

# Community Capabilities and Marine Protected Area Governance

Report on Preparing a Governance Baseline for Watamu National Marine Park and Mida Creek



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## Introduction

### Aims

This report highlights development and deployment of a **governance baseline approach** in coastal Kenya as part of a broader initiative to support marine protected area governance. The data and information used to develop this report have been provided and reviewed by a range of organisations and interested individuals.

**All interested parties and attendees were invited to provide feedback on this document and work in partnership to develop this effort beyond 2021. We welcome any further corrections or feedback on this report, please send information or comments to Judith Ochieng ([judith.ochieng@arocha.org](mailto:judith.ochieng@arocha.org))**

Good governance is critical for an ecosystem to thrive and support adjacent communities in the long-term. Our project focusses on the Watamu Marine Protected Area (WMPA) managed by Kenya Wildlife Service (KWS), the surrounding communities and coasts, including Mida Creek.

The marine governance project started in early 2019 after a scoping study by the main project partners - A Rocha Kenya, University of St Andrews and Kenya Wildlife Service (KWS). The study identified key problems facing the Watamu Marine Protected Area (WMPA) which are threatening its sustainability, including: unsustainable fishing and recreational practices; exclusion of marginal groups; and decline of habitats and species upon which livelihoods depend.

Further, these problems have also been highlighted as major threats in the WMPA management plan 2016-2026. The plan seeks to address these problems by working with stakeholders in order to achieve the primary purpose of the WMPA which is to preserve and maintain a representative area of coral reef and mangrove ecosystems together with the beaches which typify the Kenya coast, for the benefit of present and future generations (KWS, 2016).

This report is based upon applying the Governance Baseline methodology (Olsen *et al.*, 2009) and the 'Capabilities' framework which recognises that poverty is more than the lack of material goods and must be addressed by strengthening the capabilities of marginal groups by involving them (Sen, 1999). The project is therefore especially concerned to make a stronger fit between marine protected area governance and poverty alleviation. The emphasis was on improving capabilities of communities to contribute to protected area governance through knowledge exchange and platforms for participation. Furthermore, it was supposed to facilitate sharing of lessons learned across networks of practice operating at community, national and international scales through a South-South exchange.

### Collaboration in Evidence Gathering

The focus of the project has been an interactive, multi-stakeholder workshop to collate data and information, and share their ideas and feedback to the components of the governance baseline. It is hoped that new partnerships resulting from the workshop will identify

alternative livelihoods, which are environmentally sustainable, and to support the transition towards these activities, particularly amongst the marginal groups.

- In order to make sure that wide participation could occur, a series of five community meetings were conducted in 2019 and 2020. These meetings aimed to give voice to key community groups who sometimes have less involvement in management decisions, and hear from a wider range of villages and stakeholders who have an interest in the reef and creek. The meetings included.

Name of the community group	Date of the meeting	Place	Total number of attendees
Prawns Lake Conservation Group	28 <sup>th</sup> February 2020	Prawns Lake Restaurant	5
Mida Creek Conservation and Awareness Group	10 <sup>th</sup> March 2020	MCCAG Restaurant	20
Uyombo Beach Management Group	1 <sup>st</sup> December 2020	Uyombo Fish Depot Office	25
Watamu Association of Boat Operators and Watamu Excursion Marine Association	10 <sup>th</sup> December 2020	Blue Bay Beach	15
Conservation groups from Dabaso (Dabaso Creek Conservation Group (DCCG), Jipe Moyo Mangrove Conservation Group, Scope Conservation Group, Magangani Aquaculture Conservation Group and Sita-Umoja Conservation Group)	11 <sup>th</sup> December 2020	Assistant chief's office	15

Table 1: Community meetings

- The COVID-19 global pandemic significantly affected the project and a planned multi-stakeholder workshop in March 2020 could not take place. However, on 19 March 2020 a small workshop at A Rocha Kenya - Mwamba involving 12 stakeholders with appropriate social distancing trialled the approach and tested new ideas to develop of the marine governance baseline for Watamu.
- Finally, on 10-11 February 2021, a multi-stakeholder workshop was hosted at the Turtle Bay Beach Resort Club, Watamu, supported by Kenya Wildlife Service (KWS), Local Ocean Conservation and Watamu Marine Association. It brought together 47 stakeholders to explore good governance for the Watamu Marine Protected Area. Findings from community workshops were also shared at this meeting.
- Organisers noted that representation from the tourism and recreation sector was lacking at this meeting, so in order to gain feedback from these sectors, an additional meeting was hosted on at Ocean Sports Resort, Watamu on 14 March 2021 at which 15 participants attended

[See [Appendix 1: Workshop Delegates](#) for a list of delegates for all workshops and [Appendix II](#) for the meeting outline programme].

The following sections of the report introduce the 'Area of Focus' and results of exercises focussed on 3 main themes:

- i. **Looking back**
- ii. **Taking stock**
- iii. **Looking forward**



## Area of Focus

Watamu Marine National Park (WMNP), Watamu Marine National Reserve (WMNR) and Malindi Marine National Reserve form contiguous complex of Marine Protected Areas near the town of Watamu on the Eastern coast of Kenya. All of these Protected Areas (PA) were gazetted on 26<sup>th</sup> March 1968 (Kenya Wildlife Service, 2017). The MPA complex is part of a long fringing reef on the east coast of Africa with important habitats including the coral reef and seagrass, and mangroves and sand/mudflats in Mida Creek, (Muthiga, 2009)<sup>1</sup>. The legally mandated state agency is Kenya Wildlife Service (KWS) who maintain a warden with a team based at Temple Point, KWS Park HQ, Watamu.

Note, this project did not focus on the whole protected area complex but rather on WMNP and Mida creek- see Figure 1. WMNP covers an area of 10km<sup>2</sup> which is a section of the reef offshore of Watamu. It includes all habitats between the dune vegetation to the reef-crest (Cowburn *et al.*, 2018). Mida Creek is a tidal inlet at the southern end of the WMNP. The creek occupies an area of approximately 32km<sup>2</sup> and the ecosystem includes mangroves that cover an area of 1746 ha, supporting 8 of the 9 mangrove species found along the Kenya Coast (Owuor *et al.*, 2019). The creek and part of the fore-reef slope are located outside of WMNP, but are part of the Watamu-Malindi Marine National Reserve which covers an area of 164km<sup>2</sup>, which extends 20km to the north and also encompasses the Malindi Marine National Park.



Figure 1: Map of the Watamu Marine National Park in yellow and Mida Creek in red.  
Source: Google Earth, developed by Louise Harker (University of St Andrews)

The WMNP and Mida Creek were selected in this context as the **Areas of Focus** on the basis of both socio-economic and biophysical factors. Firstly, this is a suitable scale for

<sup>1</sup> Also it has been designated as an important Bird Area (IBA) <http://datazone.birdlife.org/site/factsheet/6406>. The Watamu-Malindi Marine National Reserve was made a UNESCO biosphere reserve in 1979 (Cowburn *et al.*, 2018).

understanding the interactions between local communities and the MPA, in relation to the various socio-economic services it provides, and the multi-stakeholder efforts to manage the systems. Secondly, there are important ecological links between the creek and reef ecosystems, taking a ‘catchment to coast’ perspective.

### Local Settlements

Watamu/Mida is a suitable site for understanding the dependence of the local community on the MPA for socio-economic purposes. Inadequate management of the MPA due to resource constraints, overlapping jurisdiction between various government agencies, and unsustainable fishing methods can jeopardize the ability of the local communities to sustain their livelihoods (Muthiga, 2009). The project considered settlements based on proximity to the Marine Park and Reserve—taking into account the highest water mark as the furthest area where sediments are deposited (broadly defined) and the Mombasa – Malindi Highway which provides a physical barrier. Given the above justification for the selection of the area of focus Table 1 identifies key communities to be engaged for the project (Table 1):

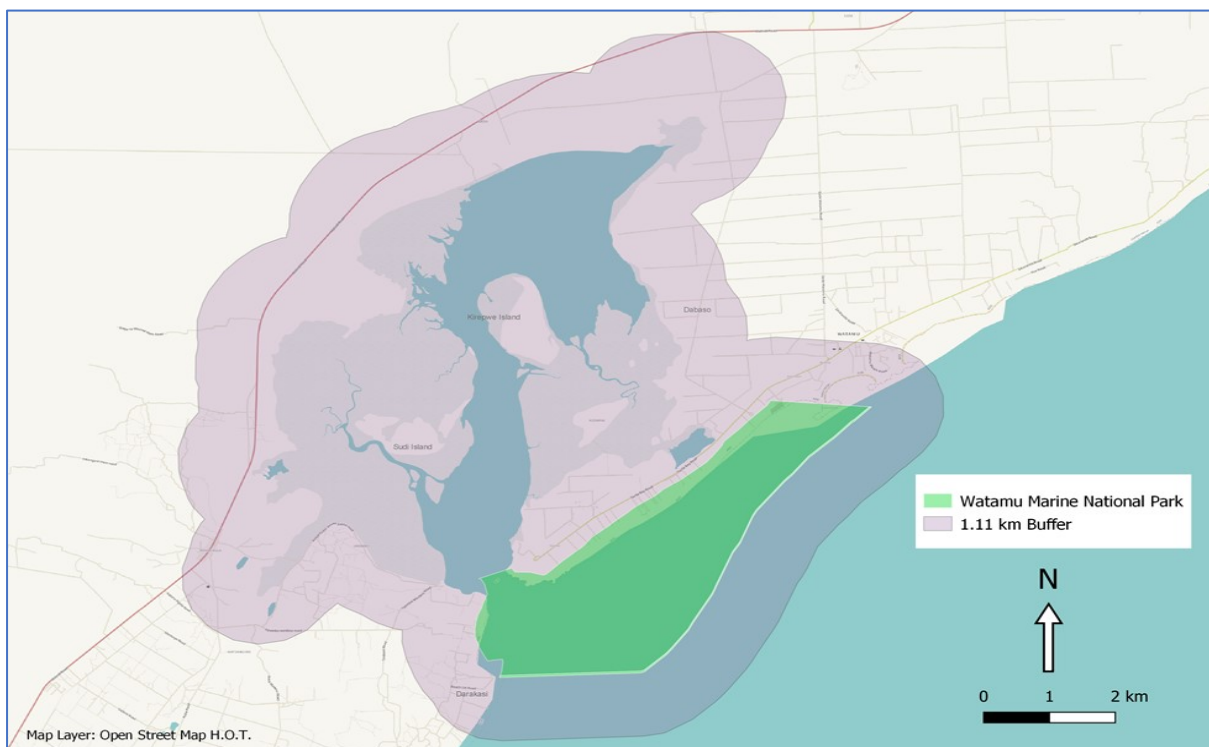


Figure 2: Map showing the Watamu Marine Protected Area and the buffer area from shoreline identifying relevant communities

1	Watamu Community
2	Dabaso Community
3	Darakasi Community
4	Dongokundu Community
5	Islands of Sudi, Kirepwe, Kisiwani
6	Mida Creek Community
7	Uyombo Community

Table 2: Communities that were considered part of the area of focus

<b>Defined Area of Focus</b>	
<b>Name of the Eco-Region (if applicable)</b>	Western Indian Ocean (LMEs of the World)
<b>Province/State</b>	Kilifi (County), Kenya
<b>Name of Area of Focus</b>	Watamu Marine National Park and Mida Creek
<b>Municipality/Area of Focus (in Km2)</b>	Watamu/ 42 sq km marine area of focus and surrounding settlements up to 1km inshore

Table 3: Various jurisdictional areas in which the defined area of focus is situated

<b>Features of the Area of Focus</b>	
<b>Area of Watamu NMP MPA</b>	<b>10 sq. km</b>
<b>Area of Mida Creek</b>	<b>32 sq. km</b>
<b>Island Area (Sudi, Kirepwe, Ki, Whale)</b>	<b>2.1 sq. km</b>
<b>Mangroves</b>	<b>17.46 sq. km</b>
<b>Beaches</b>	<b>0.495 sq. km</b>
<b>Seagrass</b>	<b>3.651 sq. km</b>
<b>Coral Reef</b>	<b>0.085 sq. km</b>
<b>Mudflats/Sandflats</b>	<b>3.234 sq km</b>
<b>Coastline Length</b>	9km shoreline for WMNP
<b>Watershed Characteristics</b>	Flat to almost flat coastal plain with low relief/slope <sup>2</sup>
<b>Forests: Arabuko-Sokoke Forest (Reserve)</b>	<b>420 sq. km</b>
<b>Climate/Annual Rainfall: Hot tropical coastal climate with two monsoon periods</b>	SE Monsoon ( <i>Kusi</i> , heavy rains), NE Monsoon ( <i>Kaskazi</i> . 500-1000mm mean annual rainfall, coastal regions wettest <sup>3</sup>
<b>Resident Population</b>	333 226 Malindi 2019 census sub county
<b>Transient Population</b>	In 2018 Approx. 65 000 per annum Visitor numbers to reef (KNBS)
<b>Comments on the Quality of the Estimates for the Features Section</b>	Measures of habitats in Watamu NMP taken from primary survey in 2015 reported Cowburn <i>et al.</i> 2018. Measures of Mangrove/Mudflat based on SPOT4/5 remote sensing data March 2015, and ground truthing from Kairo 2001, as reported in Owour <i>et al.</i> (2017) Population measures from Kenya National Bureau of Statistics (2019)

Table 4: Key features of the area of focus (Watamu NMP and Mida Creek)

<sup>2</sup> Flat to almost flat coastal plain: Uhuru Plain (overlain by littoral deposits of middle late Nyika Surface at 2-5m +MSL), McKenzie Plain (overlain by littoral deposits of upper Late Nyika surface at 5-10m +MSL), Mtondia Plain Source (overlain by littoral deposits of lower Middle Nyika Surface 10-25m +MSL) :Geomorphological Map of South East Kenya Series Y503

<sup>3</sup> KenSea Coastal Atlas 2006

## Section A: LOOKING BACK

### 1. Key Stakeholders

The project was concerned with the governance of the WMNP and Mida Creek, and identified the following stakeholders as being integral to the governance process of the Park and Creek:

Type of Organization	Organization
<b>Government Agencies</b>	Kenya Forest Service
	Kenya Marine and Fisheries Research Institute
	Kenya Tourism Board
	Kenya Wildlife Service
	Kilifi County Government Tourism Department
	Kilifi North Sub-County Government Fisheries Department
	National Environmental Management Authority
	Tourism Regulatory Authority
<b>Beach Management Units</b>	Watamu BMU
	Uyombo BMU
<b>CBOs and Conservation Groups</b>	Bidii na Kazi Women Group
	Dabaso Creek Conservation Group
	Darakasi Community
	Gede Community Forest Association
	Jipe Moyo Mangrove Conservation Group Dongokundu
	Magangani Aquaculture Conservation Group
	Mida Creek Conservation and Awareness Group
	Prawns Lake Conservation Group
	Sauti ya Wanawake
	Scope Conservation Group
	Sita-Umoja Creek Self-help group
Watamu Association (residents)	
<b>Beach operators</b>	Umoja Beach Operators
	Watamu Association of Boat Operators (WABO)
	Watamu Beach Operators and Safari Sellers
	Watamu Curio Beach Operators
	Watamu Excursion Marine Association (WEMA)
	Watamu SURPRISE Self-help Group (Boat operators)
<b>Local Administration</b>	Dabaso Assistant Chief
	Mida Assistant Chief
	Uyombo Assistant Chief
	Watamu Assistant Chief
<b>Local NGOs and Companies</b>	A Rocha Kenya
	Captain Andy's
	Local Ocean Conservation
	Tsavo Trust
	Watamu Marine Association
<b>Other National Conservation Organizations</b>	CORDIO
<b>Educational Institutions</b>	Wildlife Conservation Society (Kenya)
	Mida Primary School
	Pwani University
<b>Tourism, Leisure and Conservation</b>	Watamu Primary School
	Aqua ventures Dive Tourism
	Extra Divers Temple Point
	Hotels : Garoda Resort, Gecko Resort, Hemingways Resort, Kobe Suite Resort Ocean Sports Resort, Temple Point Resort, Turtle Bay Beach Club,
	JC Kite School

	Mida Butterfly Farm
	Tribe Watersports
	Turtle Bay Diving and Watersport Centre
<b>International Partners</b>	A Rocha Ghana
	A Rocha International
	Madagascar (Natiara Ahy)
	University of St Andrews (UK)

Table 5: Key stakeholders

## 2. Timeline of Governance

A timeline of governance aims to identify events of ‘significance’ related to environmental and societal change through a period of over the past fifty to one hundred years in a given area of focus. Ideally, it’s expected to reveal the traditions, the strengths and the weaknesses of the existing governance system in the Area of Focus. In addition, it highlights how power and influence is allocated and how the relationships between institutions are evolving (Olsen *et al.*, 2009).

In the current project the timeline was developed with the period 1963 to 2020 in mind. This period was chosen to highlight the timeline of governance of the Watamu MPA in post-colonial Kenya, given the fact that the MPA was established in 1968. Prior to the timeline being populated a preparatory analysis was conducted. The rationale of the analysis was based on the interrogation of the following questions:

- a) Which key sectors should be included?
  - b) Which laws, policies, events have been important in the history of governing the MPA?
  - c) What are the most significant events or policies? This is necessary since we cannot represent everything.
  - d) Can we identify ‘eras’ in the governance of the park related to the events posed in (c)?
- a) What pressures of events triggered the transition from one era to another?

The timeline (Figure 3) highlights key events relating to the establishment of KWS as a conservation agency, and also significant interventions by local NGO actors. The coral bleaching event of 1998-1999 is identified as a significant event. Various legal and policy initiatives, including those on conservation but also on other maritime sectors such as fisheries are highlighted as significant drivers in the management of the MPA.

The key ‘eras’ of governance are suggested, including a more recent trend towards collaborative governance involving multiple stakeholders in the 2000s onward. From the workshop break-out session, participants suggested the need to include the following ‘events of significance’ in the timeline. This would further help to better understand the history of governance of the WMPA:

- Pre 1980s- Double Gazettement of Mida Creek forest reserve (Frank *et al.*, 2017)
- 1990s- Adoption of EMCA Act of 1999
- 2000s- Formation/registration of beach operators
- 2010s- Tourism Act of 2011 recognised beach operators as key stakeholders in MPAs

Participants also highlighted the need for government institutions to engage stakeholders and the youth in policy and law making as this is an important component in governance.

Figure 3: Timeline and 'eras' of governance of the Watamu MPA

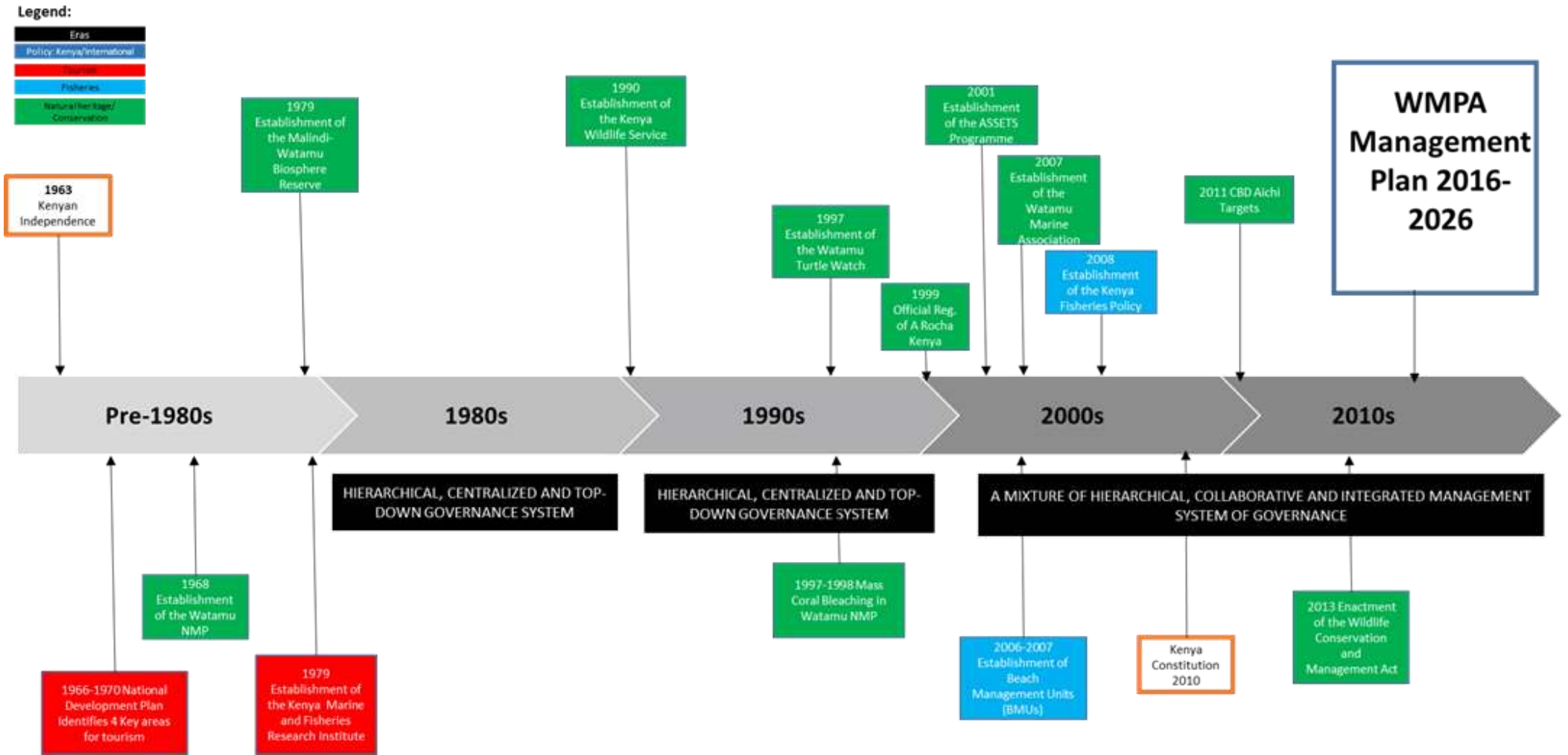


Figure 3: Timeline of Governance Watamu MPA NB: Please see [Appendix III](#) for further details on the timeline entries and eras of governance

### 3. Baseline Trends in Key Issues

In this section we focus on key trends in relation to the extent and condition of animals, habitats and ecosystems, and related human communities and populations. The following questions are helpful in considering the implication of trends:

- What is the 'shape of the curves' and what does it imply about the changing condition of the (eco)system?
- How reliable (complete and accurate) are the sources of data? Do we agree about this?
- What other data should be collected or analysed to understand this?

#### 3.1 Social Trends: population and livelihoods

Data on trends in socio-demographic variables were used to inform the social aspect of a governance baseline for Watamu National Marine Park (WMNP) and Mida Creek. Relevant population characteristics included: quality of life, employment, education, provision of services, and levels of tourist visitors.

##### 3.1.1 Population Trends in Kenya and Kilifi County 1969-2019

The population has been increasing dramatically both in Kenya and Kilifi county from 1969 to 2019, that is 10.9 million to 47.6 million (Figure 4) and 308,000 to 1.4 million, respectively. An increase in population in Kilifi County might indicate more pressure on the WMPA factoring other socio-economic variables such a human poverty index and opportunities for employment.

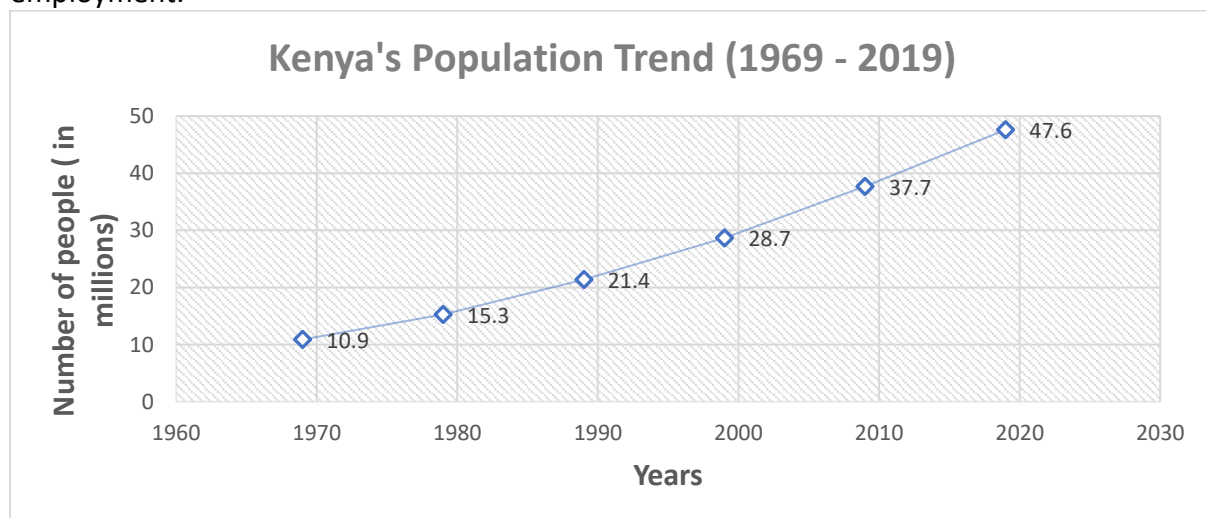


Figure 4: Kenya Population Trend.

Source: Kenya National Bureau of Statistics, 2019 Kenya Population and Housing Census Volume I, Fig 2.1, P.5

In accordance with the Kenyan Constitution of 2010 the decadal census was conducted in the 47 counties that make up the country in August 2019. Kilifi county is one of the six counties in the Coast region of Kenya and its bordered to the east with a 265km long Indian ocean coastline (County Government of Kilifi, 2018). Kilifi County hosts the study site in question (Figure 5) but note that the relevant Sub-County depends on whether considering the constituency administrative area (Kilifi North) or the census administrative area (Malindi) (see [Appendix IV](#) Geographies of the Kenyan Census)

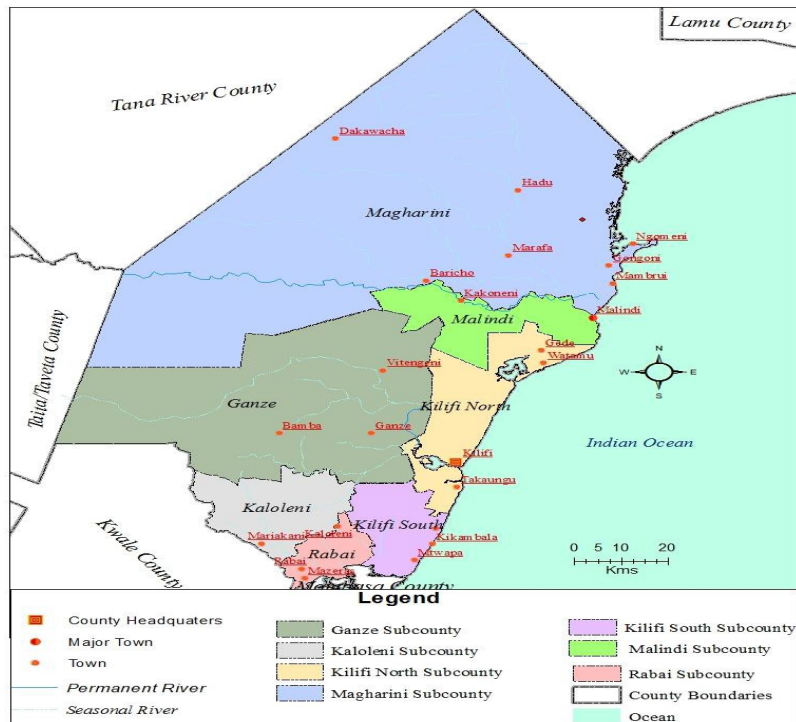


Figure 5: Map of Kilifi County and sub-counties.

Source: County Government of Kilifi County Integrated Development Plan 2018-2022, Map1.2, P. 7

Kilifi county has seen its population rise from 308 000 people in 1969 to 1 440 958 in 2019 (Figure 6). In addition, the number of households is 298 472 with an average household size of 4.8 individuals and a population density of 116 per sq. km. According to the Kilifi County Statistical Abstract (2015) the human poverty index (HPI) of the county stood at 58.4 against the Kenyan average of 45.2 (Kenya National Bureau of Statistics, 2015). Data on populations at sub-locations<sup>4</sup> are shown in Table 5.

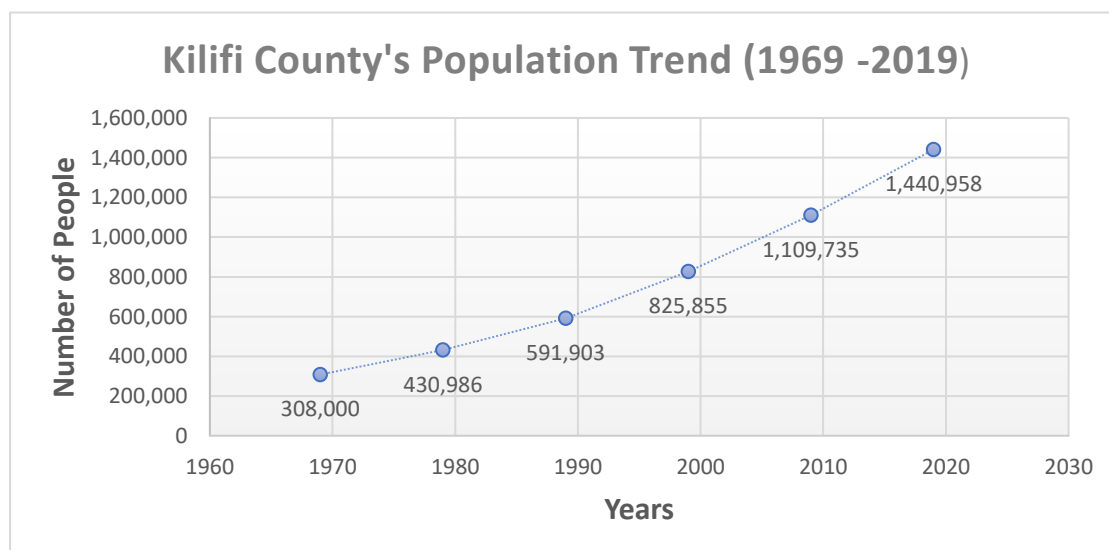


Figure 6 Kilifi County Population Trends.

Source: Kenya National Bureau of Statistics, Statistical Abstracts (1969-2009) and 2019 Kenya Population and Housing Census Volume I

<sup>4</sup> The sub-locations shown in Table 5 are based on census enumeration areas, are different from the villages identified in Table 1- (see Appendix IIV Geographies of the Kenyan Census)



		Pop. size	Households Total	Land Area Sq km	Density Persons per sq. km
1	Watamu Sub-location	12286	3575	3.1	4023
2	Dabaso Sub-location	18009	3970	24.5	735
3	Mida-Majaoni Sub-location	7459	1148	15.1	495
4	Uyombo Sub-location	6314	1075	16.3	389

Table 6: Socio-demographic variables of census areas bordering Watamu MPA.

Source: Kenya National Bureau of Statistics, Kenya Population and Housing Census Volume II Table 2.4 2019

### 3.1.2 Assessing the quality of life in regions and local communities depending on the WMPA

Measures of quality of life were reviewed by comparing the data on employment, household energy and education from nearby Malindi sub-county against the national average (Table 6). For example, those who reported working (in both formal and informal sectors) decreased from 65% (135,115) in 2009 to 43% (122, 508) in 2019 against the national average of 48%. The causes of the reduction of the employment opportunities were beyond the scope of investigation, but are important in understanding the long-term links between MPAs and local communities' livelihoods and wellbeing

Measure	Census 2009	Census 2019	National Av. 2019
Population	207 253	333 226	(Malindi 7 <sup>th</sup> highest change)
Aged 5+ in employment (Working)	135 115 (65%)	122 508 (43 %)	48%
% households lighting by mains electricity		50.4%	50.4%
Never been to school		46 878 (14.5%)	16.3% Urban 8.8%
% water from public tap/stand		40.3%	9.9%

Table 7: Malindi Sub-county socio-demographics.

Source: Kenya National Bureau of Statistics, 2019 Kenya Population and Housing Census Volume 2 – 4

### 3.1.3 Number of tourists visiting the Watamu National Marine Park from 1989-2018

The curve representing the number of people visiting the WMNP is based on visas for park access as a proxy. The trend is jagged and irregular. For example, in 1989, 17,300 tourists visited the WMNP, peaking in 1999 and 2006 at 40, 778 and 40,845 respectively. The number then dropped to the lowest in 2009 at 16,542 while peaking sharply in 2018 with 67,463 tourists reported to have visited the WMNP (Figure 7). Feedback from participants indicated that the number of tourists increased to approximately 71,000 in 2019 before it dropped dramatically in 2020 because of the COVID-19 pandemic. The KWS Warden noted that increased marketing initiatives by stakeholders as well as political stability contributed to an increase in the number of tourists visiting the WMPA prior to 2020

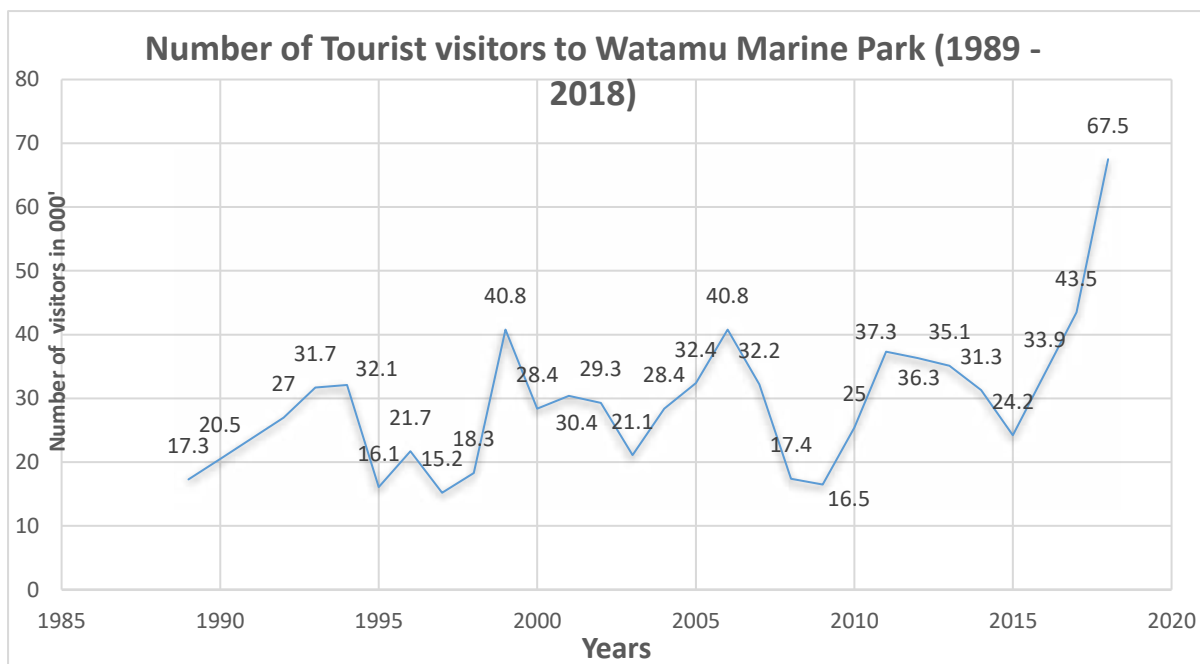


Figure 7: Tourist visitors to Watamu Marine National Park Trend.  
Source: Kenya National Bureau of Statistics, Statistical Abstracts (1969-2019)<sup>5</sup>

This data can be used to understand the pressures on the WMPA ecosystem related to tourists’ activities. For example, an influx in the number of people visiting the coral gardens was observed to significantly contribute to the degradation of corals of WMPA due to unsustainable practices as highlighted by Cowburn *et al.* (2013b) and also in the Watamu Marine Protected Area Management Plan (2016-2026) which notes management issue of concern relating to the actions of tourists and tourist operators which can have a negative effect on the ecosystem. These include: coral destruction due to irresponsible trampling, snorkeling and diving, and anchoring near reefs, as well as collecting marine life, feeding fish, boat operators chasing dolphins, and tourist activities near hotels that affect turtle nesting, (Kenya Wildlife Service (KWS), 2017).

### 3.1.4 Livelihood Characteristics

As part of understanding the socio-economic needs of the local communities beyond material needs, a livelihood and wellbeing survey was conducted in Uyombo and Mida in June -July 2020 with data collected from an opportunistic sample of 312 households. Resource limitations restricted the survey to two of the villages identified in Table 1. However, these two villages were selected on the basis of representing the variety of settlements- a location closer to the coastal highway and urban area of Watamu (Mida), and a more remote, rural village bordering the MPA (Uyombo)

Survey results revealed that the primary livelihoods (figure 8) for Uyombo are small business (43.6%) e.g., selling of vegetables and clothes followed by crop farming (13.6%) and third was fishing and tourism (10% each). In Mida it was crop farming (24.8%), followed by small business (23.8%) and third was tourism (10%). These figures suggest that, contrary to the popular narrative, that fishing is not primary source of livelihood for a large proportion of

<sup>55</sup> The Kenya National Bureau of Statistics, statistical abstracts between 1969 to 1988 do not specifically highlight the number of tourists who visited Watamu National Marine Park as they collected and combined the data for all the marine parks in Kenya at the time. However, data for tourist visitors to Watamu National Marine Park is available 1989 to 2019

households. Nevertheless many respondents associate with fishing as part of self and community identity.

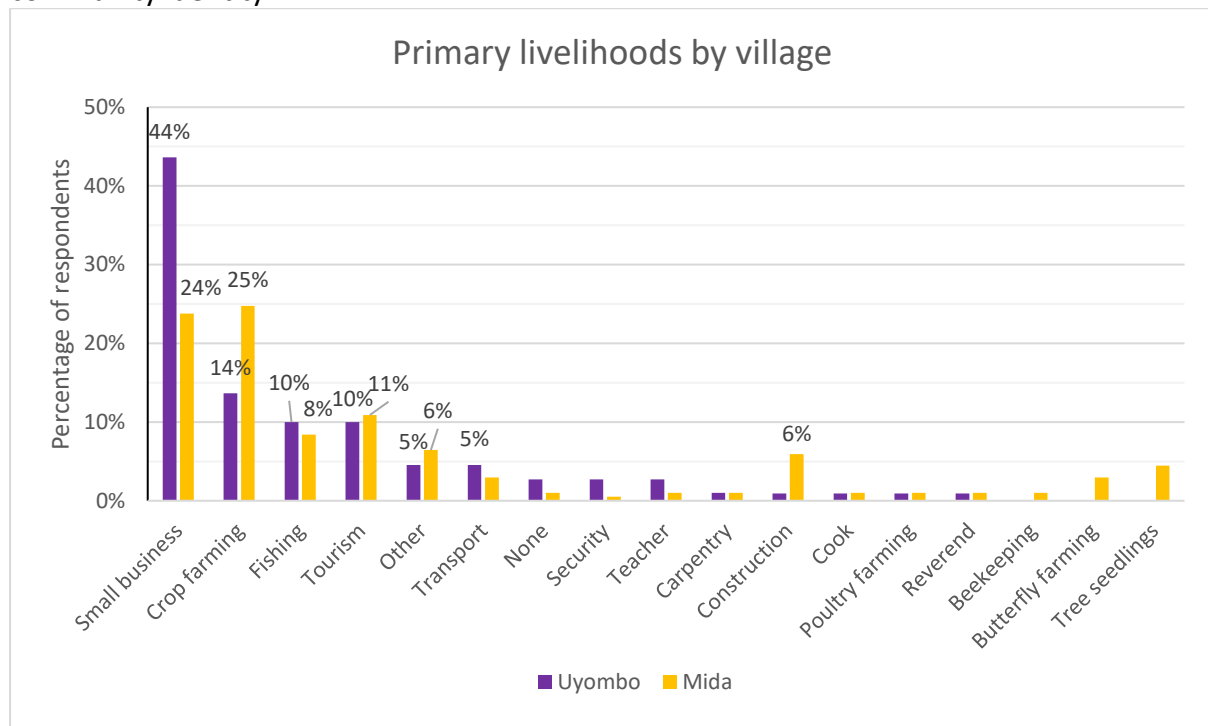


Figure 8. Percentages of Primary Livelihoods from a Survey of 312 Households in Uyombo/Mida 2020  
Source: Harker et al. (Unpublished)

Participants suggested the need to conduct further comprehensive socio-economic surveys to understand:

- The drivers and broader issues related to different livelihoods that the local communities engage in.
- The trends in livelihoods by gender

### Limitations

Whilst the quantitative data that highlights trends in visitor numbers, data on net inflows of migrants to Kilifi County are lacking. This would be interesting evidence in establishing the correlation (if any) between local migration and pressures on the WMNP and Mida Creek.

Other data socio-demographic data on wellbeing, poverty, quality of life, religious affiliation, sites and practices of cultural significance, might also be informative but is not represented here.

## 3.2 Ecological Trends

### 3.2.1 Vulnerable and Charismatic Habitats and Species

The WMPA plays a critical role in conserving species and habitats. A biodiversity survey revealed that 18 species from WMPA are on the IUCN Red List. This is a list that provides the world’s most comprehensive information source on the global extinction risk status of animal, fungus and plant species (IUCN, 2021a).

A sample of IUCN Red list species of WMPA include:

**Five- Near Threatened (NT) species,** e.g. Ribbontail Stingray and Whitetip Reef Shark  
**11- Vulnerable (VU) species,** e.g. Honeycomb Stingray, Brown-Marbled Grouper, Sea Cucumber, Thorny Seahorse and Cape Dwarf-eelgrass  
**Two- Endangered (EN) species,** i.e. Humphead Wrasse and Halavi Guitarfish

Species	Classification	Red List Status 2018/ 2020
Black-tip Reef Shark	Sharks & Rays	NT/NT
White-Tip Reef Shark	Sharks & Rays	NT/NT
Blue-Spotted Stingray	Sharks & Rays	NT/NT
Brown-Marbled Grouper	Bony Fish	NT/VU
Malabar Grouper	Bony Fish	NT/LC
Sharp-Nose Stingray	Sharks & Rays	VU/VU
Honeycomb Stingray	Sharks & Rays	VU/VU
Alfred's Manta Ray	Sharks & Rays	VU/VU
Giant Grouper	Bony Fish	VU/DD
Saddle-Back Coral Grouper	Bony Fish	VU/LC
Thorny Seahorse	Bony Fish	VU/VU
Hedgehog Sea Cucumber	Marine Invertebrates	VU/VU
White-Belly Sea Cucumber	Marine Invertebrates	VU/VU
Military Sea Cucumber	Marine Invertebrates	VU/VU
South African Eelgrass	Flowering Plant	VU/VU
Crisp Pillow Coral	Coral	VU/VU
Humphead Wrasse	Bony Fish	EN/EN
Edible Sea Cucumber	Marine Invertebrates	EN/EN
Halavi Guitarfish	Sharks & Rays	EN/EN

Table 8: Vulnerable habitats and species.  
 Prepared by Felicity Spoons, based on IUCN data

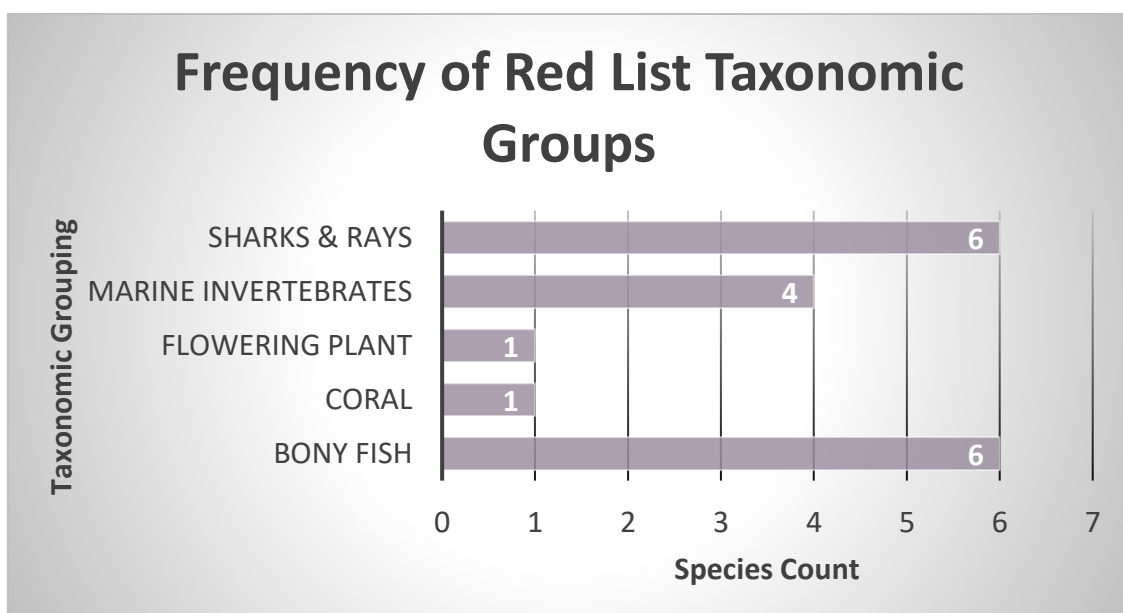
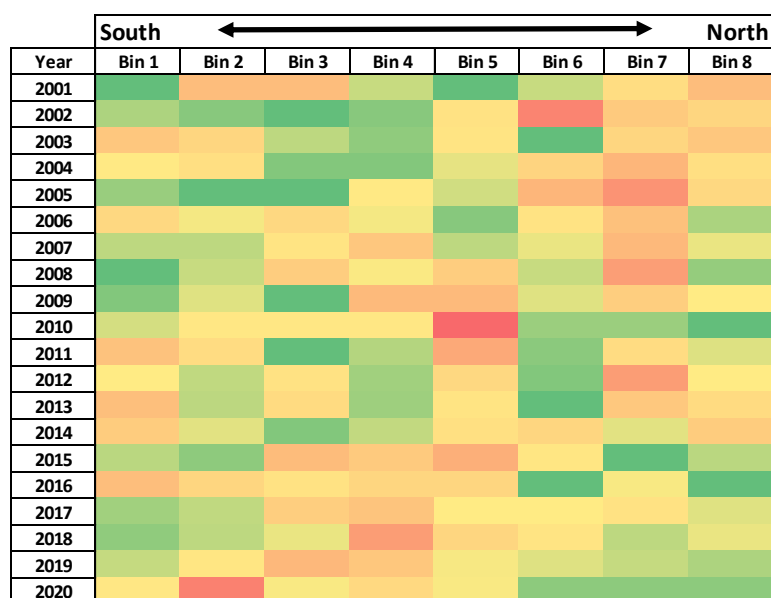


Figure 9 Frequency of Red List Taxonomic Groups

## Turtles

Local Ocean Conservation monitor turtle nesting sites through a Turtle Watch programme over the last 20 years in collaboration with KWS. In addition, Local Ocean Trust maintain monitoring data on turtle bycatch and turtle rescues. Figure 10 shows trends in Turtle rescues conducted on a yearly basis, and related reports given by informers of the need for rescue due to issues with poaching or stranding, with over 1000 rescues per year over the last 5 years.

In addition, Figure 11 indicates that turtle nesting sites are demonstrating a shift from the North to the South of the WMPA perhaps because of sea developments happening in the North of WMPA.



Colour scale		
Low	Med	High

Figure 11: Trends in turtle nesting sites (based on analysis by M.Carter and data from LOC)

## Whales and Dolphins

The Watamu Marine Association, in collaboration with Kenya Wildlife Service as part of the Kenyan Marine Mammal Network, have conducted monitoring of the Whale and Dolphin populations in the wider Watamu- Malindi Marine Nature Reserve. Species present include Humpback Whales, and Indo-Pacific Bottlenose, Humpback and Spinner Dolphins, with approximately 40 boat tour operators in the wider region in 2017.<sup>6</sup> In their recent publication, they indicate that between 2011 and 2019, 10 species of small cetaceans have been reported from inshore and offshore Kenyan waters accounting for a total of 792 sightings. Despite this

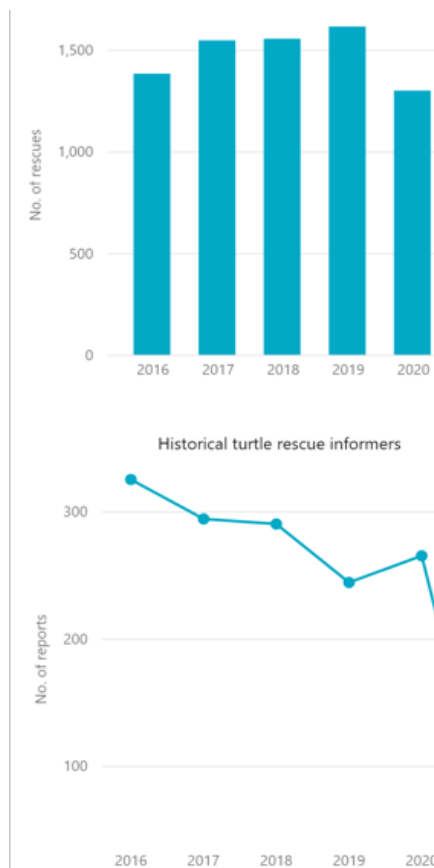


Figure 10: Trends in turtle rescue informers

<sup>6</sup> <https://wwhandbook.iwc.int/en/country-profiles/kenya>

there is no national marine mammal conservation strategy and significant knowledge gaps on population abundance, distribution, habitat use, genetic diversity and population structure<sup>7</sup>.

### 3.2.2 Coral Reef Cover

Data trend on coral reef cover shows the impact on corals experienced from multiple bleaching events in WMPA from 1997-1998 and also in, 2005, 2007, 2010, 2013, 2016 and 2020 (see Figure 10). In 1996, the percentage cover for coral reefs was 46%, which is the highest ever recorded from available data. In 2000 it was 9%, the lowest and in 2018 it was at 12%. The percentage cover of coral reefs has not recovered to former levels, and recovery has been poorer than in other reef complexes on the Kenyan coast as shown in Figure 12. Issues such as bleaching mortality, low recruitment rates and nutrients levels are potential influential factors reducing the resilience of coral communities in the MPA.

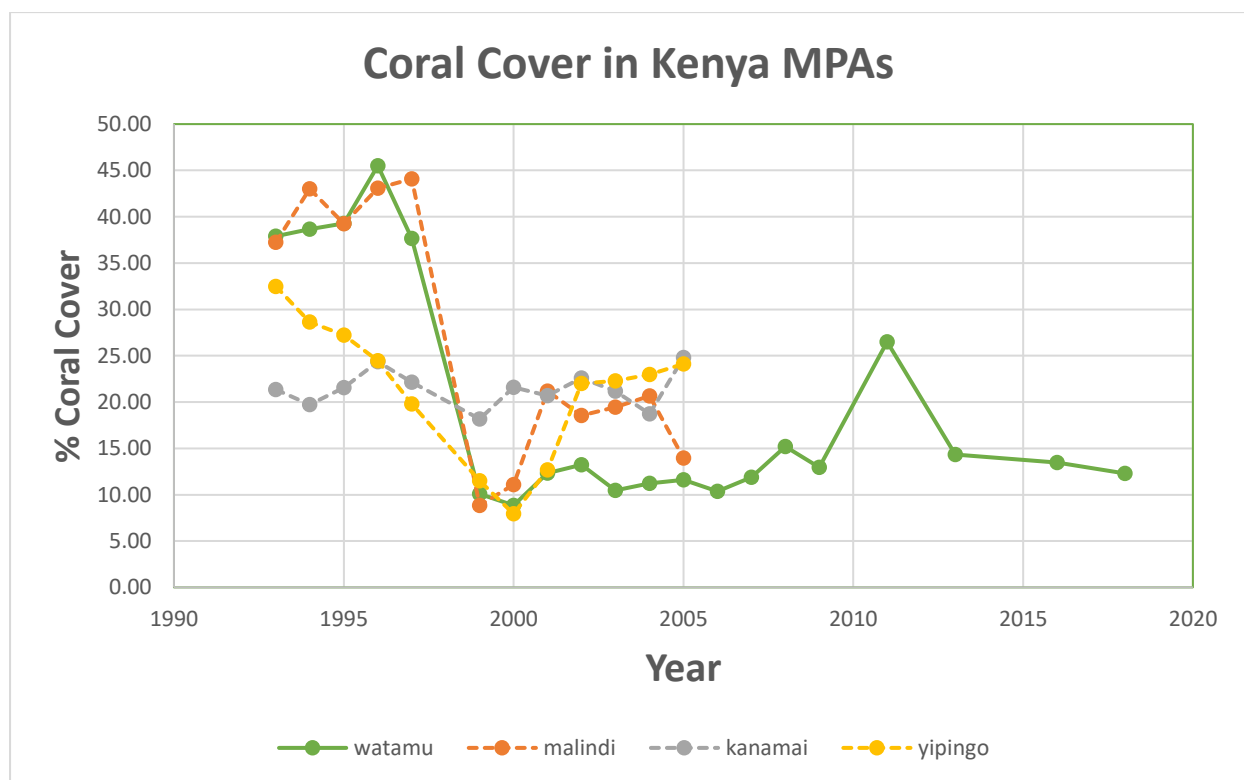


Figure 12 Percentage coral cover in Kenya MPAs. Source: Data from Wildlife Conservation Society Kenya and N.A Muthiga (2009)

<sup>7</sup> Mwango'mbe MG, Spilisbury J, Trott S, Nyunja J, Wambiji N, Collins T, Gomes I and Pérez-Jorge S (2021) Cetacean Research and Citizen Science in Kenya. *Front. Mar. Sci.* 8:642399. doi: 10.3389/fmars.2021.642399

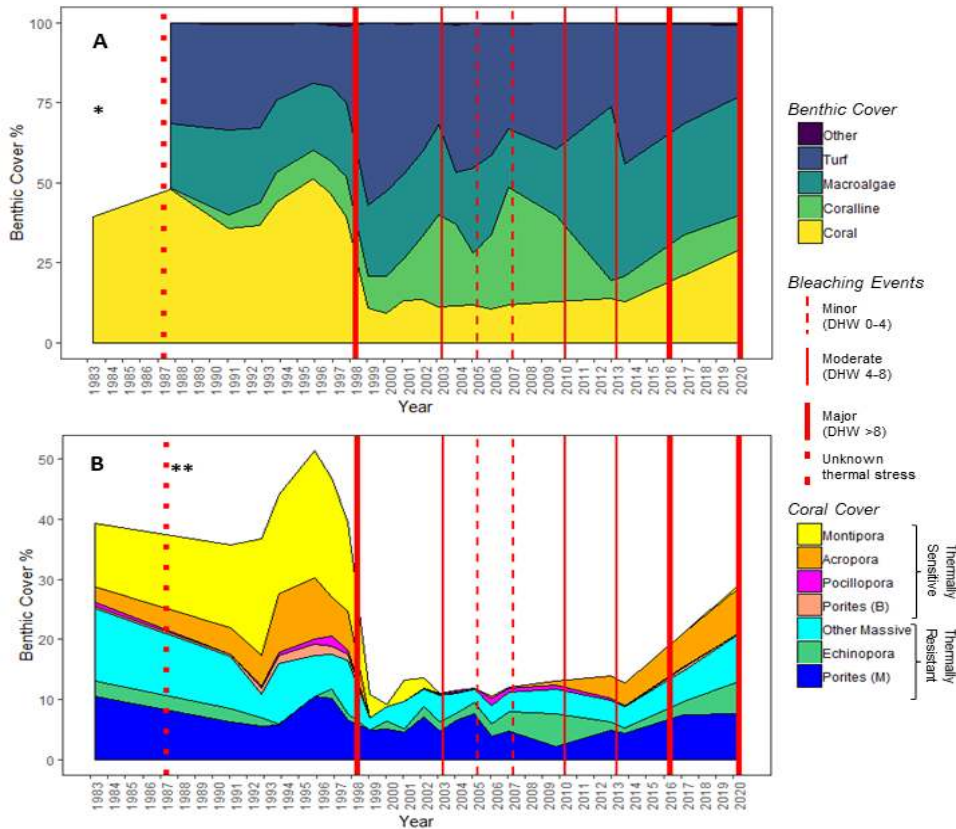


Figure 13: Percentage benthic habitat cover in Watamu National Marine Park  
 Source: ARK monitoring data

### 3.2.3 Mangrove Cover

Mangrove cover has been recorded as declining from a 1969 baseline of 1756ha to 1452ha in 1989 before recovering to 1655ha (Figure 14) according to data from a study based aerial photographs and satellite images. However, the inconsistency in methods across this timeframe means that these figures should be treated with a medium level of confidence.



Figure 14: Total Mangrove cover in Mida Creek  
 Source: Alemayehu *et al.* (2014) based on analysis of aerial photograph mosaics and satellite data

Whilst the overall trend in cover has recovered to within 5% of the baseline, there have been changes in the dominant species reported (Kairo *et al.* 2002; Owour *et al.* 2017) and this may be due to selective cutting of mangrove for tourism industry, fuelwood and other artisanal uses such as construction poles and fishing gear, although other vegetation types are used for these purposes.

### Limitations

Other data which might be relevant to understand long term trends, but are not included here are: fish biomass, sharks and rays, wading birds, levels of invasive species, measures of indicator species and functional diversity.

## 3.3 Climate Trends

### 3.3.1 Sea Surface Temperatures in the Watamu Marine National Park

The coral reefs of Watamu Marine National Park (WMNP) suffered significant bleaching during the El Niño Southern Oscillation (ENSO) event of 1997-1998. Coral bleaching occurs when environmental conditions become inhospitable. Most commonly, the photosynthetic zooxanthellae, which produce up to 90% of the coral's energy, lose their photosynthetic pigment. Causes may include changes in seawater chemistry, turbidity or elevated pollution levels, but bleaching most commonly results from changes sea surface temperature (SST). In 1998, extensive bleaching due to prolonged elevated SST led to a reduction in viable coral cover in WMNP from 35-45% to just 10% (Muthiga 2009). While corals may recover over time, recovery has been slow in some areas (Cowburn *et al.* 2013a). To better understand the dynamics or coral bleaching resilience and recovery in Watamu, long-term studies are required combining in-situ temperature loggers with frequent reef surveys.

The following work presents annual and inter-annual trends in SST within the WMNP. SST data were recorded using an in-situ data logger between 21/05/2016 – 09/10/2019. These data were provided by Tim McClanahan of the Kenyan Wildlife Conservation Society. The Watamu region experienced anomalous high seawater temperatures from late March to early May 2016 related to the 2014-2016 ENSO event. The National Oceanic and Atmospheric Administration's (NOAA) Coral Reef Watch (CRW) programme issued an "Alert Level 1" status for much of the Kenyan coast (including the Watamu area) in April 2016, indicating that bleaching conditions were likely (Fig. 15). However, this was not captured by the current in-situ data series, which began in June 2016.



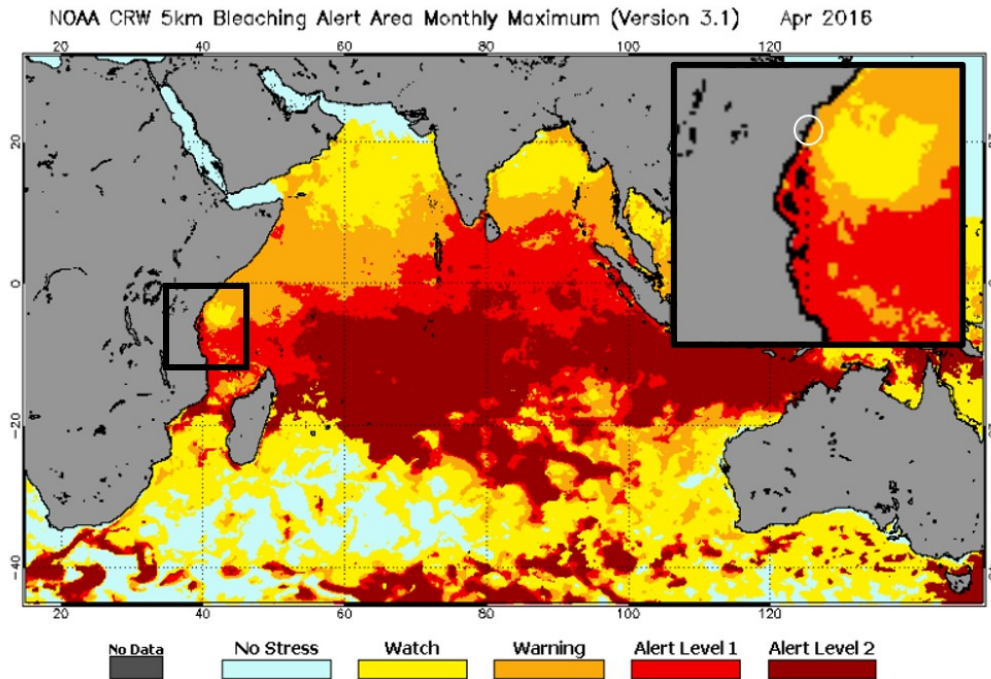


Figure 15: NOAA Coral Reef Watch Coral Bleaching Alerts for the Indian Ocean.

Note: NOAA issued an “Alert Level 1” status for the Watamu Region in April 2016 indicating likely bleaching. The map shows maximum alert levels issued for the month of April 2016. Inset map shows a close-up of areas surrounding Watamu (white circle). Map taken from <https://coralreefwatch.noaa.gov/satellite/baa.php>

Figure 16 shows the complete time series of maximum SST values per day from the temperature logger recorded during the period 21/05/2016 – 09/10/2019. The smoothed inter-annual mean, generated from GAMM predictions, reveals twice-annual peaks in SST during March – May and November – December, with the former producing the highest values, frequently exceeding 30°C. Lowest temperatures (26 – 27°C) were recorded between August – September (Fig. 2). The same data are represented in Figure 15, with all years overlaid. The NOAA Coral Reef Watch stress status is given along the top axis; yellow dots indicate a “watch” status, orange dots indicate a “warning” status where bleaching is possible at each of the seasonal peaks in the time series. This indicates possible bleaching events, occurring between 26/03/2017 – 05/04/2017, 27/02/2018 – 05/03/2018, 02/04/2018 – 10/04/2018, and 27/03/2019 – 05/05/2019 (Fig. 2). Each of these “warning” periods, with the exception of February – March 2018, coincided with consecutive days of SST values above 31°C, as recorded by the in-situ data logger. The most significant potential bleaching event was during April 2019.

In conclusion, these data, together with remotely-sensed satellite observations from NOAA, suggest that the coral reefs of Watamu Marine National Park may be exposed to risk of bleaching on an annual basis, most significantly between the months of March and May. To understand the extent of bleaching, the ability of corals to recover, and the cascading effects on reef biological communities, further data are required, including frequent surveys of coral cover and fish abundance and diversity. Such data would facilitate an assessment of the threats to the reef under future climate change and temperature anomaly scenarios.

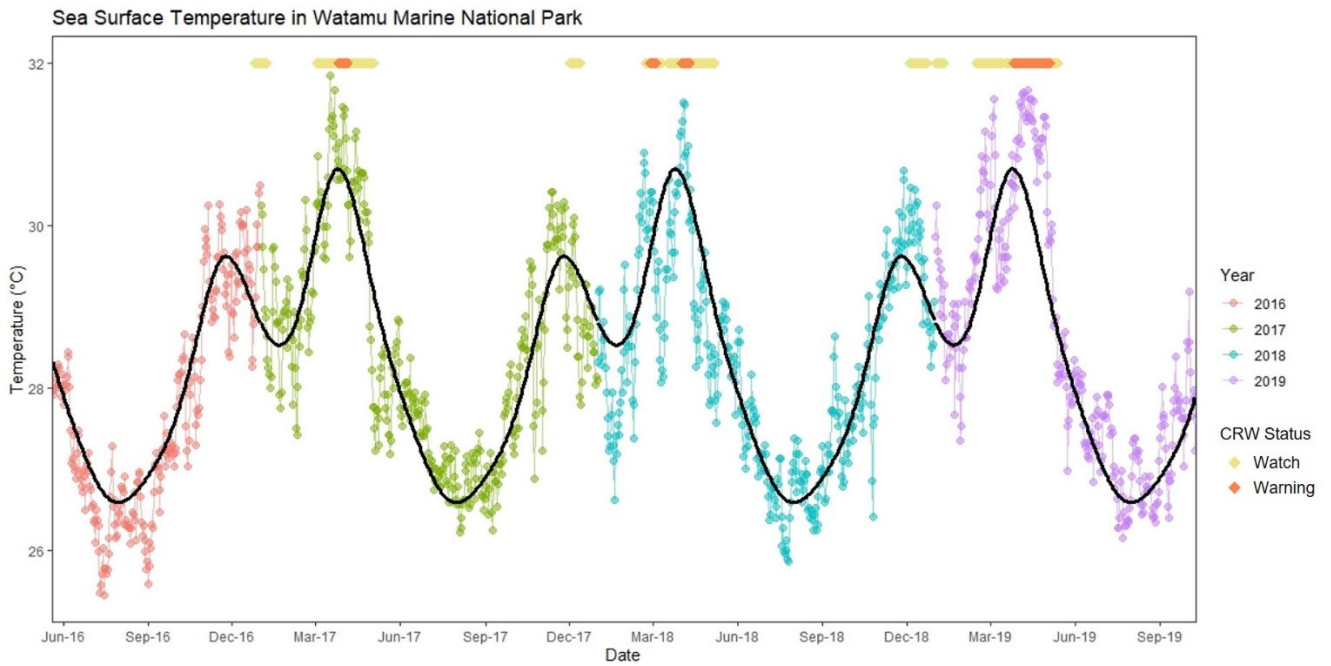


Figure 16: Daily maximum sea surface temperature in Watamu Marine National Park.  
 Source: based on analysis conducted by Dr Matt Carter

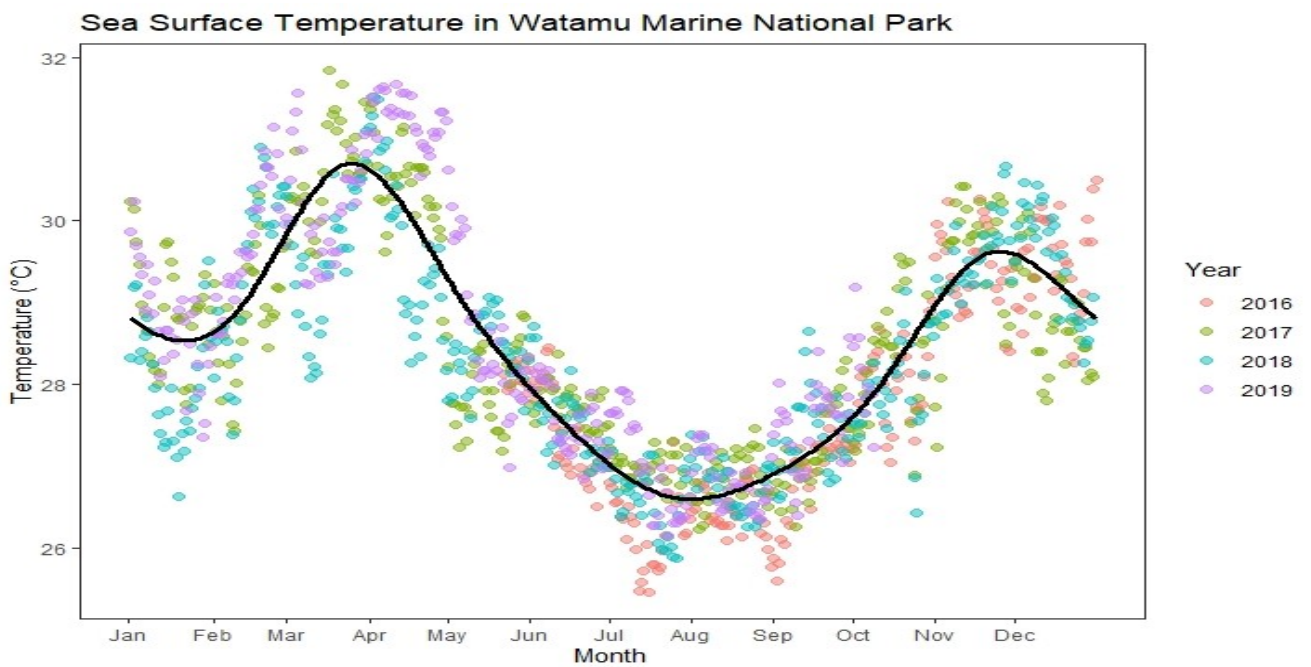


Figure 17: Inter-annual trends in sea surface temperature.  
 Source: based on analysis conducted by conducted by Dr Matt Carter

Figure 17 shows daily maximum SST recordings, colour coded by year. Thick black line is a smoothed representation of the inter-annual mean generated by a Generalized Additive Mixed Model.

- Projections of climate change from the NOAA GFDL CM3 Climate Model suggest that the sea surface temperatures will continue to increase leading to rising sea levels.

- Corals reefs of WMPA continue to experience multiple bleaching episodes as a result of impacts from climate change. This in turn affects biodiversity of the ocean such as decline in fishes.

### 3.4 Water Quality Trends

Anecdotal reports from stakeholder representatives and other experts suggests that **sewage pollution overflowing from housing and business septic tanks** in the residential areas bordering WMNP may be playing a role in reducing the resilience of the coral reef. Data on Water quality are believed to be held by KMFRI, but this data could not be successfully sourced by the project. Beach cleans are regularly organised by an alliance of representative organisations, and trend data on the contents of litter may prove instructive in identifying major sources of litter. A Rocha Kenya have been conducting surveys plastic pollution particularly microplastics as part of the Great Global Nurdle Hunt which indicate increased presence of microplastics on the WMNP Beaches<sup>8</sup>.

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<sup>8</sup> <https://www.arocha.org/en/projects/global-plastic-cleanup/>

#### 4. Drivers of Change

##### **Drivers-(Activities)-Pressures-State-Impact-Response (DPSIR) Assessment**

The Drives of Change framework (Elliott *et al.* 2017) is a holistic problem structuring framework used to assess causes, consequences and responses to changes. It provides helpful insights into the relationships between the origins and consequences of environmental problems and helps understand their dynamics by addressing the links between elements. It is a useful tool for communication between scientists, researchers, policy makers and stakeholders. The following are the various components of this framework:

##### **Drivers**

These are basic human needs, and the related large scale social processes. Example is needs/wants for financial security, giving rise to global economic systems. In coastal areas, these are manifested in maritime sectors which drive development.

##### **Activities**

Activities include human activities in the marine and coastal environment. Examples are the key sectors such as shipping, fisheries, tourism and aquaculture, and within sectors, for example within Fisheries, trawling, line fishing, etc. The level of pressures on the system by Activities is dependent on the mechanisms for control, mitigation and compensation mechanisms put in place.

##### **Pressures**

Anthropogenic factors induce change in the natural and social system. Example is Siltation in the park, marine litter. Pressures can be divided into two groups: Exogenic Unmanaged Pressures, whose causes cannot be managed in that particular area and emerge from outside the sea area being managed and but which their consequences of the pressure, such as climate change impacts on oceans; and Endogenic Managed Pressures, which are those occurring within the management area boundary and whose causes and consequences need managing, for example the activity and impacts of a particular sector such as tourism and recreation.

##### **State**

States refer to conditions in the natural environment due to one or more pressures. Example, changes in sea temperature or increased levels of sedimentation. If the state is changed, human dependence on the system may be compromised because it leads to loss of fish stocks or depletion of natural resources etc.

##### **Impacts (on welfare/well-being)**

Impacts on human welfare result from changes in the natural system. These impacts can either be positive or negative. Changes in the state of the natural environment, e.g. loss of coral reef habitat, might give rise to knock on impacts in human wellbeing e.g. as loss, reduction in fisheries catch or loss of opportunities for tourism, education, research opportunities. Similarly, functioning of ecosystems important

### Response (measures)

Human efforts to govern the system and solve problems might be reflected in a wide range of responses, including policies and actions different levels of the society, involving government, business, NGOs and community groups. Examples might include Strategies for behavioural change, Laws, Policies, Technologies, Restoration or Monitoring programmes,

An overall strength of this framework is that it captures the key relationships in environmental management.

Below Figure 16 is an example of how different components of the Drivers of Change framework link to each other using a case study of **tourism development** for WMPA. This topic is significant given recent proposals for large scale, high rise, and coastal hotel developments in Watamu. The 'response' options in this Drivers of Change assessment highlight multiple pathways or options for managing the issues- for example through implementing development control (including Environmental Impact Assessment) more effectively so that hotel developments do not interfere with beach sediment budgets; or by focusing on restoration of reef systems.

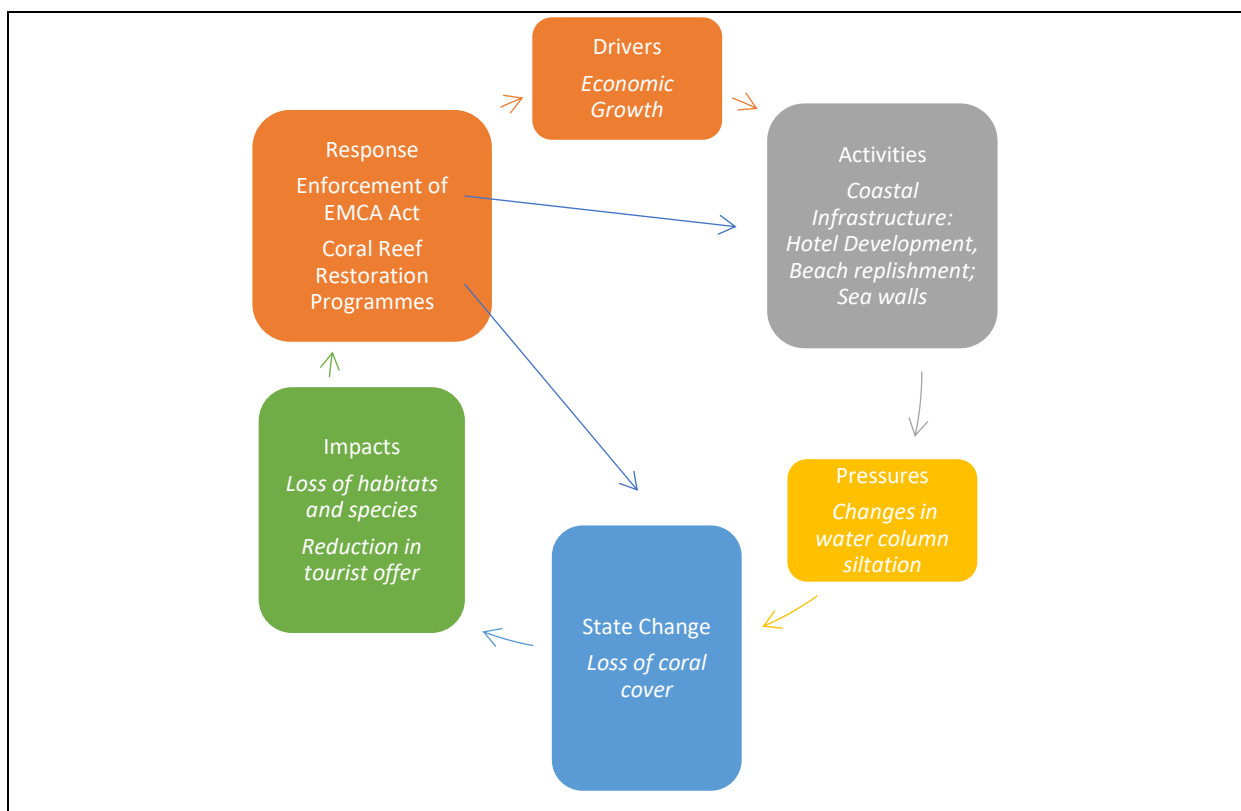


Figure 18: Drivers of Change Diagram

Source: based on analysis developed by Eric Thurair

## Section B. TAKING STOCK

Whilst section A, ‘Looking back’ sets the stage for an analysis of governance, section B ‘taking stock’ focuses on evaluation. The purpose of these evaluations is to learn lessons about the effectiveness of approaches and agree on appropriate adaptive action (Olsen *et al.* 2009)

### 5. Case Studies of Management

The work of managing a Marine Protected Area can involve a wide variety of activities including: monitoring, surveillance, permitting and zoning, research, planning, enforcement, training, awareness raising and education, as well as community and other stakeholder engagement. The activities of wider society are important influence on the success of the MPA, including the public acceptance and understanding of conservation and pro-environmental behaviour. Public, NGOs and business can play a role in MPA management, and in some cases customary management contributes to MPA effectiveness. Management is complemented by scientific research, or practical interventions in the form of species or habitat recovery or restoration, and schemes for sharing the benefits of conservation with broader society, such as visitor facilities or employment opportunities.

Given the wide variety of activities, it can be instructive to focus in on specific aspects of MPA management through the use of **case studies**. The selection of two case studies below is inspired by key issues identified in the ‘looking back’ component of the governance baseline approach. This includes activities of the mandated governance agencies and also efforts by other partners.

#### 5.1 Case Study: Mida Boardwalk

In 2012 A Rocha Kenya partnered with the community around Mida as part of their ASSETS-Scheme to develop Mida creek boardwalk a 260m long walkway hanging on suspended steel cables, with a bird hide for viewing the creek, and location of environmental education.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>Boardwalk provides a source of income to local community through a non-residents/kenyan charge. Revenue contributes towards children’s secondary school scholarships.</li> <li>The bird hide allows engagement with nature whilst reducing disturbance</li> <li>Strong level of community involvement</li> </ul>	<ul style="list-style-type: none"> <li>Upkeep of the boardwalk has proven challenging</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Strong positive links between livelihoods and nature conservation: The boardwalk provides a focus point for tour operators, curio sellers and other stallholders.</li> </ul>	<ul style="list-style-type: none"> <li>Tensions between Mida Creek Conservation and Awareness Group members and other interest groups including fishers.</li> </ul>

Table 9: SWOT Analysis Mida Boardwalk

#### 5.2 Case Study: Coral Gardens

Since the 1970s, Watamu has grown beyond a fishing town to become a major location for tourism in coastal Kenya. Tourist boat operations from Watamu beach are focussed on the honeypot visitor site of Coral Gardens at approx. 33 22’53” S 39 59’38”E.

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Honeypot site enables reduction of pressure on other parts of the reef</li> <li>• Development of a Code of Practice by WMA and KWS</li> </ul>	<ul style="list-style-type: none"> <li>• Internal competition between tour boat operators within and beyond Watamu. (multiple representative groups)</li> <li>• Tour boat crews lack basic literacy, inhibiting environmental awareness</li> <li>• Challenges related to information provision about plastic-free zone</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Further training of tour boat operators and potential development of eco-certification for good practice</li> <li>• Clear communication on good practice to tourists and improved tourism product</li> </ul>	<ul style="list-style-type: none"> <li>• Snorkelers and swimmers operating from tour boats are frequently seen to trample on the reef.</li> <li>• Breaking of coral heads by boats at low tide or through mooring.</li> <li>• Lack of adherence to codes of practice</li> </ul>

Table 10: SWOT Analysis Coral Gardens

### Limitations and Further work

Other case study topics suggested by stakeholders included review of hotel and beachfront development, and review of training and support schemes for beach operators.

### 6. Marine Protected Area Management: Processes and Outcomes

Numerous tools and evaluation standards are available, including ‘How is your MPA doing?’ and most recently the IUCN Green List. KWS and the Kenyan Marine Protected Area network are implementing the **Integrated Management Effectiveness Tool (IMET)**<sup>9</sup> a product of the IUCN BIOPAMA (Biodiversity and Protected Areas Management) Programme delivered through the Central African Forests Commission (COMIFAC) to provide evaluation of protected area management. The IMET tool conducts an assessment on 7 components which provide contextual information on the Protected Area (including ecosystem services) and a further six components which review Management Effectiveness, including: (1) Context; (2). Planning; (3). Inputs; (4). Process; (5). Outputs; (6). Outcomes. Results of this assessment for Watamu MPA are currently awaiting feedback- these would naturally complement the assessment provided by governance baseline approach here.

Meanwhile, analysis provided below uses the “orders of outcome framework” to identify phases in the development of Watamu MPA management. Table 8 highlights a first phase between the late 1980s and 2006 where protected area management has been more hierarchical and top down, with related issues including: resourcing, capacity building and the major coral bleaching event of 1998. Table 9 highlights a second phase post 2006 where MPA management has been a mixture of hierarchical and collaborative approach, with related issues including: overlapping administrative competencies between fisheries, forestry and conservation; and increased pressures from tourism and illegal fishing (Cowburn *et al.* 2012, 2013a; Bush *et al.* 2016)

<sup>9</sup> <https://rris.biopama.org/node/18795>

<b>1st Generation (1980s - 2006)</b>				
<b>Issue Identification</b>	<b>Program Preparation</b>	<b>Formal Funding and Adoption</b>	<b>Implementation</b>	<b>Evaluation</b>
<ul style="list-style-type: none"> <li>• Inefficiency</li> <li>• Low staff morale</li> <li>• Illegal fishing</li> <li>• Inadequate resourcing by the government charged with managing the marine resources</li> </ul>	<ul style="list-style-type: none"> <li>• Responsible government institutions</li> </ul>	<ul style="list-style-type: none"> <li>• The Wildlife Conservation and Management (Amended Act 1989)</li> </ul>	<ul style="list-style-type: none"> <li>• Establishment of Kenya Wildlife Service</li> <li>• Enforcement of MPA Regulations</li> <li>• Collection of revenue</li> <li>• Placing mooring buoys</li> <li>• Beach management program</li> <li>• Research and monitoring</li> <li>• Community initiatives</li> <li>• Integrated Coastal Zone Management</li> <li>• Awareness and education</li> <li>• Management plan development</li> </ul>	<ul style="list-style-type: none"> <li>• High staff turnover at KWS</li> <li>• Inadequate capacity among KWS regarding marine issues</li> <li>• The ever changing Kenyan ministries hosting KWS</li> <li>• Overlapping policies and institutional arrangements between fisheries &amp; forestry</li> <li>• Conflicts between Local community and the MPA</li> <li>• Global geopolitical threats to tourism that the MPA and KWS depend on</li> <li>• Financial instability of KWS</li> <li>• Political instability and lack of support for tourism activities</li> <li>• 1997/1998 Mass coral bleaching event</li> </ul>

*Table 11 Management Cycle Outcome assessment 1980s-2006*

Source: based on analysis developed by Allan Majalia informed by looking at the following literature: KWS and WCS (2004) International Coral Reef Action Network: Malindi Watamu MPA Complex Demonstration Site Project Final Report. Muthiga, N. A. (2009) 'Evaluating the effectiveness of management of the Malindi-Watamu marine protected area complex in Kenya', *Ocean and Coastal Management*. Elsevier Ltd, 52(8), pp. 417–423. doi: 10.1016/j.ocecoaman.2009.06.001. Tuda, A. and Omar, M. (2012) Protection of Marine Areas in Kenya, the George Wright Forum. Karanja, D. (2012) The Role of the Kenya Wildlife Service in Protecting Kenya's Wildlife. Government of Kenya (2013) Wildlife (Conservation And Management) Act. Available at: [www.kenyalaw.org](http://www.kenyalaw.org) (Accessed: 24 December 2019). Kenya Wildlife Service (KWS) (2017) 'Watamu Marine Protected Area Management Plan, 2016-2026'. Owuor, M. A., Icely, J. and Newton, A. (2019) 'Community perceptions of the status and threats facing mangroves of Mida Creek, Kenya: Implications for community based management', *Ocean and Coastal Management*. Elsevier, 175(February), pp. 172–179. doi: 10.1016/j.ocecoaman.2019.03.027. Tuda, A. O., Kark, S. and Newton, A. (2019) 'Exploring the prospects for adaptive governance in marine transboundary conservation in East Africa', *Marine Policy*. Elsevier Ltd, 104(July 2018), pp. 75–84. doi: 10.1016/j.marpol.2019.02.051. Cowburn, B. et al. (2018) 'The habitats and biodiversity of Watamu marine national park: Evaluating our knowledge of one of east Africa's oldest marine protected areas', *Atoll Research Bulletin*, 2018(618). doi: 10.5479/si.0077-5630.618.



<b>2nd Generation (2007 - Present)</b>				
<b>Issue Identification</b>	<b>Program Preparation</b>	<b>Formal Funding and Adoption</b>	<b>Implementation</b>	<b>Evaluation</b>
<ul style="list-style-type: none"> <li>• Policy, institutional and market failures</li> <li>• Top-down management approach when managing fish stocks/MPA</li> <li>• Decline in fish stocks</li> <li>• Use of illegal and/or destructive fishing gears, environmental degradation, cross-border fishing conflicts</li> </ul>	<ul style="list-style-type: none"> <li>• Collaboration between government agencies, civil society organisations and local communities</li> </ul>	<ul style="list-style-type: none"> <li>• Kenya Fisheries (Beach Management units) Regulations, 2007 to the Fisheries Act, 1989</li> <li>• Wildlife Conservation and Management Act (2013)</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries co-management (government and communities) mandate is to ensure sustainable utilisation of fisheries and inclusive use of traditional knowledge on fisheries management</li> <li>• Creation of Beach Management Units (BMUs) at fish landing sites</li> </ul>	<ul style="list-style-type: none"> <li>• Predominantly top-down although there are elements of co-management</li> <li>• Encroachment on MPA by insensitive expansion of hotels and illegal fishing</li> <li>• Inadequate financial resources allocated to KWS</li> <li>• Conflicting interests between various stakeholders involved with the management of the MPA</li> </ul>

<ul style="list-style-type: none"> <li>• Lack of enforcement capacity</li> <li>• Overlapping administrative competencies - fishing authorities, marine conservation and forestry</li> </ul>			<ul style="list-style-type: none"> <li>• Management plan development and implementation</li> <li>• Zonation of MPA<sup>10</sup> for the multiple use of marine resources</li> <li>• Enforcement of rules and regulation on management of the MPA</li> <li>• Introduction of the concept of marine conservation area</li> <li>• Collaborative Research and Monitoring</li> </ul>	
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Table 12: Management Cycle Outcome assessment 2007 –Present

Source: based on analysis developed by Allan Majalia based on the literature listed above

<sup>10</sup> Closed Zone= Whale Island and Turtle nesting sites; No take Zone=Watamu NMP +100m; Artisanal zone= Mida Creek and wider WMNMR (KWS, 2017)

## 7. Well-being of Communities

The governance baseline approach explored dynamic links between protected area management and well-being of local communities. Well-being relates to notions of ‘quality of life’ and ‘living a good life’ (White *et al.* 2010) and for this study was considered in three dimensions: (1) material well-being, referring to physical human needs such as food, income, shelter, and vital services; (2) relational well-being, including personal and social relations; and (3) subjective well-being, understood as personal perceptions of life.

A representative sample of the local population was not possible, but 312 telephone surveys were conducted by two locally recruited and trained surveyors in June and July 2020 for households in the settlements of Uyombo and Mida Creek, two of the villages near the MPA. The survey included a mix of open and closed questions and respondents asked about how the protected area contributes to their **Well-being** through benefits and disbenefits received from WMNP and Mida Creek. The average numbers reported were 4.4 benefits (St. dev. 3.5), and 2.5 disbenefits (St. dev. 2.2)<sup>11</sup>. The total number of benefits were 1386 and disbenefits 726. Respondents were asked to indicate the level to which they had been “content” with their life before the COVID-19 pandemic. The majority (53%) responded that they had been “neither much content nor little content.”

<b>Primary contribution to well-being category</b>	<b>Benefit</b>	<b>Total experienced</b>
<b>Subjective</b>	Better health	205
<b>Subjective</b>	Ability to enjoy a clean, healthy creek and ocean (can be enjoyed from land and does not require going in the water)	195
<b>Material</b>	Increased benefits from tourism	150
<b>Relational</b>	More participation in natural resource management	132
<b>Subjective</b>	Increased ability to deal with problems and challenges	128
<b>Relational</b>	Increase in educational and social facilities	125
<b>Material</b>	Increased funding and support from outside the community	109
<b>Material</b>	Increased supplies of food	104
<b>Others benefits (listed in rank order)</b>	Increase in job opportunities, Increased spiritual benefits, Increased wealth, Better mangrove harvesting practices, Recreational benefits, Environmental benefits, Increased knowledge about conservation, Increased security, Increased stakeholder collaboration, Less erosion	<100 [highest 96, lowest 1]

Table 13 Wellbeing benefits obtained from WMNP and Mida Creek

Source: Harker *et al* unpublished

Table 10 identifies the primary benefits are mainly related to subjective well-being, including “Better Health” and “Ability to enjoy a clean, healthy creek and ocean” along with material

<sup>11</sup> Statistically significant differences were found between Uyombo and Mida, different age groups, females and males, length of residency and relative wealth, but this information is not reported here.

well-being of “Increased benefits from tourism” demonstrating the dependence of tourism on conservation.

Table 11 identifies the primary disbenefits are mainly related to ‘relational’ well-being including “Decreased participation in natural resource management” and “Increased conflict and social tension” these reflect the range of resource use conflicts in the MPA and the challenges of conducting ongoing effective stakeholder engagement across different community groups. Other ‘material’ disbenefits are related to reduced access to resources due to the protected area.

<b>Primary contribution to well-being category</b>	<b>Disbenefit</b>	<b>Total experienced</b>
<b>Relational</b>	Decreased participation in natural resource management	150
<b>Relational</b>	Increased conflict and social tension	122
<b>Material</b>	Increased poverty ( <i>incl. decreased access to resources</i> )	95
<b>Other disbenefits (listed in rank order)</b>	Increased problems due to tourism pressure, Fewer supplies of food, Loss of job opportunities, Problems due to pollution or waste, Less control over my own life, More evil spirits, Loss of spiritual benefits, Logging, Illegal fishing and fishing methods, Animal attacks Disruption and killing of bird life, Drug abuse and erosion of culture and social life, Children devalue education for creek-based livelihoods, Climate change, Oil spills	<100 [highest 72, lowest 1]

Table 14 Wellbeing disbenefits related to WMNP and Mida Creek

Source: Harker *et al* unpublished

“Decreased participation in natural resource management” and “Increased participation in natural resource management” were represented under both ‘benefits’ and ‘disbenefits’. The survey also asked respondents to rank the performance of conservation agencies- 90% of respondents agreed they did a good job. One interpretation of these results is that respondents are satisfied with resource management in some domains such as effective enforcement, but generally not satisfied with their level of involvement in decision-making. It is also significant that KWS and KFS operate with limited resources, for example limitations on the number of rangers needed for community engagement in park and their capacity building for marine conservation.

### Limitations and Further work

An assessment of ecosystem services could identify the importance of key habitats, species or ecological processes, and also further understanding about how changes or impacts on the Area of Focus would affect the flow of services and related benefits.

## Section C. LOOKING FORWARD

Section C of the baseline considers issues which are approaching ‘over the horizon’ especially climate change trends, and options going forward including practical goals for MPA governance and wider visions for collaborative action.

### 8. Climate Change Trends

The rationale for developing the climate change trends was based on posing the following questions:

- What are current trends and what is the projection for change?
- What is the range of anticipated change?
- How will vulnerable features and human well-being be impacted?

#### 8.1 Historical Trends

Coastal Kenya has a tropical monsoon climate, with temperatures varying between average lows of 19 and highs of 34 Celsius year round. Yearly average temperature at Watamu is shown in Figure 18.

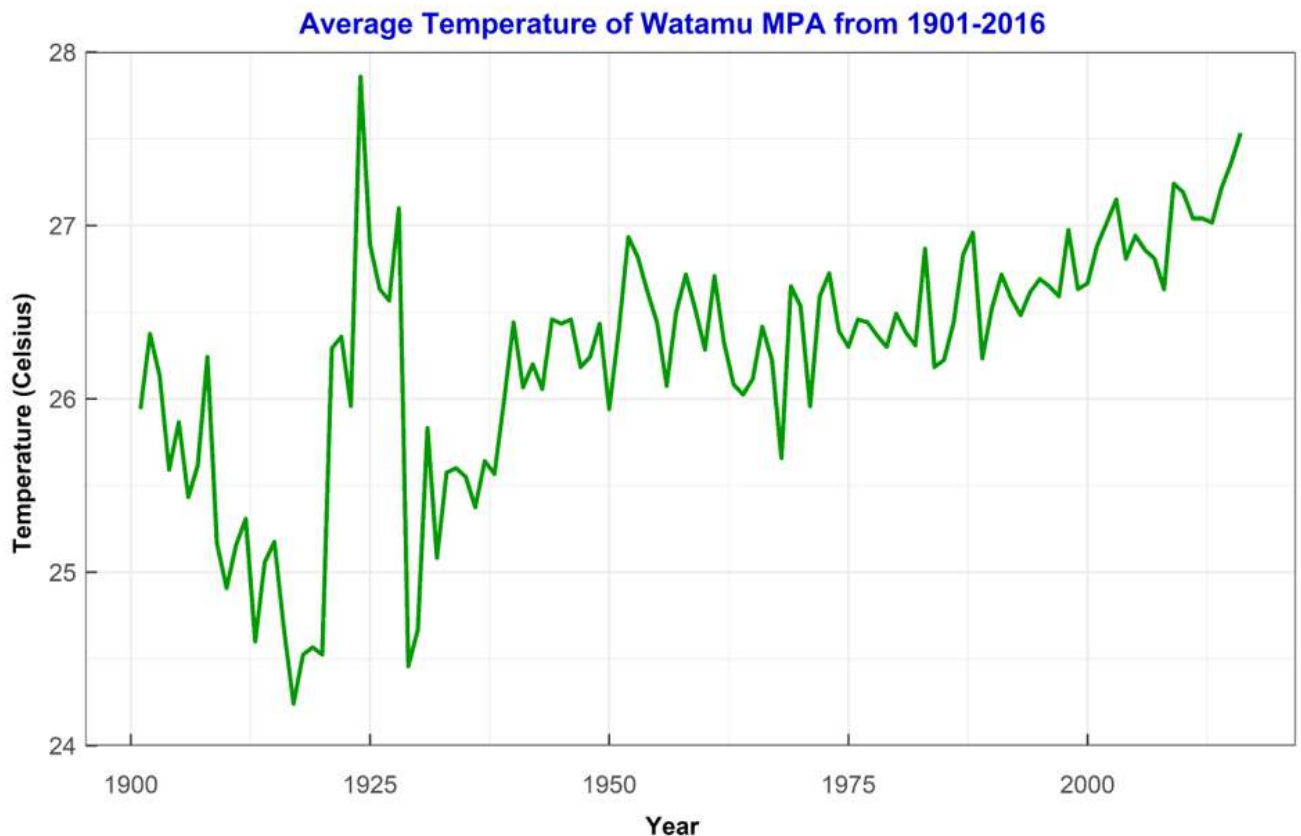


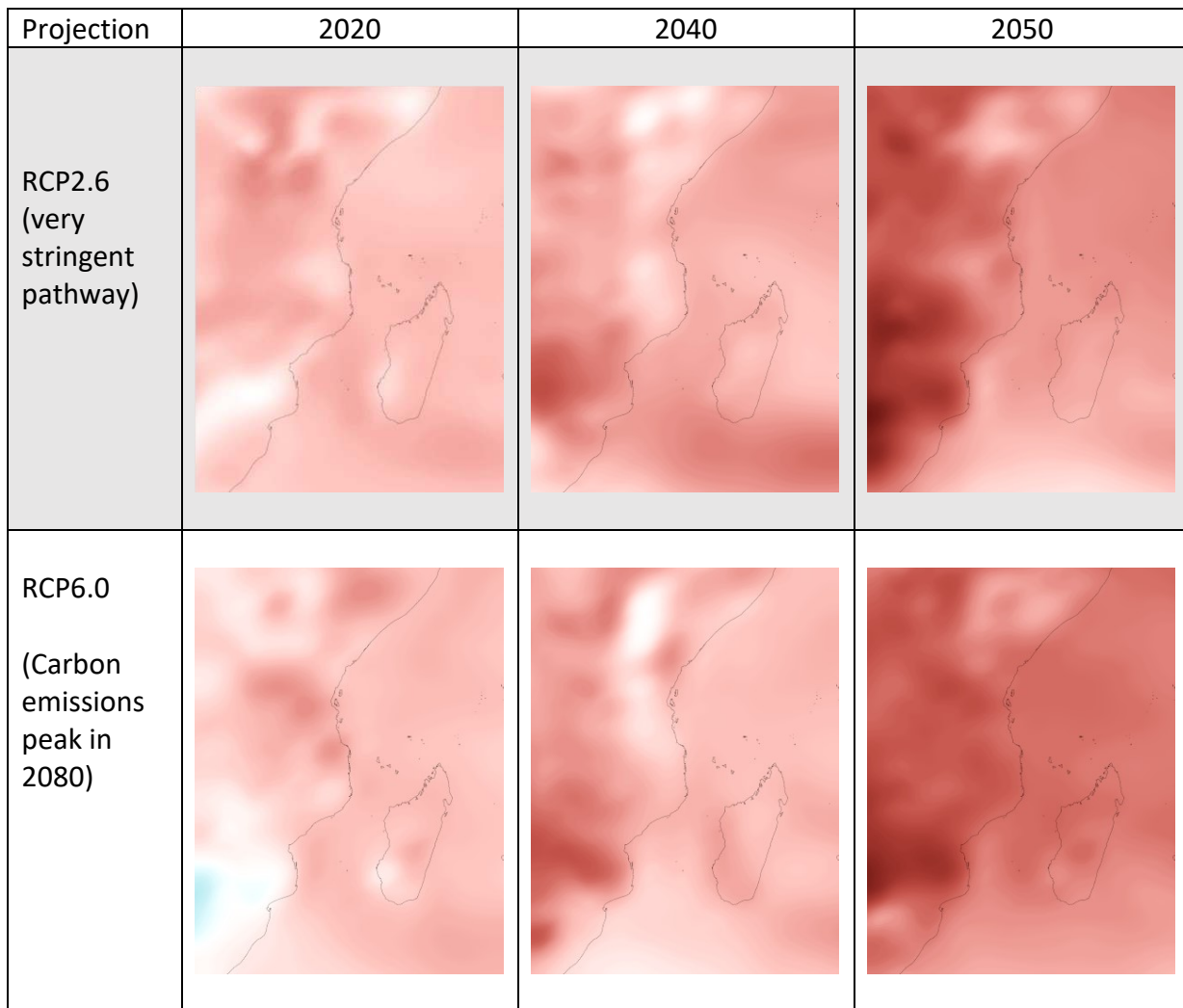
Figure 19: Average Temperature at Watamu MPA from 1901-2016.

Prepared by B Kao, based on Data from World Bank Climate Change Knowledge Portal

## 8.2 Climate Change: Projections and Impacts

### Average Temperature

Climate change profiles show how future predicted climate will see increases in average temperature in coastal Kenya and the wider Western Indian Ocean Region. Figure 19 shows increases in average temperature expected over next 20 and 30 years from two scenarios<sup>12</sup>, with warming leading to increases of between 1.2 and 1.8 degrees Celsius in the region on average. Related to these projections, precipitation is likely to be more intense in rainy monsoon seasons. Furthermore, there are likely to be impacts on marine and coastal ecosystems through increase in sea level rise and ocean acidification (IPCC, 2021)



Degrees Celsius deviation of temperature from 20<sup>th</sup> century average

Figure 20: Watamu MPA Climate Change Projections.

Prepared by B Kao, based on Data from NOAA GFDL CM3 Climate Model

<sup>12</sup> Scenarios based on IPCC AR5 assessment (2014)

## Sea Level Rise

Information from the IPCC online atlas <https://interactive-atlas.ipcc.ch/> shows projections of 0.3m sea level rise in the S.E. Africa region, over the medium term (i.e. 2041-61) relative to 1995 under the SSP3, 4 and 5 scenarios. Figure 20 below shows the projection for SSP 8.5

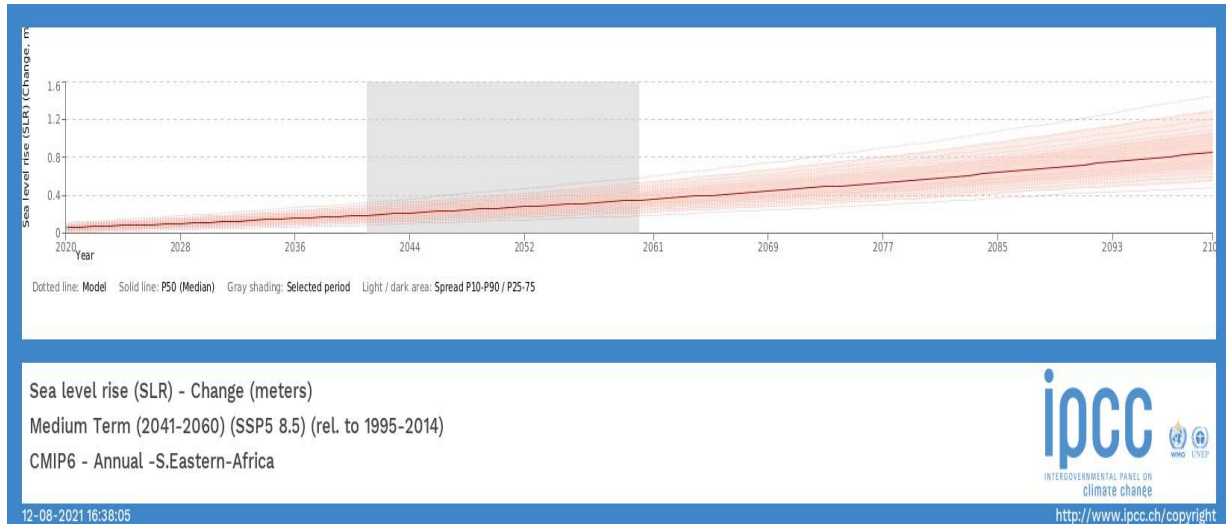


Figure 21: Projected Sea Level Rise SE African region IPCC AR6 WP1.

Source: Downloaded from IPCC online atlas <https://interactive-atlas.ipcc.ch/>

## Limitations

Further assessments particularly focusing on the impacts of climate change on the marine environment are required at a regional scale and for specific stretches of coastline. These include assessments of sea level rise, storminess and other hazards such as flooding, and ocean acidification, and knock on effects on marine ecosystems and species (particularly those vulnerable to acidification such as coral reefs) and human wellbeing.

## 9. Visioning

In response to the findings of the Governance Baseline assessment, delegates at the 2021 Turtle Bay Resort workshop sought to develop a vision for collaborative action. Partners agreed that this vision should build upon the principles and goals set for the **Watamu MPA Management Plan 2016-2026**, as this would assist to actively implement the plan, and support Kenya Wildlife Service in their legal duties, whilst creating a wider partnership for implementation and engaging key stakeholders.

Fig. 22 and Table 12 show a suggested structure and functions of the working groups respectively:

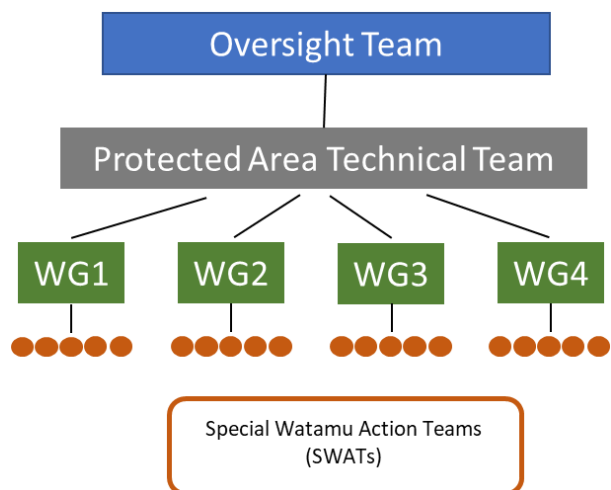


Figure 22: Suggested structure of the working groups

Team	Functions
<b>Oversight Team</b>	-Oversight -Ensures compliance e.g., with laws and policies -Provides higher level approvals
<b>Protected Area Technical Team</b>	-Co-ordinate and supervise working groups -Oversee day-to-day MPA operations -Approval of the working groups action plans -Resource mobilization
<b>Working Groups</b>	-Develop and manage action plans for WG -Create and submit WG reports to PATT
<b>Special Watamu Action Teams (SWATs)</b>	-Implementation of plan for objective -Develop and propose implementation plan to WG

Table 15: Suggested functions of the working groups

The process of setting up the working groups is still ongoing. Delegates and other organisations who were not represented during the workshop but are keen to support the implementation of the management plan are invited to submit their names to KWS against which programmes they would like to be involved in. Further communication on when the meetings will be held will be communicated in due time.

### **Watamu Marine Protected Area Management Plan (2016-2026)**

The management plan was developed by KWS in collaboration with the key stakeholders in the WMPA under the Wildlife Conservation and Management Act, 2013, which requires each wildlife protected area to be managed in accordance with an approved management plan. It was gazetted on 23<sup>rd</sup> August 2019 via Legal notice number 7883.



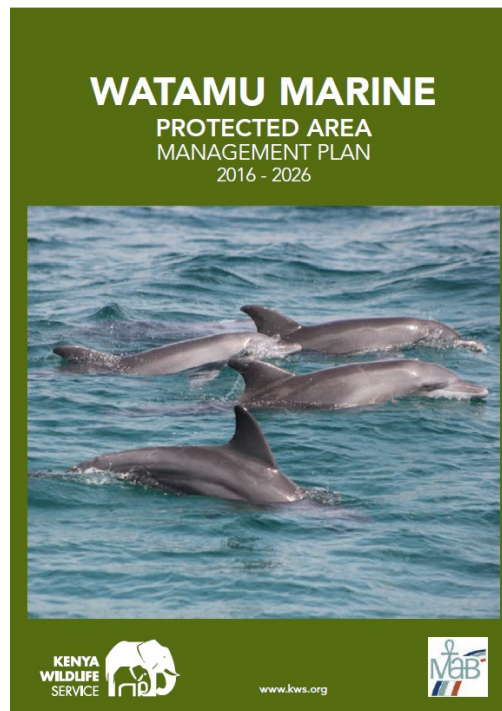


Figure 23: Cover page of the WMPA Management Plan 2016 - 2026

There are four key implementation programmes outlined in the management plan (KWS, 2016). Under each programme, delegates suggested the issues to be addressed during the implementation of the management plan. Additional suggestions can be raised through the WGs. These include:

### 1. Ecological management programme

The key goal of this component is to conserve the WMPA's marine ecosystems and improve understanding of their health and functioning.

#### Delegate Suggestions

- There is need to strengthen BMUs regarding their areas of jurisdiction. According to the BMU regulations (2007), this mandate lies with the Fisheries department from the national and devolved government. Stakeholders also need to be aware that anyone operating within the beach should be part of the BMU including boat operators, hotels, fishermen and sport fishermen.
- Frequent monitoring and evaluation of the WMPA to understand its status and find better ways to enhance its conservation.
- Stakeholders need to find ways of restoring degraded ecosystems such as coral reefs.
- Researchers need to disseminate their research findings to all stakeholders.
- Greater awareness needs to be created to stakeholders such as fishermen about the red listed species of WMPA so as enhance the conservation efforts of threatened species.

## **2. Tourism development and management programme**

The key goal of this component is to ensure sustainable tourism development in line with conservation principles and to enhance and market WMPA as a world class quality tourist destination rich in natural beauty and biodiversity.

### **Delegate Suggestions**

- There is need to address the unregulated development along the beach such as construction of sea walls.
- There is need to regulate the number of tourists accessing the WMPA particularly during peak seasons so as minimize the pressure on the ecosystem
- Explore alternative tourism sites within the MPA so as reduce the pressure on coral gardens, which is the commonly visited site
- Enhance the standards of conducting tourism related activities example through the adoption of eco-certification. There is need for an improved, effective, transparent and cheaper system of charging park entry fees e.g., electronically, weekly or yearly passes

## **3. Community partnership and education programme**

The key goal of this component is to ensure participation of WMPA adjacent communities in sustainable conservation and management of the marine resources is strengthened for livelihood improvement.

### **Delegate Suggestions**

- Strengthen the benefit sharing mechanisms by involving the communities in initiatives planned by stakeholders. Committees can play a role here.
- Develop regular sensitization and training programmes for different resource user groups such as fishermen, communities living adjacent to the WMPA, safari sellers and beach and boat operators. This will help them understand the ecology of the WMPA, activities are legal and illegal and the standards or protocols to follow when using the WMPA.
- Create an information hub for the WMPA for example at entry points. This will help create awareness about the WMPA for the benefit of all stakeholders.
- The need for environmental education as part of sensitization platform

- Explore potential for marine spatial planning for the WMPA. This will assist resource user groups know their boundaries thus minimal conflicts between themselves and with other stakeholders.
- Empower communities to explore other sustainable alternative livelihoods which are environmentally friendly.
- There is need for greater compliance and transparency with issuing of licences.
- Outline clear conflict resolution mechanisms amongst stakeholders for effective implementation of the management plan
- Recognise indigenous knowledge as an important tool in the protection and conservation of WMPA.
- Strengthen collaborations between different stakeholders, especially local communities, and government agencies, NGOs, academics and business entities.
- Support commercial fishing to meet the requirements under the Fisheries Management and Development Act, 2016<sup>13</sup>.
- Support local communities in their conservation related initiatives.
- Organise annual fora where stakeholders can report on progress of work and challenges.

#### **4. WMPA operations and security management programme**

The key goal of this component is to ensure operational systems and structure are efficiently and effectively supporting the achievement of WMPA's management programmes.

##### **Delegate Suggestions**

- Enhance security of the WMPA through the use of satellites. This can also work effectively by working in close collaboration with the community for example through formation of scouts.

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<sup>13</sup>

[http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/FisheriesManagementandDevelopmentAct\\_No35of2016.pdf](http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/FisheriesManagementandDevelopmentAct_No35of2016.pdf)

## 10. Next Steps and Identifying Alternative Livelihoods.

The common understanding developed by a governance baseline assessment forms the basis for moving from planning and analysis to action. The following key action points may be considered:

- Review opportunities and challenges for alternative, pro-conservation livelihood development, especially those which will support most disadvantaged communities.
- Implement practical options to make changes in investment and behaviour to support conservation, and identify partners to take forward work.
- Find strategic partners and funding sources to support the implementation of MPA governance

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## Appendices

### Appendix 1: Workshop Delegates

NO.	NAME	AFFILIATION
1.	Allan Majalia	A Rocha Kenya
2.	Amina Hamis	Bidii Na Kazi Women Group
3.	Bakari Mangale	National Environment Management Authority
4.	Benjamin Karissa	Dabaso Creek Conservation Group
5.	Benjamin Kelliher	Tribe Water Sports
6.	Bernard Fulanda	Pwani University
7.	Claperton Kazungu	Uyombo Beach Management Unit
8.	Colin Jackson	A Rocha Kenya
9.	Daniel Musau	Umoja Beach Operators
10.	David Kombe	Sita-Umoja Self Help Group
11.	Donald Ngowa	Kilifi North Sub-County- Fisheries Department
12.	Dr. Mohamed Omar	Kenya Wildlife Service
13.	Eric Thurania	A Rocha Kenya
14.	Erick Menza	Mida Creek Conservation and Awareness Group
15.	Faizal Omar	Watamu Excursion Marine Association
16.	Fiona Moejes	Local Ocean Conservation
17.	Florian Biziere	Ocean Sports Resort
18.	Francesco	JC Kite School
19.	Guido	Garoda /Kobe Suite/ Gecko Resorts
20.	Harry Scholz	Diving and Water Sports Centre
21.	Hellen Curtis	Aqua Ventures Dive Tourism
22.	Hellen Dadi	Mida Primary School
23.	James Njue	Watamu Primary School
24.	Jan Langer	Temple Point Resort
25.	John Kalume	Jipe Moyo Conservation Group
26.	Joseph Maitha Baya	Dabaso Assistant Chief
27.	Judith Ochieng	A Rocha Kenya
28.	Justin Beswick	Local Ocean Conservation
29.	Justin Kitsao Kenga	Watamu Beach Operators and Safari Sellers
30.	Kahindi.S. Fondo	Kenya Forest Service
31.	Kahindi Changawa	Local Ocean Conservation
32.	Ken Ombok	Turtle Bay Beach Club
33.	Lucille Ford	Watamu Association
34.	Nicky Parazzi	Local Ocean Conservation
35.	Matthias Schmidt	Extra Divers Temple Point
36.	Maxwell Azali	Wildlife Conservation Society
37.	Melinda Rees	Hemingways Resort
38.	Michael Mwang'ombe	Watamu Marine Association
39.	Mlati Ochieng	Friends of Arabuko Sokoke Forest
40.	Monica Njambi	A Rocha Kenya
41.	Osman Mwambire	Watamu Beach Management Unit
42.	Patrick Kilumo	A Rocha Kenya
43.	Peter Ngome	Prawns Lake Conservation Group
44.	Queen Elizabeth	A Rocha Kenya
45.	Renson Baya	Local Administration- Mida Assistant Chief
46.	Richard Moller	Tsavo Trust
47.	Roseline Nabala	Sauti ya Wanawake
48.	Ruth Ndumi	Watamu Curio Beach Operator
49.	Salim Swaleh	Local Administration- Watamu Assistant Chief
50.	Sandro Kopperd	Temple Point Resort

51.	Semir Eugenio	A Rocha Kenya
52.	Shebwana Dawami	Watamu Association of Boat Operators
53.	Simon Kenga	A Rocha Kenya
54.	Stanley Baya	A Rocha Kenya
55.	Steve Trott	Watamu Marine Association
56.	Thomas Mkare	Kenya Marine and Fisheries Research Institute
57.	Thomasina Owinyo	A Rocha Kenya
58.	Tina Scholz	Diving and Water Sports Centre
59.	Tsinganyiu Dadley	Kenya Wildlife Service
60.	Twahir Kiraga	Gede Community Forest Association
61.	William .K. Kombe	Uyombo Assistant Chief

Table 16: Workshop Delegates

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**WATAMU MPA GOVERNANCE BASELINE TOOL****STAKEHOLDERS WORKSHOP****10<sup>TH</sup> – 11<sup>TH</sup> FEBRUARY 2021, TURTLE BAY HOTEL, WATAMU, KENYA**

<b>DAY 1</b>			
<b>DATE</b>	<b>TIME</b>	<b>SESSION</b>	<b>RESPONSIBLE PERSON(S)</b>
10/02/2021	0900	Registration and Refreshments	Judith Ochieng
	1000	Welcome Address & A brief introduction to Marine Governance Baseline Tool	Dr. Colin Jackson National Director- ARK
	1030	Keynote Speech	Dr. Mohamed Omar Said Mohamed Assistant Director- Wetlands and Marine Reserves (KWS)
	1050	Looking Back: Timelines in Governance	Allan Majalia
	1150	Looking Back: Long term trends	Erick Thurania
	1300-1400	Lunch Break & Refreshments	Turtle Bay
	1400	Taking Stock: IMET tool	Mr. Dadley Tsinganyiu Senior Warden-WMNPR (KWS)
	1500	Taking Stock: Livelihoods Assessment	Judith Ochieng
	1600	Vote of thanks & Workshop close for day 1	Dr. Colin Jackson National Director- ARK
	1615	Feedback	Queen Elizabeth
<b>DAY 2</b>			
<b>DATE</b>	<b>TIME</b>	<b>SESSION</b>	<b>RESPONSIBLE PERSON(S)</b>
11/02/2021	0900	Registration and Refreshments	Judith Ochieng
	1000	Looking Forward: Climate Change	Dr. Colin Jackson National Director- ARK
	1030	Looking Forward: Creating a joint vision	Stanley Baya
	1230	Workshop Close & Vote of thanks	Dr. Colin Jackson National Director- ARK
	1245	Feedback	Queen Elizabeth
	1255-1330	Lunch	Turtle Bay

Appendix III. Additional Information on the governance baseline timeline and ‘eras’ of governance

Table 17: Governance Baseline Timeline Entries (1963 - 1979)

Year	Key Sector	Laws and Policies, events relevant to MPA governance	Other relevant notes	Era of Governance
1963		Kenya's Independence	Critical to note that oceans and fisheries sectors had operated without policy and legal framework between 1963 until 2003 where a policy drafting process began and was completed in 2008	
1966-1970	Tourism	National Development Plan identifies four key areas for tourism: a) Commissioned the Bertrand Study on tourism b) a feasibility established on the construction and improvement of tourist lodges c) A feasibility study done on "tourist roads" d) Establishment of the Kenya Tourist Development Corporation		
1968	Nature Conservation	Establishment of the Watamu National Marine Park		
1968	Nature Conservation	African convention on the conservation of Nature	It informed the development of most environmental laws in Africa	
1971	Nature Conservation	NMP Survey	Conducted by team led by University of Bangor	
1979	Nature Conservation	Establishment of the Malindi-Watamu Biosphere Reserve		
1979	Fishing	Establishment of the Kenya Marine and Fisheries Research Institute (KMFRI) with the mandate for fisheries research		

Table 18: Governance Baseline Timeline and Eras of Governance Entries (1980 - 1999)

Year	Key Sector	Laws and Policies, events relevant to MPA governance	Other relevant notes	Era of governance
1987	Nature conservation	The beginning of long-term ecological monitoring of Kenya's coral reefs		Hierarchical, centralized and top-down governance system
1989	Nature conservation	Amended of the Act of Parliament Cap 376 (The wildlife conservation and management Act)		Hierarchical, centralized and top-down governance system
1990	Nature conservation	Establishment of the Kenya Wildlife Service; a state corporation that is mandated to conserve and manage wildlife in Kenya, enforces law and regulations relating to wildlife. It also manages most of the national parks and reserves (both terrestrial and marine)		Hierarchical, centralized and top-down governance system
1993	Nature conservation	Arusha Resolution; Eastern Africa countries adopt the ICM process	ICM: Integrated Coastal Management	Hierarchical, centralized and top-down governance system
1994	Nature conservation	Both UNEP/FAO and CRC-URI/USAID initiate dialogue for pilot activities on ICM; however Watamu not chosen as a piloting site, the project uses Mombasa and Diani as piloting sites		Hierarchical, centralized and top-down governance system
1994	Nature conservation	Watamu ceases to be Malindi's KWS substation		Hierarchical, centralized and top-down governance system
1996	Fishing	Approximately 1000 artisanal fishermen recorded on 12 fish landing sites stretching from Malindi to Watamu		Hierarchical, centralized and top-down governance system
1997	Nature conservation	Mass coral bleaching event in Watamu		Hierarchical, centralized and top-down

				governance system
1997	Nature conservation	Establishment of the Watamu Turtle Watch		Hierarchical, centralized and top-down governance system
1999	Nature conservation	Official registration of A Rocha Kenya		Hierarchical, centralized and top-down governance system
1999	Nature conservation	Enactment of the Environmental and Management Act 1999		Hierarchical, centralized and top-down governance system
1990s	Tourism	Booming tourism industry in Watamu peaking at 30,000 visitors		Hierarchical, centralized and top-down governance system

Table 19: Governance Baseline Timeline and Eras of Governance Entries (2000 - 2019)

Year	Key Sector	Laws and Policies, events relevant to MPA governance	Other relevant notes	Eras of governance
2000	Nature Conservation	Watamu KWS office had grown in terms of the number of staff members from a few to 34		Hierarchical, centralized and top-down governance system
2001	Tourism	Significant Tourism infrastructure in Watamu from 6 in the 1960s to 120 hotels in 2001		Hierarchical, centralized and top-down governance system
2001	Tourism	Due to the growing tourism industry and the demand for labour to cater for the market there was an increase in settlement in		Hierarchical, centralized and top-down governance system

		Watamu by 597% with the mangrove forests of Mida creek affected		
2001	Nature Conservation	Coral islets, whale island, Watamu NMP and Mida creek made part of the IBA inventories		Hierarchical, centralized and top-down governance system
2001	Nature Conservation	Establishment of the Arabuko Sokoke Schools Eco-tourism Scheme by A Rocha Kenya		Hierarchical, centralized and top-down governance system
2002	Tourism	Tourists numbers decrease from the 1990s number averaging approx. 29,000 p.a		Hierarchical, centralized and top-down governance system
2002	Tourism	Three local boat operator associations established with a membership of 103 persons and 64 boats that dominate in the glass bottomed boats business in Watamu NMP. However WABO had been established back in 1993		Hierarchical, centralized and top-down governance system
2003	Nature Conservation	Revision of the African Convention on the conservation of nature		Hierarchical, centralized and top-down governance system
2007	Nature Conservation	Watamu Marine Association formed		Hierarchical, centralized and top-down governance system

2006-2007	Fishing	Establishment of Beach Management Units		A mixture of hierarchical, collaborative and integrated management system of governance
2008	Fishing	Kenya Fisheries Policy established		A mixture of hierarchical, collaborative and integrated management system of governance
2010		Kenya promulgates new constitution 2010 which advocates for devolution		A mixture of hierarchical, collaborative and integrated management system of governance
2011	Nature Conservation	Aichi Biodiversity Targets		A mixture of hierarchical, collaborative and integrated management system of governance
2013	Fishing	First Kilifi County Integrated Development Plan (2013-2017)	The plan highlights the three sectors: fishing, nature conservation and tourism in the county	A mixture of hierarchical, collaborative and integrated management system of governance
2013	Nature Conservation	Enactment of the Wildlife Conservation and Management Act (2013)		A mixture of hierarchical, collaborative and integrated management system of governance
2013	Nature Conservation	Minor bleaching event recorded in Watamu NMP		A mixture of hierarchical, collaborative and integrated management system of governance

2015	Nature Conservation	First mapping of the Watamu Marine habitats by A Rocha Kenya		A mixture of hierarchical, collaborative and integrated management system of governance
2015	Nature Conservation	The post-2015 agendas are passed: the Paris Agreement, the Sustainable Development Goals (SDG15) and the Sendai Framework on Disaster Risk Reduction		A mixture of hierarchical, collaborative and integrated management system of governance
2015	Fishing	515 fishermen/traders recorded by Watamu BMU and 460 fishermen/traders recorded by the Uyombo BMU		A mixture of hierarchical, collaborative and integrated management system of governance
2016	Tourism	A Rocha Kenya's training on beach safari sellers		A mixture of hierarchical, collaborative and integrated management system of governance
2016	Nature Conservation	Watamu Marine Protected Area Management Plan (2016-2026)		A mixture of hierarchical, collaborative and integrated management system of governance
2017	Fishing	Pemba Fishing incursions		A mixture of hierarchical, collaborative and integrated management system of governance
2018	Fishing	Second Kilifi County Integrated	Highlights the status of fishing in Kilifi county as well as	A mixture of hierarchical, collaborative and integrated

		Development Plan (2018-2022)	nature conservation and tourism	management system of governance
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#### Appendix IV Geographies of the Kenyan Census

The Kenya census data has been conducted according areas referred to as **Enumeration Areas (EA)** at the local scale. Each EA is a designated area with an average of an estimated 100 households but might vary between 50 to 149 households due to factors such as terrain, population density and/or vastness of the area of focus. Therefore, it may be a village, group of villages or part of a village (Kenya National Bureau of Statistics (KNBS), 2010). In the recent 2019 census cell phones were used with a Geographical Positioning System (GPS) to identify coordinates for households and homesteads, which were then digitized using satellite imagery for the rural areas, and aerial photographs were used in urban areas. Furthermore, digitized sub-location and EA maps were produced in line with administrative boundaries which were then uploaded to the cell phones to be used by the enumerators (Kenya National Bureau of Statistics, 2019). After completion of the exercise KNBS produces several reports based on various variables the government is interested in, such as: socio-economic characteristics, population size, composition and distribution. These reports can be accessed from KNBS website <https://www.knbs.or.ke/> or KNBS country wide offices, in this context (Kilifi County) the KNBS office is located next to Kilifi Law Courts and shares a compound with the Lands and Probation Offices in Kilifi town.

#### Acronyms and Abbreviations

KWS	Kenya Wildlife Service
ARK	A Rocha Kenya
LOC	Local Ocean Conservation
WMA	Watamu Marine Association
MPA	Marine Protected Area
BMU	Beach Management Unit
WMPA	Watamu Marine Protected Area
WMNP	Watamu Marine National Park
IUCN	International Union for Conservation of Nature
IMET	Integrated Management Effectiveness Tool
METT	Management Effectiveness Tracking Tool
BIOPAMA	Biodiversity and Protected Area Management
NGO	Non-governmental Organization
KFS	Kenya Forest Service
PA	Protected Area
EMCA	Environmental Management and Coordination Act
CBO	Community Based Organisation
CFA	Community Forest Association
NEMA	National Environmental Management Authority
MCCAG	Mida Creek Conservation and Awareness Group
WG	Working Group
PATT	Protected Area Technical Team
SWAT	Special Watamu Action Team