance Department

In accordance with the

KWS PROTECTED AREAS PLANNING FRAMEWORK



Acknowledgements

	<p>The Malindi Marine Protected Area (MMPA) Management Plan was developed through a participatory planning process involving a cross section of MMPA stakeholders, under the coordination of a Core Planning Team that comprised of representatives from the marine protected area managers, KWS HQ planners and Coast Protected Area Scientists and managers.</p>
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Approval Page

The Board of Trustees of the Kenya Wildlife Service has approved the implementation of this management plan for the Malindi Marine Protected Area

On behalf of the KENYA WILDLIFE SERVICE



Kitili Mbathi
Director General

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Acronyms

ABF	African Billfish Foundation
AFZ	Artisanal Fishing Zone
ASK	Agricultural Society of Kenya
BMUs	Beach Management Units
CAMC	Conservation Area Management Committee
CAP	Conservation Action Planning
CBO	Community Based Organization
CCA	Coast Conservation Area
CDF	Community Development Fund
CITES	Convention on International Trade on Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
COBEC	Community Based Environmental Conservation
CORDIOEA	Coastal Oceans Research and Development-Indian Ocean East Africa
CPT	Core Planning Team
CS	Cabinet Secretary
CWCCC	County Wildlife Conservation and Compensation Committee
EMCA	Environmental Management and Coordination Act
ERVs	Exceptional Resource Values
FAD	Fish Aggregation Devices
FAO	Food and Agriculture Organization
GIS	Geographic Information System
GOK	Government of Kenya
GPS	Global Positioning System
GVI	Global Vision International
HQ	Head Quarter
HUZ	High Use Zone
HWC	Human Wildlife Conflict
HWM	High Water Mark
IBA	Important Bird Area
ICT	Information Communication Technology
ICZM	Integrated Coastal Zone Management
IUCN	The World Conservation Union
IZ	Influence Zone
KCDP	Kenya Coastal Development Project
KEAs	Key Ecological Attributes
KFS	Kenya Forest Service
KMA	Kenya Maritime Authority
KMFRI	Kenya Marine and Fisheries Research Institute
KMMN	Kenya Marine Mammals Network
KPA	Kenya Ports Authority
KRA	Kenya Revenue Authority
KTB	Kenya Tourism Board
KWS	Kenya Wildlife Service
NMK	National Museums of Kenya
LUZ	Low Use Zone
MCCF	Marine Community Consultative Forum

Acronyms

MO	Management Objective
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NEMA	National Environment Management Authority
NGOs	Non Governmental Organizations
PA	Protected Area
PAC	Problem Animal Control
PAPF	Protected Area Planning Framework
PRA	Participatory Rural Appraisal
SAM	Strategic Adaptive Management
SRS	Senior Research Scientist
SST	Surface Sea Temperature
TAC	Technical Advisory Committee
ToT	Trainers of Trainers
TPU	Tourism Police Unit
UNEP	United Nations Environment Programme
VUZ	Visitor Use Zone
WCMA	Wildlife Conservation and Management Act
WCS	Wildlife Conservation Society
WMPA	Watamu Marine Protected Area
WIO	Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association
WMA	Watamu Marine Association
WTW	Watamu Turtle Watch

Executive Summary

The Wildlife Conservation and Management Act, 2013 (The Act), requires each wildlife protected area (PA) to be managed in accordance with an approved management plan¹. A key tool for shaping a PA's future, a management plan serves as a framework for planning and decision making in a protected area. Protected Area management plans are developed in accordance with the guiding principles outlined in the Planning Framework provided under the Fifth Schedule of the Act and the KWS Protected Areas Planning Framework (PAPF). These planning frameworks provide guidance on the key elements needed for a successful management planning process. In line with the Act and PAPF, the MMPA plan has been developed in a highly participatory manner, incorporating and building on ideas from a broad cross-section of MMPA stakeholders. In addition, the plan adopts the MPA zoning scheme specified in the Act.

The MMPA covers Malindi Marine National Park and half of Malindi Marine National Reserve² and their adjoining areas of influence. Prepared in consultation with MMPA's stakeholders, the MMPA's management plan will guide the MPA's overall direction for the next 10 years and will be reviewed in five years. The plan is expected to achieve the overall KWS functions as outlined under Section 7 of the Wildlife Conservation and Management Act, 2013.

The MMPA plan has six chapters. Chapter 1: **Plan Foundations**, introduces the planning process and describes the plan's functions, structure and stakeholder participation mechanisms. It also gives a general description of the MMPA and its purpose, key values and major issues of concern. Chapter 2: **Zonation scheme**, provides a zoning scheme that divides the MMPA into visitor and resource use zones. Chapters 3, 4, 5 and 6 form the bulk of the plan and presents the plan's four **management programmes**. Chapter 7: **Plan Monitoring**, provides a plan monitoring framework.

MMPA Purpose and Values

The purpose of the MMPA is:

“To preserve and maintain a representative area of the coral reef ecosystem together with the beaches which typify the Kenyan coast, for the benefit of present and future generations”

The development of the above Purpose Statement was based on the stakeholder identification of the MMPA's “Exceptional Resource Values” (ERVs), which were divided into four categories: biodiversity, scenic, social and cultural. The four most important ERVs for the MMPA were identified as: Coral reef ecosystem, Sea grass, Sea Turtle, and Marine mammals.

¹Section 44(1) of the Wildlife Conservation and Management Act, 2013

²(i.e. From the reserve's Northern boundary up to Kanani. The rest of the reserve, south of Kanani, is managed by Watamu Marine National Park management).

MMPA Zonation Scheme

The MMPA zoning scheme aims to provide a framework for reconciling management needs of protecting natural resources as well as regulating different marine uses. The complexity of zoning the MMPA is compounded by the economic importance of the area; the high community dependence on the resources, the range of users and interest groups whose use patterns frequently compete and displace each other; the need for equity and fairness in access to resources; and the unique and diverse ecological values of the area. Hence to avoid conflicts the MMPA is broadly zoned according to Resource Use and Visitor Use.

Resource Use Zones

The MMPA has been divided into 4 zones: Closed zone, No-take zone, artisanal fishing zone, and influence zone. The closed zone has been designed to give maximum protection to critical breeding areas for marine wildlife such as marine turtles. The No-take zone is designed to protect areas considered of high ecological value in their pristine conditions and offer ideal and undisturbed sites for scientific research. The no-take zone encompasses the entire Malindi Marine National Park with a total area of 6 Km² and a buffer zone of 500m around the Marine National Park. This buffer zone is an extension of the fish breeding area protected by the Marine National Park. The Artisanal Fishing Zone (AFZ) has been set aside for the purpose of maintaining and sustaining controlled sustainable artisanal fishing activities, which take precedence over any other use in this zone. The AFZ is also open to recreation activities that are compatible with artisanal fishing practices. The AFZ covers Malindi National Reserve and an area of the open sea about 5Km from the reserve boundary that defines the extent of the artisanal fishing activities. Finally, the Influence Zone (IZ) covers areas that require specific zoning controls and management since it is under different management sectors. The activities permitted in this zone are dependent upon the specific nature of the activities and management needs from the different management sectors. The IZ for MMPA encompasses the open waters of the Indian Ocean outwards of the Artisanal Fishing Zone. The zone also covers the terrestrial area adjacent to the MMPA. Human activities in this area directly or indirectly affect the ecological integrity of the MMPA. This zone will, therefore, be the target for the promotion of conservation education and outreach activities.

Visitor Use Zone (VUZ)

The MMPA has been divided into three VUZ: High Use Zone (HUZ); Medium Use Zone (MUZ), and Low Use Zone (LUZ). The HUZ is the area within MMPA that is highly visited by tourists for recreation. The MMPA HUZ includes Malindi Marine National Park and Sardegna Due Island in Malindi Marine National Reserve that is highly popular with visitors. The MUZ covers magical islands located adjacent to the Malindi Marine National Park. The site is popular with visitors, but it is not highly visited. Finally, the LUZ covers areas of the MMPA that are least visited compared to the HUZ. The zone covers Malindi Marine National Reserve. Low visitor numbers are maintained by lack of tourist attractions as well as the intense artisanal fishing activities in this zone.

Ecological Management Programme

The Ecological Management Programmes aims to

“To conserve the MMPA’s marine ecosystems and improve understanding of their health and functioning.”

In order to achieve this aim, in implementing the MMPA’s Ecological Management Programme, MMPA Management will strive to ensure that: critical habitat components are maintained and restored; threatened species are conserved and monitored; and ecological components and processes to support adaptive management are understood. The management programme focuses on conservation of seven ecological features which if conserved will imply that the entire MMPA ecosystem is in a healthy state. The seven conservation targets identified for the MMPA are:

1. Estuarine ecosystem
2. Coral reef ecosystem
3. Sea grass bed
4. Sandy beaches and sand dunes
5. Sea turtle
6. Waders (Shore birds)
7. Marine mammals (dolphins, whales)

The objectives of the Ecological Management Programme focus on addressing threats to the MMPA’s threatened marine species (covering conservation targets: sea turtles and marine mammals); addressing crosscutting threats to the MMPA’s most important habitats (covering conservation targets: coral reef, sea grass beds and estuarine ecosystems); and addressing cross-cutting threats.

Tourism Development and Management Programme

The Tourism Development and Management Programme aims to “to ensure sustainable tourism development in line with conservation principles and to enhance and market MMPA as a world class quality tourist destination rich in natural beauty and biodiversity”. In implementing this programme, MMPA management will strive to ensure that MMPA tourism product is developed and promoted as an activity that add further value to the local communities and not as the only key source of livelihood; MMPA tourism players are coordinated and work in harmony with the MPA management; and tourism products are diversified and marketed. The management objectives under this programme focus on enhancing tourism administration and management; developing and maintaining tourism support infrastructure; and diversifying tourism products and services.

Community Partnership and Education Programme

The Community Partnership and Conservation Education Programme aims to ensure that “Participation of MMPA adjacent communities in sustainable conservation and management of marine resources is strengthened for livelihood improvement”. Key in achieving this aim is ensuring that support to enhance community role in the management of the MMPA is strengthened; conservation education and awareness is enhanced; and human-Wildlife conflicts are minimized.

Protected Area Operations Programme

The aim of this programme is to ensure that “operational systems and structures are effectively and efficiently supporting the achievement of MMPA’s management programmes”. In implementing the MMPA’s Operations and Security Management Programme, MMPA Management will strive to ensure that: conservation and human development are balanced; MMPA management is working with others; and a skilled and motivated workforce is maintained. The objectives under this programme focus on enhancing MPA’s security; deploying and maintaining a competent and motivated workforce; enhancing stakeholders collaboration; enhancing and maintaining infrastructure, transport and communication equipment to support MPA administration; and enhancing MPA security operations.

Plan Monitoring

The plan monitoring section provides a framework for monitoring the potential impacts, both positive and negative, that are anticipated from the implementation of each of the four management programmes' objectives. The framework also includes easily measurable indicators for monitoring positive and negative impacts, and potential sources of this information.



PLAN FOUNDATIONS

The Plan

The Wildlife Conservation and Management Act, 2013 (The Act), requires each wildlife protected area (PA) to be managed in accordance with an approved management plan³. A key tool for shaping a PAs future, a management plan serves as a framework for planning and decision making in a protected area. Protected Area management plans are developed in accordance with the guiding principles outlined in the Planning Framework provided under the Fifth Schedule of the Act and the KWS Protected Areas Planning Framework (PAPF). These planning frameworks provide guidance on the key elements needed for a successful management planning process. In line with the Act and PAPF, the MMPA plan has been developed in a highly participatory manner, incorporating and building on ideas from a broad cross-section of MMPA stakeholders. In addition, the plan adopts the MPA zoning scheme specified in the Act.

The MMPA covers Malindi Marine National Park and half of Malindi Marine National Reserve⁴ and their adjoining areas of influence. Prepared in consultation with MMPA’s stakeholders, the MMPA’s management plan will guide the MPA’s overall direction for the next 10 years and will be reviewed in five years. The plan is expected to achieve the overall KWS functions as outlined under Section 7 of the Wildlife Conservation and Management Act, 2013.

The plan is designed to be a practical management tool supporting MMPA managers in carrying out their day-to-day activities. In order to achieve this, the plan sets out 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. The plan is partially built on the previous planning initiatives for Malindi-Watamu Marine Protected Area, mostly referring to the previous plans from years 1982, 2001 and 2009, which were barely implemented.

Plan Structure

In order to fulfil the Plan’s functions, and in accordance with the PAPF, the MMPA plan structure has been developed to be as simple as possible, and as such, easily understood by stakeholders and implemented by MMPA management. Table 1 summarises the plan’s main sections.

Table 1. Plan structure, functions and contents

Chapter	Function and Contents
<p>Plan Foundations</p>	<ul style="list-style-type: none"> • Introduces the plan, and describes the plan’s structure and the planning process leading to the plan’s development • Describes the MMPA • Sets out the MMPA’s Purpose, and exceptional Resource Values (ERVs) and outlines management issues of concern
<p>Zonation Scheme</p>	<ul style="list-style-type: none"> • Meant to enable different types and intensities of use in different parts of the MMPA, and to help reconcile the sometimes competing and conflicting conservation and resource use needs • Sets out areas of the MMPA where different types of visitor use are permitted • Provides specific prescriptions on resource utilization by the local communities • Ensures management presence across the entire MMPA.

³Section 44(1) of the Wildlife Conservation and Management Act, 2013

⁴(i.e. From the reserve’s northern boundary up to Kanani. The rest of the reserve, south of Kanani, is managed by Watamu Marine National Park Management).

Chapter Function and Contents

Management Programmes

- This section forms the bulk of the completed management plan and provides a framework to guide management activities in achieving a future desired state for specific aspects of the MMPA management. as a result, four programmes have been proposed. These are:

- ▶ **Ecological Management Programme**
- ▶ **Tourism Development and Management Programme**
- ▶ **Community Partnership and Conservation Education Programme**
- ▶ **MPA Operations and Security Programme**

Each management programme:

- Was developed in accordance with the Logical Framework approach has a programme purpose statement and strategic principles that guide development and implementation of each programme
- Contains management objectives that set out the specific goals that MMPA management aims to achieve
- Provides a set of specific management actions that management will implement to achieve the management objectives

Plan Monitoring

- Provides a framework for the assessment of positive and potentially negative impacts of plan implementation
- Includes easily measurable and quantifiable indicators for assessing impacts, and potential sources of the information required

3-Year Activity Plans

- These provide the link between the 10-year management actions and the annual work planning and budgeting of MMPA management
- Breaks down the programme’s management actions into a series of tangible and explicit activities
- It allocates responsibility for implementation, sets out the timeframe for activity implementation.

Participation in Planning

The development of this management plan involved a very high degree of stakeholder participation. This ensured that the eventual plan is both realistic and appropriate, and is built on stakeholder understanding and support for the plan’s implementation. Three principal mechanisms were used to ensure that all stakeholders could meaningfully contribute to the plan’s development: the Core Planning Team (CPT), Stakeholder Workshops, and Specialist Working Groups. The functions and membership of these participation forums are elaborated in table 2 below. Stakeholder participation in plan development is provided in Annex 3.

Table 2. Stakeholder participation in planning

Mechanism	Functions and Membership
Core Planning Team	<p>The CPT provided overall guidance and oversight to the entire planning process. Specific roles were to:</p> <ul style="list-style-type: none"> • Collect and synthesize information relevant to planning, • Organize and facilitate planning events, • Ensure appropriate stakeholder participation throughout the process, • Synthesize planning event outputs into the final management plan • Ensure the plan being developed is in line with the Act and PAPF, and appropriate to the MMPA. <p>Membership of the MMPA CPT consisted of representatives of organizations and groups involved in the management of resources in the MMPA (e.g. KWS MMPA management, KWS Headquarters planners and scientists, Beach Management Unit officials, Beach Operators, KFS and NEMA area managers, Malindi Residents Development Group officials, Watamu Marine Association officials, and KMFRI and AROCHA Kenya scientists</p> <ul style="list-style-type: none"> • The team met at intervals throughout the planning process, and also kept in frequent contact through email and phone.
Stakeholder Workshops	<ul style="list-style-type: none"> • The 1st Stakeholders Planning Workshop was held at the beginning of the plan review process and identified the MPA's values, key problems, opportunities and management intervention measures to be addressed by the plan. A stakeholder analysis was also carried out. • The 2nd Stakeholder Planning (validation) Workshop was held at the end of the plan development process to enable stakeholders to review, comment on, and endorse the draft management plan
Expert Working Groups	<ul style="list-style-type: none"> • Four Expert Working Groups were formed, each of which developed one of the four management programmes, and contributed to the MMPA Zonation Scheme. • Each group developed the detailed contents of the management programmes (i.e. the purpose, guiding principles, objectives, the management actions and activity plan)

The Malindi Marine Protected Area

Area Description

Malindi Marine Protected Area comprises Malindi Marine National Park and Malindi National Reserve which were gazetted on 26th March 1968 under CAP 377 of the laws of Kenya (consult legal notice No. 98 under Boundary Plan No. 204/39 and legal notice No. 99, Boundary Plan No. 216/17 respectively). In 1979, Malindi and Watamu MPAs were the first MPAs in Africa and third in the world to be designated as a single biosphere reserve under the UNESCO Man and Biosphere Reserve Programme.

The MMPA is located in the Indian Ocean on Kenya's territorial waters in Malindi Sub-County, Kilifi County. It is about 110 km north of Mombasa by tarmac road. By air, the MMPA can be accessed from Malindi Airport.

Malindi Marine National Park

The Park covers 6 km². The coastline of the park is an attractive coral-sand beach. Low tide exposes more sand and patches of seaweeds, broken by shallow pools and channels. Between the shorelines and the two main reefs, North Reef and Barracuda Reef, runs the Barracuda channel. The water here is too deep for casual snorkelling, but the sandy bottom with its rich growth of seaweed harbours numerous shells, particularly the common spider conch which may often be seen on the shallow edges of the reef.

The Barracuda Reef lies on the shoreward side of the North Reef which protects it from rough seas, and is constantly washed by the flow of water through the Barracuda channel. The lowest tide exposes the tips of only a few coral heads, the rest of the reef shows a smooth slick on the surface. The North Reef is the main reef in the park, lying parallel to the shore for about two-thirds the length of the park. Much of the reef is exposed at low tide which leaves a low and flat, rather desolate, looking surface of old coral covered with a layer of deposit and patches of weed. On the shoreward side of the northern end of the reef there are several stretches of sand bank, and towards the sea from this point is a large inlet, shallow at its entrance, but four to five feet deep in some parts. In this sandy inlet, particularly around the edges are clumps of coral.

At the southern end of North Reef there is a large inlet, with its opening on the seaward side and almost reaching the leeward side of the reef. This is the area of the Coral Gardens; it is fairly shallow and the water is usually very clear, making it an ideal spot for goggling. It contains most of the fish and corals found in other areas with brain coral dominating the reef. The outer edge of the North Reef provides some of the most beautiful diving areas. There is a platform quite wide at the northern end, but narrower towards the entrance of the coral gardens.

Malindi Marine National Reserve

The Malindi Marine National Reserve encloses Malindi and Watamu Marine National Parks. The Reserve includes several coral islets, notably Whale Island at the entrance to Mida Creek in the Watamu Marine National Reserve. The reserve is 213 km² forming a complex of marine and tidal habitats on Kenya's North Coast. It extends 5 km into the sea and stretches 30 km along the coast from Malindi town to beyond the entrance to Mida Creek. Habitats include intertidal rock, sand and mud; fringing reefs and coral gardens; sea grass beds; coral cliffs, platforms and islets; and sandy beaches.

MPA Adjacent Areas

The terrestrial part adjacent to the MPA (Watamu and Malindi towns and adjacent settlements plus Sabaki River estuary) falls in the transition zone, where MPA managers seek to influence human activities to support sustainable conservation and development.

The interactions between the MPA and neighbouring communities and oceanic components are extensive. The human population along the coast has been increasing due to an influx of people from other areas increasing pressure on the MPA natural resources. The main economic activities include: fishing, tourism, agriculture and manufacturing.

Fishing is prohibited in the marine parks, and only artisanal fishing is permitted in the marine reserve. However, there has been weak control of access and use of the Malindi Marine National Reserve resources by the fishermen, BMU members and other users. As a result, marine resource stocks are currently considered over-exploited.

The frontline beach plot owners who neighbour the reserve often conflict with beach users over access. A high degree of collaboration between the KWS, land owners and marine users, with clear roles and responsibilities for synergy, is therefore required to resolve resource access and use conflicts.

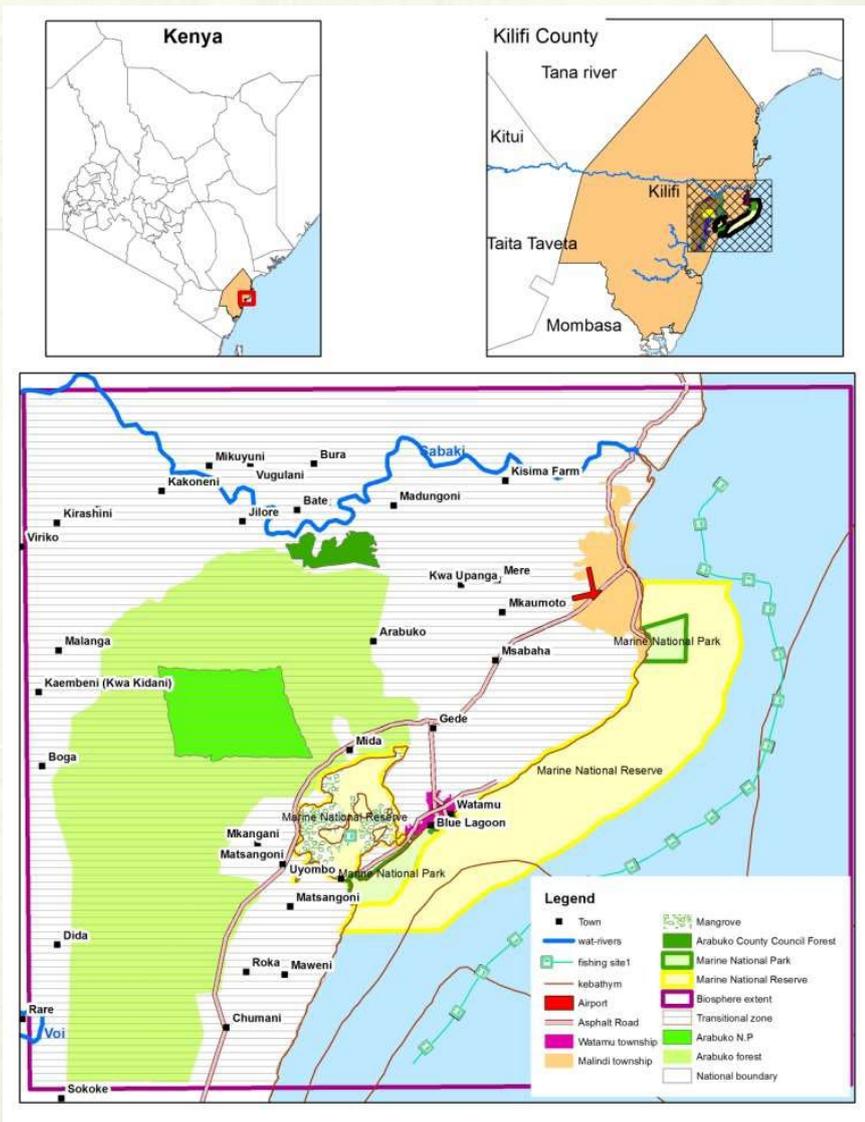


Figure 1. Malindi Marine Protected Area: Regional Setting

MMPA Purpose Statement

The MMPA Purpose Statement summarizes the importance of the MMPA, clarifies the reasons for its existence, and provides the overall goal that MMPA managers are striving to achieve. The Purpose Statement is divided into a primary MMPA Purpose followed by a series of supplementary purposes that expand on and complement the primary purpose. Both primary and supplementary purposes have been agreed upon by MMPA stakeholders.

The Purpose of the Malindi Marine Protected Area is:

“To preserve and maintain a representative area of the coral reef ecosystem together with the beaches which typify the Kenyan coast, for the benefit of present and future generations”

Supplementary purposes of the MMPA are:

- To promote public understanding, appreciation and enjoyment of the natural resources through interpretation/ education and the provision of recreational opportunities;
- To provide opportunities for rational and sustainable use of resources in the MMPA and for the improvement of the overall relationships between people and their environment;
- To undertake the development of the MMPA's natural resources in a manner which will generate revenue and, therefore, provide an economic justification for the use of scarce resources and land to fulfil the conservation objective; and
- To promote research on the coral reef in the MMPA for the purpose of supporting its management and education programmes.

Exceptional Resource Values

The MMPA ERVs describe the area's key natural resources and other features that provide outstanding benefits to local, national and international stakeholders. They are especially important for maintaining the area's unique qualities, characteristics and ecology as well as building an understanding of the MPA's features that are important for maintaining the unique ecological and social character of the area. The following sections describe the MMPA ERVs and their importance to the area. These sections have been set out according to the four categories of ERVs identified: Biodiversity, Scenic, Social and Cultural (see Table 3).

Table 3. MMPA's Exceptional Resource Values

Category	Exceptional Resource Value
Biodiversity	<ul style="list-style-type: none"> • Sea Turtle • Marine mammals • Sharks and rays • Billfish • Important Bird Area • Sea grass • Intertidal habitats • Mangrove Forest at the mouth of Sabaki River • Coral reef ecosystem
Scenic	<ul style="list-style-type: none"> • Sandy beaches • Magical Islands • Coral reef
Social	<ul style="list-style-type: none"> • Tourism • Source of livelihood for the local community • Man and Biosphere Reserve status
Cultural	<p>Malindi Old Town Historical monuments in the transition zone The unique cultures of the local communities (Swahilis, bajunis, miji kendas)</p>

Biodiversity Values

Coral reef ecosystem

Coral reefs are critical habitats in marine ecosystems and play a key role in primary production. They are among the most sensitive ecosystems and their health and dynamics can easily be altered if the environmental conditions fall out of acceptable range. Malindi coral reef complex consists of both fringing and patchy reefs which are close to the shore. The reef contains a great variety of corals and together with the marine vegetation, particularly the sea grass meadows, provides an excellent habitat for a large number and variety of colourful reef fish, molluscs and other sea animals such as sponges, sea urchins and sea anemones. The coral reef is majorly dominated by coral genera belonging to four families: Acroporidae, Faviidae, Pocilloporidae and Poritidae.

Discharge from River Sabaki and anthropogenic stress have had a high impact on the MMPA. The coral reef ecosystem was impacted by the 1997-1998 El Niño/Southern Oscillation (ENSO 97-98) event resulting in extensive coral bleaching. Thermally induced coral bleaching and subsequent coral mortality was observed in mid-March 1998 which greatly reduced the hard coral cover to below 10%. There have been subsequent bleaching events within the Kenyan coast since the year 1998, affecting the recovery of the hard coral cover which currently stands at 25%. This has greatly contributed to change in the coral reef community structure and dynamics.

MMPA coral reef ecosystem is an important fish breeding and recruitment habitat that supports a high diversity of reef fish. The reef fish support artisanal fishers with the main catch comprised of Lethrinidae (emperor fish), Siganidae (rabbit fish), Scaridae (Parrotfish) and Lutjanidae (snapper) families.

Marine mammals

Marine mammals found in MMPA include dolphins and humpback whales. As top-level predators, they impact on local food webs and ecosystems as a whole and serve as important indicators of the health of marine environments. They also indicate exposure and effects of pollutants over spatial, temporal and trophic scales.

Humpback whales: Humpback whales have been sighted in Malindi-Watamu area for the last 15 to 20 years. Reports indicate that the whales sighted in the area are part of a sub-population of East African humpback whales from the South West Indian Ocean. Each year they are sighted mainly in June as they make their annual migration from Antarctica. Over the years local NGOs including Global Vision International (GVI), Watamu Marine Association (WMA) and Kenya Marine Mammals Network (KMMN) have been working in collaboration with boat operators and sports fishermen to record sighting of dolphins and humpback whales through photographs. The highest number recorded to date was in 2013 whereby 25 whales were spotted per day by locals and sports fishermen between July and September in the Malindi-Watamu MPA.

Literature shows that humpback whales from Antarctica travel around May/June to warm tropical inner reefs for protection to enable them to breed. They then make their return journey around October, swimming over 4000km to the cold food-rich seas of Antarctica which are their main feeding ground.

Humpback whales are listed as Least Concern in the IUCN Red List. However, the Wildlife Conservation and Management Act 2013 has classified these marine mammals as vulnerable which was the earlier classification before 2008 when IUCN changed the classification following improvement in the whale population numbers globally. In CITES⁵ and⁶ the species is listed in Appendix 1.

⁵ Appendix I

⁶ CMS Appendix I

The annual sighting of the humpback whales and dolphins in Malindi-Watamu MPA is a potential tourist attraction that should be promoted and marketed to attract visitors to the area.

Dolphins

Visitors to the Kenyan coast can expect to see the Indo-Pacific bottlenose dolphins (listed as near threatened to extinction by IUCN), Indo-Pacific humpback dolphins and spinner dolphins. Dolphin watching is an established ecotourism activity in Watamu. It is popular with tourists and is an important source of income for local community members. Dolphins are facing a number of threats, including fishing net mortalities, loss of habitat, degradation of foraging areas and loss of their food due to commercial scale overfishing, and slaughtering of dolphins as a source of fresh red meat. Dolphin watching can also cause stress and disruption of their natural behavior if not properly managed.

Billfish

There are five threatened Billfish species in the Kenyan Indian Ocean from Lamu to Shimoni. These are Blue marlin *Makaira nigricans*, (Vu, IUCN Red List category 2011), Black marlin (*Istiompax indica*), striped marlin, Sailfish (*Istiophorus platypterus*) LC, (IUCN RL, 2011) and swordfish. Billfishing, particularly for the swordfish, is an important component of commercial sport fishing and subsistence fishing. Sport fishing could pose a threat locally, as these species are found primarily near shore and around islands. In addition, the Blue marlin population shows a decreasing trend, while the Sailfish is threatened by catching in long-lines and purse seines under sport and artisanal fisheries.

The African Billfish Foundation (ABF) is involved in studies on billfish migration patterns, growth rates and breeding stocks among others. The ABF aims to compile a socio-economic study on the value of sport fishing as a sustainable resource in the East African waters. ABF recommends that appropriate fishery statistics be compiled and analysed to accurately assess the condition of this species.

Sharks and Rays

Sharks: There are five (5) shark species in the Kenyan marine area. They include the Whale shark (*Rhincodon typus*), Grey nurse shark (*Carcharias taurus*), Oceanic whitetip shark (*Carcharhinus longimanus*), Great white shark (*Carcharodon carcharias*), and Short tail nurse shark (*Pseudoginglymostoma brevicaudatum*). The Whale shark and Grey nurse shark are listed as vulnerable under the IUCN Red List (2005-2009). They are found in Malindi-Watamu Marine Protected Area where they inhabit both deep and shallow coastal waters and the lagoons of coral atolls and reefs.

The annual rates of population increase are very low, greatly reducing their ability to sustain fishing pressure. Populations in several locations have been severely depleted by commercial fishing, spear fishing and protective beach meshing, requiring the introduction of specific management measures. The current main threat to this species in its ranges is likely the accidental (bycatch) capture of juveniles by recreational line fishers.

Rays: Rays are closely related to sharks, they have flat bodies with eyes and mouths on their undersides. The Ray fish is listed as a threatened species in the Wildlife Conservation and Management Act, 2013. Electric rays have organs on either side of their heads that can deliver an electric shock to scare away predators and to shock prey. Stingrays, eagle rays and devil rays have spiny stingers on their tails that can inject a predator with venom. Hence, there is need to document the sightings of stingrays and electric rays and disseminate this information to swimmers.

Table 4 shows conservation status of elasmobranch species sighted in the Malindi-Watamu area

Table 4. List of sighted elasmobranch in the Malindi-Watamu area

Common name	Species name	Risk status
Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	
Whitetip Reef Shark	<i>Triaenodon obesus</i>	
Ribbontailed Stingray	<i>Taeniura lymma</i>	NT
Reticulate Whipray (Ray)	<i>Himantura uarnak</i>	VU
Reef Manta Ray	<i>Manta alfredi</i>	VU
Bluespotted Stingray	<i>Neotrygon kuhlii</i>	DD
Marbled Electric Ray	<i>Torpedo sinuspersici</i>	DD
Giant Guitarfish	<i>Rhynchobatus djiddensis</i>	VU

*NB: NT= Near Threatened, VU= vulnerable and DD=data deficient

Sea Turtles

Sea turtles are recognized as flagship species in the marine environment. The Government of Kenya has shown commitment to their conservation. Sea turtles are legally protected under the Wildlife Conservation and Management Act, 2013⁷ and the Fisheries Act, Cap 378. Under the Fisheries (General) Regulations, section 51, Kenya’s maritime zones are designated a marine mammal and turtle Sanctuary where these species are accorded total protection⁸.

Sea Turtles are widely distributed along the Kenyan coastline in areas mainly associated with sea grasses and coral reefs. There are five species of sea turtles documented as occurring within the Kenyan waters: the green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), olive ridley turtle (*Lepidochelys olivacea*) and the leatherback turtle (*Dermochelys coriacea*). Of these, green, hawksbill and olive ridley turtles are known to nest and forage in Kenya, while the loggerhead and leatherhead turtles are occasional visitors. All the five sea turtle species are listed by the World Conservation Union (IUCN) as either endangered or critically endangered (IUCN/SSC, 2008) and are listed in Appendix 1 by the Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES) and Convention on Migratory Species (CMS, 2001a). In MMPA and adjacent areas, sandy shores flanking either side of the mouth of the Sabaki estuary extending into Malindi Bay are important breeding grounds for turtles.

Sea turtles play several important ecological roles in the marine ecosystem as they directly affect other marine species as consumers, and indirectly through nutrient recycling within and between ecosystems. An example is the Green turtles, which primarily graze on sea grass beds and actually increase the productivity and nutrient content of the beds, thus benefiting other species in the food web. Over time, the grazed areas not only contribute to stabilizing sediments and recycling of nutrients but also offer food and shelter to a wide array of smaller herbivores, including fish. The Hawksbill turtles play the important role of keeping the balance of sponges and corals. The Leatherbacks play a key role in controlling jellyfish populations, which when in high numbers can wipe out fish populations by feeding on fish larvae of commercially important food fish.

⁷ Sixth Schedule (S.47): Nationally Listed Critically Endangered, Vulnerable, Nearly Threatened And Protected Species

⁸ Fisheries (General) Regulations, Section 51. Protection of marine mammals and turtles

(1) The maritime zones of Kenya are declared to be a marine mammal and turtle sanctuary.

(2) No person shall—

- (a) Kill any marine mammal or turtle;
- (b) Chase any marine mammal or turtle with intent to kill;
- (c) Harass any marine mammal or turtle so as to disturb its behaviour or breeding habits; or
- (d) Take any marine mammal or turtle, alive or dead, including any marine mammal or turtle stranded on land.

(3) Where any marine mammal or turtle is caught or taken unavoidably during fishing, such marine mammal or turtle shell, whether it is alive or dead, be released immediately into the waters

(4) Any person who contravenes this regulation shall be guilty of an offence and liable to a fine not exceeding twenty thousand shillings or to imprisonment for a term not exceeding two years or to both.

Despite efforts towards conservation of sea turtles, there are still many threats to the species. These include illegal exploitation of eggs, meat and oil, incidental capture by fishermen, pollution, diseases, and beach development among others. Efforts to mitigate these threats will go a long way to ensuring viable populations. The implementation of the National Sea Turtle Conservation Strategy is key to addressing threats to the species. There is a need to harmonize conservation measures with the National Sea Turtle Conservation and Management Strategy and outline the functions of the Site Committees under the strategy.

The Sabaki River Estuary

The Sabaki Estuary is located about 5 km north of Malindi town in Kenya and occupies 250 Ha. The estuary receives freshwater and sediment load from the Athi-Sabaki river basin. The estuary is unique in that it is not permanent, but is more or less completely flushed out after every tidal cycle exposing parts of the main tidal channel and inter-tidal mudflat area.

There are mangrove forest stands on the periphery of the mudflats and the southern bank of the estuary dominated by three species including *Avicennia marina*, *Brugiera gymnorhiza* and *Rhizophora mucronata*. Wildlife species include crocodiles and hippopotamus in the mangrove areas while small antelopes such as the Suni and Duikers still exist in small numbers in the scrub vegetation in the adjacent areas. Beyond the intertidal area is scrubland dominated by *Acacia* spp. The native bush is severely degraded by charcoal burning and firewood collection activities. Alien plant species, including the highly invasive shrub *Prosopis juliflora*, are common throughout the agricultural, residential, and scrubland areas.

The estuary is a source of livelihood for the local community which depends on it for domestic water collection, livestock watering, fishing, crustacean/gastropod collection, mangrove harvesting, charcoal burning, beekeeping, small-scale agriculture and collection of medicinal plants. Resource extraction, fisheries, and farming activities are unregulated and their contribution to local livelihoods at Sabaki has not previously been quantified.

The estuary is a tourist attraction due to its bird life, striking landscape, and a small resident population of Hippopotamuses (about 18-25 individuals estimated in 2013). Birdwatchers have visited the Sabaki for decades to view the large congregations of waterbirds and local school groups also visit the estuary. There is, however, no tourism infrastructure and tourism activities are unregulated.

Important Bird Area

Ecologically, Sabaki river estuary consists of intertidal mud, sand flats, salt marshes, dunes, seasonal and permanent freshwater pools, mangroves and scrub. The convergence of fresh river water and salty sea water provides one of the richest feeding grounds for birds in Africa. As such, the Sabaki estuary is one of Kenya's 62 Important Bird Areas with a total of 186 bird species, including 91 species of waterbirds. It hosts more than 1% of the biogeographic population of Sooty Gull; Saunders Tern; and Lesser Crested Tern. The estuary and the nearby turbid coastal waters are also an important nursery ground for prawns and numerous species of fish and crustaceans some of which are of commercial importance. The IBA is a site well known for globally important birds such as the Malindi Pipit, the Madagascar Pratincole and the Zanzibar Red Bishop. Malindi pipit, *Anthus melindae* is listed by the Wildlife Conservation and Management Act, 2013 as near threatened and hence the bird is of special importance to conservation. Madagascar Pratincole, *Glareola ocularis* is considered as vulnerable as the population is small and undergoing a continuing decline, probably owing to pressures on its wetland habitats. The site is also an important resting, roosting and feeding ground for gulls and terns.

The Palearctic migrant waders congregate in their tens of thousands, some before dispersing southwards down the coast, but many are content to winter in this coastal food larder, mingling with the resident herons, egrets, gulls, terns and the numerous other species that frequent the lagoons, reedbeds, and sand dunes adjacent to the river mouth. The

estuary is also visited by thousands of other migrant waders and resident water birds including flamingos. Six African Skimmers, a species listed as vulnerable in Kenya are also spotted here especially in April-March.

Good numbers of Palearctic shorebirds also occur, and broad-billed sandpiper, *Limicola falcinellus*, a very uncommon bird in Kenya, winters here in flocks of up to 80. The Near Threatened, restricted-range Malindi pipit, *Anthus melindae* is resident in and around the grassy dunes. Regionally threatened species include great egret, *Casmerodius albus* (Vulnerable) and usually present in small numbers and *Rynchops flavirostris* (a regular visitor, mainly August–March).

Seagrasses

Seagrass beds are highly productive components of coastal ecosystems that cover wide expanses of the intertidal and subtidal zones. They provide food, shelter and nurseries for several animals, including many commercially important fish and shellfish species and create remarkably high rates of secondary productivity. Their roots and rhizomes are important in binding sediments, thus preventing soil erosion. They are important in nutrient cycling, carbon capture and storage, coastal protection among other ecosystem services. There are 12 seagrass species belonging to 8 genera that have been reported in Kenya. Seagrass beds are subject to frequent disturbances, anthropogenic and natural, that have led to alterations in vegetation complexity. Sedimentation and eutrophication have been recorded to lead to the decimation of large areas of seagrass beds. However, the main threat in Kenya has been explosions of sea urchins that have occurred in the past as a result of overfishing, which has changed the predator-prey balances causing a decline of seagrass plants and their functionality.

Scenic

Magical Islands

A natural drama unfolds in Malindi Marine National Park at low tide when patches of dry land appear a few kilometres from the mainland. The untold phenomena of tidal islands appear magical during the low tides offering an incredible scenario. As the tide ebbs, a sandy gold ridge laced with dark-brown emerges out in the open sea as the reef gets exposed making it possible to walking almost a kilometer in the sea on the soft white sand overlooking crystal blue fast flowing waters in the adjacent fringing reef. When the tide is high the islands get filled with water but with a glass bottom boat, one can cross the reef and observe a seemingly endless lagoon intercepted by white magical islands. These magical islands offer ideal sites that are utilized for picnicking and hence a key tourist attraction. The shining beams of the sun reflected in the sea gives the entire area a magical appearance and thus a memorable experience.

Sandy beaches

MMPA is renowned for its famous and vast stretches of white sandy beaches making it one of the most preferred tourism destinations. The sandy beaches are important recreational sites for the local tourists and provide alternative livelihood opportunities through the provision of goods and services.

The sandy beaches are in a dynamic equilibrium where the sediment outflux from a certain coastal section is balanced by the influx to the same section. If this balance is disrupted, it is likely to lead to a morphological response with deposition in some areas and erosion in other areas. The construction of seawalls for coastal protection changes the longshore hydrology causing erosion. Seawalls also obstruct turtles from reaching their nesting grounds, further threatening turtle populations.

Determination of the sediment transport rates is a prerequisite to the assessment of the morphological stability and impact, and thus should be prioritised to mitigate or prevent the erosion problems which are evident in many areas along the shoreline.

The Malindi-Mambriui area has experienced consistent sediment deposition from river Sabaki. The sediment influx has accreted and is now a major cause of management concern. Beach hotels and dwellings initially constructed at the

beach front are now distant from the shore by some 500 meters since 1990. At Mambui the coastal settlement is threatened by mobile sands from the adjacent sand dunes. This has caused seven water bore holes, a dozen houses, a mosque, a health centre and customs offices to be abandoned.

Social

Man and Biosphere Reserve

Malindi-Watamu MPA is a member of the global network of biosphere reserves which are internationally recognized within the framework of UNESCO's programme on Man and the Biosphere (MAB). Biosphere reserves are areas of terrestrial and coastal marine ecosystems which are internationally recognized for promoting and demonstrating a balanced relationship between people and nature. They are nominated by governments to promote solutions to reconcile conservation and sustainable use. The Malindi-Watamu MPA was designated as a Biosphere reserve in 1979.

Biosphere reserves have three functions:

- Contributing to the **conservation** of landscapes, ecosystems, species and genetic variation;
- Fostering economic **development** which is ecologically and culturally sustainable; and
- Providing sites and facilities to support **research, monitoring, training** and **education** related to local, regional and global conservation and development issues.

Biosphere reserves are organized into three interrelated zones: a legally protected core area, established to ensure long-term protection and where minimal human activity is allowed; a buffer zone around or next to the core, where activities are compatible with conservation objectives of the core area; and an outer transition area where resources are managed and developed sustainably for the benefit of people who depend on the area. At the Malindi-Watamu MPA, the Marine National Parks fall in the core area; the Marine National Reserves fall in the buffer zone, and the terrestrial part adjacent to the MPA (Watamu and Malindi towns and adjacent settlements) fall in the transition zone.

Source of Livelihoods

Provision of livelihoods is an important goal of protected areas. This is normally achieved through no-extractive services such as tourism in no-take areas, sustainable resources extraction in the artisanal fishing zones, and spill-over of exploitable resources to surrounding areas. These two livelihood sources are described below:

Tourism :The key socioeconomic activity at MMPA is tourism, with numerous hotels, associated beach trade and boat operators. Given the high density of tourism in this site, public access to recreational beaches has been restricted; some access points have been blocked altogether while others have narrowed considerably due to encroachment.

Tourism related activities depending on the beach and marine features include curio vendors, beach traders, boat operators, sport fishing, snorkeling and diving while secondary activities include safari tour companies, entertainment spots and other service trades such as salons, and boutiques, among others. The tourism industry is one of the major employers for the local people, thus threats to its long-term sustainability are a serious concern to the locals and the government alike.

Marine dependent tourism relies heavily on the health of the marine ecosystem. The actions of tourists and tourism operators can, however, have a damaging effect on the system. For example irresponsible snorkelling and scuba diving can cause damage to coral reefs. Increasing tourism numbers has also led to tremendous coastal development which can also harm the marine life. The tourism industry is a significant source of livelihoods for the people around MMPA and its dependence on the marine ecosystem means it will benefit from effective management of the area.

Fishing Artisanal fishing, which is another important source of income in the area, is carried out within the Malindi Marine Reserve and other areas surrounding the reserve. Fishers around the protected areas benefit from the protected area through spill-over when fisheries resources in the no-take areas increase and replenish areas adjacent to Marine waters in the artisanal fishing zone. However, this depends on the effectiveness of the no-take zone. Fish markets are readily available through tourist hotels and local consumption. Fishing within these areas is managed and controlled by the Fisheries Department through the Beach Management Units (BMUs). Due to limited capacity, some of these BMUs are not effective in controlling fishing activities in the area and therefore in some instances there is disorder and overfishing. Even though the reserves are gear-restricted, they are over-exploited with both legal and illegal gears. Migrant fishers sometimes conflict with local fishers mostly due to their destructive fishing methods. The different BMUs also conflict on fishing areas and fishing methods. Such conflict has been experienced with Mayungu BMUs.

Cultural

The Malindi Old Town

Malindi town has had contacts with Indians from the time of Jesus Christ. Chinese knew Malindi by 11 Century, the Arabs visited and wrote about it in the 12th century, the Portuguese were here by the 15th Century and the British arrived in the 19th Century. Its architecture and set-up are a reflection of the Swahili culture that characterises many of the old towns established along the coast by the Swahili Arabs starting from the 12th century.

One of the key hallmarks of the old town is the Jumma Mosque, which is reportedly said to have been built on the site where slaves were auctioned on a weekly basis until late 18th Century. The Malindi Tourist Market, which is known to be one of Kenya's best markets for craft shopping is also located in the old town.

Historical monuments

Vasco Da Gama Pillar: The pillar is situated in Malindi town on the seafront road near the jetty. The pillar is one of the oldest remaining monuments in Africa and was built in 1498 by the great Portuguese explorer, Vasco da Gama as a sign of appreciation for the welcome he was given by the Sultan of Malindi. The pillar is accessed from Scorpio Villas or alternatively from the Silver sands area.

This historical Pillar is threatened by wave action which has eroded the reef terrace on the Pillar headland. This phenomenon is historical as demonstrated by earlier efforts to support the reef terrace using reinforced concrete pillars and reduce the velocity of waves using concrete boulders. However, only the western side of the pillar was stabilized and hence the southern and eastern sides of the pillar are gradually but steadily collapsing under wave action. Even the stabilized areas are showing signs of degrading, which can be attributed to the rusting of the steel reinforcements. The infrastructure at the Pillar such as seats, information boards and signage are also dilapidated. Sanitation facilities (toilets and wash areas) are also lacking.

The Malindi Museum: The museum is located within Malindi town. it offers a fascinating tour of Malindi historic Circuit and a range of exhibitions including:

- **The Strange Catch:** an exhibition of coelacanth - the world's oldest living creature, a 400 million-year-old prehistoric fish that was captured off the coast of Malindi in 2001 and that has remained unchanged since its fossilized ancestors were discovered 65 million years ago. The creature has paired fleshy limb-like fins that move like human arms and legs.
- **History of Malindi:** The Museum offers an opportunity to learn the history of Malindi town. Malindi is one of the ancient towns along the East African Coast believed to have been established around the seventh century.
- **Malindi Historic circuit:** A guided tour is offered starting from The Museum to The Old Town, The Old District Officer's Building, Mamburi, Portuguese Chapel and back to The Museum.

The museum is housed in what is commonly referred to as the house of columns which was built before 1891. It is

thought to have been an Indian trader's house and offers a tour of the Malindi historic circuit and a range of exhibitions. The Museum offers an opportunity to learn the history of Malindi town through photographic exhibitions that also features other heritage sites found along the East African Coast.

Portuguese chapel: The chapel was built in the 16th century to mark the burial ground of two Portuguese sailors. This chapel is the first Christian church in East Africa. It is located along seafront road near the Gossip Hotel and is within proximity to Vasco da Gama pillar.

Mekatilili Monument: This is a monument erected in the honour of Giriama heroine, Mekatilili Wa Menza. Born Mnyazi Menza, Mekatilili organised the Giriama to oppose the British in what is known as the Giriama uprising of 1913 to 1914. Mekatilili led her people to war on August 13, 1913, at Kwa Hawe Wanje, Chakama in Malindi. Mekatilili opposed forced labour in British-owned rubber and sisal plantations, hut tax, and evictions from the fertile Sabaki River Valley.

Ancient shipwreck in Ngomeni: This is a Portuguese shipwreck found off coast of Kenya. The ship is estimated to have made its last ill fitted journey in the Indian Ocean 500 years ago, making it the oldest shipwreck in Kenya. It was named the Ngomeni ship. The wreck was explored and found to contain gold, copper, ivory and gold coin currency. The ship still has most of its major components including timber still intact. These remains make the site ideal for an underwater museum.

Pillar Tombs: The pillar tombs are located next to Juma Mosque, between the jetty and the town centre. The tombs are believed to have been built in the 15th century as burial grounds for renowned Portuguese. The pillar has bowls of the late Chinese Ming Dynasty still intact in its upper portion.

Portuguese sail monument at the former DCs office: The new coastal cultural museum was once the District Officer's office. This is where the mast pond or sail monument of Portugal stand. It was erected in honour of Prince Henry the navigator as a memorial to mark 500 years since his death in 1460. The vice premier of Portugal unveiled it in October 1960.

The Culture of the Local Community

The uniqueness of local culture around Malindi MPA is coastal endemism of local community, Mijikenda pro-conservation Kaya taboo, Swahili resilience to foreign intrusion, and neighbour receptive culture.

Malindi town has been a Swahili settlement since the 14th century and traditionally a port city for foreign powers. Kilifi County has rich cultures and is also home to Mijikenda's nine communities (the most populous but in the rural being Giriama and Chonyi). However, in the Malindi and Watamu townships the Swahili, Arabs and Bajuni communities are the dominant groups.

In Kilifi County, the rich traditional cultures cover housing, fishing, resource conservation, cuisine, religion, communication, dressing, matrimonial rituals, gender, and health. For example housing, agriculture, cookery, protection are feminine roles. Fishing is by males. Mijikenda ceremonies include birth, naming, age group knowledge and marriage and the literature part of the Mijikenda which include songs, dances, poems and storytelling.

Management Issues of Concern at MMPA

1. Encroachment on protected area. No permanent construction is allowed within 30m from the highest water mark, which is part of the gazetted protected area. Nevertheless, encroachment on this area by developers occurs. Illegal developments along the beach include restaurants, building of unofficial sunbed venues, souvenir shops, sea walls and clearing of the vegetation by private home owners to extend their gardens.

Some plot owners claim ownership of the beach front facing their plots (30m above highest water mark) which is legally under KWS jurisdiction. In certain cases, the owners actually legally acquired this land prior to the establishment of the MPA, but the gazettelement did not take this into account by excluding these plots. This causes conflict as to

the legal ownership of the land. Also, some beach front plot owners deny others the freedom of using the beach.

2. **Poaching.** Although fishing in the park is illegal, some poaching takes place and this remains a management concern. In addition to illegal extraction of fish, beach sand, shells, sea turtles and their eggs, and corals are also extracted from the MPA.

In addition, trawling is a prohibited fishing method within five nautical miles off the coast in all Kenya waters. The marine reserve extends three miles out from shore and trawlers encroach on the area under jurisdiction of KWS. Trawlers target primarily prawns and most of the by catch (including turtles due to lack of Turtle Excluding Devices in the nets) is discarded. Park management has no legal authority to address the issue. The artisanal fishers have been accusing KWS of its inability to restrict trawlers from encroaching on their fishing grounds. They complain that their gill nets are destroyed by trawlers.

3. **Unsustainable fishing methods.** Controlled fishing using legal fishing gear is permitted in the reserve. However, marine life in the inshore waters is being decimated by unsustainable fishing methods. The number of fishers and fishing effort in the Reserve is increasing, resulting in declining catches and stocks. In addition, some fishers use small size mesh nets that catch young and juvenile fish. Similarly, trawling nets have a large by-catch, including threatened species such as sea turtles. Ring netting also occurs in the MMPA. Like trawling, it is a highly unselective fishing method which leads to a lot of by-catch. As a commercial scale method of fishing it is not permitted by Kenya Wildlife Service. However, Fisheries Department issues licenses to the ring net operators, permitting them to fish without being monitored or regulated.
4. **Threats to species of special concern.** Marine turtles are severely endangered due to a reduction in their breeding grounds by development projects (hotels and residential houses). Local communities also kill turtles on the nesting beaches and collect the eggs. Turtle nesting grounds outside the protected area, where the 30 meters above the highest water mark ends, have an even greater risk of being destroyed since there is no policing, human activities are not controlled, and the areas are outside KWS jurisdiction.
5. **Invasive species.** Sea urchins (*Tripneustes sp.* and *Echinometra matthaei*) at times proliferate, possibly due to an imbalance in the food chain. This results in increased bio-erosion of the reefs and loss of aesthetic appeal. On the other hand, the Indian House Crow, an invasive pest which is native to India, is common along the coast including MMPA adjacent areas. It is blamed for decreased bird diversity as it out-competes other indigenous bird species for food and also feeds on the eggs and young ones of indigenous birds. The aggressive nature of the Indian House Crow scares other birds from feeding sites making them to move to other alternative places. It also preys on small reptiles, insects and invertebrates impacting their populations. Other problems caused by Indian house crows are; nuisance (noise, droppings, entering dwellings, electric power failure, destruction of TV aerial reception), disease transmission e.g. cholera and salmonella, pest (destroys crops e.g. ripe paw paws and mangos, green maize and attacks poultry), and may cause air strikes due to the flocking nature.⁹
6. **Pollution.** Agricultural activities have a great impact on the marine environment. Use of fertilizers has promoted the colonization of coral heads by algae. The effects of herbicides and fungicides are yet to be determined. Also, untreated sewage from hotels and residential areas enters the sea directly or indirectly and solid waste from hotels causes visual pollution and affects the ecosystem. Further, occasional problems of disposing used oil during maintenance and service of boat engines are a source of marine pollution.

⁹Chongomwa, M. M. 2011. Mapping locations of nesting sites of the Indian house crow in Mombasa. Journal of Geography and Regional Planning Vol. 4(2), pp. 87-97, February 2011

Non-biodegradable waste in the form of marine debris is a key threat to marine life. This waste is mainly in form of plastic waste which can be ingested by marine wildlife such as the endangered sea turtles and cetaceans leading to their death. The turtles eventually die due to internal problems and starvation due to the gut being blocked. Plastics strewn on the beach also discourage tourists from visiting the area.

7. **Coral bleaching:** The single most significant impact to the MMPA, and one which is best documented, was the El-Niño linked mass-bleaching and mortality of coral in 1998. Since 1998 there have been at least two minor bleaching events in 2005 and 2013 and with increasing ocean temperatures the future of corals in MMPA and elsewhere is under threat. Mass-coral bleaching is also linked to climate change and so cannot be prevented on a local scale.
8. **Climate change:** Global warming which may lead to sea level rise which could in turn lead to disappearance of the deeper reefs.
9. **Tourism impacts.** The actions of tourists and tourist operators can have a damaging effect on the ecosystem. Irresponsible snorkel and dive tourism in coral reef areas have long been recognised as a problem. Other unsustainable tourism practices include: coral destruction in coral gardens, feeding fish, animals picked up and handled during rock pooling, and boat operators chasing dolphins. Tourism also impacts the rocky intertidal where unofficial guides offer tours of the areas. Physical damage of the coral reefs by trampling, anchoring and collecting of marine life also occurs. Some reefs have been unable to sustain the high pressure from tourism and fishing activities. Behavioural changes of marine species have been noted in many species especially zebra and parrotfish, as well as the surgeonfish species. Due to feeding of the species, they are habituated to human presence and they associate humans with food.
10. **Visitor safety.** Before a boat is licensed to operate in the MMPA, it has to get consent from Fisheries Department, KPA, KMA, Tourism Department and KWS. However, despite this requirement, some non-seaworthy vessels are operating. Some glass bottom boats have neither KPA nor Tourism License and are also not insured. Most boats carry insufficient safety equipment, e.g. life-rings, life jackets and /or floats. Thus safety of visitors is not guaranteed while in KWS waters. In addition, unaccompanied and accompanied dogs are a nuisance to visitors on the beach. There have been incidents of dogs attacking people.
11. **Speeding:** Over speeding boats can cause accidents while overtaking or swerving to avoid hitting coral heads. This problem cannot easily be monitored and controlled because of the large number of boats and the limited capacity of KWS to patrol the entire MMPA.
12. **Breaking of coral heads during low tide:** There is some breaking of coral heads by boats especially when a boat is tied to another moored boat. When the tides are low, the tied boat may rest on a coral head and break it.
13. **Skiing:** No regulations for this activity are in place and specific areas for this activity need to be designated and marked.
14. **Visitor harassment.** Licensed commercial activities along the beach include curio selling, safari selling and boat operation that include snorkelling trips, sailing and sea excursions. The Beach Operators occasionally harass tourists as they compete for customers.
15. **Resource use conflicts.** Conflicts between different resource users are as follows:
 - Divers and artisanal fishers use the same areas whereas their activities are incompatible.
 - Sport fishers fish in the marine reserve for bait yet the reserve is the key source of livelihood for artisanal fishers.

- Boat operators and hotels compete in the snorkelling business.
 - The trawling companies over fish reducing fish catch by artisanal fishers.
 - Boat operators and safari sellers compete for business from potential clients on the beach.
 - The hotels complain that beach operators harass their clients
 - Some institutions give authority and issue licences without consulting other concerned stakeholders, e.g. the Fisheries Department issue trawling licences without prior knowledge of other concerned institutions.
- 16. Lack of conservation awareness.** There is lack of awareness on the benefits of a No-Take- Zone among stakeholders, especially fishermen. This has led to increased non-compliance with protected area legislation. There is also need for education and awareness among the beach operators to reduce reef degradation.
- 17. Beach clearing and levelling** is also a common occurrence. This increases the threat of beach erosion since the sand-binding vegetation is normally cleared.
- 18. Non adherence to the Code of conduct:** Dive schools do not always adhere to the agreed code of conduct. Dive operators are not using the appropriate flags while divers/snorkelers are underwater.
- 19. Insufficient snorkelling sites:** There is a need to look for alternative sites for goggling/ snorkelling as there is heavy utilization at the coral gardens.



MMPA ZONATION SCHEME

Introduction

Zoning is a key management tool for multiple-use MPAs. It allows areas to be set aside for particular activities such as protection of key habitats or nursery areas and breeding sites, research, education, anchoring, fishing and tourism. Zoning helps to reduce or eliminate conflict between different users of the MPA, to improve the quality of activities such as tourism, and to facilitate compliance.

The MMPA zoning scheme aims to provide a framework for reconciling management needs of protecting natural resources as well as regulating different marine uses. The complexity of zoning the MMPA is compounded by the economic importance of the area; the high community dependence on the resources, the range of users and interest groups whose use patterns frequently compete and displace each other; the need for equity and fairness in access to resources; and the unique and diverse ecological values of the area. Hence to avoid conflicts among resource users (recreationists, fishers, conservationists) there is need to establish zones with clear prescriptions.

Zonation is guided by the following principles:

- Protect the marine ecosystem, species, or habitat critical to the survival of the diverse species
- Reduce or eliminate conflict between resource users
- Manage resource users
- Provide a buffer between managed and unmanaged areas
- Reserve suitable areas for particular human uses while minimizing adverse impacts
- Reserve areas for specific purposes such as research and education

There exist spectrums of zonation schemes that can be defined within a multiple use area to allow a range of reasonable uses to occur in a coordinated way, and to provide for broad-area integrated management with many of the benefits. In coming up with the zonation scheme for the MMPA, two types of zonation have been proposed. These are Resource Use Zonation and Visitor Use Zonation. The following sections describe these zones in detail

Resource Use Zones

Closed zone

The primary objective of the MPA is to conserve biodiversity. This zone has therefore been designed to give maximum protection to critical breeding areas for marine wildlife such as marine turtles. In Malindi MPA, this zone includes the sea turtle nesting sites located in the riparian area, 30m from the high water mark. Currently, turtle nesting sites at Jacaranda-Mayungu and Malindi Marine National Park are included in this zone. Access to this zone will be authorised by the MPA Warden. These sites will be marked to enhance their protection. MPA management and conservation stakeholders will create awareness on turtle regulations to enhance protection of turtle nesting sites.

No-take zone

This zone is designed to protect areas considered of high ecological value in their pristine conditions and offer ideal and undisturbed sites for scientific research. This zone is highly protected where the removal or harm to plants or animals is prohibited. Conservation of natural values and natural processes takes precedence over recreation use in this zone. There is minimal management intervention in this zone so natural processes occur unimpeded. It is open to recreation activities such as snorkelling, diving, but closed to fishing. The no-take zone encompasses the entire Malindi Marine National Park with a total area of 6 km² and a buffer zone of 500m around the Marine National Park. This buffer zone is an extension of the fish breeding area protected by the Marine National Park.

Artisanal Fishing Zone

The Artisanal Fishing Zone (AFZ) has been set aside for the purpose of maintaining and sustaining controlled sustainable artisanal fishing activities, which take precedence over any other use in this zone. The AFZ is also open to recreation activities that are compatible with artisanal fishing practices. The AFZ covers Malindi National Reserve with a total area of 213 km² and an area of the open sea about 5km from the reserve boundary that defines the extent of the artisanal fishing activities.

Activities not permitted in the AFZ include any form of commercial fishing and any destructive fishing methods as stipulated in the Fisheries Act, Cap 378. Ring net vessels and aquarium fishing activities are not allowed.

Influence Zone

The influence zone (IZ) covers areas that require specific zoning controls and management since it is under different management sectors. The activities permitted in this zone are dependent upon the specific nature of the activities and management needs from the different management sectors. The IZ for MMPA encompasses the open waters of the Indian Ocean outwards of the Artisanal Fishing Zone. The IZ is utilized by different government sectors and the communities. Beach management units (BMUs) play a crucial role in the sustainable exploitation of fisheries resources in the IZ.

In addition, the zone also covers the terrestrial area adjacent to the MMPA. Human activities in this area directly or indirectly affect the ecological integrity of the MMPA. This zone will, therefore, be the target for the promotion of conservation education and outreach activities.

Resource use zones are shown in Figure 2.

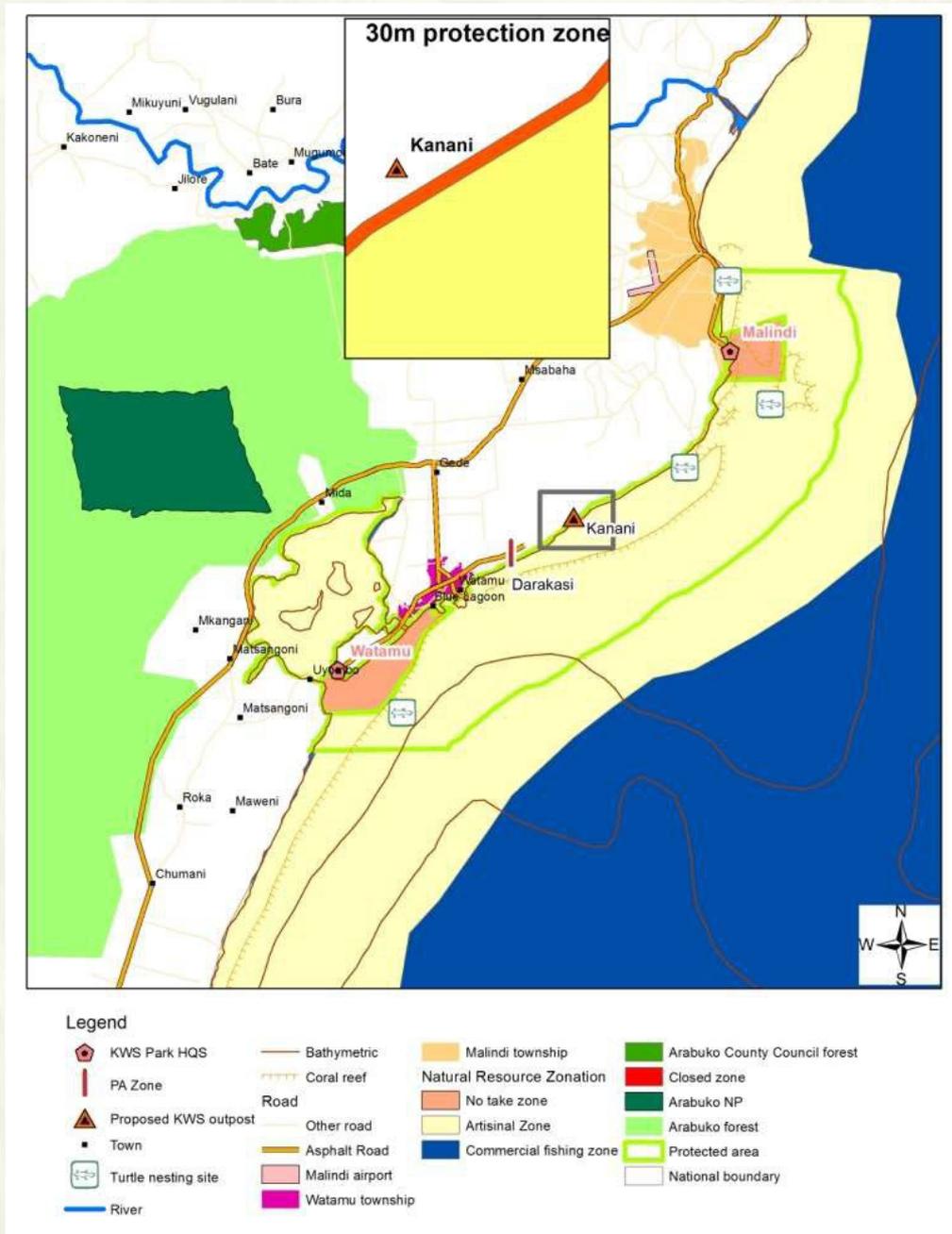


Figure 2. Resource Use Zones

Visitor Use Zone (VUZ)

Visitor use zones enable the degree and type of visitor use to be managed spatially over the protected area. The inclusion of visitor use zones ensures that the overall zonation scheme will enable the spatial management of the protected area to facilitate both the protection of the area’s key ecological features and sensitive habitats and the sustainable utilization of the area for tourism.

The MMPA visitor use zones will ensure that tourism interests are incorporated more sustainably with other activities, such as fishing, within the MPA. On the other hand, tourism has had environmental impacts such as destruction of corals from snorkelling and diving activities. Hence, visitor use has to be regulated to reduce such impacts on critical habitats. Figure 3 shows categories of VUZ that have been proposed for MMPA.

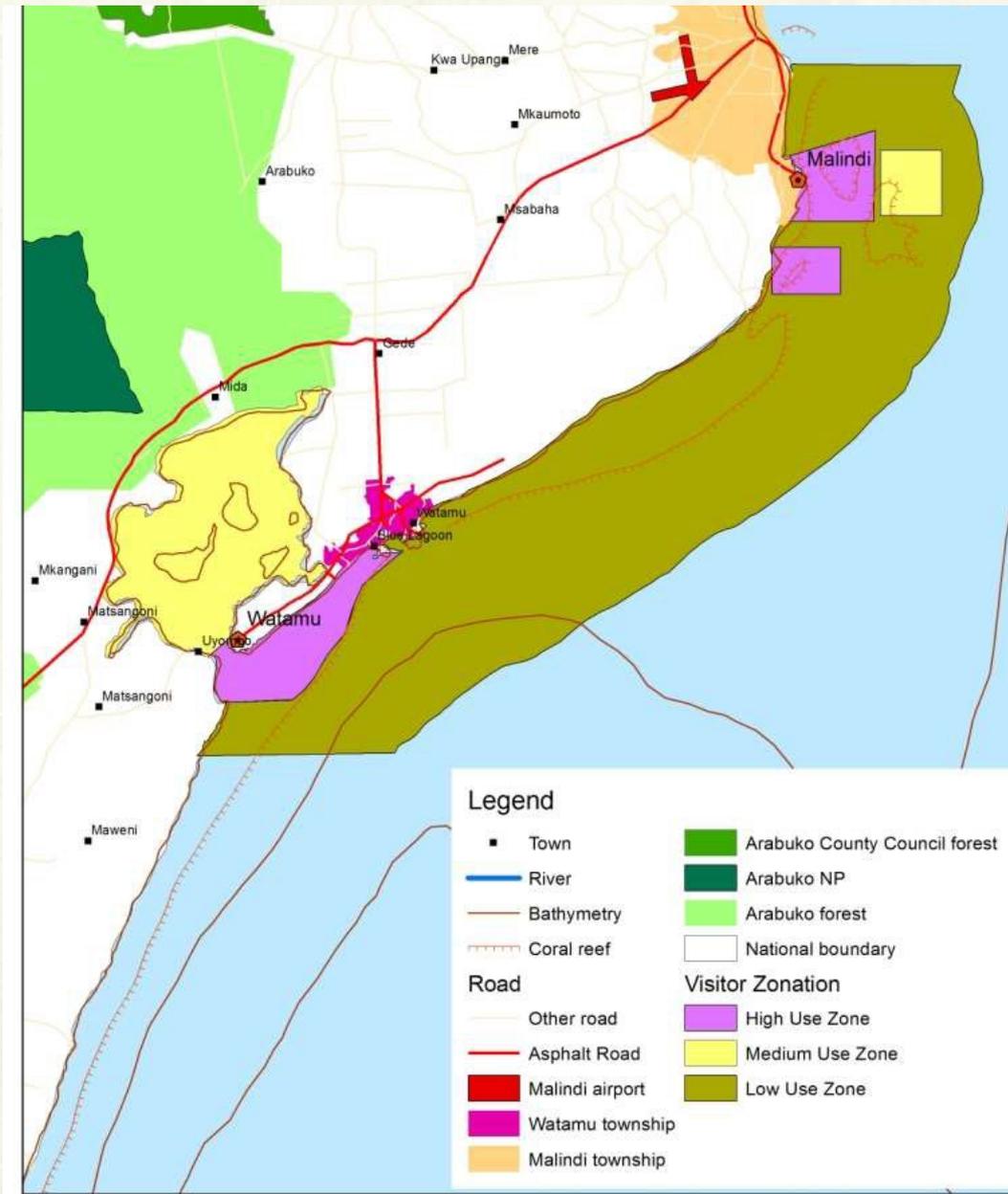


Figure 3. MMPA Visitor Use Zones

High Use Zone (HUZ)

The HUZ is the area within MMPA that is highly visited by tourists for recreation. The MMPA HUZ includes Malindi Marine National Park and Sardegna Due Island in Malindi Marine National Reserve that is highly popular with visitors.

Medium Use Zone

This zone covers magical islands located adjacent to the Malindi Marine National Park. The site is popular with visitors, but it is not highly visited.

Low Use Zone (LUZ)

This covers areas of the MMPA that are least visited compared to the HUZ. The zone covers Malindi Marine National Reserve. Low visitor numbers are maintained by lack of tourist attractions as well as the intense artisanal fishing activities in this zone.

Table 5. Allowable Activities and Uses in different zones

Activity/Use/ Facility	Closed Zone	No-take Zone	Artisanal Fishing Zone	Influence zone
Commercial fishing	N	N	No beach seine; ring net ¹⁰ or any form of modified seine net	Y
Subsistence Fishing	N	N	Y	Y
Aquarium fishing	N	N	N	Y
Shell collection	N	N	N	Y
Sport fishing	N	N	Y (Fishing for Billfish, Blue Marlin, Tuna)	Y
Curio vending	N	N	Y (only in curio vending designated areas; should be vetted by KWS)	N
Safaris sellers	N	Y (with authority from KWS; should be vetted by KWS)	Y (with authority from KWS; should be vetted by KWS)	N
Camel rides	N	Y	Y	N
Historical tours	N	N/A	Y	N
Scuba diving	N	Y	Y (No fishing allowed 100 meters from a dive site - marked with a buoy)	N
Air safaris	N	Y (Flying height should be in line with the KCA rules)	Y (Flying height should be in line with the KCA rules)	Y
Research	Y	Y (collection of specimen should be authorised by KWS)	Y (collection of specimen should be authorised by KWS)	Y
Wind surfing	N	Y	Y	N
Sailing as a recreation	N	Y	Y	Y

¹⁰ Results in overfishing and by-catch and habitat destruction affecting the overall ecosystem health

Activity/Use/Facility	Closed Zone	No-take Zone	Artisanal Fishing Zone	Influence zone
Glass-bottom boat tours	N	Y	Y	N
Kite surfing	N	Y(with authority from KWS)	Y (with authority from KWS)	N
Sightseeing	N	Y	Y	Y
Reef Walking/Rock pooling	N	Y (Adhere to the Park code)	Y (Adhere to the Park code)	N
Barbequing	N	N	Y(allowed with authority from KWS)	N
Snorkelling	N	Y(adhere to the snorkelling guidelines)	Y(adhere to the snorkelling guidelines)	N
Dhow rides	N	Y	Y	N
Beach activities (swimming, sunbathing,)	N	Y	Y	N
Beach sporting activities	N	Y(with authority from KWS)	Y(with authority from KWS)	N
Social functions	N	Y (with authority from KWS)	Y (with authority from KWS)	Y(in an appropriate boat)
Sun beds	N	Y(in accordance with KWS sun bed guidelines)	Y(in accordance with KWS sun bed guidelines)	N
Boating (Power)	N	Y	Y	Y
Boating (Non-Power)	N	Y	Y	Y
Natural and cultural values appreciation (birding, photography, wildlife viewing)	Y(with authorisation from KWS)	Y	Y	Y
Filming (commercial)	Y(with authority from KWS)	Y(with authority from KWS)	Y(with authority from KWS)	Y

A black whale, likely a pilot whale, is captured in the middle of breaching the surface of the ocean. The whale's dark, sleek body is the central focus, with its head and tail visible above the water. The surrounding water is a deep, textured blue, with white foam and spray from the whale's movement. The lighting is bright, highlighting the contours of the whale's body.

ECOLOGICAL MANAGEMENT PROGRAMME

Programme Purpose and Strategy

The purpose of the Ecological Management Programme is:

To conserve the MMPA's marine ecosystems and improve understanding of their health and functioning

In recent years, population growth in Kenya's coastline has resulted in increased pressure and management challenges, for example from overfishing and by-catches, pollution from fossil oil exploration, invasive species, tourism development, sea water level fluctuation, among others. The biodiversity and ecological integrity of the marine ecosystems are being threatened as a result.

This programme provides actions to assess and secure MMPA marine biodiversity and targeted resources, mitigate anthropogenic threats, adapt to climate change impacts, maximize research collaboration and information disseminated to guide management.

The following paragraphs set out the guiding principles that will guide MMPA Management in the implementation of the Ecological Management Programme and the achievement of the above Programme Purpose.

Guiding Principles

In implementing the MMPA's Ecological Management Programme, MMPA 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, MMPA management 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, MMPA 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 species are conserved and monitored

The MMPA has several species of conservation concern including the sea turtles 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 minimizing human threats, population monitoring, and securing breeding and foraging areas.

Ecological components and processes to support adaptive management are understood

Reliable information generated according to well established scientific principles and methods are 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

This management plan has been developed using the Protected Area Planning Framework (PAPF) which prescribes the use of the Nature Conservancy's (TNC) Conservation Action Planning (CAP) process as a foundation for designing the MPA plan's Ecological Management Programme. Principally, the CAP methodology works on the rationale that, with limited human and financial resources available to MPA managers, it is impractical to attempt to manage and monitor every single aspect of the complex ecology of a protected area. The CAP methodology provides a tested mechanism for targeting ecological management, by identifying and developing an accurate definition and understanding of the protected area's most important ecological features and their management needs, and the major threats to these features. In line with the PAPF, this programme also adopts the CAP framework.

The PAPF identifies three main stages in applying the CAP methodology: the selection of **conservation targets**; the identification and ranking of **threats** to the conservation targets; and the development of **management objectives and actions** to address these threats as well as to enhance the conservation targets. These key stages and their application in the MMPA planning process are elaborated in the following sections.

Conservation targets

Conservation Action Planning is designed to help develop and implement strategies to conserve key targets in conservation sites. The first step of the CAP process is the definition of a small number (usually about eight) of **conservation targets** which represent and encapsulate the unique biodiversity contained within the protected area, as well as any ecological features that may require specific management actions (such as particularly endangered species or habitats). They are the basis for setting goals, carrying out conservation actions, and measuring conservation effectiveness. In theory – and hopefully in practice – conservation of the focal targets will ensure the conservation of all native biodiversity within functional landscapes and seascapes.

Each focal conservation target has certain characteristics or **“key ecological attributes”** that can be used to help define and assess its 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 broad categories of size, condition, and landscape context can be used to inform the selection of specific key ecological attributes. Each key ecological attribute can either be measured directly or will have an associated indicator that can be measured to represent its status. Common examples of KEAs include essential habitat requirements of a particular species; keystone species for a specific habitat; or ecological connectivity requirements. The seven MMPA conservation targets, the rationale behind their selection, important subsidiary targets (i.e. other ecosystem components that share KEAs and threats with the conservation target concerned), and each of the KEAs for each target are set out in Table 6 below.

Table 6. MMPA Conservation targets, subsidiary targets, and KEAs

Ecosystem				
Conservation Target	Rationale for selection	Important subsidiary targets	Ecological Attributes	
Estuarine ecosystem	<ul style="list-style-type: none"> • IBA • Fish breeding grounds • High subsistence value • Source of fresh water from dunes • Critical habitat 	<ul style="list-style-type: none"> • Wetland birds • Hippos and crocodiles • Fish species • Prawns 	<ul style="list-style-type: none"> • Abundance of bird species • Water quality • Turbidity maximum zone • Sediment deposition • Abundance of molluscs and prawns • Abundance of Hippos and crocodiles • Abundance of estuarine fish species 	
Coral reef ecosystem	<ul style="list-style-type: none"> • Critical habitat for animals and plants • Targeted Fisheries • Highly threatened (Global warming, over-exploitation, siltation) • High economic value • Recreation value-diving and other water sports • Spawning grounds 	<ul style="list-style-type: none"> • Coral reef fish species • Turtles • Echinoderms • Filter feeders (other than corals) 	<ul style="list-style-type: none"> • Water quality • Diversity and abundance of coral community (coral, fish, sea urchins) • Coral community size structure • Coral recruitment • Extent of coral bleaching • Abundance and distribution of sea shells • Fish populations • (Abundance, biomass, density, diversity) 	

Habitat				
Conservation Target	Rationale for selection	Important subsidiary targets	Ecological Attributes	
Sea grass bed	<ul style="list-style-type: none"> • Provide habitat and food for many animals and species. • Feeding, nursery and breeding grounds for fish • Carbon sink 	<ul style="list-style-type: none"> • Turtle • Sea shells • Echinoderms (sea urchins, star fish) • Fish species 	<ul style="list-style-type: none"> • Sea grass percentage cover • Shoot density • Water quality • Abundance and distribution of sea shells • Abundance of fish 	
Sandy beaches and sand dunes	<ul style="list-style-type: none"> • Critical nesting site for turtles • Economic value • Source of fresh water (sand dunes) • Buffer zone • Coastal development 	<ul style="list-style-type: none"> • Sea turtles • Birds • Benthic fauna • Riparian vegetation 	<ul style="list-style-type: none"> • Number of turtle nests and birds • Extent of riparian vegetation • Change in land use 	

	Conservation Target	Rationale for selection	Important subsidiary targets	Ecological Attributes
Species	Sea turtle	<ul style="list-style-type: none"> Classified as endangered Affected by rapid coastal development Susceptible to solid waste pollution 	<ul style="list-style-type: none"> Sea grass Coral reefs 	<ul style="list-style-type: none"> Species diversity Population structure Suitable nesting sites Mortality rates
	Waders (Shore birds)	<ul style="list-style-type: none"> Key indicator species for marine health Tourist attraction IBA Important breeding and wintering grounds 	<ul style="list-style-type: none"> Intertidal zone Mudflats Mangroves Sandy beaches 	<ul style="list-style-type: none"> Species density and diversity Population structure of key species Condition index Availability of food
	Marine mammals (dolphins, whales)	<ul style="list-style-type: none"> Tourism value Measure of ecosystem health Important migratory route Threatened (whales) 	<ul style="list-style-type: none"> Sea grass beds Coral reef habitat 	<ul style="list-style-type: none"> Species abundance Species distribution Population dynamics and social structure Habitat quality Prey species

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 7 shows the priority threats impacting or likely to impact on the MMPA conservation targets and their KEAs.

Table 7. Threats to MIMPA Conservation Targets

TARGETS	THREATS	Marine mammals (Dolphins, Whales)	Waders (Shore birds)	Sea Turtle	Sandy beaches and sand dunes Islands	Sea grass bed	Coral reef ecosystem	Estuarine ecosystem
Climate change and sea level rise			Low	Medium		Low	High	
Management conflict			High	High	High		High	
Over-abstraction of groundwater and diversion								Low
Poor land use practices								High
Siltation						Low	High	High
Encroachment								
Sand harvesting				High				Medium
Destructive fishing practices (spear guns, seine net)							High	High
	Over fishing						Very High	High

ECOLOGICAL MANAGEMENT PROGRAMME

TARGETS		Estuarine ecosystem	Coral reef ecosystem	Sea Grass bed	Sandy Beaches and Sand dunes Islands	Sea Turtle	Waders (Shore birds)	Marine mammals (Dolphins, Whales)
THREATS								
Cultural beliefs						Medium		
Inadequate legal enforcement						Medium		
Disturbance from tourism activities								Medium
Use of poison baits by fishermen							Low	
Invasive species (Indian crow)							Low	

Ecological management objectives and actions

The identification and ranking of the threats to the MMPA's conservation targets and their KEAs provide the basis for the development of the Ecological Management Programme's management objectives and actions. Objectives have been developed to address the clusters of threats shown in Table 7. Four objectives have been developed addressing threats to the MMPA's threatened marine species (covering conservation targets: sea turtles and marine mammals); addressing crosscutting threats to the MMPA's most important habitats (covering conservation targets: coral reef, sea grass beds and estuarine ecosystems); and addressing cross-cutting threats. The four objectives developed for the MMPA's Ecological Management Programme are:

- MO 1. Conservation of MMPA's threatened marine species enhanced
- MO 2. MMPA's important habitats sustainably conserved
- MO 3. Threats to MMPA's critical components reduced
- MO 4. MMPA's ecological components and processes are understood

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: Conservation of MMPA's threatened marine species enhanced

The future desired state of the MMPA is that the ecosystem is conducive to the habitation of a rich biodiversity and provides ecological services to migratory sea turtles and large marine mammals. Most of the major species of conservation concern are migratory species drawn to the MMPA by specific ecological services. The Sabaki estuary ecosystem provides foraging and nesting grounds for migratory birds. There is however, insufficient information on the ecological services offered to the large marine mammals.

The extent and nature of the marine environment provide a challenge for life studies on the large marine mammals. Enhancing reporting of opportunistic sightings of large marine mammals can bridge this shortcoming.

Some of the species of conservation concern have been in constant decline, facing real threats such as by-catch in fishing gears, loss of habitat, overfishing or whale/dolphin watching activities. For these reasons, there is an urgent need to gain a more comprehensive data-set for these species. The IUCN Red List assessments is a widely used system for quantifying threats to species and assessing species extinction risk, there is a need to conduct an IUCN Red List assessment for the MMPA.

The management actions that have been developed to achieve this objective are described in the sections below.

Action 1.1 Update the status of key species of conservation concern in MMPA for regular monitoring

A number of endangered, vulnerable or endemic species are known to exist within the MMPA. There is, therefore, need to identify and list selected target species for effective monitoring to ensure their long-term survival in the MMPA. Hence, surveys of identified species of conservation concern will be initiated. These will encompass activities such as bird counts, turtle and bird nesting counts. In addition, the surveys will set up a basis to develop and implement conservation strategies for all species of concern in the MMPA. They will include constituting species-specific conservation teams to monitor, protect and conserve these endangered species.

To reduce cases of destruction of turtle nesting sites, mortality of young ones, disturbance of birds nesting and roosting sites, the species conservation teams will be mobilised while the bird watching and turtle management guidelines will be developed and implemented. This will be accomplished through community partnership and collaboration; education and awareness campaign. The existing code of conduct with regard to species such as dolphins, turtles and whales will also require regular review, updating and enforcement for their effective conservation.

Action 1.2 Review environmental stressors and research gaps on threatened species

The populations of many species, the world over, are decreasing at an unsustainable rate, and the number of marine species listed as endangered such as whales, dolphins, manatees and dugongs, salmon, seabirds, sea turtles, and sharks is on the rise. The threats to marine species are difficult to perceive because marine animals are not as visible as animals on land. Unfortunately, marine creatures are equally, if not more, vulnerable to problems such as habitat destruction and overexploitation.

Rising sea levels and temperatures due to climate change are and will have detrimental effects on these species. It is known that one of the impacts of climate change will be the change in distribution and migration patterns of species. Identification through research of the migratory patterns and the general response of the ecosystem and species in case of an eventuality need to be conducted as a precautionary strategy. Research that has already been done on different species will be collated and periodic analysis of available data on endangered species will be ensured. For management and adaptation to climate change impacts it may be important to conduct an inventory of biodiversity, establishing the status of different species within the MMPA, and their patterns of distribution to include: marine mammals' abundance and distribution, birds' migratory patterns and species composition, as well as studies on sea turtles (sex ratio, sand temperature and hatching rates) and whale sharks.

An information database for these species will be developed to avoid duplication of research work. There are species-specific conservation and management strategies that have been developed in the past for endangered species such as the turtles. Through this action, therefore, implementation of these strategies will be supported and achievements evaluated so as to guide MMPA management on the best practices for these species.

Action 1.3 Control invasive species

KWS in collaboration with stakeholders has formulated several conservation strategies including the National Sea Turtle Conservation Strategy that is intended to guide efforts in conservation and management of sea turtles and their habitats. Others are; Coral and sea grass, invasive species strategy among others. The crown of thorn star fish, *Acanthaster planci* preys on hard, or stony coral polyps and over harvesting or collection of its predators or habitat destruction leads to increased abundance of star fish¹¹ resulting to over-use of the coral polyps. The outbreak of a density of over 140/ha is considered alarming and action should be taken (injection with sodium ions, injection with vinegar, removal control or bury them under rocks/debris) at a density of 1,000/ha. The Indian house Crow has also been an ecological menace and an invasive species all along the coast line including MMPA where it has continued to impact negatively on other bird species.

In this regard, the main tools to be utilized towards the realization of these strategies include advocacy, communication, education, public awareness, targeted research and monitoring, and threat mitigation. Sea turtles of MMPA are faced with numerous threats that are impacting their survival. Some of these threats include; Incidental capture in fisheries, Illegal exploitation of eggs, meat and oil, Loss and degradation of nesting and foraging habitats, Sea turtle handling practices, Pollution, Predation and Diseases. Most notable and critical of these threats has been developments along the beach that have been very high in both Watamu and Malindi areas.

¹¹ which is considered as an invasive species in the Seventh Schedule of the Wildlife Conservation and Management Act, 2013

Action 1.4 Collaborate with local conservation groups in the conservation of marine species of conservation concern

Turtle nesting grounds outside the protected areas, where the 30m above the highest water mark is not gazetted as protected land, have an even greater risk of being destroyed. This is because KWS has no direct jurisdiction over these unprotected sites, there is inadequate patrols and law enforcement, and human activities are not controlled. This has resulted in the loss and degradation of nesting and foraging habitats for the sea turtle. In order to address this issue, the MMPA management will work collaboratively with the Sea turtle Conservation task force and community-based sea turtle conservation groups while implementing the activities in sea turtle conservation strategy. In addition, there is a need to develop new strategies to mitigate threats facing other key species within MMPA including; dolphins, whales, sharks, rays and dugong.

Action 1.5 Develop a collaborative research strategy for the MMPA

Information based on scientific methods is one of the guiding principles in decision-making for conservation and management. Studies conducted within the MMPA are largely based on the ecology of the marine ecosystems, which have been conducted, by KWS, KMFRI, CORDIO- EA, WCS, Watamu Turtle Watch, Watamu Marine Association, and institutions of higher learning. Development of understanding of the interactions between natural and social environments of the MMPA is critical to effective management. Through their vast knowledge and experience in the area of concern, these institutions can be key players in identifying major management knowledge gaps.

A comprehensive review of all research will be undertaken to prioritize areas that may be needed to improve the understanding of the marine environment and impacts of human activities on species of conservation concern. This will help guide the researchers in addressing ecological challenges on priority basis. To ensure this happens, therefore, a scientific workshop will be organized to outline and review major research undertakings in the MMPA and identify gaps for further research. Thereafter, a collaborative research strategy will be drawn by key marine experts and research institutions undertaking marine ecology research in the MMPA.

Action 1.6 Lobby for and contribute to the development of a National Marine Mammal Conservation and Management Strategy

Approximately 34 of the estimated 76 species of cetaceans (dolphins and whales) and 4 species of sirenians (dugongs) worldwide are known to occur in the Western Indian Ocean (WIO) region. Few systematic studies on these marine mammals have been carried out along Kenyan coast, so whales, dolphins and dugongs have rarely been studied in MMPA. To enhance their conservation and management, it is paramount to develop a National Marine Mammal Conservation and Management Strategy, which will adequately identify and address challenges facing them.

Considering that the marine mammals are trans-boundary species, there will be need for concerted efforts by all the stakeholders to come up with an action plan for the strategy. This will elevate the status of the marine mammals hence provide a link to the national, regional and international initiatives on marine mammal conservation. MMPA will initiate the process of developing the strategy that will incorporate all stakeholders. Currently, KWS is the signatory of all the conservation conventions and hence coming up with national mechanisms which domesticate and implement these conventions will be important.

Action 1.7 Promote sustainable alternative livelihood interventions and enhance biodiversity awareness

Lack of engagement in alternative livelihood among the fisher folks is often highlighted as being a driving force to human threats on important marine species including sea turtle, sharks, dolphins, and dugongs. The coastal communities have a high degree of dependence on fishing and associated activities, which often lead to, increased pressure on marine resources. Community conservation participation model has previously been successfully incorporated in natural resource management. The success of this model is hinged on the ability of the conserving community benefiting financially in the process. This model can be adopted for the conservation of large marine species with emphasis on turtles, dolphins and whales. Currently, some local community groups are involved in turtle nest conservation and dolphin watch. Empowering them with tour guiding and business skills can enhance this engagement. There is also need to build their capacity with relevant tools and equipment (binoculars, infrared touches) as well as empower them financially.

Action 1.8 Develop and implement seawall guidelines

Accelerated shoreline erosion has prompted property owners along the beach to control erosion and protect their assets by installing coastal protection structures such as seawalls. However, seawalls can have adverse impacts on threatened species like sea turtles. For instance, construction of a seawall adjacent to the Malindi National Park offices has led to loss of a turtle nesting site due to restriction of movement and erosion. The Park offices are also threatened by erosion due to interference with the reflection of sea waves. Also, seawalls have been shown to cause beach narrowing and loss.

The existing seawalls are of diverse designs. Some designs seem to be effective in breaking the force of the waves minimizing erosion impacts. However, there are no local seawall construction guidelines that can be followed to construct environmentally friendly seawalls. As such, KWS will develop seawall guidelines to assist landowners proposing to construct seawalls determine the most appropriate type of coastal protection in a particular location and how to assess the potential impacts of seawalls along the MMPA shoreline. These guidelines will provide guidance to support consideration of the social, environmental and economic impacts of seawalls and measures that can be implemented to mitigate these impacts. These measures could include locating seawalls in the most feasible landward position to reduce erosion and using an environmentally friendly seawall design (Table 8). The guidelines will also help proponents and consent authorities (e.g. NEMA, KWS, County Government of Kilifi) to consider and assess the likely impacts from a proposed seawall. The guidelines will also provide acceptable structures for emergency (temporary) coastal protection and define a permitting system for coastal protection structures in the MMPA to streamline construction of these structures. As a first step KWS and its partners has produced a brief technical report that recommends the appropriate coastal protection structures that can be constructed (see Annex 2).

Table 8. Guide for building new seawalls or modifying existing seawalls¹²

Existing Seawall	New Seawall
<p>Seawall face</p> <p>Increase roughness and texture:</p> <ul style="list-style-type: none"> • Create holes and cavities • Attach objects 	<p>Incorporate riparian vegetation</p> <ul style="list-style-type: none"> • Step seawalls with mangrove benches (where practicable) • indigenous riparian buffer landward of seawall
<p>Landward</p> <p>Plant indigenous riparian vegetation:</p> <ul style="list-style-type: none"> • Mix of trees, shrubs, Grasses 	<p>Maximise habitat diversity and complexity</p> <ul style="list-style-type: none"> • Using boulders of various sizes and shapes • Adding cavities and pools that retain water at low tide • Not cementing between blocks to create crevices • Incorporating rubble toes for vertical seawalls • Utilising natural building materials • Utilising irregularly shaped and/or weathered blocks • Incorporating protruding/indented blocks • Concrete panels with indentations and exposed aggregate
<p>Seaward</p> <p>Planting riparian vegetation:</p> <ul style="list-style-type: none"> • Mangroves (where practicable) <p>Creating artificial reefs:</p> <ul style="list-style-type: none"> • Boulders • Large woody debris • Rock clumps • Reef Ball 	<p>Low-sloping seawalls</p> <ul style="list-style-type: none"> • Gentle slopes • Changes of slope e.g. benches and steps

¹² Sydney Metropolitan Catchment Management Authority and Department of Environment and Climate Change NSW. 2009. Environmentally Friendly Seawalls. A Guide to Improving the Environmental Value of Seawalls and Seawall-lined Foreshores in Estuaries.

Website: www.environment.nsw.gov.au

Objective 2: MMPA's important habitats sustainably conserved

The desired future state of MMPA is where critical habitat systems are sustainably conserved. These habitats include coral reefs, Sea grass beds, mangroves, sandy beaches, and estuary ecosystems and intertidal zones. Currently, the MMPA habitats are home to various species ranging from tiny planktonic organisms (phytoplankton and zooplankton) that comprise the base of the marine food web to large marine mega fauna like the sea turtles, dugongs, whales, sharks, and dolphins. In addition, many fish species dwell in these diverse marine habitats. The intertidal areas are good foraging grounds for marine birds such as shorebirds, gulls, wading birds, and terns. Marine habitats also provide critical ecosystem services for humankind. MMPA human populations mainly depend on the marine environment for goods and services such as coastal protection, food, and income.

In recent years, various natural and anthropogenic threats have led to increased loss and degradation of these critical habitats, with a general decline in ecosystem health. Some of the notable threats include; global climate change, resource overexploitation, destructive fishing practices, unsustainable tourism, physical alterations and habitat destruction, poor governance, pollution and limited scientific information. Studies indicate that climate change will fundamentally alter the structure of oceans and directly impact marine ecosystems and human societies. Recent assessments of the global climate have concluded that ocean temperature, sea level and acidity have been increasing. Further, summaries of recent climatic data indicate that the intensity and frequency of ocean storms are increasing as well. In addition, the discharge from Sabaki River suppresses the growth of coral reef ecosystems in MMPA. The fringing reef system is broken at creeks and river mouths, where fresh water and sediments suppress reef growth.

In the past decade, seagrass cover along the Kenyan coast has shown a massive decline. For instance, the most dominant seagrass species (*Thalassodendron cilatum*) showed 50% decline between 2001 to 2005 due to a proliferation of the sea urchin (*Tripneustes gratilla*), which feeds preferentially on seagrass. Seagrass species in MMPA occurs in various habitats such as intertidal rock pools, sandy areas near the beach and in some subtidal areas near the reef. Some of the known threats that affect seagrass communities in MMPA include sea urchin population explosion (*T. gratilla*) due to sedimentation, pollution – nutrient input, siltation and Climate change. Extensive exploitation with little regulation, particularly use of destructive fishing techniques, has also led to seagrass degradation.

To address these ever increasing threats to the delicate and highly diverse marine habitats, the following actions have been proposed.

Action 2.1 Assess the nature, extent of impacts of human activities and other natural factors on coral reef communities

Globally, coral reefs and seagrass beds are being degraded by global warming through unusual selective pressures at individual organism level. For example, reefs are particularly sensitive to climate change because they bleach easily due to changes in sea surface temperature (SST). If the corals are exposed to prolonged duration of elevated SST for several weeks or months, they bleach and become more vulnerable to other threats, such as overfishing, pollution; sedimentation from storm surges and coastal developments. Corals can tolerate a narrow range of environmental conditions and live near the upper limit of their thermal tolerance.

Some of the recommended interventions to this problem include setting up of artificial corals or transplantation of healthy coral to degraded reefs - this is helpful in areas experiencing slow growth rate, monitor and assess coral recruitment and growth, map coral reefs and seagrass systems, experiment on transplantation of sea grass in degraded areas, implement management plans for key identified community marine conservation areas in collaboration with BMU, SDF and KMFRI, develop guidelines for establishment of Community Conserved areas, zoning plans to designate areas for different uses and managing fisheries activities within the marine reserve.

Action 2.2 Strengthen legal and policy framework and enforce existing laws

Kenya does not have a specific legislation or policy on protection of coral reef and seagrass systems. However, there are a number of sectoral laws and policies that touch on these habitats. These include EMCA 1999; Wildlife Act 2013; Fisheries Act 1991 and ICZM Action Plan among others. The new Wildlife Conservation and Management Act, 2013, Wetlands Policy and ICZM Action Plan have made more explicit provisions on the protection of coral reefs compared to other sectoral laws.

Some of the legal actions that should be taken by MMPA management are; advocate for establishment of community Marine conservancies in areas with coral reef and seagrass systems as stipulated in Wildlife Act 2013; and advocate for collaboration with the State Department of Fisheries to enforce mechanisms for monitoring, control and surveillance for MMPA fisheries.

Action 2.3 Increase stakeholder awareness on marine habitats through conservation education and awareness programmes

Generally, information and interest on coral reef and seagrass systems is low compared to terrestrial ecosystems. Recognizing the value of an informed and engaged public, this management action aims at promoting the flow of information, creating awareness and raising the profile of these ecosystems in the public. This will entail reviewing existing environmental education and awareness programmes and including critical ecosystems in public awareness materials. Talks on key marine habitats will be conducted for students, tour operators, government staff and local community visiting Malindi Marine MPA. In addition, training manuals, coral reef and seagrass newsletters and posters will be developed to disseminate information on marine ecosystems.

Action 2.4 Enhance research, monitoring and information management on coral reefs and seagrass system

Different stakeholders conduct their research and or monitoring but little information is available at a central depository. This is mainly due to weak regulation and information sharing mechanism. There is also limited expertise in some fields, e.g. seagrass ecology, to design and conduct research. Other factors that affect the low capacity to conduct research include poor infrastructure and limited equipment. There is need to collect, collate and synthesize available scientific data and information and develop an information resource centre. Some of the priority research that will be carried out on coral reefs and sea grass beds include: diseases, pests and invasive species; climate change impacts; and impacts of pollutants. In action, it is recommended that the management of MMPA should continue to monitor and evaluate the impact of climate change and develop potential mitigation and adaptation measures.

Action 2.5 Lobby for the designation of the Sabaki estuary as a Ramsar site and as a marine wildlife conservancy

The MMPA estuarine ecosystem is faced by immense pressure from the burgeoning human population as demand for land for settlement and other uses escalate. The relative fertile land available in the ecosystem along the river banks has added extra pressure to the ecosystem. As local people scramble for land bordering the River to undertake subsistence and commercial farming. The high demand for land has led to encroachment into some of the sensitive habitats in the ecosystem including the riparian zone. In addition, The MMPA estuarine ecosystem is an important conservation and biodiversity site as evidenced by its global recognition as an IBA. Consequently, efforts should be deployed to strengthen its protection status by designating the area as a Ramsar site and gazetting it as a marine conservancy. Towards this, the estuarine ecosystem will be mapped in collaboration with other stakeholders and a proposal for Ramsar listing developed. Further, Lack of awareness amongst the local community on the role and importance of Sabaki estuarine ecosystem limits their participation and interest in conservation and management of the

ecosystem. Besides, it poses the danger of irresponsible exploitation and use of existing natural resources within the ecosystem. During the Ramsar listing process the community will be educated on the importance of the estuarine ecosystem.

Action 2.6 Rehabilitate degraded mangrove areas within the Sabaki Estuary

The mangroves at the mouth of Sabaki estuary covers approximately 250 Ha. The mangroves are a home to wildlife like crocodiles and hippopotamus. However, development projects in Malindi area has resulted in increased sediment load in the mangrove ecosystem resulting in degradation of the ecosystem. Lack of a functional sewage treatment plant in Malindi has resulted in mangrove areas being used as sewage dumping sites. In addition, climate change has increased the vulnerability of mangroves to degradation and other natural calamities, including pests and diseases. Encroachment and conversion of mangrove areas to other land- uses and over-exploitation has also led to loss and degradation of mangrove ecosystem. To address these challenges Sabaki River estuary, including degraded sites, will be mapped and rehabilitation plans developed and implemented in collaboration with relevant stakeholders.

Action 2.7 Map and demarcate the River Sabaki estuarine ecosystem including riparian zones in collaboration with other stakeholders

The MMPA estuarine ecosystem is faced by immense pressure from the burgeoning human population as demand for land for settlement and other uses escalate. The relative fertile land available in the ecosystem along the river banks has added extra pressure to the ecosystem as local people scramble for land bordering the river to undertake subsistence and commercial farming. The high demand for land has led to encroachment into some of the sensitive habitats in the ecosystem including the riparian zone. In this regard, there is need to map and delineate the estuarine ecosystem boundaries including the riparian zone and explore effective means of protecting and managing the area.

Action 2.8 Promote alternative livelihoods

The MMPA estuarine ecosystem is faced with overexploitation of natural resources which is attributed to poor land use systems that threaten the sustainability of MMPA habitats and the aesthetic quality of beaches. These unregulated socio-economic activities that take place at the estuary and adjacent areas have exerted pressure on the estuary through depletion and degradation. In order to reduce community pressure on these resources, there is need for alternative livelihood activities to support the local community. This will empower the local community and diversify their livelihood sources hence reduce the pressure of exploitation of natural resources in the ecosystem.

Action 2.9 Lobby for protection of Sabaki River catchment

In collaboration with other relevant stakeholders, MMPA management will lobby for promotion of good farming practices in Sabaki River's water catchment to reduce the siltation load. Catchment protection and conservation will be enhanced to improve the quality of discharge which has tremendous effects on the mangrove forests at the mouth of Sabaki River.

Action 2.10 Build capacity of KWS staff and other stakeholders on conservation and management of mangrove ecosystems

Information and interest on mangrove ecosystems is generally low compared to other aquatic ecosystems. Recognizing the value of informed and engaged personnel and public, this action aims at promoting the flow of information, creating awareness and raising the profile of these ecosystems. Hence, in collaboration with other relevant stakeholders training and awareness creation on the importance of the mangrove ecosystem to KWS personnel, CFAs, BMUs and other relevant groups within MMPA will be carried out. Mangrove research and monitoring will also be conducted to improve understanding of their ecology.

Action 2.11 Control marine pollution

Non biodegradable marine debris (e.g. flip flops, plastic bags, nylon fish nets, polystyrene objects and hard plastic water bottles) pose a threat to the animals that depend on the oceans for food. These debris, when washed ashore, degrades some of the key turtle nesting beaches. In view of the foregoing, under this management action, the MMPA management will work closely with NEMA to ensure that all facilities, vessels and individuals observe waste disposal protocols as stipulated in the Environmental Management and Coordination Act (EMCA), 1999. A comprehensive system to identify all sources of pollution into the MMPA as well as assessing the impacts and extent of waste pollution on the marine ecosystems will be designed and implemented. MMPA management will also work closely with the local community, local hoteliers and businesses in carrying out regular beach cleaning campaigns to remove all non biodegradable debris from the MMPA beaches.

Objective 3: Threats to MMPA's critical components reduced

Coastal and marine ecosystems in Kenya are facing a wide variety of threats from human activities on land and in the ocean. Global climatic and oceanographic events are also contributing to sea level rise, severe storm events, coastal erosion, and sea surface temperature rise, all of which can harm marine ecosystems. In MMPA, pollution in the form of solid waste emanating from nearby tourist facilities and other shoreline developments in the area is common and affects the aesthetic appeal of the environment besides affecting the health of large marine animals and posing environmental health risks. Overexploitation of marine resources, especially fisheries resources, is high due to increased fishing effort and limited alternative livelihoods for the fisher folk. The use of poor fishing methods characterised by the use of small mesh-size nets and trawling in the near-shore have contributed to worsening of the state of fisheries resources in the area. Turtles are also reported to be killed on the beach and their eggs collected for food by local communities. Coral reefs are facing physical damage through trampling and anchoring of vessels by boat operators while mangrove habitats are experiencing over-harvesting by the local community due to poor enforcement of relevant regulatory requirements. Conflicts amongst different stakeholder groups mainly hoteliers, beach curio dealers and boat operators are also common. This objective, therefore, aims at remedying and minimizing the anthropogenic threats for the MMPA to keep a balance between the use of the resources and the health of the marine ecosystems. Some of the key anthropogenic threats for MMPA include; inadequate public awareness, recreational overuse, turtle entanglement in fishing gear and subsequent drowning, incidental off take by sport and commercial fishers, habitat degradation, disturbance and harassment of the marine mammals by tourists and illegal exploitation for meat, oil and eggs as well as for commercial trade; incidental capture by fishing gear; beach

nourishment which affects turtles by direct burial of nests; diseases (mainly Fibropapilloma tumors); predation of eggs and hatchlings and loss of nesting and foraging habitats to near shore developments along the beach, ingestion of marine debris by marine animals, incidental, and nest predation and damage from recreational vehicles on sand beaches. The management actions that will be implemented to address these threats are discussed in the following sections.

Action 3.1 Promote synergy and integration with other stakeholders

There are several government agencies and departments both at National and County level that need to be involved in the management of the MMPA owing to their legislative mandates that they have over certain issues facing the area. For instance, issues facing mangroves management require the involvement of KFS while tackling agriculture-related issues in the Sabaki estuary and along the shoreline require the involvement of the County Government. Non-state actors including the private sector, NGOs and CBOs also exist in the area. Despite the presence of many players with specific roles that affect the MMPA and the surrounding area, poor coordination of the stakeholders' efforts in and around the MPA has remained a challenge. As a result, there exists overlaps and duplication of activities around the MMPA. Coordination and integration of the stakeholders' efforts present a cost-effective mechanism to tackle the issues facing the MMPA. As such, an integrated approach to management of the MMPA will, therefore, be embraced.

Action 3.2 Implement zoning prescriptions

The marine reserve component of MMPA is an area with a high number of resource users such as artisanal fishers, sports fishers, commercial fishers (ring-net fishers) and trawlers; tour operators including boat owners, hoteliers, dive clubs, water sports and conservationists. The presence of many competing uses in the marine reserve has resulted in resource use overlaps sometimes leading to conflicts among the users. Some of the overlaps include diving and snorkelling sites, and fishing sites both in the protected areas (reserve) and the surrounding area. In order to bring order and sanity amongst the conflicting uses and ensure sustainable use of the marine reserve resources the zoning prescriptions will be enforced.

Action 3.3 Promote alternative livelihoods for the local fisher folk

The communities living close to the MMPA depend on marine resources for their livelihood. Fishing is the main livelihood activity. However with an increasing number of fishermen, over-exploitation and degradation of habitats is evident while catch per unit area has diminished over the years causing high levels of poverty amongst the fisher folks. One way to reduce this pressure is to initiate viable alternative livelihoods which will reduce pressure on the marine resources, enhance conservation as well as generate income to households.

Action 3.4 Promote community awareness and participation in MMPA management

Low community awareness on the importance of the MMPA is a major issue that needs to be addressed. Low level of awareness and understanding of the importance of the area's resources and linkage between the environment, livelihoods and economic development has contributed to environmental degradation in the area. This is evidenced by the proliferation of illegal activities such as poaching; use of illegal fishing gear; disturbance and harassment of the marine mammals by tour operators and tourists; and poor waste disposal mainly in the marine reserves. Community awareness and participation is an essential social tool for the management of change in conservation and sustainable development. Promotion of awareness and education among local communities and other stakeholders with a view to highlighting the value of resources found in an area can result in change of negative community attitudes and perceptions towards the environment. In addition, such awareness and education activities can enable local communities to reduce negative impacts of their actions on the environment.

Action 3.5 Establish shoreline setbacks and coastal erosion hazard data

The landward boundaries of the Malindi Marine National Park and Malindi Marine National Reserve are defined by a line 30 metre above the high-water mark. The Survey Act, Cap 299 requires that a setback of 60 metres from the High Water mark be reserved and no permanent development is allowed in the reserved setback. The intent of shoreline setbacks is to establish a coastal-hazard buffer zone to protect beach-front development from high-wave events and coastal erosion. Adequate setbacks allow the natural erosion and accretion cycles to occur and help maintain lateral beach access. Furthermore, setbacks provide open space for the enjoyment of the natural shoreline environment. However, the alignment of the legally prescribed setbacks have been shifting over the years because of coastal erosion shifting the high water mark landward while in some areas the high water mark has shifted seawards. Hence, in addition to delineating the MMPA landward boundary based on the status of land tenure when the MMPA was established and to provide adequate environmental open space for coastal processes, MMPA scientists will design and conduct a study that will analyse coastal erosion trends using remote sensing and cadastral survey data to provide data on a property scale. Historical erosion rates will be determined on a parcel by parcel scale and used to project the future erosion hazard area along the shoreline. The output erosion-hazard information will be used to identify areas prone to high rates of coastal erosion and help determine the causes of and methods to address coastal erosion. They will also provide a scientific basis for assessing and regulating proposed structures and activities within the projected shoreline erosion hazard zone.

Objective 4: MMPA's ecological components and processes are understood

The future desired state at the MMPA is where ecological as well as socio-economic research is carried out and research findings disseminated to support management decision making. Research and monitoring are essential for management to be effective and for the evaluation of the impacts of diverse ecological processes. Long-term data collection is important to have a complete understanding of some drivers that act over a long temporal scale.

There is a long history of ecological research and monitoring in the MMPA that has made significant contributions to the global understanding of the area's marine ecology and biodiversity. The available information, however, is not easily accessible at the MMPA, it's biased towards ecological elements and what is available is also not readily usable by MMPA managers. Additionally, there are still some areas, habitats and species that have not been studied.

This management objective has been designed to strengthen research and monitoring as well as information dissemination for effective MPA management. Management actions that will be implemented to achieve this objective focus on obtaining and collating information that is available, generate information that is not available, interpret the information and communicate to all stakeholders in MMPA. Additionally, appropriate management interventions will be developed for managers to allow the implementation of research findings. These actions are elaborated in the following sections.

Action 4.1 Conduct an assessment of all research studies and monitoring programmes that have been conducted in the MMPA

Many studies have been done in the MMPA. These studies are focused on coral reefs, mangroves, seagrass, fisheries and the effects of siltation from the Sabaki River. Species inventories of fish, coral, marine and terrestrial invertebrates, birds, and marine and terrestrial mammals can be collated from current publications but this information needs to be updated. In addition, most of these species have not been adequately catalogued for mapping purposes making it difficult to estimate range and extent of these species.

It is important to review all the past research and monitoring assessments on various biodiversity subjects or resources and help in designing a comprehensive plan for future assessment within MMPA. In addition, adequate reviewing will

facilitate detection and identification of research gaps as well as areas that have been widely studied. Reviewing of the research areas will also guide in determining the merits for research funding in areas where such funds are available. Additionally, a monitoring strategy that takes into consideration key species, habitats and processes will also be developed and implemented.

Action 4.2 Conduct research on habitats and species

Most research from the MMPA has been concentrated in the coral gardens, a few other patch reefs and the mangroves. While repeated studies in one site are extremely useful for studies examining change over time, this information does not help us to understand how the various habitats and organisms in the ecosystem are interconnected. Before you can start to understand how habitats and organisms are interconnected, you must first know all habitats and organisms that are present and how they interact at both small and large scale. On the other hand, limited studies on social issues that impact the ecological integrity of the MMPA have been carried out. For effective management of the MMPA socio-economic and even political factors around and within the area cannot be disconnected from the ecological factors. These, as well as emerging issues such as climate change and ecological and social resilience, need to be well-understood.

There is need to develop a research plan to collect data on areas, critical habitats and species that have not been studied. This will establish the status of the MMPA resources and user groups and fill research gaps. It is also essential to establish a long term monitoring plan for specified ecological and socio-economic indicators based on research activities undertaken.

Action 4.3 Review current monitoring capacity and train MMPA staff and communities in ecological monitoring and reporting

The MMPA currently has scientists and rangers trained to conduct ecological and socio-economic monitoring within the marine and coastal ecosystems. There are also many stakeholders who conduct research and monitoring. However, there is need for capacity building for the staff involved in the management of marine resources. This will enable them to acquire the required knowledge in ecological, biological and social issues and basic methodologies for carrying out monitoring. This will also ensure building of local expertise and continued local research and monitoring to inform evidence-based management.

Action 4.4 Intensify collaboration in marine research and ecological monitoring

In the past, outcomes from research and monitoring assessments have not been optimally used for management of MMPA due to institutional collaboration issues. There is need to improve coordination in order to obtain important information, expertise and avoid replication. Overall coordination with other agencies and stakeholders is required to enable making collective decisions that affect the management of the area positively. Additionally, this will help in sharing costs of monitoring and logistics. Coordination will also ensure that all the three levels of monitoring are achieved. These monitoring levels include:

- Community monitoring - This is the lowest level with lower details; this can be carried out continuously as it is inexpensive to conduct.
- Management monitoring – This covers more details and requires more training than the first level and can be carried out periodically.
- Research/Scientific monitoring – This is expensive and requires expertise and experience. It is mainly designed to answer specific questions.

Action 4.5 Develop an integrated information management system

MMPA management conducts research and monitoring aimed at generating crucial information that guides the mitigation of threats and adverse impacts, and helps to develop effective management intervention measures. It also collects other management information (e.g. MMPA resource use conflicts, human-wildlife conflicts and security information) to support management decision making. However, research and management information databases are not integrated making it hard to link research and management. Hence, an integrated information management system will be designed and implemented to integrate research and management information.

Action 4.6 Evaluate the MMPA's management effectiveness

Many protected areas, including marine protected areas, are failing to achieve their objectives and, in some cases, are actually losing the values for which they were established. Biodiversity loss is accelerating despite large parts of the country being under protected area coverage. Hence, there is need to continuously assess the status and management of the protected area, to understand better what is and what is not working, and to plan any necessary changes as efficiently as possible. As such, the MMPA's management effectiveness will be assessed based on the key elements of protected area management outlined in this management plan.



TOURISM DEVELOPMENT AND MANAGEMENT PROGRAMME

Programme Purpose and Strategy

To ensure sustainable tourism development in line with conservation principles and to enhance and market MMPA as a world class quality tourist destination rich in natural beauty and biodiversity

The community living adjacent to the MMPA depends largely on marine resources for their livelihood, key among them being fishing and tourism related activities along with subsistence farming. With an ever growing population and tourism expansion the demand for marine resources and services is increasing at an advanced rate. In order to maintain the quality and health of marine resources and to provide consistent quality goods and services for sustainable tourism, sound management of these resources is required.

Ensuring that tourism follows a truly sustainable path and that it contributes to the sustainable management of the MMPA, will require enhanced cooperation and concrete partnerships among the tourism industry, government at all levels, local communities, protected area managers and planners and the tourists themselves.

To sustain economic growth and ensure future benefits for the community which depends on the MMPA for livelihood and income it is necessary to develop tourism marketing plans aimed at attracting national and international visitors in line with sustainable tourism growth.

Guiding principles

MMPA tourism product is developed and promoted as an activity that add further value to the local communities and not as the only key source of livelihood

The MMPA communities have benefited from tourism through a number of ways. Tourism provides formal (working in tourist hotels) as well as informal (providing services to visitors) employment to the residents. However, it is important that the community is not over-dependent on tourism. Overdependence on tourism can erode cultural values and make the community vulnerable to fluctuations in tourism industry. In addition, local residents should not be led to expect unrealistic levels of employment. Sustainable tourism will generally not be an economic bonanza for the entire community, but will simply generate some jobs for a portion of the community.

MMPA tourism players are coordinated and work in harmony with the MPA management

This management plan seeks to promote an integrated approach to product development and marine environment planning and management dealing with all aspects of the tourism industry. Generally, there is lack of consistent co-ordination and open dialogue between tourism players (hoteliers, dive operators, tour operators, safari sellers, curio sellers, tour guides, boat operators, beach boys) and park management bodies.

Tourism agencies and MPA management agencies are often excluded from the development of tourism products, marketing and promotions by the above stakeholders. A lack of coordination also extends to the advocacy of conservation organisations operating in the MMPA. Consequently, the MPA management needs to assist in coordinating and integrating the needs and future planning of tourism players.

Tourism Products diversified and marketed

Tourism is the largest source of income in the MMPA for both business and community sectors. This is due to the world rated natural attractions on offer, including stunning white sandy beaches and coral gardens with tropical reef fish. Activities include; swimming and sunbathing, scuba diving, snorkelling, glass bottom boat tours, kite surfing, dolphin and whale watching tours.

Whilst these tourist activities are first class, opportunities exist to diversify activities and develop marketing potential. In recent years community based ecotourism enterprises have emerged and are becoming increasingly popular with visitors. Hence under this management programme, tourism products will be diversified to enhance visitor experience.

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

- MO 1. Tourism administration and management enhanced**
- MO 2. Tourism support infrastructure developed and maintained**
- MO 3. Tourism products and services diversified**

The following sections describe the 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: Tourism administration and management enhanced

The MMPA tourism industry is faced with a myriad of administrative and management problems and challenges that have been left unresolved. These include: poor collaboration and networking by the different groups in the tourism industry which has led to conflicts in resource use and access in the MMPA; poor tourism infrastructure such as inadequate and lack of world class boats for visitors; visitor harassment; unplanned tourism and urban development; negative visitor impacts on the MPAs, among others.

Tourism is a dynamic industry that involves diverse players with different interests, needs and opinions. A holistic approach to management of tourism is needed to guarantee sustainability and maximise quality tourism products within the MMPA to achieve maximum benefits. This includes developing systems for marketing, communication, tourism products, and conflicts

resolutions to enhance the tourism industry in the area. This can help cushion the negative tourism impacts that occur in times of terrorism activity and unpredictable political unrest, factors which affect Kenya as a favoured tourist destination. The following actions will be undertaken to meet this objective:

Action 1.1 Facilitate formation of MMPA tourism stakeholder forum

There exists no formal channel for airing and addressing tourism issues in the MMPA. There is need for the MMPA tourism stakeholders to come up with a Tourism Stakeholder Forum that will consist of representatives from all tourism stakeholder groups operating within MMPA. This will provide a formal channel for addressing tourism issues within the area and enhancing synergy among resource users and management. Among the stakeholders to be included in the forum are the Ministry of Tourism, Boat Operators Association, Hoteliers, Safari sellers, Curio sellers, Divers, Ecotourism groups among other Community Based Organizations and Associations operating within the area.

The forum will develop its working mandate, structure, regulation and constitution which will govern its operation. It will also enhance networking and sharing of information by various stakeholders hence being abreast with the emerging challenges and opportunities.

Action 1.2 Monitor and manage visitors impacts

Visitor impact management is ever more important as the number of tourist increases with the highest concentration being in major sites that are ecologically vulnerable. Congestion and overcrowding within coral gardens is singled out as a major problem that is causing the degradation of habitats especially at Mayungu during the high season (October to February) when park visitation is usually high. In particular, damage to corals resulting from tourist trampling during snorkelling excursions has resulted in coral gardens degradation over the years. Currently the buoys installed within the coral gardens are not enough to serve the number of boats visiting the area and control on boat numbers and establishing a monitoring and evaluation system is recommended. The inflow of visitors to Mayungu is unregulated.

Harassment of marine life and collection of marine curios such as shells by unregistered beach operators is a consistent concern and measures need to be put in place to stop such bad practice.

The following activities need to be undertaken to address this issue:

- Limit the number of boats visiting the coral gardens at any given time by developing a rota system for boats with a monitoring and evaluation component including self policing and assessment and KWS enforcement of boat and snorkelling guidelines and best practice.
- Conduct research on visitor carrying capacity for the MMPA. This is to help guide management in determining the number of visitors to be allowed to either snorkel at
- the coral garden or dive at the specified areas at a given period of time. This will minimize the pressure on the coral gardens.
- Conduct research on carrying capacity in terms of new tourism development within the MPA and projected impacts on natural resources, amenities and renewable resources.
- Establish code of conduct to guide the operations of the boat operators, beach operators, hotels and tourists (refer to existing WMA Tourism Codes of Conduct).
- Explore and create new sites to reduce pressure on the existing ones. This could include use of ship wrecks and fish aggregation devices (FADs) to enhance visitor experience.
- Conduct a pre-dispatcher lecture to clients before heading to the park.
- Develop customer care and information training, education packages and guidelines for boat and tour operators

Action 1.3 Liaise with relevant authorities to train Rangers, Customer Care Staff and Tourism Police Unit (TPU) officers on basic visitor handling and guiding practices

The local community at the MMPA has been in conflict with the Tourist Police. Principally, the TPU is charged with provision of security for the tourist and the local community as well as maintaining law and order. However, there have been concerns that the TPU is not well versed with tourism issues. They have been accused of giving tourists wrong information as well as meddling with the operations of organized community groups. Through this action, the warden will follow up with the senior officers of the TPU to address this problem. The TPU will also be sensitized on best practice for handling visitors and it will be provided with visitor information on a regular basis to keep it informed on current issues in the tourism industry. The MMPA Warden will hold regular meetings with the TPU's Senior Officers and collaboratively develop and implement training on visitor handling and MMPA interpretation for TPU officers.

Action 1.4 Register and regulate boat operator and beach operator activities and their associations

There have been wrangles among the boat operators due to lack of clear regulations and unregistered associations. Also, serious concerns from hotels, beach operators and the authorities have been raised in relation to beach boys' activities. The Malindi Association of Boat Operators (MABO) is organised but not all boat operators are members; hence they are not bound by formal regulations. Standard regulations and best practice guidelines need to be developed for all boat operators to increase professionalism, provide a quality tourism product as well as enhance business.

There are registered and long established beach operator organisations in the MMPA. However, there are many more unregistered operators known as “beach boys” who generally harass tourists, are unruly and create a bad image for registered operators and for coastal tourism.

It is therefore paramount to ensure that all beach and boat operators are licensed and belong to registered associations and work with badges and uniforms. This will enhance order along the beach, boost the positive image of the operators and create trust with the visitors. In addition, all vessel owners will be urged to register their vessels with Kenya Maritime Authority (KMA) and employ skilled crew. MMPA management will also liaise with the relevant authorities to allocate beach operators designated areas for their operations to bring order along the beach.

Action 1.5 Ensure safety of park visitors and boat operators

To ensure visitors safety boats operating within any MPA need to be licensed and comply with the KMA regulations. Most of the boats operating within MMPA are not licensed and lack safety equipment. Before boats are licensed by KMA they must be certified as seaworthy. Therefore, KWS will work closely with KMA to conduct regular inspections to enhance adherence to the set rules and regulations regarding marine vessels.

Action 1.6 Develop and gazette Navigational Regulations for the MMPA

Jet skis, skiing and racing /speed boats have been associated with disturbance of birdlife and especially flamingo's, distraction of other resource users including canoes and fishermen. There is need to develop navigational regulations for the MMPA to govern operation of marine activities within the area. There exists a code of conduct for boat operators operating in the MPAs that include speed limits. However, speeding is still occurring in the Marine Reserve. Through this action, the existing regulations will be enforced and where possible reviewed to come up with new navigational regulations that will eventually be gazetted.

Objective 2: Tourism support infrastructure developed and maintained

The planning of infrastructure and services for visitors should be based on the understanding of carrying capacity, environmental impacts and of the needs of existing and potential visitors. Tourism infrastructure and services should stimulate use of the protected area by people as well as enhance visitor understanding of key themes and values in the protected area. Some of the key challenges on infrastructure development and services in the MMPA include; unplanned tourism and urban development, blocking of beach access roads by private land owners, and poor waste disposal and sanitation facilities. The following actions have been developed to address issues on tourism infrastructure development in the MMPA.

Action 2.1 Develop infrastructure to support local tourism enterprises

The MMPA lacks basic infrastructure that support the boat operation business to enable them offer quality services to tourists. There are neither ablution facilities on the beach nor solid waste collection facilities. Solid wastes, both bio and non-biodegradable, are a nuisance within MMPA. The community groups need to be supported to come up with their own initiatives to maintain cleanliness of their working environment. The operators have been urged to carry their own wastes to the mainland but due to lack of waste disposal sites in the mainland there is lack of compliance. Through this action, the MPA management in collaboration with other stakeholders will seek to address waste disposal issues by constructing and maintaining an ablution block and waste disposal bins in the mainland.

Action 2.2 Renovate all ticketing gates and install signages at appropriate sites

MMPA has one ticketing gate which needs renovation. Through this action, the gate will be restructured to accommodate an information centre with ablution blocks. On the other hand, the current signages showing the direction to the

ticketing gate are poorly positioned and not visible from far. Therefore, the signages will be renovated and some placed at major road junctions. In addition, an entry gate will be established at Mayungu once an outpost is established there.

Action 2.3 Upgrade and maintain the parking area

The parking area at the gate is small for the heavy traffic experienced during the high season. The parking is also inappropriate for bus parking. Hence, MPA management will upgrade the parking area by increasing parking space and providing bus parking spaces.

Objective 3: Tourism products and services diversified

MMPA has diverse ecological and cultural attributes that offer great opportunity for diversification of tourist products. MMPA is unique in itself due to its exceptional and abundant marine resources/attractions as well as historic monuments that give it an advantage to develop distinctive products with high potential to attract more tourists from different market sources. Very little has been done to exploit existing opportunities and provide unique visitor experience.

Tourists themselves are becoming increasingly sophisticated in their demands in terms of having meaningful travel experience, including such aspects as cultural authenticity, contacts with local communities and learning about flora and fauna, special ecosystems and natural life in general and its conservation. All these are opportunities existing in the MMPA that needs to be harnessed and explored further to add value to the tourism product that is being offered. The following actions have been proposed aimed at promoting and diversifying tourism products in the MMPA.

Action 3.1 Identify and explore possibilities to introduce artificial reefs

Coral cover has been reducing over the years partly due to the impacts of Climate change. Artificial reefs can provide protection to natural reefs in several ways, including: increasing the amount of hard-bottom habitat, reducing stresses on existing reefs, acting as obstacles to provide a deterrent for ships and nets, serving as guideposts for snorkel and diver trails. To enhance visitor sites, there is need to explore opportunities of installing artificial reefs and fish aggregation devices to reduce pressure on damaged reef areas. Towards this, the MMPA management in consultation with the research department and local marine scientists will identify a suitable place to install the artificial reef (E.g a ship wreck).

Action 3.2 Assess current marketing methods and scope and develop a Marketing Strategy for the MMPA

A marketing strategy needs to be developed to target both national and international visitors. Several hotels and organisations have created marketing materials but most are carrying out individual promotions of their business and not the MMPA and its tourism activities as a whole. The strategy should create a tourism forum under KWS and explore best approaches to gain maximum marketing potential and publicity for the MMPA. This forum could meet quarterly. Materials to be produced could include brochures, video materials including features from above and underwater, maps, pamphlets, magazines, directories, information in specific websites, face book etc.

Inadequate promotion materials are still a hindrance to marketing of the MMPA. Participation in exhibitions has been used whereby MPA displays its products. This has not been as extensive as expected because in most cases it has been within towns like Malindi and Watamu only. MMPA displays should be on show at every tourism expo in Kenya and especially in Nairobi. Many Nairobians are only aware of Mombasa and Diani as tourism destinations at the coast and do not know that MMPA has much more to offer. Participation in East African and regional expo's will also give a boost to marketing of the MMPA. This will be achieved in collaboration with the Ministry of Tourism, KTB, Ecotourism Kenya and national media houses.

Action 3.3 Liaise with KWS HQ Marketing Section to ensure MMPA is included in the national tourism marketing strategy

MMPA is the best place for anybody whose interest in wildlife and conservation in general extends beyond the plains game. MMPA is easily accessible by air via Malindi airport and by road from Mombasa a distance of 110 Kms. Despite its proximity to Malindi and Watamu towns and availability of diverse accommodation, the MMPA receives relatively low visitation compared to Kisite-Mpunguti MPA. Most of the marketing for the MMPA is done by private companies and hotels and little marketing is done by KWS.

The KWS website contains limited tourism information on marine protected areas compared to terrestrial protected areas. This also applies to the information in any other national marketing strategy. There is need to familiarise the agencies involved in tourism marketing with what is on offer in the MMPA through tours of the MMPA. In addition, the MMPA will also liaise with KWS Marketing & Business Development Department to market the MMPA both locally and internationally.

Actions 3.4 Conduct a capacity building exercise for all groups dealing with ecotourism to meet required standards

Communities living adjacent to the MPAs benefit from a wide range of tourism-related opportunities such as providing boat services, managing tourist attractions such as boardwalks, tour guiding, Safari selling, etc. By working closely with the different community groups, individuals and other organizations, the MPA management will contribute to the enhancement of community livelihoods and reduce pressure on the MPAs.

The MPA management will identify and develop a database of all people practicing ecotourism activities or any form of tourism in the MMPA. Conducting regular capacity building exercises among the stakeholders will ensure that they conduct their businesses and handle visitors in a manner that enhances visitor experience and satisfaction. To enhance the capacity of such groups the following will be carried out:

- Establishment of a revolving fund for the boat operators
- Increasing the capacity through training in small business management, interpretative and marine guiding skills and visitor handling.
- Training officials of the groups in leadership
- Enhancing the ability to increase business through marketing. This can be addressed through production of marketing materials including brochures and fliers to be posted in hotels and tourism offices, as well as hosted at easily accessible websites.
- Supporting the development of an investment plan to cater for the low season when business is slow.
- Supporting the development and implementation of a monitoring and evaluation plan that includes tracking revenues, compliance to regulations and compliance with standards. Results should be communicated to the respective association/group and hotels hence improving willingness of hotels to collaborate with the group or association.

Actions 3.5 Embark on domestic tourism marketing campaign using appropriate methods

The performance of any industry is judged by how it is able to sustain itself. Tourism is no exception. Globally, Domestic Tourism is regarded as the backbone of sustainable tourism development, and International Tourism as the off-shoot. This is because International Tourism depends on Domestic Tourism products and attractions. This is quite unlikely in Kenya where all along tourism marketing has basically been targeting international tourism. The trend has however changed over the recent past and the government through Domestic Tourism Council is investing in promotion of domestic tourism. As a result, MMPA should be incorporated in the national marketing strategy for domestic tourism.

There is need to step up advertisement campaigns to promote domestic tourism for the MMPA. This can be done

using local media, TV, national broadcasters and more specifically vernacular radio stations to target the locals. On the other hand, most Kenyans who come to the coast for their holidays hardly know anything about marine protected areas and other unique marine features in the areas apart from the beaches. There is need to liaise with marketing agents to enhance marketing of the area. There is also need to partner with the Kenya Tourism Board to make facilities more affordable for domestic tourists especially during the low tourism season.

Actions 3.6 Promote, enhance and market cultural events and historical sites in liaison with stakeholders

MMPA is rich in culture which is not adequately tapped and marketed as a tourism product. Cultural cuisine can be used in hotels to display the Swahili cultural foods. Though the area celebrates a cultural week annually, little is known about it. There is need to form cultural groups within the area which will help market their culture. The Ministry of Tourism is highly supportive of cultural promotions and already has supported the Magarini residents to develop a cultural centre in their town.

The existing historical ruins within MMPA need to be developed to ensure that they are of tourism standard. In addition, interpretative information for these historical sites should be provided to enhance visitor experience. The locals need to be trained as guides and highly sensitized on the importance of preservation of the ruins to retain their value as historical tourism products.

Actions 3.7 Identify potential homes stays and promote their adoption in MMPA

There is need to diversify tourism products to allow maximum spending by tourists, with benefits trickling down to the local community. Home stays or philanthropic travel can be explored as an option as it allows direct benefit for the local community from tourism. Unlocking community development through the concept of 'destination communities', where the economic generosity of the philanthropic travellers could allow the community to benefit from this industry, e.g., by assistance in education, medical facilities and entrepreneurial training is currently gaining popularity in Kenya.

The MMPA has a high potential for home stays. Hence, there is a need to sensitize the community to start developing their homes to meet the required standards. Once there are approved and registered homestays, tour operators will be approached to include these homestays in their marketing materials.

Actions 3.8 Establish youth and women development programmes

Youth in Malindi is highly influenced and impacted by the vice associated with tourism. The town is renowned for sex tourism especially with young and school going teenagers; hence, their education is affected. There is need for leaders, local administration, community groups and organisations as well as parents to partner to address these tourism issues. This can be tackled by identifying investment opportunities in tourism in which the youth can engage.





**COMMUNITY PARTNERSHIP AND
CONSERVATION EDUCATION
PROGRAMME**

Programme Purpose and Strategy

The purpose of the Community Partnership and Conservation Education Management Programme is to ensure that:

“Participation of MMPA adjacent communities in sustainable conservation and management of marine resources is strengthened for livelihood improvement”

Many coastal inhabitants depend on marine resources for their livelihoods, with coral reefs playing a particularly important role. Besides providing construction materials, ornamental objects and medicinal products, at least, half of the fish caught off the Kenyan coast are reef-associated. In Marine Protected Areas (MPAs), access to such goods and services from the reefs therein is either prohibited or restricted. To ensure adherence to the rules and regulations, KWS personnel undertake regular patrols in marine parks and reserves. Community resource management works on the principle that conservation will only flourish if it is embedded in local communities and is voluntary rather than enforced. Therefore, people living in or adjoining protected areas such as MMPA have an influence towards the successful management of protected areas or otherwise.

In the recent past, landmass adjoining MMPA is steadily experiencing increased pressure from human settlement and tourism development. The illegal acquisition and construction of riparian zone affect access to the beach and beach landing sites for fishermen and nesting beaches for sea turtles. Increased settlement also puts pressure on marine resources, especially mangrove products for construction purposes and fishery resources to meet the fish protein demands of the local population.

This programme sets out actions which MMPA management will implement in the next 10 years. In implementing these actions MMPA management hopes to realize an empowered local community that derives its socio-economic benefits within the MPAs while at the same time conscious of conservation of resources therein. The following sections set out the strategic principles that will guide MMPA management in implementing the community partnership and conservation education management programme to achieve the programme purpose.

Guiding Principles

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

Support to enhance community role in the management of the MMPA is strengthened

Local communities living adjacent to MMPA have historically borne many of the costs associated with the area's conservation, through reduced access to previously utilized natural resources including fish resources, shell collection, removal of other marine life for medicinal use, harvesting of mangrove products and access to areas of cultural importance. There has been a misperception that key benefits accruing from the area's utilization, especially from tourism, have mainly benefited KWS or tour operators/hoteliers whose owners are urban based or foreigners. This situation, combined with a lack of community awareness of the national and global importance of MMPA and the exceptional biodiversity it contains, has resulted in the lack of community support for the area's continued existence and KWS management activities. This, in turn, has exacerbated the community-related challenges that MMPA managers have to deal with, increasing both the complexity and costs of the MMPA management.

As such, alongside efforts to develop open and constructive relations with neighbouring communities, a major thrust of this programme will be to rectify this situation and improve overall community support for the MMPA conservation through diversification of livelihood sources without necessarily extracting natural resources.

Conservation education and awareness is enhanced

Public awareness of the importance of the MMPA is critical to continued support for conservation in the area. Conservation agenda in the ecosystem is facing serious threats from other competing resource use practices. The local community should be made aware of the opportunities and benefits from conservation of the ecosystem, otherwise, conservation might lose out in the long run. As community livelihood activities taking place around MMPA increasingly impact on conservation pursuits or conservation concerns impact on community activities, good relations between MMPA managers and communities are essential to ensure that both parties can raise issues of mutual concern before they escalate into serious problems, and can work together when livelihood and conservation goals align.

Past experience indicates that while law enforcement is an effective way of combating illegal activities within a protected area, the development of good relations with surrounding communities is an essential complement to this approach. It can result in a reduced need for law enforcement activities in the first instance if carried out effectively. It is therefore vital that MMPA managers proactively engage neighbouring communities, to ensure that MMPA- community interactions do not simply focus on damage mitigation and conflict resolution, and that KWS' interests are not seen as being restricted to dealing with problems that impact on the management of the protected area, rather than addressing the concerns raised by communities themselves, or capitalising on potential synergies between community and KWS activities. As a guiding principle, KWS will strive towards developing open and constructive relations between MMPA managers and neighbouring communities, in order to strengthen KWS-community collaborations and increase communities' support and contribution to the MMPA's conservation. The wildlife conservation and management Act, 2013, currently provides for game farming and consumptive utilisation of some wildlife species including the formation of conservancies. This is an area which can be explored by the resident communities bordering the MMPA in collaboration with KWS.

Human-Wildlife conflicts are minimized

Wildlife continues to negatively affect the adjoining community of MMPA through incessant crop raiding, human injury and property destruction. Crop raiding is rampant in settlement areas adjacent to riverine areas (along River Sabaki) and farms bordering MPA. Despite implementation measures to curb human-wildlife conflict (HWC) by KWS, conflict seems to persist and is rather high, particularly, in cultivated areas around River Sabaki estuary leading to increased resentment of wildlife. This is more so because farmers along the river banks do not adhere to 30-metre riparian rule (EMCA act 1999) and regulation of wetlands but instead they farm almost water edge hence the farms remain exposed to the wildlife species living therein e.g. hippopotamus. To gain support for conservation in and around MMPA through reduction of resentment for wildlife, effective measures to curb HWC will be put in place and appropriate compensation done as prescribed in the Wildlife Conservation and Management Act 2013. Education campaigns on HWC will also be undertaken to minimize conflicts.

The above guiding principles are intended to help in the development and implementation of the three management objectives of the Community Partnership and Conservation Education Management Programme. These objectives are outlined below.

- MO 1. Community participation, collaboration and benefit sharing mechanisms strengthened**
- MO 2. Conservation education and outreach programmes strengthened**
- MO 3. Human-wildlife conflicts and natural resource use conflicts reduced**

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: Community participation, collaboration and benefit sharing mechanisms strengthened

The future desired state at MMPA is where resident communities derive maximum benefits accruing from natural resource use and management, and benefits trickle down to the household level. Unfortunately, the local community frequently bear a disproportional share of the costs associated with conserving the protected area, compared with the benefits generated. These costs include exclusion from fishing grounds, as well as other opportunity costs incurred where areas traditionally used for livelihood or cultural activities are no longer available to them. This imbalance has often resulted in resentment and poor relations between MPA managers and the adjacent communities, who are not directly involved in the management of MPA. This has, in turn, led to increased misunderstanding in the management of MPA, and has in some instances impacted on the conservation of the key values that the area was created to protect. In pursuit of alternative livelihood sources, some segments of MMPA community are involved in enterprise development where a majority of enterprises are tourism based. This is rather risky considering that tourism associated business is very vulnerable to local and international uncertainty. In addition, tourism enterprises do not involve a large section of the community and thus, benefit spin-offs are more localized.

To reverse this trend, the option of dedicating some income from wildlife conservation towards socio-economic development of communities is necessary because incomes reaching households directly is considered critical to convincing the community to support wildlife conservation efforts. In addition, there is an urgent need to diversify enterprises in order to increase benefits from natural resource use as a way of reducing impacts of a tourism slump.

This objective is therefore designed to enhance the participation of the local residents in conserving the MMPA as well as enhancing benefits accruing from natural resource use and management, and ensuring that the benefits trickle down to the household level while at the same time creating a forum where communities and other stakeholders can exchange, share and deliberate on issues of community concern. To realize this, the following management actions will be implemented.

Action 1.1 Collaborate with local communities in the management of MMPA

Involvement of the local community in the management of MMPA will cultivate a sense of ownership and eventually the success of the implementation of this management plan. Additionally, a cordial relation between local community and protected area management will serve to reduce inherent conflicts within the MPA especially those involving misunderstanding among multiple uses of the resource.

To ensure that this is realised, the community will be involved in the implementation of this management plan as they were involved in its development. This will be achieved by having clear definitions of community and management authority roles and responsibilities through formal agreements. The management will also train villagers as 'specialists' in a variety of skills; the villagers can then train or advice a larger number of villagers. This is an effective way of getting villagers on board and will save time and money. On the other hand, the elected community representatives will be recognized throughout the plan period and placed in the forefront of public activities related to the protected area (planning workshops, meeting with donors, other institutions and media). In addition, a collaborative relationship characterized by a commitment to mutual goals shall be jointly developed with structured and shared responsibility, mutual authority and accountability for successful sharing of resources and rewards. Efforts will be made to ensure that partnership processes are inclusive and represent the diversity of the MMPA communities.

Action 1.2 Support implementation of community projects and formulate conservation benefit sharing mechanism

Like any other community adjacent to protected areas, KWS through MMPA management has a long history of assisting communities by funding community projects. This not only helps KWS to fulfil its corporate social responsibility but also increases community support for MMPA management and the ongoing conservation of the area. These projects have included the building of schools infrastructure (buildings/sitting materials), the development of water projects, and support for tourism based activities through the provision of beach rest beds, change rooms and janitorial facilities. However, a number of community development projects have failed in the past, often due to poor community participation and engagement, either because projects were not well aligned with community needs, or because community members lacked the necessary skills for their successful implementation.

To address this situation, KWS will also continue to provide ongoing material, technical and other forms of support to ensure the successful implementation of other ongoing projects such as sun beds at Malindi MPA, etc. The organisation shall also support Participatory Rural Appraisal (PRA) exercise in collaboration with community representatives from target communities to identify appropriate projects that have strong community support, as well as the capacity-building needs for their successful implementation. Once appropriate projects have been identified and agreed with the target communities, KWS through its community social responsibility programme will provide additional support and training to community members in developing project proposals, which can then be submitted for funding. In addition, the local community will enter into agreements with the protected area management for the purpose of benefit sharing and related transactions as prescribed in the Act. In this regard, the County Wildlife Conservation and Compensation Committee will fast-track this process for the benefit of the resident community.

Action 1.3 Establish a community consultative forum as a platform for stakeholder cooperation

Currently, MMPA does not have a forum where community members can share their views on resource utilization or management of MMPA. Coordination across sectors and institutions is also a major challenge. However, there is need to champion for the formation of a consultative forum where the community can raise their concerns regarding resource use in MMPA to the Warden and stakeholders. The same forum can also be used in handling community problems related to MMPA or resources therein especially internal conflicts that exist within registered associations and between stakeholders. Such consultative forums may consist of the following membership besides representatives of MMPA managing authorities:

- Malindi Association of Boat Operators representative;
- Malindi Glass Bottom Boat Owners and Captain Association representative;
- Malindi Residents Development Group

In order to ensure control of the committee members, there is need to specify roles and responsibilities of each member group(s), from inception, with regular reviews to accommodate emerging issues. This also takes care of the temptation of some groups lording over others in matters where everyone has equal rights.

The tenure rules for Malindi resources are often unclear, with varying degrees of open access, traditional user rights and government regulation. The legislative framework and policies vary and sometimes contradict each other with a common feature being lack of government capacity to enforce the rules that exist and often a lack of understanding of how to implement the new policies that encourage community involvement in resource management. To ensure involvement, participation, dialogue between all actors in the management and decision-making processes, and to avoid conflicts among government institutions that license particular activities, representatives of such groups will be incorporated in an established and registered Marine Community Consultative Forum (MCCF). The MMPA management will be the secretariat for the forum and as such will be taking the role of convening and keeping recordings of meetings. In addition, the forums will guide implementation of laws that provide for participatory natural resources management through the development of best practice guidelines for all.

Action 1.4 Carry out a social-economic study to determine viable community- based income generating activities to be promoted in MMPA

Other than eco-tourism ventures, MMPA is endowed with a variety of natural resources that can be exploited to alleviate poverty that afflicts the community. However, information on the nature and extent of natural resources that can be exploited to generate income for the community is still patchy; therefore, few resources are being exploited. On the other hand, the quest to experience a unique mix of Giriama and Swahili culture is one of the reasons why tourists visit MMPA. However, the fact that culture has been commercialized has reduced its authenticity in some cases and damaged cultural presentation. It is, therefore, necessary to identify what defines and represents true Swahili or Giriama culture.

In order to discern the natural and cultural resource potential of MMPA, a socio-economic study will be carried out to catalogue spatial distribution of exploitable natural and cultural resources and hence appropriate eco-tourism activities. This will include identifying areas with beekeeping potential, plants that have medicinal value, more areas that have ecotourism potential and areas with ingredients of nature-based business. In addition, authentic Swahili and Giriama cultural sites will be identified and described. Giriama or Swahili culture and cultural artefacts will also be identified to prevent presentation of other cultures as their culture. To expedite the study and ensure that detailed information on natural resources is available to support decision making, KWS will collaborate with other research NGOs to fund the study. Priority will be given to initiatives that are in line with community aspirations and expectations, and in so doing diversify tourism options to relieve pressure on reefs.

Action 1.5 Explore potential markets for community products

Past experience shows that products of most projects carried out within and around MMPA compete on the minimal market share available for them. Also, most projects in MMPA are initiated prior to checking if there will be a market available for the products or services produced. In addition, project success depends largely on meeting customers' needs and desires. There is a need, therefore, for project members to know the scope of their customers, their requirements, location and financial capabilities. It is also important for MMPA's communities to understand that community projects cannot be sustained by donors alone.

To correct this anomaly, there is a need for market research to be undertaken before products or services are produced. Market assessment should ideally be carried out to determine whether initiated projects will be beneficial to the community. Like any other business players, communities also need to understand those challenges and opportunities associated with the business project they wish to undertake. This will help them to plan in advance how to enter, participate and thrive in specific markets for their products/services.

Action 1.6 Enhance the capacity of the local community on project management

Local communities in MMPA have minimal capacity to effectively handle management of community owned projects. This has resulted in the failure of many community projects once the donor exits. To address this problem, MMPA management in collaboration with other conservation groups will enhance the capacity of community project leaders through training in marketing, business management, and accounting skills. This will help to increase participation within community projects, hence ensuring transparency and accountability in the running and management of the projects. In addition, the management of community projects will be strengthened by having a legal constitution for each community group which can then be used to guide and govern their operations. Members will also need to form management committees that will handle various segments of project implementation.

Action 1.7 Diversify funding opportunities for community projects

Poverty is a cause as well as effect of environmental degradation in the MMPA. Most of the people in the area are involved in fishing, mining, and agricultural activities. However, the MMPA community seems to be unaware of the existence of alternative funding opportunities for their projects besides KWS and other traditional donor agents. Financial institutions also remain behind in promoting community support systems through micro-credit support for small-scale fishing - to acquire appropriate fishing gear. Development of income-generating schemes, which encourage alternative and sustainable land use remains at its lowest thrust.

To address this, MMPA management will take a lead role in sensitizing the local community on the availability of these alternative development funds. In cases where the community could be aware of the existence of these funds but it does not have the capacity for proposal development, MMPA management could assist the community in proposal writing. Successful funding of such proposals will empower the community and foster good working relations between MMPA management and local communities. In addition, the MMPA is recognised as a UNESCO Biosphere Reserve and there are seed funds provided by UNESCO and its partners to support projects in biosphere reserves. This is an opportunity which can be explored for the benefit of the local people.

Action 1.8 Enhance employment opportunities for local community members

Provision of employment to the members of MMPA-adjacent communities, in various tasks necessary for the successful management of the MMPA, is one of the most direct ways to improve the linkages between the conservation of the area and community well-being. Whenever possible, priority should be given to MMPA community members for any job opportunity especially in those areas that do not require professional skills.

To further enhance relationships with surrounding communities, MMPA management will liaise with KWS HQ to ensure that casual workers already engaged within the MMPA are, wherever possible, employed as permanent employees thereby allowing them to enjoy the improved security and benefits associated with this type of employment. In addition, as and when necessary for specific tasks in the MMPA, casual employees will continue to be sourced from the local communities. Further, to reduce demand and seek alternatives to the local use of available resources, the MMPA management, in collaboration with other stakeholders, will identify the best alternative livelihoods to support the resident communities while sensitizing them on the impacts of the current levels of resource use. The management will also continue to strengthen enforcement of the existing legislation, regulations and guidelines.

Objective 2: Conservation education and outreach programmes strengthened

The perceptions and attitudes of users and other stakeholders of MPAs can enhance or limit their management. Strengthening conservation education enhances community understanding and support for management of the Protected Area's resource values. Improved conservation education and awareness among the Kenyan public is one of KWS' strategic objectives. KWS has devolved the conservation education and outreach programme to the park level. This community outreach is carried out through public awareness in barazas, sensitization forums for students and other organised groups, and radio and television talks. However, implementation of the community outreach programme has been implemented inconsistently.

The desired 10 years' outlook for the MMPA is that the MPA balances nature conservation with socio-economic development by increasing conservation awareness among the local communities. Conservation education is required to influence people's attitude and skills to attain and maintain this balance. In order to achieve this objective, the following management actions have been proposed: improving MMPA educational facilities, strengthening linkages

and relations with schools, Beach Management Units, fishermen, and government agencies. These actions are elaborated in detail in the following sections.

Action 2.1 Upgrade and operationalise the existing MMPA Education Centre

Currently, MMPA does not have a fully equipped standard education centre for educating, accommodating, catering and entertaining visiting students or the general public. In the previous plan period, a KWS/ investor partnership constructed one conference hall, 1 unit banda, a dining hall plus kitchen and a cafeteria. The Marine Park lacks a library hall and student bandas. The existing banda(s) are not yet furnished, hence they are not functional. Information materials targeting tourists such as maps and guidebooks are available; however these materials are not appropriate for the local community.

To ensure that the education center is functional, KWS, in collaboration with partners, will produce and disseminate multi-linguistic stakeholder-specific education materials (such as display panels, poster maps, graphs, electronic aides, documentaries) using diverse media. To ensure a systematic education programme is in place at the education center the MMPA management will develop a conservation education scheme of work for use by the education team.

Action 2.2 Strengthen MMPA education staff establishment and capacity

The effectiveness of the MMPA conservation education section is currently hampered by insufficient staff capacity. Currently there is one education officer and community officer working in the facility. A communications and technology officer is needed.

In this regard, there is need to strengthen the facility in accordance with the Management Objective 1 of MPA Operations and Security Programme.¹ Once the required staff is in place and the relevant training needs have been prioritized, implementation of the same will commence.

Action 2.3 Create public conservation awareness on the importance of MMPA

Tackling threats and challenges facing MMPA ecosystem requires concerted local and international stakeholders' efforts. There already exists a Strategic Adaptive Management (SAM) programme backstopped by scientific resources and relaying information to the public. For the public to understand and appreciate the outstanding ecological and socio-economic significance of the MMPA, (informed by research and SAM), MMPA Management will intensify the publicity status of MMPA resource values and ongoing interventions. A nature school will be designated and developed within Malindi sub-county to drive the intensification agenda. Regular radio, TV and print programmes on MMPA will also be produced. Moreover, MMPA managers, users, and researchers will be mobilized to produce and disseminate films and informative articles on MMPA exceptional resources such as turtles, coral reefs, and fish communities. Further, an interactive MMPA conservation education web page will be included in the KWS website. This will be updated using sample essay competitions and biodiversity quizzes, among others. This web page will also be linked to the websites of the other MMPA stakeholders to increase internet visits.

MMPA management will continuously coordinate support and participation of stakeholders in ecosystem awareness events, including the World Environment Day, World Wetlands Day, Ocean Day, International Beach Cleaning Day, Public Service week and Agricultural Society of Kenya (ASK) shows. During these events, the community will be enlightened on the unique MMPA natural resources, and issues and challenges facing their conservation through exhibitions, drama and lectures.

Action 2.4 Design and implement a conservation education outreach programme

To gain conservation support across all the social strata in the MMPA ecosystem, the management will develop educational materials and activities targeting various groups. In the case of school children, this will include giving biodiversity lectures and video shows in local schools. Local schools will also be encouraged to visit the parks and learn about ecological principles and dynamics. The schools will also be sensitized to form wildlife clubs that will be used to liaise with KWS in organizing environmental activities such as Park cleaning, drama, and essay competitions to enhance conservation awareness amongst school children. In addition, in order to encourage school children to visit the park, KWS will avail transport to local wildlife clubs at a modest fee and if possible offer free boat rides.

On the other hand, the adult groups will be reached through seminars and workshops specifically targeted at specific groups (e.g. the youth, elders, and women). In addition to this, sponsored study tours to areas experiencing similar challenges such as Kisite-Mpunguti MPA will be organized for these groups to help them appreciate challenges facing conservation in MMPA and Kenya at large.

Action 2.5 Strengthen KWS – Honorary wardens and other stakeholders working relationships

Collaboration and engagement of MMPA management with local institutions and honorary wardens is not satisfactory. These stakeholders, especially honorary wardens, Judiciary and Kenya Police Service require understanding of the policies, laws and regulations that guide conservation and management of biodiversity in order to effectively execute their conservation support roles. The honorary wardens (5 in Malindi Sub-county) apparently have not positioned themselves as per their mandate outlined under Section 12 (5) of the WCMA 2013, probably due to lack of knowledge, skills and capacity. In addition, wildlife offences are not prosecuted successfully in the legal system, perhaps because the local legal machinery does not appreciate the impacts of the offences on nature conservation. In this regard, the MMPA management will sensitize its honorary wardens and MPA management committee on their roles and create awareness among players in the legal system on the impacts of wildlife offences.

Objective 3: Human-wildlife conflicts and natural resource use conflicts reduced

The future desired state at the MMPA and adjacent areas is one where natural resource use conflicts and conflict between people and wildlife in and around MMPA is minimized. Currently, resource use and human-wildlife conflicts are pertinent issues in the MMPA. As human populations continue to increase, settlements expand and land use intensifies, the number of incidences of human-wildlife conflict (HWC) are increasing. Human-wildlife conflict takes a number of dimensions including the following: crop and property damage by wildlife especially the hippopotamus, baboons and monkeys; livestock killing by pythons and baboons; the stone fish poisoning; as well as competition for shared resources between wildlife and fishers intending to fish at the estuary habitat which also serves as home for hippos, or fishers fishing in turtle foraging grounds leading to net damage by turtles. On the other hand, reduced abundance and distribution of fish stocks has stirred resource use conflicts among multiple users in MMPA namely sport fishers, artisan fishers, commercial fishers and dive operators, especially in reef areas. Misunderstanding on the 30m terrestrial reserve as regards the MPA and the 60m reservation as regards the riparian zone has continued to confuse various user groups to an extent that conflicts arise with the law enforcement officers.

Therefore, this objective seeks to minimize natural resource use conflicts and HWC incidences through implementation of the management actions outlined in the following sections.

Action 3.1 Assess and adopt innovative problem animal control techniques

HWC data is currently available but it is not stored or organised in a format that enables easy analysis of the nature, spatial distribution and trends in HWC around MMPA. Most of the HWC in MMPA are recorded in the northern part of Malindi along the Sabaki River where there is a mix of natural habitats, which host diverse wildlife species and farmlands where subsistence farming is the mainstay of the local community. The natural habitats which include coastal forest patches harbour problem animals, such as crocodiles and hippos, which often raid adjacent farmlands causing losses to farmers, injuries and sometimes even death. These problem animals are often controlled through scaring techniques, but this is only a temporary solution as the crop raiding often recurs. A wide variety of problem animal control (PAC) techniques have been developed and tested, with varying degrees of success across Kenya and in a number of other African countries. These techniques include the use of banger sticks to scare away animals, applying pepper mixed with grease to ropes or fences, and/or the inter-planting of chilli pepper with other crops to discourage elephants and/or other wildlife from eating them.

To make the best use of these new techniques and to capitalise on the lessons learnt elsewhere in Kenya and Africa, MMPA management will liaise with the Coast Conservation Area research unit in identifying and assessing potential new PAC techniques, including wildlife scaring methods, which could be effective around the MMPA. Once potential methods have been identified and a study visit is undertaken to see them in action, necessary equipment or resources will be acquired, and pilot trials carried out with appropriate communities. Finally, building on the success and lessons learnt from these pilot trials, communities will be equipped and then trained on the implementation of the most successful PAC techniques. In addition, to address the issue of HWC information management and facilitation of monitoring of HWC cases, a computerised GIS-based database for recording and mapping the location, type and severity of HWC incidences around the MMPA will be developed. The new database will enable MMPA management to pinpoint priority HWC hotspots and where mitigation methods should be focussed. This information will, in turn, be used to support planning and implementation of the proposed activities under this action. Once the equipment needed to implement the system has been identified (in consultation with the CCA Research Section) and acquired, MMPA staff will be trained in their operation. In addition, the local community will be consulted and engaged on the best approaches to deal with HWC hotspots.

Action 3.2 Enhance collaboration with the County Wildlife Conservation and Compensation Committee (CWCCC)

According to the Wildlife Conservation and Management Act 2013, each county shall have a wildlife conservation and compensation committee whose mandate is registration and establishment of wildlife user rights, ensuring that benefits derived from use of wildlife resources are distributed according to the Act while at the same time dealing with human-wildlife conflict issues as prescribed by the legislation. Compensation for death, injuries and property damage or crop destruction by wildlife is well addressed in the Act, and the committee is expected to address the issue accordingly. However, there is a lack of awareness of the wildlife compensation procedures stipulated in the Act.

To address this problem, the committee will spearhead a continuous sensitization campaign to educate the local community on wildlife compensation requirements and develop proactive conflict resolution methods that will protect people, their property and wildlife. This will include highlighting cases that can or cannot be compensated, the process and steps involved, and the government agencies involved in each step of the compensation process. In addition, the MMPA community and education programme will organize meetings aimed at intervening and pre-empting planned retaliatory attacks on wildlife. There is a need to sensitize the community about the existence of this committee and also fast track implementation and operationalization of this committee in MMPA.

Action 3.3 Construct new and strengthen existing ranger outposts

Delays in responding to HWC incidences are one of the key factors that fuel poor relations between local communities and the MMPA management. Although MMPA does have a designated number of outposts, they are either inactive or non-functional altogether owing to personnel shortage. Other shortfalls associated with outposts include lack of working tools to facilitate effective service delivery. This situation, combined with the large areas that staff has to cover and the often limited or poor transportation infrastructure, is currently under review.

In response, a number of new outposts will be developed during the lifespan of this plan, including appropriate new outposts at several hotspots e.g. at Magarini areas, Dakacha, Mayungu, Kanani and any other priority HWC hotspots identified under Action 3.2 above. To complement this approach, a mobile PAC unit base will be established in far-flung areas of Malindi/Tsavo border with a responsibility for Galana, Dakacha, and Madunguni areas.

Action 3.4 Enhance incidence reporting for HWC

With challenges of network coverage in some areas around MMPA, some cases of HWC are not reported or there are delays in reporting. In this regard, MMPA management will facilitate rapid reporting system of HWC by providing serviceable hotline contacts to the adjacent communities. In addition, honorary wardens will be used in relaying such reports to MMPA management for an appropriate response. MMPA management will also liaise with existing government structures on the grassroots, especially the provincial administration, in monitoring and sharing information on HWC in their respective areas of jurisdictions to facilitate a timely response.

Action 3.5 Identify and document resource use conflict areas within MMPA

Reduced abundance and distribution of fish stocks has stirred resource use conflicts among multiple users in MMPA namely fishers, including sport fishers, artisan fishers, commercial fishers and dive operators, especially in reef areas. Unsustainable fishing practices are also one of the major challenges affecting the management of marine resources in the MMPA. Consequently, the livelihoods of many members of the fishing folk are at stake. For instance, dynamite fishing, use of beach seines, small-mesh size nets, spear guns in coral reefs, and ring-nets in shallow inshore waters, which are fishing methods preferred by migrant fishermen, is a source of conflict between these fishermen and the local indigenous fishermen. In addition, there is overfishing in the inshore waters as local fishermen lack suitable fishing boats that can be used to fish in deep waters.

In this regard, there is a need to identify and document all the conflicts on resource use within the conservation area to facilitate design and implementation of an effective intervention measure to resolve such conflicts. Some of the identified conflicts include the use of ring nets within the reef, use of explosive-dynamite to fish, crop raiding by wildlife, and stone fish problem. Under this management action, therefore, MMPA management in collaboration with the local community will identify and document all the conflict areas to help design viable solutions. This will also include participatory mapping of all the conflict hot spots to have insights on the local distribution patterns of the conflict areas.

Action 3.6 Liaise with state department of fisheries to formalise access of migrant fishermen to Kenyan fishery

There are migrant fishermen, mainly from the Island Pemba and mainland Tanzania, who often fish in the MMPA. These fishermen are more experienced in fishing, hence, most of the time they are contracted by local fish dealers to fish in Kenyan waters. Since these fishermen use ring nets and dynamite fishing they are able to land more fish than the local fishermen, thus creating tension. In addition, the government of Tanzania subsidizes fishing activities of the Pemba fishermen by hiring out cheap boats which enhance the efficiency of their fishing operations.

To ensure that conflicts between local and foreign fishermen are minimised, MMPA management will collaborate with the Fisheries and Immigration Departments to ensure that there is vigilance in the fishing permit system. This collaboration will be extended to monitoring whether both local and foreign fishermen have paid the requisite fishing licensing fees, and enforcing the law regarding illegal fishing methods.

Action 3.7 Liaise with the fisheries department to establish a vibrant Fisheries Management Committee

Taking cognizance of multiple players in fishery resource management in MMPA, it will be desirable for the MPA management to put in place a functional Fisheries Management Committee (FMC), with members drawn from relevant government agencies, tourism players (sport fishers), NGOs, community representatives, security agents, research and other conservationists' representatives. The FMC primary role will be to advise on MMPA management issues related to fisheries, lobby for controlled and planned development of tourism facilities, including proper waste disposal, and resolve resource based conflicts to ensure sustained utilization of marine resources within MMPA. In regard to inherent resource based conflicts involving either dive operators or fishers on one hand, and sport fishers and artisanal fishers on the other hand, FMC would strive to provide objective measures to address such conflicts to the approval of both conflicting group(s) as much as possible. It is important, however, to clearly define terms of reference for FMC from inception (in light of prevailing legal provisions) with room to improve over time and circumstances. The FMC will hold regular meetings with MMPA managers taking the lead in convening meetings as secretariat to the forum. The FMC will be expected to propose appropriate management measures to address issues in MMPA relating to fishery resource management. The forum will also be expected to monitor implementation of management actions geared towards solving various fishery related challenges.

They will, for example, explore delineation of several points along the reefs and mark them out with marker buoys as dive/snorkelling spots. These points should, however, be agreed upon by both fishers and dive operators. In conflicts involving sport and artisanal fishers, FMC could encourage sport fishing companies to register as BMU members and contribute to the BMU kitty. Additionally, instead of fishing in Marine Reserves for baits (thereby conflicting with artisanal fishers), they could purchase fish baits from artisanal fishers ("chuchungi' fish) and only fish in deep sea waters (instead of fishing in Marine Reserves). There's also a need for FMC to evaluate the concern that the sport fishers are themselves commercial fishers given that they land substantial amounts of fish when they are supposed to catch, tag and release. Given their somewhat huge landings, the local fishers are denied market opportunities for their catches since sport fishers supply the local hotels with (high) quality catches. This being a long-standing area of conflict between artisanal and sport fishers, FMC needs to explore an appropriate way of dealing with it for the benefit of fishery resource conservation.

An underwater photograph of two large, silver, disc-shaped fish swimming in a blue, slightly murky environment. The fish have a metallic sheen and a prominent dorsal fin. They are positioned in the lower half of the frame. A dark green banner is overlaid on the right side of the image, containing white text. The background shows some dark, branching structures, possibly coral or seaweed.

MPA OPERATIONS AND SECURITY MANAGEMENT PROGRAMME

Programme Purpose and Strategy

The purpose of the MMPA's Operations and Security programme is to ensure that:

“Operational systems and structures are effectively and efficiently supporting the achievement of MMPA's management programmes”

As discussed elsewhere in this management plan, the MMPA faces an increasingly complex array of management challenges and issues, originating from both within and outside the MMPA's boundaries. Some of these threats, such as siltation resulting from discharge from River Sabaki require national level strategies and involvement of multiple stakeholders to address. In addition, with the increase in local population and lack of alternative livelihoods, increased pressure on MMPA's Natural Resources, specifically fisheries, is bound to intensify during the plan period. Targeted and complementary management responses will be vital if all these emerging management challenges are to be adequately addressed, and these are set out in the management objectives and actions included in each of the plan's management programmes. However, delivering these management responses effectively will call for strengthening operational management through providing a conducive working environment and supportive management systems and structures. In particular, the co-management approach advocated in this plan will require strong collaboration mechanisms between KWS and the local community. The Marine Protected Areas Operations and Security Management Programme provides the means for strengthening the MMPA's management systems, structures and human resources to support the implementation of the three other management programmes, and the overall achievement of the MMPA's Purpose Statement.

The following sections set out the principles that will guide MMPA Management in the implementation of this programme.

Guiding Principles

In implementing the MMPA's Operations and Security Management Programme, MMPA Management will strive to ensure that:

Conservation and human development are balanced

UNESCO's designation of both MMPA and WMPA as a single Biosphere Reserve reflects the global community's recognition of the area's importance in demonstrating how conservation and human development can be achieved in the same area. Given the shared importance of the MMPA and WMPA, their management strategies must be coordinated to achieve biosphere reserve goals.

MMPA management is working with others

The local community will be at the heart of the delivery of many of the objectives set out in this Plan. This is in recognition of the community's significant role in the use of natural resources in the MMPA. Due to diversity of allowable uses and users, there is need for consensus building on many of the conflicting uses for management success. Hence, MMPA management will work with communities, partners, and government agencies to complement capacities and build consensus on natural resource management.

A skilled and motivated workforce is maintained

Effective management of a protected area requires a skilled, motivated and properly resourced workforce that is committed to achieving the PA's management objectives and realisation of its long-term vision. Under this management programme, therefore, KWS will aim at recruiting and retaining qualified MPA staff with requisite skills in marine conservation and management. The workforce will be equipped with essential working tools to ensure that they are motivated and can deliver on the MPA's management objectives.

MPA's security is enhanced

Threats to personal security and safety, more than any other factor, adversely affect the attractiveness of a tourist destination. When visitors perceive a protected area as insecure, both domestic and international visitors avoid it. It is, therefore, paramount that MMPA has high security standards to make it a destination of choice when compared to other protected areas. Consequently, under this management programme, MMPA management will collaborate with partners in establishing a robust security management system, including a public relations component, to ensure that security of visitors is not compromised.

These 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. A competent and motivated workforce deployed and maintained in MMPA

MO 2. Stakeholders collaboration enhanced

MO 3. Infrastructure, transport and communication equipment to support MPA administration enhanced and maintained

MO 4. MPA Security operations enhanced

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: A competent and motivated workforce deployed and maintained in MMPA

Competent, motivated and adequate human resource is an important ingredient for success of any management entity. This management plan seeks to ensure that such human resources are available at MMPA. During the plan period, staffing to optimal levels, staff appraisals, capacity building, and strategic placement of staff will be undertaken as stipulated in the human capital manual. In addition, staff innovations and creativity will be encouraged. Appropriate documentation of staff reports will be prepared and used as suggested by the KWS human Capital policy document. These reports will form the basis for staff promotions, transfers and training. Newly deployed staff will be expected to have the relevant skills required for their work.

The desired future state of the MMPA that this objective aims to achieve is improvement of staff numbers, efficiency, welfare, morale and output. The actions below elaborate issues and problems that affect competency and adequacy of human resources in MMPA as well as activities to be undertaken to mitigate the issues and problems.

Action 1.1 Deploy appropriate staff

Currently the MMPA a deficit of staff in critical cadres. The most affected cadre is the ranger cadre. Other areas that have deficit of staff include administration, procurement, community wildlife service, biodiversity research and monitoring, tourism, customer care, and the mechanical services. The shortfall of staff is supplemented by employment of casuals on short contracts and multitasking of staff. The deficit can be resolved by employing staff on temporary terms to permanent and pensionable terms. Locals should be given precedence over others in the recruitment of permanent and temporary staff.

Action 1.2 Liaise with CCA and KWS HQs to ensure that transfers within MMPA are done in accordance with the KWS Human Capital Manual

Transfers are very common and irregular in KWS and this affects productivity and continuity of MPA operations. High staff turnover is a drawback to effective management as it interrupts operations while at the same time impacting negatively on the productivity of the affected employees. It is worth noting that marine staff have specialized skills and expertise that is unique to the marine environment. Such set of skills and expertise is acquired over a long period of time to enable certification by international organizations such as WIOMSA. However, some of these skill sets are not recognized by the organization as being specific for conducting effective park operations. This has resulted in a negative perception of transfers by the affected staff and the stations.

To ensure continuity and productivity during the plan implementation period, the implementation of this action will ensure that staff transfers for both the affected staff as well as the recipient stations are done in consultation with all parties involved. Efforts will be made to ensure that replacements have relevant skills required for effective management of a marine protected area. In addition, area level managers will be required to advise Human Capital appropriately on transfers. Furthermore staff appraisals will be undertaken to ensure that personnel with specialized training and expertise on marine ecosystems, and are also certified by international marine bodies, are retained in marine protected areas.

Action 1.3 Train staff in relevant skills

To enhance the staff skills and enhance their productivity, there is need to upgrade their skills. To achieve this, it is necessary to liaise with the area Wardens and Human Capital in the Coast Conservation Area (CCA) to provide short courses according to the prescriptions provided in the KWS Training Needs Assessment Report. Skill upgrading courses can be conducted in service through training of trainers (ToT). Possible training should be done "on-the-job" by the respective officers in charge of sections while more specialized training should be carried out through competent institutions. The emphasis of the training must be on gaining practical and applicable field knowledge, rather than theoretical knowledge. More emphasis should be placed on the following training courses for all staff: computer courses, customer care, GIS and remote sensing courses, emergency response, environmental impact assessment, environmental auditing, preparation of protected area management plans, evaluating effectiveness of implementation of a protected area management plan, and range practice. Boat operations courses and range practice for rangers should be carried out at least thrice a year.

Action 1.4 Improve prosecutorial capacity of MMPA management

MMPA management spends considerable financial and human resources to curb illegal activities taking place within the area under its jurisdiction. However, whenever arrests are made they often do not lead to conviction of perpetrators, or when convictions are achieved they attract very low penalties. This is attributed to poor prosecution expertise, weak drafting of charges, lack of support from police, weak investigation by KWS officers, poor evidence handling, interference with the scene of crime, improper filing of cases, long judicial processes, lack of knowledge by the police, judiciary, prosecutors and the community on the importance of the marine protected area, and political interference.

To deal with these challenges, the park management will work in liaison with other arms of government (e.g., the police, directorate of public prosecution, the judiciary and other external experts) to develop training programmes that will equip the relevant staff with the right skills. The above arms of government, as well as the community, will be sensitized on the value of marine ecosystems and threats that are existent. This could be done through organising open days at the protected area for target groups to have a real life experience of the marine environment and associated challenges of managing it.

Action 1.5 Enhance staff motivation

Motivation of staff is the key to effective and productive workforce. Staff motivation can be achieved using different approaches that include ensuring staff are provided with working tools (e.g., uniforms), enhancing sporting activities, awarding outstanding staff, and team building among others. The park management will embrace these approaches to enhance staff motivation.

Currently, the park is experiencing a shortfall of marine patrol uniforms. There is also need for patrol uniforms for the beach patrol and boat patrol teams. The uniforms include patrol shorts, t-shirts, tanga shoes and caps. Furthermore, uniforms for the staff at the coast need to be designed and customized to make them more user, customer and climate friendly. This action should be implemented together with the report on coast guard training that was initiated during the exchange programme with the Brazilian Coast Guard Service.

Currently, the MMPA has an awards committee set up to monitor and evaluate the output of the personnel and award exceptionally performing staff. An initiative that can be started in the medium term is that of recognizing staff excellence through the award of an appreciation letter for exceptional performance at the field station level. This letter can also be considered as part of staff appraisal documents. This action will also initiate a staff or employee of the year reward scheme in order to motivate staff to engage positively in their duty stations. An inventory that captures awards and certificates given to personnel who have experience in MPA operations, clean disciplinary record, exceptional customer service as well as those with exemplary performance needs to be developed. This will assist in motivating and encouraging the personnel to work hard. Other reward mechanisms that will be used in the implementation of this action include: exchange programmes and recommendation for in-service training opportunities to improve performance. In order to improve staff performance and output, team building is vital. Through team building the personnel can interact and learn more about each other's strengths and weaknesses, collective team goals, mechanisms for enhancing achievement of goals and proper work ethic. Teamwork also enhances staff appreciation for emotional intelligence, thus assisting staff in developing trust and understanding of the different personalities among the teammates. It also improves the productivity in the long term as well as ways of capitalizing on collective output. This action will emphasize on various team building approaches including: staff campaigns, parties, competitions, holidays and retreats. During the team building sessions, the management of MMPA can articulate to staff their vision.

Action 1.6 Improve Staff Welfare

Staff welfare is a key component for the management of any entity. Currently, MMPA has a registered staff welfare association that is managed by MMPA staff. The welfare runs an M- PESA retail shop and a restaurant. The earnings from these welfare businesses are used to provide staff with some soft loans to meet their needs. This cushions the staff from worries whenever they are faced with immediate financial needs, and makes them avoid requesting for salary advances. The welfare members are also assisted in case of demise of a staff member and immediate family member.

Entertainment of staff is a key ingredient that motivates staff and enhances their performance as it offers an opportunity for relaxation. Entertainment is achieved through provision of DSTV and boat tours for staff and their families. At the moment, DSTV is not operational and it is proposed that during the plan period, free to air decoders should be procured and installed for use by staff. This will reduce the cost of paying for the monthly DSTV subscription.

During the plan period, the park management will endeavor to ensure that all staff allowances (leave and field) are paid on time. This will enhance staff morale and avoid staff using a lot of time following up payment of allowances. In addition, the park management will work closely with CCA and KWS headquarters to ensure that all other allowances and claims (e.g., transfer, medical, housing, and bereavement facilitation) are paid on time.

During the management plan period, expansion of the staff canteen will be undertaken. In addition, the following activities will also be undertaken during the management plan period: implementation of team building activities, enhancement of staff welfare allocations, provision of better housing facilities and working environment, promotion of teamwork, enhancement of rewards and recognition of staff, provision of a staff welfare van, as well as the provision of the right working tools and recreational facilities.

Objective 2: Stakeholders collaboration enhanced

The future desired state at MMPA is where there is close collaboration between KWS and other stakeholders involved in the management of the MPA. Threats to MMPA stem from resource use by the local community. The scale and intensity of the impacts of resource use are increasing. Although some of the resources being used are outside the direct mandate of KWS (e.g., fish and mangroves) these issues cannot be left unaddressed. As such, activities under this objective will pursue partnerships and collaborations with other institutions and organisations such as relevant National Government Ministries, County Government, BMUs, KMFRI, KFS, Department of Fisheries, and NGOs to address issues that are of mutual concern in and outside the core protected area. This objective has been designed to ensure synergy in conservation and protection of natural resources in MMPA and the adjacent areas. In order to attain this objective the following actions will be implemented.

Action 2.1 Establish a functional Park Management Committee

Unless successful management collaboration can be achieved amongst MMPA's stakeholders, the implementation of this management plan will be seriously undermined. Good coordination, collaboration and networking with other stakeholders will ensure constructive engagement and effective working relationships in the management of the MPA. At the moment, there is no clear mechanism of ensuring collaborative management of the MMPA. As such, to enhance stakeholder collaboration in the management of the MMPA, an MPA Management Committee will be formed. This committee will be chaired by KWS and it will be meeting quarterly. Members of this committee will include representatives from KWS, KFS, FD, TPU, County Government (Ministry of Tourism), Ministry of Tourism (national Government), NEMA, BMU, Boat operators, Divers, Hoteliers, KMA, Safari sellers (beach operators), Curio sellers, and the physical planner. Key responsibilities of the MPA Management Committee will include: to oversee implementation of the management plan, assist in conflict resolution, develop oversight rules to govern the MPA operations, fundraise for projects, and to resolve conflicts between different resource users.

Action 2.2 Build strong relations with local Beach Operators, Conservation NGOs, Research Institutions, and Hoteliers

While MMPA management plays a primary role in enforcing the law, compliance will greatly be improved if the stakeholders actively take part. This calls for a common strategy among different stakeholders to ensure sustainable utilization of the natural resources is undertaken in a way that permits both derivation of socio-economic benefits and conservation of the same. Generally, there exists mistrust and suspicion among different stakeholders, which has led to uncoordinated duplication of activities. On the other hand, non-governmental agencies take interest in conserving marine resources and advocating for their responsible utilization and research. It is, therefore fitting for all stakeholders to enter into a formal agreement with appropriate government agencies to enable them to voice their concerns thereby making respective agencies accountable to the public in line with their mandates. In this regard, during the plan period, all stakeholders with interest in the MMPA will be identified. Consultative meetings, joint training and team building activities will be undertaken to enhance awareness and bonding of the stakeholders as well as sharing information about MMPA. To ensure that formal relationships towards the management of the resources in the MMPA and adjacent areas are enhanced, MoUs will be developed and signed to clearly outline the roles of KWS and the other stakeholders.

Action 2.3 Work with the State Department of Fisheries to enhance management of fisheries resources

The Fishing Act of 1991 mandates the Fisheries Department (FD) to control fishing in open waters (seas, ocean, dams and rivers). The Act gives authority to the Fisheries Department to issue fishing licenses to fishermen. In this regard, all fishing regulations (fishing seasons, fishing gears, fishing sites) have been vested on the FD. As such, KWS has a minimal role in controlling fisheries resources. Since the key resources in the MMPA are the fisheries, it is paramount for KWS to work closely with FD to ensure these resources are sustained as they form a key attraction (especially the coral fish) for tourists in the MPA.

The conservation of fisheries, as well as their utilization, have been uncoordinated. For example, the FD has been licensing fishing activities in MMPA (especially in the reserve) without consulting KWS, which manages the operations of MMPA including fishing activities. This on many occasions has led to multiple conflicts among fisher folks (those in support versus those against specific fishing gear like the ring nets) on one hand, and environmentalists and BMUs/DoF on the other hand. While the ring nets yields are high thus economically viable compared to other fishing gears, their impact on fish stocks and fishery habitat are detrimental since they break the corals in addition to collecting sea grasses in the course of their operation. The FD has no capacity to monitor whether the licenses they issue are being used as stipulated therein. However, KWS has some capacity to monitor fishing activities in the MPA; therefore, the two institutions can develop a mechanism for working together to complement each other and be effective in monitoring fisheries resource use by stakeholders.

To facilitate the achievement of both conservation and sustainable fisheries utilization, it is necessary to promote and enhance wider stakeholder collaboration geared towards ensuring that activities by FD and KWS are coordinated and integrated towards achieving the fisheries programme purpose. During the plan period, KWS will develop and sign an MoU with the FD that identifies areas of collaboration and formalizes their working relationship. It is envisaged that once the MoU is in place, the two organizations will be holding consultative meetings to iron out outstanding issues as well as create awareness among the fishermen on the need for controlling overfishing, among other issues.

Action 2.4 Collaborate with County and National Government conservation agencies in enhancing management of the MMPA

Several government agencies play coordinating or regulatory roles in the management of marine natural resources. These agencies are brought together through forums such as county level administrative committees. As such, active participation of MMPA management in county administrative meetings will no doubt increase its visibility besides providing an opportunity for it to lobby for support from appropriate government agencies to ensure sustainable conservation at the MMPA.

Action 2.5 Mobilise funds for implementation of the management plan

Over dependence on KWS budgetary allocation results in poor funding of MPA activities, leading to the provision of poor services and deterioration of infrastructure. To address this funding shortfall, the management of MMPA will develop alternative sources of external funding to supplement what KWS shall allocate for the implementation of the activities specified in the Management Plan. Stations are currently allowed to source for their own funding through the resource mobilization department at KWS Headquarters to enhance recurrent and capital budgetary requirements proposed in the annual work plans. Developing viable proposals is one way of fundraising for projects. In case KWS, through the management of the MMPA, cannot undertake a task an external organisation can be approached for assistance.

Action 2.6 Develop and implement a participatory beach management plan

Unplanned and uncontrolled beach development is affecting public access, turtle nesting sites and restricting available fish delivery points. To address this problem, a beach management plan will be developed through a participatory approach involving all MMPA stakeholders. This plan will clearly designate areas where different beach activities can take place to minimise conflicts between different beach users. It is worth noting that the Beach Management Plan Development process had been initiated in the year 2012 but stalled. Under this management action, the MMPA management will restart the process in collaboration with other key stakeholders, for example marine resource users, the County Commissioner, County Government of Kilifi and local conservation NGOs.

Objective 3: Infrastructure, transport and communication equipment to support MPA administration enhanced and maintained

The improvements to the MPA infrastructure are needed to ensure that appropriate operations in the protected area support the realisation of the protected area purpose. This could be achieved through the maintenance and development of all infrastructure and associated facilities in order to improve the MPA's visitor appeal, the efficiency of operations and increase staff productivity. The objective's aim is to achieve a situation and environment where transportation, office equipment, MPA management facilities, buildings, communication and protected area utilities are enhanced and maintained. The management actions that will be implemented to achieve this objective are outlined in the following sections.

Action 3.1 Procure appropriate transport equipment

MMPA is an active area with numerous activities that range from research and monitoring to security, tourism, education and problem animal control. Therefore, acquiring and maintaining appropriate transport equipment is crucial for the successful management of the MPA. Vehicles and boats are currently used to transport personnel either for law enforcement, general administrative duties and staff welfare. However, the vehicles and boats are at times either not adequate or serviceable. The MMPA has three vehicles (1 land cruiser hard top, 1 land cruiser pickup, and 1 Nissan double cap); 1 motorbike, three boats, and four boat engines (3 serviceable and 1 un-serviceable).

Furthermore, in order to adequately cover the MMPA's vast geographical area, there is need to have a good fleet of boats. MMPA boats are crucial to facilitate the following activities: transport of equipment and personnel; patrols in the shallow waters, deep channels with extremely fast tidal currents and occasionally in the open waters where it is deep and often rough; research, surveys and monitoring; visits by school children; as well as search and rescue operations. Currently, Malindi has three (3) boats. Two of these boats are old and not in a proper serviceable state. This increases their running cost. Such a situation interferes with the regular use and, therefore, hampers security and park operations. The requirements for efficient and effective boat speed and range are often determined by the distances to be covered. Thus, the boat to be procured through the implementation of this plan should be able to meet management expectations.

Action 3.2 Ensure prompt repair and maintenance of transport equipment

Lack of proper and regular maintenance, as well as wear and tear, are the major causes of transport equipment failure. Basic maintenance rules for any equipment for the use either at sea or on land includes regular scheduled maintenance. Currently, at the MMPA, the boats receive maintenance when financial resources are available. Services of a mechanic for engine maintenance are usually outsourced making routine boat maintenance expensive and time-consuming. Therefore, under this management action the coxswains will be trained in boat engine maintenance skills as well as navigation and diving skills. This will decrease the costs of repairs related to minor defects. Similarly car drivers will also be trained in car maintenance skills to ensure that vehicles are not grounded because of minor problems.

Action 3.3 Construct additional staff houses and office blocks

The MMPA has residential buildings but they are not sufficient to accommodate the current and projected staff levels. A lot of staff, including security personnel, have to seek accommodation outside the MPA headquarters. Therefore, there is need for urgent development of staff housing as well as offices for staff. Additionally, visitor amenities such as an information centre equipped with toilets and shop need to be provided. Malindi has a proposed plan through public-private partnerships¹³ to develop modern staff housing complete with a new visitor complex that has a conference centre, information pavilion and state of the art gate. This arrangement will transform visitor reception facilities in Malindi. However, for successful development of the proposed complex, KWS should conduct an EIA to ensure that environmental impacts of these developments are identified and mitigated.

Action 3.4 Refurbish the existing information centre

This action will ensure that the information center in the MMPA is refurbished to meet future expectations for visitor management and education. Information centres serve as reception points for visitors, Points of Access for MPA entry tickets, brochures and other gift items. This area is also used to display materials about the MPA, with a notice board often displaying key information on the MMPA. It is a facility where visitors can learn about the MMPA, its attractions and the natural environment that it has been established to protect. The information centre will therefore be refurbished and supplied with adequate interpretation materials to ensure that visitors have adequate and relevant information on the MMPA.

Action 3.5 Procure and maintain scuba and snorkelling gear

The park has diving cylinders, flippers and snorkelling masks that are stored in a uniport. This store is not adequate and safe for such expensive equipment. As such there is need for construction of a modern store for safe custody of the equipment.

Effective management of the MMPA is dependent on acquisition and analysis of data to support decision making. To facilitate information collection, a research officer will be deployed in the MMPA to monitor ecological dynamics of the protected area. This officer will require diving gear and an under water camera to facilitate data collection in the marine environment. As such, diving or snorkelling equipment and under water camera will be procured. The snorkelling and diving equipment can also be used by visitors and other MPA staff for recreation, underwater guiding and for a range of management activities such as installation and maintenance of mooring and boundary buoys, or even finding items that have been lost overboard. The main items required for diving are masks, fins and snorkels, wetsuits and booties, cylinders, regulators, pressure gauges and octopus rigs, dive computer, knives, decompression tables, compasses, surface marker buoy (SMB), safety sausage, torches, glow sticks and goody bags, dive slate (plastic sheet), and pencils. These are useful for both snorkelling and diving as well as data collection.

¹³ KWS Billionaires Club PPP

Action 3.6 Procure and maintain office equipment

The MMPA offices have old tables and chairs with some of them being damaged beyond use. During the plan period, new office tables and chairs will be acquired for each office to ensure all junior and senior officers are comfortable as they discharge their duties. Further, the office computers are not adequate. Each officer requires a computer to ensure timely production of reports and maintenance of relevant databases. Therefore, procurement of additional computers is necessary. Office equipment requirements are shown in table 9.

Table 9. MMPA office equipment requirement

Item	Number	Condition	Requirements
Computers	6	Serviceable	10
Laptops	0	N/a	2
Photocopying machines	0	N/a	1
Printers	2	Unserviceable	7
Office tables	10	Old and in very bad state	10
Office chairs	10	Old and in very bad state	10
Filing cabinets	7	Old/ Unserviceable	6
Safes	2	Serviceable	1
Information boards	10	Old	5
Shelves	2	In good condition	4
Cupboards	Nil	N/A	2
Projector	1	Unserviceable	1
Scanner	1	Serviceable	1
Gas Cooker	1	Serviceable	0
Gas cylinder	2	Serviceable	1
Fridge	1	Serviceable	1

Action 3.7 Ensure internet connectivity

Email and the internet allow the connectivity of remote locations to the rest of the world at minimal costs. Internet service providers are now easily available and they provide internet connections and host email addresses. Connections to the internet can be made through the following ways: fixed telephone line, which is the cheapest option; mobile phones which are more expensive and unsuitable for internet browsing; shortwave HF radio which is suitable for email messages but not for large attachments or internet access; Broadband high speed internet connection through phone lines (ISDN and ADSL) with a special modem; and via a wireless link in the VHF band or with a direct satellite link which is expensive. WiFi connections are available through wireless connections.

Currently, the park is using WIFI connection for emails and internet access. The area covered by the WIFI is restricted to the office blocks. The WIFI strength is weak and does not cover the POA, conference, and staff quarters. There is need to expand the area of coverage to include all offices, conference facility and staff houses. To ensure that all offices and staff houses are connected to WIFI, MMPA management will liaise with the Mombasa IT Office and KWS headquarters (IT Department) for procurement of adequate bandwidth and associated accessories.

Actions 3.8 Install VHF radios in all boats and vehicles in MMPA

Currently, the park has one HF radio, 2 VHF radios and 2 handheld radios. Only two vehicles have VHF radio communication. All the boats do not have radio communication. However, handheld radios are used in vehicles and boats without VHF radios. This poses a danger since once in the ocean, teams cannot communicate back to park headquarters. The same problem is experienced by those using the hand-held radios in vehicles without VHF radio. To improve on radio communication, there is need to install modern digital radios in the radio room, on the existing vehicles and all boats. Additionally, all handheld radios should be digital.

Objective 4: MPA Security operations enhanced

This objective addresses issues related to security of the MMPA and its surroundings. To ensure maintenance of security, a well motivated and equipped security force is a prerequisite while the provision of adequate funds to facilitate and support operations is paramount. Therefore, the focus of this objective is to ensure that the security department of MMPA is well motivated and equipped to undertake the tasks at hand. At the same time, the objective recognizes the need for enhancing collaboration with other government security agencies operating in the area (e.g., regular police, Kenya Maritime Authority (KMA), Tourist Police Unit (TPU) and the Administration Police) as well as other informal security mechanisms that encourage community policing.

The major areas of concern for MMPA security operations relate to illegal activities (e.g. illegal fishing and wildlife poaching) and visitor safety. The major issue affecting visitor safety and that are regarded as an impediment to the quality of tourism in the MPAs is visitor harassment by beach operators. Kenyan beaches have a public status, with access by all guaranteed by law. This open access to beaches has virtually allowed everyone to interact freely with visitors. Such interaction has often resulted in harassment by unlicensed curio vendors, safari sellers, boat operators or idlers. The limited capacity of tourism police and other law enforcement agencies has further complicated the issue.

For effective protection of wildlife, visitors and property, there is a need to strengthen the security department of the MMPA to enable it to execute its duty with ease. The MPA requires additional rangers given the large geographical scope they are expected to cover and the quality of services they are required to deliver under this management plan.

The management actions that will be implemented to strengthen security operations are discussed in the following sections.

Action 4.1 Establish good institutional framework for beach operators

This action aims at ensuring that all cases of visitor harassment in and around MMPA are significantly reduced or eliminated. An effective and reliable linkage between the different stakeholders within the MMPA and its management is crucial for the maintenance of a high state of security throughout the area. The key players already identified include boat owners and boat operators, safari sellers, curio sellers, persons who give massage, and hoteliers. The plan advocates for the development of a code of conduct suited for each group, proper identification (such as tags and shirts with a logo) and registration of members. It is envisaged that the registration of members will streamline beach operations as registered groups will oversee the discipline of their members. Currently, groups have an amorphous membership, ambiguous objectives and are subordinate to the interests of founders leading to disorganization in management, lack of accountability and exclusion of future members. In addition, most of the groups have not evolved; lack widespread membership, and governance instruments that would encourage accountability, transparency and inclusion. In order to streamline and provide a solution to these issues, the management of MMPA will provide training and capacity building to beach operators. This will sensitize members on group dynamics, group weaknesses and strengths and areas of improvement. The different groups will also be empowered to enforce their rules and regulations.

Action 4.2 Conduct regular joint patrols

Since the MMPA encompasses a very large area, patrolling the entire geographical scope is a challenge given limited management resources. The security force of MMPA has the responsibility to protect wildlife, visitors and property and as such needs to be strengthened to enable it to execute its mandate. To aid in conducting this task, including administration and reduction of illegal activities, there is a need for collaboration with other relevant institutions to facilitate widespread monitoring and enforcement. Such collaboration with agencies and communities can assist in improving surveillance, intelligence gathering and general security. Joint regular patrols and operations by TPU and KWS can be organised between agencies so as to increase chances of successful execution. This could be conducted at intervals and intensified during high seasons of visitation. The Jacaranda area has been identified as a hot spot for a variety of these illegal activities and thus should be considered as a priority.

Action 4.3 Provide appropriate equipment to security personnel

Currently, MMPA security staff lack essential field equipment. Additionally, all security patrol equipment need to be maintained as prescribed in the standard operating procedures. There is need for additional equipment such as tents, sleeping bags, water bottles, uniforms, boots and more sophisticated equipment such as cameras (waterproof), night vision goggles, night scope, rucksacks, computers and dictaphones. This equipment aids in gathering evidence as well as enabling rangers to remain on patrols for longer to enhance the effectiveness of operations.

Action 4.4 Improve prosecution of wildlife and visitor harassment related offences

MMPA management expends considerable financial and human resources in an effort to curb illegal activities and visitor harassment taking place within the area. When arrests are made they do not usually lead to the conviction of perpetrators or very low penalties are accorded to them in case they are convicted. This can be attributed to failures from the KWS management, the judiciary, and political interference.

Poor drafting of charge sheets by KWS staff has occasionally led to the dismissal of cases on the grounds of improper charges. Lack of awareness amongst the magistrates on the impacts of wildlife offences on wildlife populations and the effects of visitor harassment on tourism has contributed greatly to the dismissal of cases or awarding of minimal penalties. This action will ensure that MMPA management improves collaboration with the police, prosecutors, and the judiciary to enhance prosecution rates and create awareness on the impacts of wildlife-related offences on the economy. Furthermore, the KWS staff will also be trained in the drafting of charge sheets and court procedures.

Action 4.5 Fast track acquisition of appropriate documents for KWS property

KWS has various properties along the MMPA. However, these properties are at risk of encroachment and loss through illegal activity as KWS has not acquired title deeds for the plots. Since these areas are not gazetted as part of the protected areas, they can be grabbed by persons who may get legal documents through falsified documents and corrupt means.

Currently, the Jacaranda Hotel has been constructed close to the marine reserve. Some plot owners bordering the MPAs claim ownership of the beachfront facing their plots (30m above the highest water mark) which are legally under KWS jurisdiction. In certain cases, the owners legally acquired this land prior to the establishment of the MPA, but the gazettment did not take this into account, or the high water mark has moved with the increase in sea water. This has caused conflict as legal ownership of the land is disputed. In some cases, owners have denied people free access to the beach as stipulated under the law. To avoid such incidents, the service shall fast track acquisition of all legal documentation relating to ownership (i.e., title deeds) for KWS property.

Action 4.6 Install additional moorings and buoys at anchorage sites

Buoys are used for a variety of purposes in the MPA including: marking the marine park boundary and zones, and marking specific locations (e.g., coral gardens, mooring sites, diving sites). Moorings are particularly important to protect seabed and corals from anchor damage. Through mooring boats, the need to drop and haul anchors is eliminated.

Within the MMPA, competition for anchorage space for tourist boats in the Marine Park and Reserves exists with most vessels crowding in one area. This is commonly seen during the high season. Increasing the number of buoys will reduce overcrowding at popular dive sites and coral gardens where anchoring is prohibited and the number of buoys limited.

Action 4.7 Ensure proper maintenance of mooring and buoys

The mooring and buoys are used to mark the park boundary, diving sites and coral gardens. However, mooring buoys are sometimes cut off by illegal fishermen whereas the buoys of poor quality are damaged by marine life and fishermen. Sometimes the buoys are covered by algae, thereby their colour is altered and cannot be seen from a distance. Therefore, it is important to routinely check the buoy condition for maintenance purposes. Regular maintenance will include visual inspection (using SCUBA), immediate replacement of worn out parts, a pull test on the system, and cleaning from fouling.

In addition a buoy monitoring system will be implemented. This will involve the following: monthly inspections of all buoys and pick up lines; cleaning of pickup lines to remove algal growth and replacement if necessary; waxing and polishing buoys, and checking for cracks and replacing where needed. On a quarterly basis, the mooring lines, shackles and protective sheaths should be inspected for wear and tear and replaced as needed, especially the contact area between the two. On a biannual basis, the anchor mounting and surrounding area should be inspected and checked for signs of movement, and the buoy should be replaced through-line and pick-up line if the system is regularly used. Annually, the pins in the mooring line shackle should be replaced while after two years the mooring line should be replaced if needed.

Action 4.8 Delineate MPA boundaries

The riparian zone defined by 30m above the High Water mark keeps on changing due to receding sea in some areas or cliff erosion in others, which makes it difficult to have a fixed 30m zone from the high water mark. This has been exploited by private developers and beach operators resulting to establishment of facilities in the riparian zone. As such, claims of illegal development on beaches, sand dunes and ecologically sensitive areas have been on the increase. Investors have developed and changed use of these areas to lodges, homes and hotels without authority from relevant government departments. Hence to remove ambiguity on the MPA boundary, the 30m High Water Mark (HWM) will be surveyed and marked to prevent encroachment. In addition, the 60m setback from HWM for permanent structures along the open coasts will be enforced as specified under the Survey Act 1989¹⁴ and the EMCA wetland regulations.

¹⁴ Coast foreshore reservation. The Survey Act Chapter 299. Section 110 (1). Where unalienated Government land fronting on the area coast is being surveyed for alienation, a strip of land not less than 60 metres in width shall normally be reserved above high-water mark for Government purposes: Provided that, if the interests of development require, the Minister may direct that the width of this reservation shall be less than 60 metres in special cases.

Action 4.9 Ensure compliance with environmental regulations

Some infrastructure in the MMPA and adjacent areas has been developed without EIA that complies with the requirements set out in the EMCA, 1999. Environmental Audits are also not conducted on existing facilities to mitigate impacts on the environment. There is need for the MMPA management and MPA management committee to establish a mechanism that will ensure that EIA and EA is carried out as stipulated by law. Towards this, MMPA management will work closely with NEMA to ensure that environmental inspections are carried out for facilities neighbouring the MMPA.

Action 4.10 Ensure that all boat operators, sport fishers, and fishing vessels are duly licensed and compliant

Currently, the management of MMPA is not involved in licensing of either tourism vessels or fishing boats. This activity is either done by the Fisheries Department or the Kenya Maritime Authority who have statutory powers for enforcement and regulation. Yet, fishing and tourism activities have an impact on the reserve while KWS only has the mandate for visitor safety and protection of the MPA from illegal activity. In cases of sea accidents, KWS is the only institution with the capacity to respond immediately and efficiently.

Most vessels run by tourism operators are neither insured nor do they have safety equipment; this makes them unseaworthy. Moreover, KMA has limited capacity to ensure that licensing rules and regulations are adhered to. Hence, MMPA management will ensure that boats operating in the MMPA are insured, have a tourism trading license, and are sea worthy.

Action 4.11 Enhance security for MMPA visitors

The future desired state for MMPA is that a good system that guarantees security to all visitors is in place. The presence of many unregistered beach operators poses a security threat to visitors as it is difficult to establish the culprits. Incidences of visitors being robbed by persons purporting to be beach or boat operators have been reported in the past, with such reports being more common during high seasons.

To address the above issues, the park management will do the following: always liaise with tourism police to increase visitor safety, increase tourism security patrols during the tourism high seasons, establish a communication link with BMU operators, establish radio communication with tourist facilities in the MMPA, establish a 24-hour hotline number for visitors and BMU operators, and train security teams on terrorism and disaster preparedness.

Action 4.12 Establish and maintain a security database

The future desired state for MMPA is that all security data is stored and maintained in a digital format. Currently, data is stored in an analogue making it difficult to analysed information efficiently. The major reason for keeping the security data in an analogue form is lack of a computer designated for such a purpose as well as the lack of security personnel assigned to undertake database maintenance and management. In view of the above, this plan envisages that a functional security database will be put in place with a security personnel assigned to maintain it during the plan period.

Further, an appropriate security database will be designed and all existing security related data digitized and routinely updated. A database computer will be procured and one security personnel deployed and trained on how to use and update the database. At the end of each year, mapping and modelling of security hotspots in MMPA and adjacent community areas will be undertaken.

Action 4.13 Strengthen law enforcement efforts

MMPA is experiencing a number of illegal activities. These include illegal harvesting and selling of shells and ornamental fishes; illegal exploitation of sea turtles for meat, oil and eggs; and beach encroachment by shoreline developments, among others. There is a need to ensure these illegal activities are addressed. The following activities will be implemented to tackle the issues:

- Strengthen patrol and law enforcement operations in the area by enhancing staff numbers and equipment
- Implement an intelligence network and anti-poaching operations in the MMPA and the adjacent areas
- Form and operationalise a cross-sectoral enforcement committee to enforce relevant laws in the marine reserve
- Empower BMU units to enforce fisheries regulations in the marine reserve
- Create linkages with local law enforcement agencies e.g. the police service



PLAN MONITORING

The Plan Monitoring Framework

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 four 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 (see tables 10, 11, 12, 13).

Table 10. Ecological Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective 1: Conservation of MMPA's threatened marine species enhanced	<ul style="list-style-type: none"> -Sufficient scientific information to support management of threatened marine species is available -Threats to threatened marine species are reduced 	<ul style="list-style-type: none"> -Sea turtle nesting sites -status of coral reef 	<ul style="list-style-type: none"> -Turtle nesting monitoring data -Coral reef degradation monitoring data
Objective 2: MMPA's important habitats sustainably conserved	<ul style="list-style-type: none"> -Increased support for marine conservation efforts -increased health of coral reefs and sea grass beds -Increase in area under conservation land use 	<ul style="list-style-type: none"> -Resource use conflicts -Status of coral reefs and sea grass beds - A new gazetted protected area 	<ul style="list-style-type: none"> -Security data base -Coral and seagrass monitoring data -Gazette notice
Objective 3: Threats to MMPA's critical components reduced	<ul style="list-style-type: none"> -Threats to the shoreline are understood and minimised 	<ul style="list-style-type: none"> -Shoreline setbacks established -status of marine pollution 	<ul style="list-style-type: none"> -Management reports -research and monitoring reports
Objective 4: MMPA's ecological components and processes are understood	<ul style="list-style-type: none"> Ecological research and monitoring is being carried out 	<ul style="list-style-type: none"> Research studies and ecological monitoring carried out 	<ul style="list-style-type: none"> Research and monitoring reports

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 administration and management enhanced	Reduced visitor impacts	-evidence of visitor-caused destruction to coral reef	Research reports
	Increased collaboration between KWS and MMPA tourism stakeholders	tourism stakeholder consultative meetings	Meeting minutes
	Increase in visitor satisfaction	Visitor complaints	Visitor satisfaction surveys
Objective 2: Tourism support infrastructure developed and maintained	Enhanced visitor satisfaction	New visitor facilities and their maintenance status	Management reports and visitor satisfaction surveys
	Degradation of wildlife habitat	Area developed	Management reports
Objective 3: Tourism products and services diversified	Increased visitation and visitor satisfaction	Marine park visitation	Park visitation data
	Pressure on marine resources	Degradation of marine habitat	Research and monitoring reports

Table 12. Community Partnership and Conservation Education Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective 1: Community participation, collaboration and benefit sharing mechanisms strengthened	Local communities are benefiting from the MMPA	Benefits of consumptive and non- consumptive utilisation of resources	Management reports Fisheries department reports
Objective 2: Conservation education and outreach programmes strengthened	Increased community support for the MMPA	Resource use conflict incidents	Management reports
Objective 3: Human-wildlife conflicts and natural resource use conflicts reduced	Enhanced relationships between MMPA management and local communities	Human-wildlife conflict incidences	Community Wildlife Service records
	Reduced costs of wildlife to MMPA adjacent communities	Incidents of human-wildlife conflict in terrestrial areas under MMPA's management	Community Wildlife Service records
	Reduced illegal natural resource use in the MMPA	Number of local community members arrested for illegal natural resource use the in MMPA	Security Section Records

Table 13. MPA Operations and Security Management Programme Monitoring Plan

Objective	Potential Impacts (Positive and Negative)	Verifiable Indicator	Sources and means of verification
Objective1:A competent and motivated workforce deployed and maintained in MMPA	Improved efficiency of MMPA staff	Staff performance against 3-Year Activity Plan	MMPA annual reports
	Improved staff morale	Number of poor morale related incidences	MMPA annual reports
Objective 2:Stakeholders collaboration enhanced	Enhanced management collaboration between KWS, the County Government , Conservation NGOs and the beach operators	Percentage of joint responsibility of 3-year activity plan achieved	Quarterly and annual reports
	Increased stakeholder support for management of the MMPA	Number of management committee meetings or other stakeholder collaboration events held	Meeting minutes or quarterly and annual reports
Objective 3: Infrastructure, vehicles and equipment to support MPA administration enhanced and maintained	Efficient and effective management	Response time to management issues e.g. security issues	MMPA quarterly reports
Objective 4: MPA Security operations enhanced	Increased safety of visitors, and wildlife and staff	Number of security incidents related to visitors, KWS assets, revenue or KWS staff	Security Section records



PLAN ANNEXES

Annex 1. Three-Year Activity Plans (2016 – 2019)

The following pages set out the first 3-Year Activity Plan for implementation of the MMPA management 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.

1. Ecological Management Programme

Management Action and Activities	Persons Responsible	Timeframe												
		FY 2016-17				FY 2017-18				FY 2018-2019				
		1	2	3	4	1	2	3	4	1	2	3	4	
Objective 1: Conservation status of marine biodiversity and targeted resources assessed and secured														
1.1 Update the status of key species of conservation concern in MMPA for regular monitoring														
1.1.1 Fill data gaps on the area's IUCN red list	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X
1.1.2 Collate available information on opportunistic sightings and enhance scientific data quality		X	X	X	X	X	X	X	X	X	X	X	X	X
1.1.3 Conduct a monitoring and conservation program for the Key species of conservation concern in collaboration with the local community		X	X	X	X	X	X	X	X	X	X	X	X	X
1.1.4 Conduct endangered species education and awareness campaign especially among the resident community		X	X	X	X	X	X	X	X	X	X	X	X	X
1.2 Review environmental stressors and research gapson endangered and threatened species														
1.2.1 Collate all research work and findings done for MMPA and identify research gaps through a stakeholders forum		X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.2 Collect and collate marine species-specific research works		X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.3 Conduct periodic analysis of data on endangered species		X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.2.4. Generate information on the migratory patterns of species of conservation concern and establish the role of the ecosystem	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.5 Advocate for ecological research based on an ecosystem approach		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.6 Update and periodically populate a geo-referenced biodiversity data base system		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.7 Assess the impact of climate change on species of conservation concern		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.8 Develop a geo-physical monitoring system for MMPA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.9 Identify marine and land-based activities with impact on the marine environment		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3 Support the implementation of existing national conservation strategies i.e. Sea Turtle Conservation Strategy, coral reefs and seagrass conservation strategy etc																	
1.3.1 Secure sea turtle habitats through active enforcement of legislation and community participation	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.2 Develop and educate fishermen on turtle handling techniques & guidelines, especially when entangled or hooked by fish nets		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.3 Collect and collate existing information on nesting and foraging grounds		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.4 Advocate for conservation and protection of sea turtle nesting beaches i.e. gazettelement of key turtle nesting sites		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.5 Advocate for the use of turtle excluder device		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.6 Conduct regular beach cleaning		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.7 Monitor domestic wastewater management		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.8 Implement all existing key species strategies in collaboration with other stakeholders		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.3.9 Develop conservation and management strategies for all key species of conservation concern in MMPA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.10 Monitor the abundance of crown of thorn star fish, Acanthaster planci upon which action is taken to manage the species		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4 Prioritise research activities on key ecosystem functionality																	
1.4.1 Identify key marine experts and research institutions undertaking marine ecology research in the region		X															
1.4.2 Organize a workshop to review major research undertakings and inform future research scope	MMPA Management & CCA Scientists							X									
1.4.3 Identify gaps for further research		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4.4 Disseminate research priorities to relevant institutions		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5 Lobby for and contribute to the development of a National Marine Mammal Conservation and Management Strategy																	
1.5.1 Initiate the process of developing the marine mammal conservation strategy	MMPA Management & CCA Scientists	X															
1.5.2 Develop an action plan for the formulation of the strategy			X														
1.6 Promote sustainable alternative livelihood interventions and enhance biodiversity awareness																	
1.6.1 Promote community based marine ecotourism	MMPA Management																
1.6.2 Undertake capacity building on tools, equipments and training																	
1.7 Develop and implement seawall guidelines																	

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
2.2 Strengthen legal and policy framework and enforce existing laws													
2.2.1 Enforce fishing gear regulations in collaboration with state department of fisheries	MMPA Management NEMA, KEMFRI and fisheries department	X	X	X	X	X	X	X	X	X	X	X	X
2.2.2 Enforce regulations on water quality, in collaboration with NEMA, KMFRI,		X	X	X	X	X	X	X	X	X	X	X	X
2.2.3 Enforce tourism regulations and park rules on anchoring		X	X	X	X	X	X	X	X	X	X	X	X
2.2.4 Enforce Code of conduct		X	X	X	X	X	X	X	X	X	X	X	X
2.2.5 Regulate ornamental fisheries in the reserve		X	X	X	X	X	X	X	X	X	X	X	X
2.2.5 Enforce water quality regulations in collaboration with NEMA, KMFRI		X	X	X	X	X	X	X	X	X	X	X	X
2.2.6 Implement seasonal closures within the reserve in collaboration with state Department of Fisheries		X	X	X	X	X	X	X	X	X	X	X	X
2.2.7 Lobby for inclusion of coral reef and sea grass issues in policy forums	X	X	X	X	X	X	X	X	X	X	X	X	

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.3 Increase stakeholder awareness through education/training and participation in conservation education and awareness activities																	
2.3.1 Train boat operators on code of conduct		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.2 Train natural resource users, CBOs, BMUs and CFAs in monitoring, law enforcement, and awareness creation in collaboration with key stakeholders	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.3 Conduct coral reef and seagrass ecosystems management training and certification programs for institutions and local communities.		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.4 Develop training manuals, coral reef and seagrass and Package information in useful products for stakeholders						X											
2.3.5 Install sign boards on park habitats and boats code of conduct						X	X										
2.3.6 Create a stakeholders forum						X											
2.3.7 Highlight marine ecosystem issues through media		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.8 Train Personnel on research and monitoring techniques both at technical and community level so that they can monitor their systems and predict changes		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4 Enhance research, monitoring and information management on coral reefs and sea grass ecosystems																	
2.4.1 Centralize data and information depository	MMPA Management & CCA Scientists			X													
2.4.2 Monitor coral reef and sea grass beds		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
Develop maps of marine environment and habitats within MMPA						X				X							
2.4.4 Undertake research on diseases, pests, invasive species and issues of climate change in relation to corals and seagrass beds		X				X				X				X			
2.4.5 Develop a coordinated framework for research and monitoring					X												
2.4.6 Conduct an inventory of MMPA critical ecosystems status and level of resource exploitation									X								
2.4.6 Undertake applied research on biological, social and economic aspects		X				X				X				X			
2.4.7 Conduct research on sources of pollutants on sea grass beds and coral reefs and watersheds		X				X				X				X			
2.4.8 Maintain catch records from reserve (request from BMU, Fisheries)		X				X				X				X			
2.4.9 Continue to monitor and evaluate the impact of climate change and determine potential mitigation and restoration measure		X				X				X				X			
2.4.10 Monitor recovery of sea grass areas degraded by urchins		X				X				X				X			
2.5 Manage watershed to improve water quality and reduce pollution																	
2.5.1 Organize meetings with watershed communities (upcountry)	MMPA Management & CCA Scientists	X				X				X				X			
2.5.2 Collaborate with key stakeholders to develop watershed soil conservation programs in the upland areas		X				X				X				X			
2.5.3 Identify and document existing and potential land based sources of pollution		X				X				X				X			
2.5.4 Enforce, in collaboration with NEMA and other relevant agencies, implementation of environmental management plans of development projects generated through the EIA process																	

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
2.6 Lobby for the designation of the Sabaki estuary as a Ramsar site in collaboration together with other stakeholders													
2.6.1 Advocate for designation of the ecosystem as a Ramsar site		X	X	X	X	X	X	X	X	X	X	X	X
2.7 Map and delineate MMPA estuarine ecosystem including riparian zones in collaboration with other stakeholders													
2.7.1 Develop concept proposal													
2.7.2 Avail necessary resources including mobilizing community										X			
2.7.3 Carry out mapping and delineate the ecosystem and riparian zones										X			
2.8 Create awareness on the importance of MMPA estuarine ecosystem													
2.8.1 sensitize Local community on the importance of the ecosystem		X	X	X	X	X	X	X	X	X	X	X	X
2.9 Promote alternative livelihoods													
2.9.1 Identify and promote alternative livelihoods activities		X	X	X	X	X	X	X	X	X	X	X	X
2.10 Map and rehabilitate degraded mangrove areas within the Sabaki Estuary													
2.10.1 Map degraded areas										X			
2.10.2 Develop and implement habitat rehabilitation plan in collaboration with relevant stakeholders										X	X	X	X
2.10.3 Protect natural regeneration and enriched sites										X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.11 Lobby for the protection of Sabaki river catchment																	
2.11.1 Advocate for good farming practices to control erosion down stream		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.11.2 Protect Sabaki water catchment		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.12 Build the capacity KWS staff and other stakeholders on conservation and management of Mangrove ecosystem																	
2.12.1 Train KWS staff personnel on management of mangrove forest		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.12.2 Carry out research and monitoring on the estuary		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.13 Conduct research and monitoring on the Mangrove ecosystem																	
2.13.1 Identify research gaps		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.13.2 Carry out research on the identified gaps within the ecosystem																	
2.13.3 Disseminate research findings to managers and relevant stakeholders for implementation																	
2.14 Control marine pollution																	
2.14.1 Work closely with NEMA to ensure that all facilities, vessels and individuals observe waste disposal protocols		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.14.2 Design and implement a comprehensive system to identify sources of pollution as well as assessing the impacts and extent of waste pollution on the marine ecosystems																	
2.14.3 Carrying out regular beach cleaning campaigns		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
Objective 3: Threats to MMPA's critical components reduced													
3.1 Promote synergy and integration with other stakeholders													
3.1.1 Form stakeholder coordination committee													
3.1.2 Establish theme-based marine reserve integrated resources management and coordination forums for e.g. enforcement committee; conflict resolution committee; etc.	MMPA Management & CCA Scientists					X							
3.1.3 Draw MOUs and agreements with stakeholders to facilitate implementation of highly technical activities in management of the marine reserve													
3.1.4 Implement collaborative activities in and around the MMPA						X	X	X	X	X	X	X	X
3.1.5 Build stakeholder capacity on integrated approach to marine ecosystem management						X	X	X	X	X	X	X	X
3.2 Develop and enforce resource use zones													
3.2.1 Map resources users in the marine reserve, their needs and impacts associated with their activities	MMPA management & CCA scientists					X	X	X	X	X	X	X	X
3.2.2 Undertake rezoning of resource use in the marine reserve										X			
3.2.3 Enforce various zones identified in the marine reserve						X	X	X	X	X	X	X	X
3.3.4 Monitor resource user activities to ensure compliance with zone use prescriptions						X	X	X	X	X	X	X	X
3.3.5 Develop and implement conflict resolution mechanism to mediate conflicts						X	X	X	X	X	X	X	X
3.3 Promote alternative livelihoods for the local fisher folk													

Management Action and Activities	Persons Responsible	Timeframe																				
		FY 2016-17				FY 2017-18				FY 2018-2019												
		1	2	3	4	1	2	3	4	1	2	3	4									
3.3 Promote alternative livelihoods for the local fisher folk																						
3.3.1 Assess fishing effort and viability of the artisanal fishery in the marine reserve area of MMPA	MMPA Management & fisheries dept	X																				
3.3.2 Raise fisher community awareness on fishery status		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.3 Upscale successful livelihoods sources within the MMPA such as Kipepeo community project and Mida creek board walk among others																						
3.3.4 Identify and implement new alternative livelihood options such as ecotourism, beekeeping, butterfly farming, etc		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.5 Build capacity and empower fisher community to embrace alternative livelihood options		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.6 Promote community support systems through micro- credit support to enable diversification of livelihood sources		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4 Strengthen law enforcement efforts in the MMPA																						
3.4.1 Strengthen patrol and laws enforcement operations in the area by enhancing staff numbers; equipment, etc	MMPA Management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.4.2 Implement intelligence network and anti-poaching operations in the MMPA and the adjacent areas addressed		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.3 Form and operationalise cross-sectoral enforcement committee to enforce relevant laws in the marine reserve		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.5 Empower BMU units to enforce fisheries regulations in the marine reserve		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.6 Create linkages with local law enforcement agencies e.g. the police service		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5 Promote proper waste management measures																	
3.5.1 Create awareness on good solid waste management practices	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.2 Map sources of pollution into the MMPA	CCA Scientist, NEMA																
3.5.3 Install solid waste receptacles at strategic points in the beach																	
3.5.4 Undertake water quality monitoring																	
3.5.5 Promote solid waste based enterprises targeting composting and recycling		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.6 Undertake joint enforcement of Waste and Water Quality Regulations, 2006 with NEMA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.7 Promote best practices in solid waste and effluent management in and around MMPA		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6 Promote community awareness and participation in MMPA management																	
3.6.1 Hold regular public awareness meetings for various resource user groups and general public	Park Warden	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.6.2 Produce and disseminate education and awareness materials					X												
3.6.3 Engage both print and electronic media to create awareness about MMPA	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6.4 Organise workshops and seminars to share best practices on environmental conservation		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6.5 Strengthen and encourage access to the MMPA information centre by stakeholders including the local community		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6.6 Develop and implement an environmental award scheme to recognize best environmental practices around MMPA													X				
3.7 Control invasive species																	
3.7.1 Monitor the crown of thorn star fish and take control measures when density exceeds 1,000/ha		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.7.2 Control Indian House crows through several methods including destruction of their nests, trapping, and creating awareness on waste management		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8 Establish shoreline setbacks and coastal erosion hazard data																	
3.8.1 Design and conduct a study to analyse coastal erosion trends using remote sensing and cadastral survey data to provide data on a property scale										X	X	X	X	X	X	X	X
Objective 4: MMPA's ecological components and processes are understood																	
4.1 Conduct an assessment of all research studies and monitoring programmes that have been conducted in MMPA																	
4.1.1 Collect and collate all the available information	MMPA Management & CCA Scientists	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.1.2 Disseminate the available information to park managers		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
4.1.3 Identify research gaps		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2 Conduct research on habitats and species																	
4.2.1 Carry out research in unstudied and understudied issues and sites		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2.2 Create habitat, species distribution maps and resource use patterns		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2.3 Establish long-term monitoring plan		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.3 Review current monitoring capacity and train MMPA staff and communities in ecological monitoring and reporting																	
4.3.1 Review the skills of the MMPA staff and stakeholders		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.3.2 Continuously build capacity of local MMPA staff and stakeholders		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.3.3 Certify skills of trained staff		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.4 Intensify collaboration in marine research and ecological monitoring		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.4.1 Establish good relations with the scientific community		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.4.2 Involve the local community in the research and monitoring activities		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.4.3 Ensure all researchers carrying out research in the area submit reports to the MMPA managers		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.4.4 Establish national, regional and global networks		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.5 Develop an integrated information management system																	
4.5.1 Establish a resource center where all the information (manuscripts, publications, articles and reports) on the MMPA is availed																	X

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
4.5.2 Establish a position of a resident researcher who will be trained to be the custodian of the resource centre													X
4.5.3 Train managers of the MMPA and other stakeholders in the use and retrieval of information												X	X
4.6 Evaluate the MMPA's management effectiveness		X	X	X	X	X	X	X	X	X	X	X	X
4.6.1 Undertake an evaluation of the management programmes based on information generated through research and monitoring		X	X	X	X	X	X	X	X	X	X	X	X
4.6.2 Adapt the management programmes based on the evaluation results.		X	X	X	X	X	X	X	X	X	X	X	X
4.6.3 Involve external reviewers		X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
1.1.5 In liaison with committee, organize meetings to develop a strategic plan for the forum										X	X	X	X
1.1.6 Support implementation of the strategic plan											X	X	X
Action 1.2 Monitor and manage visitors impacts													
1.2.1 Install additional buoys and Moorings within Malindi Marine National Park						X	X	X	X	X	X	X	X
1.2.2 Conduct visitor carrying capacity and impact assessment for the MPA and develop impact monitoring and mitigation plan						X	X	X	X	X	X	X	X
1.2.3 Set and enforce standards (code of conduct) for boat operators and tourists	Warden MMIPA, SRS-CCA					X	X	X	X	X	X	X	X
1.2.4 Support / facilitate implementation of impact monitoring and mitigation plan						X	X	X	X	X	X	X	X
1.2.5 Identify and create new sites to reduce pressure on the existing ones						X	X	X	X	X	X	X	X
Action 1.3 Liaise with relevant authorities to train TPU officers on basic visitor handling and guiding practices													
1.3.1 Organize meetings with tourist police to sensitize them and share information on visitor handling and best practices										X	X	X	X
1.3.2 Organize workshops bringing together wardens, tourist police, local communities, organized groups and tour operators to deliberate on their strengths, opportunities and challenges in the tourism sector and forge better working relationships.	Wardens MMIPA					X	X	X	X	X	X	X	X
1.3.3 Train selected TP on visitor handling													
Action 1.4 Register and regulate boat operator activities and their associations										X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.4.1 Review and enforce standards for boat operators in relation to registration of vessels, working through organized groups						X	X	X	X	X	X	X	X	X	X	X	X
1.4.2 Organize meetings with boat operators to sensitize them on the standards and consequences for non-compliance	Warden MMPA, AD CCA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4.3 Liaise with KMA to carry out regular inspection to ensure compliance to the above standards		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4.4 Lobby for gazettelement of the standards		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Action 1.5 Ensure safety of park visitors and boat operators																	
1.5.1 Ensure all boats carry sufficient safety equipments, e.g. life-rings, life jackets and/or floats	Warden MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.2 Liaise with the KMA to have all boats in the MMPA inspected for seaworthiness		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.3 Conduct impromptu checks on visitor boats operating in MMPA to authenticate if they are seaworthy		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.4 Discontinue the operations of all boats that are found to be unseaworthy from operating in the MPAs		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
Action 1.6 Develop and gazette Navigational Regulations for the MMPA																	
1.6.1 Organize security boat patrols to curb speeding	Warden MMIPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.2 Conduct stakeholder meeting to review the existing code of conduct with regard to speeding				X													
1.6.3 Liaise with the KWS HQs to have the new regulations gazetted					X												
1.6.4 Avail the new regulations to all boat operators and other tourism players in the MMPA																	
Objective 2: Tourism Infrastructure and Services improved																	
Action 2.1 Develop infrastructure to support local tourism enterprises																	
2.1.1 Carry out infrastructural development needs assessment within the MPA					X												
2.1.2 Design, procure and install / construct priority infrastructure such as visitor information centre, public water and sanitation facilities, waste bins etc.				X				X	X			X	X			X	X
2.1.3 Rehabilitate access roads	Wardens MMIPA, Wardens MMPA			X				X	X			X	X			X	X
2.1.4 Upgrade camp site at Malindi				X				X	X			X	X			X	X
2.1.5 Design and rehabilitate basic water, sanitation and hygiene facilities				X				X	X			X	X			X	X
2.2 Renovate and brand all ticketing gates and erect signage at appropriate sites																	
2.2.1 Install signages at appropriate areas in Malindi				X				X	X			X	X			X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.2.2 Establish an entry gate at Mayungu once an outpost is established there				X	X			X	X			X	X			X	X
2.2.3 Remodel the park entry gate																X	X
2.3 Upgrade and maintain the parking area																	
2.3.1 Develop designs of the parking area	Warden Malindi MPA							X	X			X	X				
2.3 Upgrade and maintain the parking area																	
2.2.1 Develop designs of the parking area	Warden Malindi MPA							X	X			X	X				
2.2.2 Construct the parking area													X	X		X	X
Objective 3: Tourism products and services diversified																	
3.1 Identify and explore possibilities to introduce artificial reefs																	
3.1.1 Carry out feasibility study				X	X			X	X			X	X			X	X
3.1.2 Carry out environmental impact assessment	Wardens MMMPA, SRS CCA			X	X			X	X			X	X			X	X
3.1.3 introduce artificial reefs if practicable				X	X			X	X			X	X			X	X
3.2 Assess current marketing methods and scope and develop a Marketing strategy for the MMMPA																	
3.2.1 Develop a marketing strategy	Wardens MMMPA, SRS CCA			X	X			X	X			X	X			X	X
3.2.2 Participate in tourism promotion exhibitions				X	X			X	X			X	X			X	X

Management Action and Activities	Persons Responsible	Timeframe												
		FY 2016-17				FY 2017-18				FY 2018-2019				
		1	2	3	4	1	2	3	4	1	2	3	4	
3.3 Link with KWS HQ Marketing Section to ensure MMPA is included in the KTB national marketing strategy														
3.3.1 Develop / review marketing strategy for MMPA	Wardens MMPA					X	X	X	X	X	X	X	X	X
3.3.2 Develop marketing tools (brochures, video materials maps, pamphlets, magazines, directories, internet)		X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.3 Liaise with KWS marketing section to lobby for inclusion of MMPA in KTB marketing strategy		X	X	X	X	X	X	X	X	X	X	X	X	X
3.4 Conduct a capacity building exercise for all groups dealing with ecotourism to meet required standards														
3.4.1 Carry out training needs among tourism stakeholders	Wardens MMPA	X												
3.4.2 Train identified groups/associations to enhance their capacity for example in small business management, interpretative and marine guide skills and visitor handling						X	X	X	X	X	X	X	X	X
3.4.3 Assist organized groups to establish a revolving fund that can be utilized for maintenance and development costs						X	X	X	X	X	X	X	X	X
3.4.4 Train officials of the groups in leadership skills						X	X	X	X	X	X	X	X	X
3.4.5 Enhance the ability to increase business through marketing e.g. through production of marketing materials including brochures and fliers						X	X	X	X	X	X	X	X	X
3.4.6 Support organized groups to develop investment plans to cater for the low season when business is slow						X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.5 Embark on domestic tourism marketing campaign using appropriate methods																	
3.5.1 Develop a domestic tourism marketing strategy, plan and tools for marine parks/reserves	Wardens MMIPA, AD CCA				X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.2 Partner with mobile phone operators to market marine parks through mobile phones.					X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.3 Establish and roll out a staff MPA marketing campaigns	Wardens MMIPA				X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.4 Make use of print and audio visual media to promote marketing of MMIPA					X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.5 Market and popularize Malindi- Watamu Tourism Circuit connecting Watamu MPA, Mida Creek and Board Walk, Sudi Kirebe Islands, Arabuko Sokoke Forest, Gede Ruins, Malindi MPA, and Sabaki River Mouth														X			

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.7.5 Create awareness, develop and promote the historical ruins to locals and the MMPA managers				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.7.6 Liaise with National Museums of Kenya for rehabilitation of Historical Ruins				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.7.7 Train selected locals as tour guides				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.7.8 In liaison with National Museums, sensitize local community on value and conservation of the ruins				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.8 Identify potential home stays and promote adoption of the same in MMPA																	
3.8.1 Carry out an assessment to determine the potential of MMPA for home stays				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.8.2 Sensitize local communities on the potential of home stays				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.8.3 Lobby with Tourism Department to develop standards for home stays and sensitize local communities on the same				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.8.4 Liaise with established tour operators to include home stays in their tour itineraries				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.9 Establish youth and women development programmes																	
3.9.1 Collate information on potential nature-based / tourism related enterprises in MMPA		X															
3.9.2 Sensitize youth on potential nature-based /tourism related enterprises in MMPA				X	X	X	X	X	X	X	X	X	X	X	X	X	
3.9.3 In liaison with relevant funding agencies, sensitize youth on procedures for accessing funding support				X	X	X	X	X	X	X	X	X	X	X	X	X	

3. Community Partnership and Conservation Education Programme

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
Objective 1: Community participation, collaboration and benefit sharing mechanisms strengthened																	
1.1 Collaborate with local communities in the management of MMPA																	
1.1.1 Develop clear definitions of community and MMPA management roles & responsibilities through formal agreements	SW, MPMAC							X				X					
1.1.2 Train local residents as specialists in a variety of skills to act as trainers of trainers (TOT)	SW, MPMAC				X												
1.1.3 Recognise elected community representatives and place them in the forefront of public activities related to MMPA management	SW, MPMAC				X												
1.1.4 Develop a structured collaborative relationship with shared responsibilities, mutual authority and accountability for successful sharing of resources & rewards	SW								X								
1.2 Support implementation of community projects and formulate conservation benefit sharing mechanism																	
1.2.1 Continue providing material, technical and financial support to ensure successful completion of ongoing CSR projects	SW				X			X				X				X	X
1.2.2 Support a PRA exercise	SW							X									
1.2.3 Formulate conservation benefit sharing mechanism	Chairperson- CWCCC								X								
1.2.4 Based on the PRA findings, train local communities on development of project proposals	SW, NGO											X				X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.3 Enhance community Consultative forum as a platform for stakeholder cooperation																	
1.3.1 Create awareness on existing forums among resident community	X	X	X														
1.3.2 Form, register and operationalize Malindi Community Consultative Forum				X													
1.3.3 Develop best practice guidelines & regulations that provide for participatory natural resource management							X										
1.3.4 Invigorate existing forums	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
1.4 Carry out a social-economic study to determine viable community based income generating activities to be promoted in MMPA																	
1.4.1 Conduct a socio-economic study to catalogue spatial distribution of exploitable natural and cultural resources							X										
1.4.2 Diversify tourism options to relieve pressure on the reefs										X							
1.5 Explore potential markets for community products																	
1.5.1 Carry out market research before community business products and services are produced										X				X			
1.5.2 Undertake evaluation studies on the challenges & opportunities of proposed community business projects															X		

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.5.3 Identify potential market for community products																	
1.6 Enhance capacity of community on project management																	
1.6.1 Train community leaders on project planning and implementation		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.2 Train community leaders on project business management & leadership skills Develop legal constitutions for community groups to guide and govern their operations	SW, CNGO, DFO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.3 Ensure proper book keeping and regular audits as per group constitution	SW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.4 Form management committees to handle segments of project implementation	SW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.7 Diversify funding opportunities for community projects																	
1.7.1 Sensitize local communities on existing alternative funding opportunities in MMPA	SW, CNGO								X								
1.7.2 Solicit for technical assistance on proposal writing on behalf of the local community groups	SW								X								
1.7.3 Develop project proposals for durable financial mechanisms through support from UNESCO's Man and Biosphere programme	SW, SRS-CCA									X							
1.7.4 Promote community support systems through micro-credit support for the youth and the vulnerable groups	SW												X				

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.8 Enhance employment opportunities for local community members																	
1.8.1 Give special consideration to local community youth while recruiting staff in MIPA	SW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.8.2 Source casual employees from the local communities	SW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.8.3 Strengthen enforcement using community based groups like scouts	SW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.8.4 Identify best alternative livelihoods	SW, SRS-CCA	X	X	X	X												
Objective 2: Conservation education and outreach programmes strengthened																	
2.1 Upgrade and operationalise the existing MIPA Education Centre																	
2.1.1 Administer exit strategy of the county multi- agency unit from the KWS conference hall		X	X	X	X					X	X	X	X				
2.1.2 Procure services to design a standard education centre	SW	X	X	X	X					X	X	X	X				

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.1.3 Launch the existing education facilities as part of the proposed centre	SW					X					X						
2.1.4 Furnish the new banda	SW										X						
2.1.5 Construct and furnish additional self- contained bandas for group visitors	SW												X				
2.1.6 Construct and equip the library with information materials,	SW												X			X	
2.1.7 Replace dining chairs	SW															X	
2.1.8 Produce, display, publicize and disseminate multi-linguistic stakeholder specific education materials	SW, CNGO												X			X	
2.1.9 Develop an education scheme of work for use by the education section	SW								X								
2.2 Strengthen MMPA education staff establishment and capacity																	
2.2.1 Deploy a substantive ICT officer	SW, DD-HC									X							
2.2.2 Identify and prioritize training needs	SW, DD-HC										X						
2.2.3 Train education staff in relevant courses																X	X
2.3 Create public conservation awareness on the importance of MMPA																	
2.3.1 Designate and develop one nature school in Malindi Sub-County	SW, Curator-NMK								X								
2.3.2 Produce regular radio, TV and print programmes on MMPA	SW									X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.3.3 Develop interactive MMPA conservation education web page within KWS web site	SW		X														
2.3.4 Coordinate stakeholders' support and participation in ecosystem awareness events	SW, CNGO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4 Design and implement a conservation education outreach programme																	
2.4.1 Develop stakeholder specific education and awareness materials	SW, CNGO						X										
2.4.2 Lobby school communities to form and strengthen WCK clubs and visit MMPA as an education and entertainment destination	SW, CEO-WCK		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4.3 Deliver conservation lectures and video shows in local schools	SW, CNGO		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4.4 Avail transport to local wildlife clubs at a modest fee and where possible with free boat rides	SW																
2.5 Strengthen KWS – Honorary wardens and other stakeholders working relationships																	
2.5.1 Sensitize honorary wardens on KWS roles, MMPA resource conservation requirements, Wildlife Act 2013	SW, AD-CCA									X	X	X	X	X	X	X	X
2.5.2 Provide Judiciary, Kenya Police Service, Public with special (sensitization) seminars involving field - based demonstration visits	SW				X												
2.5.3 Use honorary wardens to relay reports to MMPA management for appropriate response	SW				X												
2.5.4 Liaise with existing government structures in the grassroots especially the provincial administration in monitoring and sharing information on HWC in their respective areas of jurisdictions to facilitate timely response	SW				X												

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
Objective 3: Human wildlife conflicts and natural resource use conflicts reduced																	
3.1 Assess and adopt innovative problem animal control techniques																	
3.1.1 Carry out research on new PAC techniques																	
3.1.2 Liaise with CCA research unit in identifying and assessing potential new PAC techniques	SW, SRS-CCA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.1.3 Undertake an exposure/ study visit to familiarise with these techniques	SW					X	X	X	X								
3.1.4 Acquire the necessary equipment	SW									X	X	X	X				
3.1.5 Carry out pilot trials	SW													X	X	X	X
3.1.6 Equip the communities and train them on the most successful PAC techniques	SW									X	X	X	X				
3.1.7 Acquire and develop a computerised GIS- based database for recording and mapping the location, type and severity of HWC incidences around the MMPA (in consultation with the CCA Research Section)	SW, SRS-CCA									X	X	X	X				
3.1.8 Train MMPA staff on G.I.S data collection and management										X	X	X	X				
3.1.9 Map out the HWC hotspots using G.I.S	SW, SRS-CCA									X	X	X	X				
3.1.10 Confirm and amend the indentified HWC hotspots through a participatory process involving extensive consultation with the local communities around the MMPA	SW, SRS-CCA													X	X	X	X
3.2 Enhance collaboration with the County Wildlife Conservation and Compensation Committee (CWCCC)																	
3.2.1 Carry out a sensitization campaign to educate the local community on the wildlife compensation requirements highlighting cases that can and cannot be compensated	SW, Chairperson-CWCCC		X														
3.2.2 Sensitize the community about the existence of the CWCCC as provided for in the Wildlife Act 2013.	SW, Chairperson-CWCCC				X					X	X	X	X				

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.2.3 Fast track implementation and operationalization of this committee in MMPA	SW																
3.2.4 Conduct continuous consultation, dialogue and awareness over wildlife problems in MMPA	SW, MPMAC																
3.3 Construct new and strengthen existing ranger outposts																	
3.3.1 Develop new outposts at several hotspots including Magarini areas, Dakacha, Mayungu, Kanani and any other priority HWC hotspots	SW			X				X									
3.3.2 Establish a mobile PAC unit base at far flung areas of Malindi/Tsavo border with responsibility for Galana, Dakacha, Madunguni areas	SW								X								
3.4 Enhance incidence reporting for HWC																	
3.4.1 Provide serviceable hotlines contacts to the adjacent communities	SW								X								
3.4.2 Establish and maintain a human wildlife conflict database		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.3 Liaise with existing government structures in the grassroots especially the provincial administration in monitoring and sharing information on HWC in their respective areas of jurisdictions to facilitate timely response	SW			X				X									
3.5 Identify and document resource use conflict areas within MMPA																	
3.5.1 Carry out participatory mapping of all the conflict hot spots	SW, SRS-CCA			X				X				X					
3.5.2 Identify and document all the conflicts areas to help design viable solutions	SW, SRS-CCA							X				X				X	
3.6 Liaise with State Department of Fisheries(SDF) to formalise access of migrant fishermen to Kenyan fishery																	
3.6.1 Work with SDF to monitor activities migrant fishers		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.7 Liaise with the State Department of Fisheries to establish a vibrant fisheries management committee (FMC)																	

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
3.7.1 Review fishing regulations & guidelines to reflect the intended sustainable conservation of fish resources within the park & national reserve as per the Wildlife Act, 2013													
3.7.2 Define the terms of reference for FMC from inception (in light of prevailing legal provisions)	FMC							X	X				
3.7.3 Explore delineation of several user zones within MMPA with marker buoys in consultation with the fishers and dive operators	SW, FMC								X				X
3.7.4 Encourage the sport fishing companies to register as BMU and contribute to the BMU kitty	SW, FMC											X	X
3.7.5 Explore appropriate ways of dealing with conflicts between sport fishers and artisanal fishers for the benefit of fishery resource conservation	SW, FMC												X

4. MPA Operations and Security Management Programme

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
Objective 1: A Competent and motivated workforce deployed and maintained in MMPA																	
1.1 Deploy appropriate staff																	
1.1.1	Employ staff currently placed on temporary basis on permanent and pensionable terms	SW-MMPA & KWS HQ	X	X													
1.2 Liaise with CCA and KWS HQs to ensure that transfers within MMPA are done in accordance with the KWS Human Capital Manual																	
1.2.1	Carry out staff appraisal to identify weaknesses and strengths	SW-MMPA & KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.2.2	Deploy staff in the right field/area of competencies.	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3 Train Staff in relevant Skills																	
1.3.1	Carry out staff appraisal to identify the weakness and strength	SW-MMPA & KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.2	Train staff on basic general knowledge of organizational operations (Exchange and exposure programs)	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.3	Ensure staff deployed to MPA acquire relevant skills	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.4	Implement training needs assessment recommendations	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.5	Liaise with KWS HQs training office to train staff on the required skills	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.6	Conduct short courses on marine skills for newly posted personnel	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.3.8	Encourage staff to acquire extra skills in different fields	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4 Improve prosecutorial capacity of MMPA																	
1.4.1	Deploy KWS prosecutors to MMPA	SW-MMPA & KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.4.2 Create awareness on the Wildlife Act, 2013 amongst staff	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.4.3 Follow up on legal cases until they are concluded	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5 Enhance staff motivation																	
1.5.1 Provide appropriate working tools (e.g., uniforms)	SW-MMPA & KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.2 Award outstanding staff	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.3 Develop good sporting facilities	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.5.4 Facilitate sporting and other team building activities e.g. competitive swimming, beach volleyball	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6 Improve Staff Welfare																	
1.6.1 Raise capital and expand the staff canteen	SW-MMPA & KWS HQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.2 Implement team building activities	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.3 Enhance staff welfare budgetary allocations	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.4 Provide adequate and better housing facilities and working environment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.5 Promote teamwork and create good working environment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.6 Enhance reward and recognition of staff	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
1.6.7 Provide working tools in a timely manner	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.8 Provide staff recreation facilities	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.9 Buy decoder to Air free digital channels	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.10 Procure the right marine working gear	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1.6.11 Provide staff with a welfare van (29 seats)	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Objective 2: Stakeholders collaboration enhanced																	
2.1 Establish a functional MPA Management Committee																	
2.1.1 Identify relevant committee members and officially launch the committee	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.1.2 Committee to develop and review comprehensive terms of reference	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.1.3 Fundraise for MMPA projects	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.1.4 Hold consultative meetings on monthly or quarterly basis to review progress	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.2 Build strong relations with local Beach Operators, Conservation NGOs, Research Institutions, and Hoteliers																	
2.2.1 Identify the relevant stakeholders	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.2.2 Develop and sign MOUs with stakeholders	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.2.3 Hold consultative meetings, training and team building activities	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.2.4 Organize and hold workshops and conferences to disseminate research findings	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3 Work with State Department of Fisheries to enhance management of fisheries resources																	

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
2.3.1 Develop a mechanism of working together	SW-MMPA & SDF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.2 Develop and sign an MOU	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.3 Hold monthly, quarterly, yearly meetings with SDF	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.3.4 Engage and train the fishermen in net exchange program	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4 Collaborate with County and National Government conservation agencies in enhancing management of the MMPA																	
2.4.1 Attend stakeholder meetings to increase MMPA visibility	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.4.2 Undertake conservation and awareness sensitization of the rural folk	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.5 Develop Joint funding proposals																	
2.5.1 Organise proposal writing meetings	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2.6 Develop and implement a participatory beach management plan																	
2.6.1 Organise stakeholder planning meetings	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Objective 3: Infrastructure, vehicles and equipment to support MPA administration enhanced and maintained																	
3.1 Procure appropriate transport equipment																	
3.1.1 Liaise with KWS HQs to procure a staff welfare vehicle and an additional vehicle for use by investigation staff	SW-MMPA & KWS HQS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.2 Ensure prompt repair and maintenance of transport equipment																	

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.2.1 Undertake routine maintenance of all boats and vehicles	SW-MMMPA & KWS HQS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.2.2 Liaise with KWS HQs to acquire relevant licenses for vehicles and boats	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3 Construct additional staff houses and office blocks																	
3.3.1 Undertake routine maintenance of residential and non-residential buildings	SW-MMMPA & KWS HQS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.2 Liaise with KWS HQs to develop a site plan for the park HQs	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.3 Conduct EIA for all facilities to be constructed	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.4 Liaise with KWS HQs to raise funds required for construction of the facilities	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.5 Supervise construction of all facilities in the park	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.3.6 Carry out environmental audits for all facilities in the park	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4 Refurbish the existing information centre at MMMPA																	
3.4.1 Liaise with KWS HQs to develop a site plan for expansion of information centre	SW-MMMPA & KWS HQS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.4.2 Conduct EIA for expansion of resource centre	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.3 Develop a proposal in liaison with KWS HQs to raise funds required for expansion of the facility	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.4 Supervise expansion of the information centre	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.5 Carry out environmental audits of the information centre	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.6 Develop new information materials for display	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.4.7 Update the existing materials and information for display	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5 Procure and maintain scuba and snorkelling equipment																	
3.5.1 Undertake an inventory of all scuba and snorkelling equipment and maintain their database	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.2 Identify additional scuba and snorkeling equipment needs	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.3 Develop a proposal and budget in liaison with the procurement office to procure additional scuba and snorkeling equipment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.4 Undertake routine maintenance of scuba and snorkeling equipment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.5 Train staff on use of scuba and snorkeling equipment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.5.6 Construct and equip scuba and snorkeling store	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6 Procure and maintain office equipment																	
3.6.1 Liaise with KWS HQs to procure office equipment and furniture	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.6.2 Undertake routine maintenance of office equipment	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.7 Ensure internet connectivity																	

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
3.7.1 Liaise with the Mombasa IT office and KWS IT Department to expand the WIFI strength and coverage	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8 Install VHF radios in all boats and vehicles in MMMPA																	
3.8.1 Carry out an inventory of all radios in the park	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8.2 Liaise with KWS HQs to acquire and install new digital radios for radio room, vehicles and boats	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8.3 Liaise with KWS HQs to acquire digital hand held radio sets	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3.8.4 Liaise with communication workshop in Mombasa for routine maintenance of all fixed and hand held radios	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Objective 4: MPA security operations enhanced																	
4.1 Establish good institutional framework for beach operators																	
4.1.1 Develop a code of conduct suited for each group	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.1.2 Register members and develop mechanism for identification e.g. use of tags and/or shirts with a logo for easy recognition and management.	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.1.3 Provide training and capacity building to beach operators	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2 Conduct regular joint patrols																	
4.2.1 Liaise with other relevant institutions to facilitate widespread monitoring and enforcement.	SW-MMMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.2.2 Undertake joint regular patrols and operations (e.g., between TPU and KWS)	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe											
		FY 2016-17				FY 2017-18				FY 2018-2019			
		1	2	3	4	1	2	3	4	1	2	3	4
4.2.3 Engage multiagency security teams in sharing of intelligence information	"	X	X	X	X	X	X	X	X	X	X	X	X
4.2.4 Arrest and prosecute any violator of the MPA regulations and laws	"	X	X	X	X	X	X	X	X	X	X	X	X
4.2.5 Conduct high profile patrols along the beach to disrupt any intended illegal missions	"	X	X	X	X	X	X	X	X	X	X	X	X
4.3 Provide appropriate equipment to security personnel													
4.3.1 Undertake an inventory of equipment currently with security teams	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X
4.3.2 Identify additional equipment required by security teams	"	X	X	X	X	X	X	X	X	X	X	X	X
4.3.3 Provide security equipment (e.g., tents, sleeping bags, water bottles, uniforms, boots, water proof camera, night vision goggles, night scope, rucksacks, computers and dictaphones etc).	"	X	X	X	X	X	X	X	X	X	X	X	X
4.4 Improve prosecution of wildlife and visitor harassment related offences													
4.4.1 Engage the judiciary and the police on matters pertaining to court procedures and penalties	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X
4.4.2 Organize orientation tours to MPA for the police, prosecutors and judiciary to create awareness on the impacts of wildlife offences on the economy	"	X	X	X	X	X	X	X	X	X	X	X	X
4.4.3 Train KWS staff on drafting of charge sheets and court procedures	"	X	X	X	X	X	X	X	X	X	X	X	X
4.5 Fast track acquisition of appropriate documents for KWS property													
4.5.1 Undertake an inventory of all KWS property including registration status	SW-MMPA & KWS HQs	X	X	X	X	X	X	X	X	X	X	X	X
4.5.2 Liaise with KWS lands office for acquisition of the title deeds	"	X	X	X	X	X	X	X	X	X	X	X	X
4.5.3 Survey and fence KWS properties	"	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
4.5.4 Design and install signage in all KWS properties	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.6 Install additional moorings and buoys at anchorage sites in MMPA																	
4.6.1 Carry out a site survey (depth, seabed conditions, tidal range, currents, waves and wind factors)	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.6.2 Disseminate information on positions of buoys to resource users such as boat operators, tourism police, provincial administration, SDF and other relevant institutions.	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.6.3 Offer guidance and training on the use of mooring buoys for all boat operators, visitors and institutions	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.6.4 Procure moorings and buoys with long lasting material	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.7 Ensure proper maintenance of mooring buoys																	
4.7.1 Develop a monitoring and maintenance schedule of mooring buoys	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.7.2 Replace unserviceable mooring buoys	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.7.3 Undertake routine manual cleaning	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.8 Delineate MPA boundaries																	
4.8.1 Survey and map the MMPA boundary	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.8.2 Sensitize stakeholders on MPA boundary	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.9 Ensure compliance with environmental regulations (e.g. audits to existing facilities)																	
4.9.1 Establish MMPA management committee	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe															
		FY 2016-17				FY 2017-18				FY 2018-2019							
		1	2	3	4	1	2	3	4	1	2	3	4				
4.9.2 Monitor effluents from existing facilities and compare results with gazetted standards	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.9.3 Hold consultative meetings with facility managers to emphasise on need to comply with EMCA, 1999	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10 Ensure that all boat operators, sport fishers, and fishing vessels are duly licensed and compliant.																	
4.10.1 Undertake an inventory of status of all boat operators, sport fishers and fishing vessels	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10.2 Develop an MoU between KWS and other licensing agencies and beach operators to ensure a mechanism for monitoring compliance is in place	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10.3 Inspect all vessels and fishing equipment regularly	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10.4 Hold training workshops for boat operators, sport fishers, and fishing vessels owners to sensitize them on Maritime laws and regulations	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10.5 Liaise with other security agents to enforce maritime laws and regulations	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11: Enhance security for MMPA visitors																	
4.11.1 Liaise with tourism police to increase visitor safety	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11.2 Increase tourism security patrols during high tourism seasons	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11.3 Establish a communication link with BMU operators	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11.4 Establish radio communication with tourist facilities MMPA	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11.5 Establish a 24-hour hotline number for visitors and BMU operators	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.11.6 Train security teams on terrorism and disaster preparedness	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Management Action and Activities	Persons Responsible	Timeframe																
		FY 2016-17				FY 2017-18				FY 2018-2019								
		1	2	3	4	1	2	3	4	1	2	3	4					
4.12 Establish and maintain a security database																		
4.12.1	Design an appropriate security database	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.12.2	Procure database computer and accessories	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.12.3	Deploy and train MMPA database staff	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.12.4	Model and map security incidents	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.13 Strengthen law enforcement efforts																		
4.13.1	Enhance staff numbers and operation/patrol equipment	SW-MMPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.13.2	Improve intelligence network and anti-poaching operations in the MMPA and adjacent areas	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.13.3	Form and operationalise cross-sectoral enforcement committee to enforce relevant laws in the MMPA	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.13.4	Empower BMU units to enforce fisheries regulation in the marine reserve	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4.13.5	Create linkages with local law enforcement agencies e.g. Police Service, Kenya Navy etc.	"	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X



Annex 2. Technical Report on Malindi Beach Erosion Report Prepared by the Technical Advisory Committee

Dr. Mohamed Omar - Kenya Wildlife Service
Dr. Judith Nyunja - Kenya Wildlife Service
Dr. Maarifa A. Mwakumanya - Pwani University
Michael Mbaru - Kenya Maritime Authority
James Kamula - National Environment Management Authority
Dr. Charles Magor - Kenya Marine and Fisheries Research Institute

Co-opted Members

Jacqueline Bernard - Kenya Wildlife Service

1. BACKGROUND

In 2014, KENIAKU Ltd was licensed by NEMA to construct an environmentally friendly Seawall for erosion control purposes in front of its beach resort facility in Malindi. The construction of the Seawall, however triggered shoreline erosion on the downstream areas adjacent to the wall resulting in degradation of the beach and destruction of vegetation. The erosion has been increasing every year according to reports received from beach users in the area.

In order to address the beach erosion threat, KENIAKU applied for an EIA license from NEMA to extend the Seawall. The license was issued in 2015 and one of the license conditions required that the KENIAKU sort approval from Kenya Wildlife Service (KWS), Kenya Maritime Authority (KMA) and the County Government of Kilifi before construction of the Seawall. While it has been confirmed that KMA was not consulted, KWS has since objected to the construction citing shoreline management issues associated with the existing wall and the sheer neglect of laws governing the shoreline and management of conservation areas (i.e. the Wildlife Act, EMCA, Fisheries Act etc).

Following consultations between KENIAKU, KWS, NEMA and Pwani University, the Technical Advisory Committee (TAC) was constituted to assess the shoreline situation in Malindi and advice on strategies to address the shoreline erosion and safeguard investments and ecology of the Malindi beach. The TAC comprised of experts from Pwani University; NEMA; KMA; KWS; and KMFRI. The specific objectives of the TAC were to:

- i. Review and evaluate the current status of the beach in Malindi and establish the main drivers of shoreline change including wave hydrodynamics on the beach
- ii. Evaluate the short term strategies to mitigate against beach erosion and shoreline change that is threatening both investments and ecology of the beach
- iii. Evaluate the mid-term and long-term strategies to mitigate against beach erosion and shoreline change in Malindi
- iv. Identify strategies of funding the mid-term and long-term mitigation measures;
- v. Present the strategies to stakeholders
- vi. With the guidance of NEMA, the TAC shall provide recommendations on licensing the immediate strategy for implementation
- vii. Compile a technical report outlining the three recommended strategies within two weeks.

2. METHODOLOGY

The methods used by the TAC to collect information on the shoreline erosion issues were:

- Site visit and assessments – A rapid assessment on the hydrodynamics and sediment dynamics along the Malindi shoreline was conducted
- Stakeholder consultations – The TAC held consultative meetings with the property owner, representatives from Malindi residents, boat operators and fishermen.
- Literature review – Several information sources were reviewed and synthesized to provide background information on the coastal erosion problem in Malindi; and, justification for the proposed interventions.
- Information synthesis and report compilation – The TAC compiled all the information to produce the advisory report with recommendations.

3. FINDINGS

3.1. Hydrodynamic Characteristic of the Beach

As the characteristic of beaches globally, the beach in Malindi experiences both accretion and erosion with some sites creating new land surfaces while other places are eroding to an extent of threatening development structures. Our main findings for the beach at the Billionaire Resort indicate that: -

- The beach is sheltered by a fringing reef and is exposed to ocean waves and tidal current surges. The beach is comprised of sand and coral rock shores which have been severely eroded.
- The site is experiencing a loss of about 8-10 meters per year, creating the current eroded beach as evidenced by the presence of short (10m) and steep (320) beach at one point and long (70m) and gently sloping (080) eroded beach at another.
- The threatened shoreline is known for recreation and nesting sites for turtles and urgent measures are required to protect property developments and preserve the beach for turtle nesting.
- The high rate of erosion necessitated the property owner to construct a Seawall of about 600m long and about 4 m high to protect the property (Photo 1). Consequently, it is observed that the areas adjacent to the Seawall are severely eroded threatening the existing developments, the public beach and the Marine park offices. The property owners placed sand bags on the beach to protect against the erosion which has also not worked.
- It is observed that the high rate of erosion in this section of the shoreline is attributed to the high waves exacerbated by the construction of the vertical seawall of gabions.
- The mean wave height (0.89m) and mean energy dissipated (990.74 joules) are high compared to other parts of Casuarina Point. This is mainly due to the vertical sea-wall which deflects wave energy, transferring the same to adjacent areas. With the high and intense wave energy on the shoreline, vertical walls will not withstand the exerted energy and instead it will erode adjacent areas, compounding the erosion problems and related conflicts on the shorelines.

3.2. Stakeholder Concerns

Malindi residents and other stakeholders were consulted to give their understanding of the situation and how it has evolved, how it is or has affected them, the historical perspective and their recommendations. The main comments from the stakeholders include: -

- The Billionaire's beach wall has influenced the front and adjacent beaches. During the South East monsoon winds, waves washes up against the beach wall and reflect back towards the ocean with too much energy causing the beach in front of the wall to erode excessively fast.
- These wave actions have created an artificial 3 meter high cliff which is obstructing the public from accessing the beach, forcing them to pass through the sea waters during high tide. Attempts by the boat owners to access the beach over the cliff are met with hostile resistance from the Billionaire Resort management. Mr. Ayub Chai for the Billionaire club, however clarified that there is no restriction on access by the public and this can be resolved easily. The erosion is rapidly destroying the recreational beach area which besides being a hub for both international and domestic tourists in Malindi is also greatly utilized by schools on education tours. The beach in addition provides space for local beach traders. The current state of the beach does not provide sufficient space for recreation and the beach users are scrambling for the remaining beach area.
- The strong waves created as result of the beach Seawall have caused destruction to four boats belonging to the local community. The boats which are normally anchored close to the shore are strongly lashed against the beach wall during high tide and this greatly impact on their livelihood through loss of income.
- Increased concentration of sediments on nearby seagrass beds and subsequent reduction of foraging and nesting habitats for fish and other marine species has affected the locals' livelihoods due to decreased fish catches from the marine reserve.

- Malindi Marine Park beach had previously provided important habitat for sea turtles.
 - The beach wall has blocked natural replenishment of sand resulting in degradation of the sea turtle nesting grounds. Sea turtles sightings have decreased and they stopped nesting at the beach. The last one sighted tried to get a suitable nesting site in between the sacks placed on the eroding beach but left without establishing a nest.
 - Stakeholders expressed discontent with the manner the government was managing the shoreline. They questioned why construction of the beach wall was approved despite encroaching on a public beach. The government was accused of being partial and exhibiting double standards in implementation of the law, with harsh penalties on poor locals while approving destructive actions of the well to do.
-
- In conclusion, the stakeholders recommended that;
 - (i) An urgent redress of the shoreline erosion is called for with an integrated approach where all stakeholders are involved especially the County physical planners, the marine scientists and the policy makers
 - (ii) The structural design of the protection measure should consider the ecological and socio-economic implications.
 - (iii) Science should inform any shoreline protection design suitability, viability and sustainability.
 - (iv) In the short term, the existing wall should be modified to allow gradual dissipation of wave energy on the shoreline.
 - (v) In the medium and long term, groynes and offshore artificial reef can be constructed to cover the entire Casuarina littoral cell, with support from the investors and the Government

4. RECOMMENDATIONS

4.1. Short Term Strategies

- The current vertical sea wall design was identified to be the major cause of increased wave action and energy hence the erosion. In order to minimize the wave action and energy on the shoreline, it is recommended that the current seawall design be modified or redesigned to a slopping design to minimize shoreline erosion. The gradient for the redesigned slopping wall should take cognizance of the beach profile, wave and wind dynamics during the South East and North East monsoon. This needs to be done immediately within the coming week.
- The proposed extension of the seawall should be withheld as implementation of the above recommendation on redesigning is done since the redesigned wall is anticipated to have an immediate positive impact by minimizing the current shoreline erosion, and improved sand deposition.
- The impacts of the redesigned wall should be monitored continuously and modifications carried out where necessary to address any emerging erosion incidences.
- KENIAKU Ltd to provide resources for redesigning the sea wall and monitoring the beach.
- KENIAKU Limited to apply for variation of EIA license for the current sea wall to allow for redesigning of the wall and implementation of the modification based on immediate observations.
- Access to the beach by beach users should be guaranteed.
- The beach area is a recognized sea turtle nesting site and the redesigning of the sea wall should allow for turtle nesting.

4.2. Medium and long term Management Strategies

- Ensure shoreline projects are subjected to EIA before construction.
- Strengthen enforcement of the 60m set-backline rule for any new structures, including seawalls when licensing such structures.
- Where sea wall construction is licensed, ensure the design is environmentally friendly.
- Vertical design should be strictly prohibited.
- Avoid licensing development of permanent structures such as houses and seawall in areas experiencing active morphological processes (e.g. ongoing beach accretion in Malindi).
- Strengthen compliance monitoring for licensed developments to ensure developers comply with license conditions.
- Shoreline developments close to ecologically sensitive areas such as sea turtle nesting sites should take into account turtle nesting beaches when doing coastal defence planning for such developments.
- Educate property owners along the shoreline on the potential risks (environmental and economic) associated with beach encroachment and non-compliance with regulatory requirements.
- Support implementation of the Kenya shoreline management strategy.

Annex 3. Stakeholder Participation in Planning

Name	Position and organization	Workshop		Working Groups			
		#1	#2	Ecology	Tourism	Community	Sec /PAOps
Chrispus M.Kadzomba	Mayungu BMU	X	X				
Michael Kazungu	Mayungu BMU	X	X				
Nixon Kazungu Gina	Manyungu BMU	X					
Mwalimu Kaingu	Mayungu BMU	X	X				
Ahmed Omar Said	Mayungu BMU	X	X				
James Ndaro	Jacaranda	X					
Kahindi Charo	Jacaranda	X					
Simon Kitsao	Mayungu BMU	X	X				
Mwalimu Athman	Jacaranda	X					
Shebwana Shekwe	Malindi BMU	X	X				
Haruni Bwanaidi	Malindi BMU	X	X				
Ali Shee	Malindi BMU	X	X				
Twalib A. Abed	Malindi BMU	X	X				
Peter Kaingu	Jacaranda	X					
Patrick Changawa	WCCC Kilifi County	X					
Jignesh Patel	Lion in the Sun & Billionaire Club	X	X				
Deborah Goodhart	Malindi Resident Dev. Group	X					
Lisst Ruben	Malindi Resident Dev. Group	X	X				
Shee Abdalla	Malindi Resident Dev. Group	X					
Praquato Teji	Jacaranda	X					

Name	Position and organization	Workshop		Working Groups			
		#1	#2	Ecology	Tourism	Community	Sec / PAOps
Justus Nzuki	Siversand	X					
Jackson Wanje	Siversand	X					
Picy Kadzo	Tropical	X					
Alex Mtuku	Tropical	X					
Hassan M. Burhan	MABO (Malindi boat Operator)	X	X				
Baraka Kahindi	Jacaranda	X					
Dickson Kutaka	Plan Hotel Resorts	X					
Omar A. Abdalla	National Museums of Kenya	X					
Salim Ali Mohamed	BMU- Malindi	X	X				
Fredrick Karenga	Tourism Regulatory Authority	X					
Ebo Masha	Jacaranda	X					
Elvinah Nyevu	Jacaranda	X					
John Kenga	Jacaranda	X					
Aggrey Odindo	UoN	X					
Jackline Mutwiri	Assistant Research Scientist, KWS HQ	X	X			X	
Israel Makau	Research Scientist, KWS HQ	X	X			X	

Name	Position and organization	Workshop		Working Groups			
		#1	#2	Ecology	Tourism	Community	Sec / PAOps
Bernard Ngoru	Senior Scientist, Ecosystem and Landscape Research KWS HQ	X	X			X	
Apollo Kariuki	Ag. Head – Planning & Environmental Compliance, KWS HQ	X	X	X			X
Shadrack Ngene	AD Parks & Reserves – External Linkages, KWS HQ	X	X	X	X		
Jacquiline Bernard	CCA Research Scientist, KWS	X	X	X			

Name	Position and organization	Workshop		Working Groups				
		#1	#2	Ecology	Tourism	Community	Sec /PAOps	
Salim Rashid	KWS Mombasa MNP	X						
Edison Mutie	KWS Malindi MNP	X	X					
Mercy Mwabilai	KWS Mombasa MNP	X						
Mohamed Bakari	KWS Malindi MNP	X						
Erick Aduda	WMIPA Assistant Warden II, KWS	X	X		X	X	X	
Bernard Ngetich	KWS Malindi MNP	X						
Bernard Kosgei	KWS Watamu MNP	X						
Rotich Isaack	KWS Mombasa MNP	X						
Judith Nyunja	CCA Senior Research Scientist, KWS	X		X				
Judith Nyunja	KWS Mombasa MNP	X						
Moses Michil	KCDP Accountant, KWS	X	X				X	
Adan H Kala	KCDP Mombasa MNP	X	X					
Kitsau Ngala	KWS	X						

Name	Position and organization	Workshop		Working Groups				
		#1	#2	Ecology	Tourism	Community	Sec /PAOps	
Joseph Kavi	MMPA Warden III, KWS	X	X		X	X	X	
Juma M Mbuja	KWS Malindi MNP	X						
Mercy Ngatuu	KWS Mombasa MNP	X						
Mkulu Hemed	KWS	X						
Josephine Mutiso	CCA Assistant Research Scientist, KWS	X		X				
Pily K. Kombe	Curio Seller		X					
Dickson M. Chipira	Jacaranda Tour Guides		X					
Pop Kavuu	KWS Malindi		X					
Julius Muriithi	TRA		X					
Eunice A. Musili	KWS Malindi		X					
Elizabeth N. Mwangi	Sheila Women Group		X					
Ahmed Farnau	Malindi BMU		X					
Bahati Khamisi Kaingu	Malindi BMU		X					
Loise Ishamaili Kahindi	Malindi BMU		X					

Name	Position and organization	Workshop		Working Groups				
		#1	#2	Ecology	Tourism	Community	Sec /PAOps	
		James Kamula	Coast Region Senior Marine Officer, NEMA			X		
Bernard Ochieng	Shimba Hills Assistant Research Scientist, KWS			X				
Peter Musembi	Marine Research Scientist, KWS			X				
Moses Kenana	Senior Scientist, KWS			X				
Albert Gamoe	CCA Senior Warden, KWS			X	X			
Mohamed Heri	Shimba Hills Senior Warden, KWS				X			
John Wambua	KMMPA Warden I, KWS				X			
Sammy Towett	Tourism Officer, KWS HQ				X			
Esther Gitau	MMPA Senior Warden						X	
Joseph Mukeka	GIS Modeller, KWS HQ							X
Peter Hongo	GIS Technician, KWS HQ							X

Name	Position and organization	Workshop		Working Groups				
		#1	#2	Ecology	Tourism	Community	Sec /PAOps	
		Jacob Kazungu Ngumbao	Kivulini Fishermen		X			
Paul Muhutsu	Ocean Beach Resort		X					
Vincent Wanjala	KWS WMPA		X					
Lucy K. Kivunzi	CCA Secretary, KWS		X					X
Aisha Churo	KWS MMPA		X					
Christine A. Ogutu	KWS MMPA		X					
Kahindi Charo	KWS MMPA		X					
Jane A.Ochieng	CCA Human Capital Officer,KWS							X
Denis Ombuna	Arabuko Sokoke Warden III, KWS							X
Dr. Joseph Kamau	Senior Scientist, KMFRI			X				
Jillo Katelo	KMMPA Assistant Research Technologist, KWS			X				
Dr. Mohamed S. Omar	Head – Wetlands and Marine Conservation, KWS HQ			X				



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