MINISTRY OF MINING, BLUE ECONOMY AND MARITIME AFFAIRS

State Department for the Blue Economy and Fisheries (SDBE&F)

KENYA MARINE SPATIAL PLAN (MSP)

DRAFT STRATEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT (SESA) REPORT

Submitted to:

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CERTIFICATION

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EXECUTIVE SUMMARY

Introduction and Purpose

Kenya is preparing its first National Marine Spatial Plan (MSP) to provide a long-term framework for organising marine and coastal space in a manner that balances ecological integrity, social equity, and economic development within the blue economy. The MSP establishes an integrated, ecosystem-based framework for determining the spatial and temporal distribution of marine activities, aiming to reduce user conflict, enhance regulatory compliance, and align economic development with national and international biodiversity commitments. This Strategic Environmental and Social Assessment (SESA) evaluates the environmental and social implications of the proposed MSP, assesses reasonable alternatives, and recommends safeguards to be embedded within the Plan before adoption.

Planning Area and Time Horizon

The MSP applies to nearshore and offshore waters spanning the land–sea interface from the high-water mark of the five coastal counties—Kwale, Mombasa, Kilifi, Tana River, and Lamu—seaward across Kenya's territorial sea, Exclusive Economic Zone (EEZ), and extended continental shelf. The Plan adopts a twenty-year time horizon from 2025 to 2045, with statutory provision for periodic adaptive review to incorporate climate projections, emerging ocean uses, and monitoring feedback.

SESA Approach and Methodology

The SESA was conducted in accordance with Kenya's Environmental Management and Co-ordination Act (EMCA), the Environmental (Impact Assessment and Audit) Regulations, and the World Bank's relevant Operational Policies, including OP 4.01 (Environmental Assessment), OP 4.04 (Natural Habitats), OP 4.10 (Indigenous Peoples), OP 4.11 (Physical Cultural Resources), OP 4.12 (Involuntary Resettlement), OP 4.36 (Forests), OP 7.50 (International Waterways), and OP 7.60 (Disputed Areas). The assessment comprised a review of legal and institutional frameworks; compilation and spatial analysis of biophysical and socio-economic baseline conditions; comparative assessment of planning alternatives; identification of priority risks, cumulative impact hotspots, and opportunities; and development of mitigation, monitoring, and institutional measures. Stakeholder engagement was conducted throughout, meeting constitutional requirements for public participation and World Bank consultation obligations.

Stakeholder Engagement

The assessment incorporated consultations with national and county governments, coastal communities, private sector actors, civil society organisations, and sector regulators. Engagement was designed to ensure that stakeholder knowledge, use patterns, and preferences substantively informed MSP development. Community consultations comprising focus group discussions and participatory mapping were conducted in Kwale, Mombasa, Kilifi, Tana River, and Lamu from 16 to 23 October 2025. National stakeholder validation—including consultative meetings, key informant interviews, and technical workshops—took place from 24 October to 2 December 2025.

Coastal communities depend heavily on artisanal fisheries, tourism, small-scale trade, maritime services, and emerging blue economy activities. The SESA identifies groups potentially affected by spatial zoning decisions, including small-scale fishers, women engaged in fisheries value chains, and coastal youth. Livelihood vulnerability is influenced by resource dependence, limited alternative income opportunities, and exposure to climate variability. Recurring stakeholder priorities included resolving conflicts between artisanal and industrial fisheries; strengthening enforcement and compliance; managing pollution and climate risks; protecting culturally significant sites; and ensuring fairness and transparency where zoning may restrict resource access. Stakeholder input influenced zoning refinements, identification of conflict hotspots, and development of mitigation measures. Continued engagement during implementation will be essential to maintain transparency, manage emerging conflicts, and operationalise grievance redress mechanisms.

MSP Zoning Framework

The MSP establishes six zone types. Marine Biodiversity Conservation Zones protect critical habitats, ecological corridors, and climate refugia. Fisheries and Sustainable Use Zones accommodate fishing and aquaculture while managing overlap with conservation and tourism. Cultural Heritage and Tourism

Zones safeguard heritage assets and maintain high-value seascapes. Maritime Transportation and Infrastructure Zones designate shipping corridors, port areas, and cable protection zones. Renewable Energy Development Zones guide the siting of offshore energy infrastructure. Multi-Use and Transition Zones permit managed coexistence and provide buffers between incompatible uses.

Assessment of Alternatives

Four strategic alternatives were carefully assessed to determine the most suitable pathway for MSP. The Business-as-Usual option, characterised by continued sectoral decision-making without an integrated spatial plan, poses the greatest risk. It intensifies cumulative impacts, perpetuates user conflict, and undermines long-term socio-economic benefits due to fragmented governance. The Conservation-Led Scenario, while delivering strong environmental outcomes through prioritisation of biodiversity protection, imposes significant livelihood restrictions and constrains near-term economic activity more than the integrated approach. The Blue Growth Scenario, focused on rapid economic expansion, generates the highest short-term economic projections but carries severe risks of irreversible habitat loss, disproportionate community impacts, and escalating restoration and compliance costs.

In contrast, the Integrated (Balanced Multi-Use) Scenario, which applies ecosystem-based management to balance development and conservation, demonstrates the most favourable trade-offs. It distributes benefits more equitably, manages risks effectively, and aligns with the SESA framework. This option ensures continuity by addressing environmental, social, and economic dimensions in a balanced manner, thereby reducing conflict and safeguarding long-term sustainability. On this basis, Business-as-Usual is rejected for its fragmented approach and intensification of cumulative impacts. The Blue Growth Scenario is rejected because its short-term economic gains are outweighed by severe environmental degradation and costly long-run liabilities. The Conservation-Led Scenario, though environmentally strong, is not preferred as it imposes disproportionate restrictions on livelihoods and economic activity. The Integrated Scenario emerges as the preferred option, offering the best overall balance of environmental protection, social acceptability, and durable economic performance. It is therefore recommended as the foundation for MSP finalisation, ensuring a coherent and sustainable path forward.

Key Findings: Benefits, Risks and Cumulative Hotspots

Under the preferred Integrated Scenario, the MSP is expected to deliver reduced habitat loss and recovery of mangroves, seagrass, and coral reefs; improved maritime safety through spatial separation of conflicting uses; greater regulatory predictability for investors; and strengthened climate resilience through protection of blue carbon ecosystems. Principal risks requiring active management include short-term livelihood displacement where conservation or safety measures restrict nearshore access; higher compliance costs for industry and risk of non-compliance where enforcement is weak; residual pollution and sedimentation from land-based sources and dredging; and ineffective protection of wildlife and cultural heritage where seasonal controls are not enforced.

Cumulative impact hotspots requiring priority intervention include nearshore multi-use areas adjacent to Mombasa, Kilifi, Malindi, and Lamu, where turbidity, pollution, and user conflict converge; Ungwana Bay prawn grounds, where bycatch, gear conflict, and benthic impacts may intensify if trawl compliance is weak or effort is displaced; and Important Marine Mammal Area (IMMA) corridors and other migration or aggregation areas exposed to increasing underwater noise and vessel-strike risk.

Acceptability of the MSP, Conditions for Approval and Residual Risks

The Kenya Marine Spatial Plan has been determined to be acceptable for approval, but only under strict conditions that make its implementation, monitoring, and compliance provisions binding. The SESA emphasises that the Integrated Scenario is not impact-free; its acceptability depends on rigorous application of mitigation, monitoring, grievance, and adaptive-management measures throughout execution. The assessment highlights several significant risks that must be addressed: livelihood displacement in nearshore access-controlled areas; residual dredging and sedimentation impacts; wildlife disturbance from vessel traffic, noise, and poorly timed construction; and potential damage to cultural heritage from uncontrolled access or anchoring. Institutional risks also remain, particularly those linked to fragmented mandates, financing gaps, and weak enforcement capacity. High-risk zones requiring enhanced controls have been identified, notably the nearshore multi-use areas around

Mombasa, Kilifi, Malindi, and Lamu; the prawn grounds of Ungwana Bay; and Important Marine Mammal Areas (IMMAs) such as migration and aggregation corridors.

Approval of the plan must therefore be conditional on several safeguards. Financing should be ring-fenced for monitoring, control, surveillance, and ecological oversight. Proponent-funded EIA/ESIA monitoring must be carried out as per the provisions of EMCA Cap 387. Equitable transition measures are required, including gear-swap support, agreed access corridors, and transparent benefit-sharing mechanisms. Pollution prevention must be strengthened through port reception facilities, spill readiness, county-level waste and stormwater controls, and compliance audits. Adaptive-management triggers should be applied where indicators such as catch per unit effort (CPUE), habitat cover, strandings, bycatch, or conflict exceed agreed thresholds.

Even with these measures, residual risks will persist. Localised disturbance is expected in areas where compatible uses continue, and some access restrictions and transition burdens will remain for artisanal fishers, tourism operators, and users near ports and heritage assets. Compliance and enforcement costs will be recurrent, while risks from illegal activity, dredging, vessel traffic, and lower-intensity offshore construction will continue. These must be actively managed through ongoing monitoring and corrective action. Taken together, the Kenya Marine Spatial Plan is acceptable for approval as long as these conditions are fully integrated into its implementation. By embedding strict safeguards and adaptive management, the plan can deliver a balanced outcome that protects the environment, supports livelihoods, and sustains economic performance.

Implementation Requirements and Conclusion

The SESA proposes mitigation measures including environmental and social screening of sectoral projects, strengthened fisheries co-management, pollution control enforcement, participatory monitoring, and social safeguard mechanisms. A monitoring framework is recommended to track ecological health, livelihood indicators, and governance effectiveness. Adaptive management principles are emphasised to allow periodic review and revision of zoning decisions based on new scientific data and stakeholder feedback.

Effective implementation will depend on institutional coordination, technical capacity, enforcement resources, and sustained political commitment. The SESA identifies risks related to fragmented mandates, limited monitoring capacity, financing gaps, and inconsistent enforcement. Addressing these governance constraints is as critical as the spatial design itself. Clear accountability structures and intergovernmental collaboration are necessary to translate planning objectives into measurable outcomes.

In conclusion, the SESA finds that the Kenya Marine Spatial Plan provides a structured framework capable of improving marine ecosystem management, reducing sectoral conflicts, and guiding sustainable blue economy development. The preferred Integrated MSP scenario is acceptable for approval subject to the conditions set out above—particularly enforceable monitoring and compliance financing, equitable transition support, strengthened pollution and wildlife controls, functioning grievance redress, and adaptive-management triggers for high-risk zones. Its long-term benefits remain contingent upon equitable implementation, effective mitigation of localised social impacts, robust monitoring systems, and institutional strengthening. Success will depend on sustained commitment to adaptive management, transparency, and inclusive participation across national and county levels.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

Acronym	Full Form
ADZ	Aquaculture Development Zone
AIS	Automatic Identification System
BAU	Business-as-Usual
BCR	Benefit-Cost Ratio
BETA	Bottom-Up Economic Transformation Agenda
BMU	Beach Management Unit
BRD	Bycatch Reduction Device
CA	Communications Authority of Kenya
CBD	Convention on Biological Diversity
CBO	Community-Based Organisation
CEC	County Executive Committee
CFA	Community Forest Association
CIG	Common Interest Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Community-Managed Area
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CoK	Constitution of Kenya
CORDIO	Coastal Oceans Research and Development in the Indian Ocean
CPUE	Catch Per Unit Effort
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
DWT	Deadweight Tonnage
EACC	East African Coastal Current
EBSA	Ecologically or Biologically Significant Marine Area
ECS	Extended Continental Shelf
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EPRA	Energy and Petroleum Regulatory Authority
ESF	Environmental and Social Framework (World Bank)
ESG	Environmental, Social and Governance

Acronym	Full Form
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FMDA	Fisheries Management and Development Act
FMZ	Fisheries Management Zone
FPIC	Free, Prior and Informed Consent / Consultation
FPV	Floating Photovoltaics
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GIS	Geographic Information System
GOK	Government of Kenya
GRID	Green, Resilient, and Inclusive Development
GRM	Grievance Redress Mechanism
GWh	Gigawatt-hour
HAB	Harmful Algal Bloom
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IBA	Important Bird Area
ICD	Inland Container Depot
ICZM	Integrated Coastal Zone Management
IMMA	Important Marine Mammal Area
IMO	International Maritime Organization
INTP	Integrated National Transport Policy
IOC	Intergovernmental Oceanographic Commission
IOTC	Indian Ocean Tuna Commission
IPM	Integrated Pest Management
IRR	Internal Rate of Return
ISPS	International Ship and Port Facility Security Code
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported and Unregulated (fishing)
JCMA	Joint Co-Management Area
JCMU	Joint Co-management Unit
KBA	Key Biodiversity Area

Acronym	Full Form
KCGS	Kenya Coast Guard Service
KeFS	Kenya Fisheries Service
KEMFSED	Kenya Marine Fisheries and Socio-Economic Development Project
KEMFRI	Kenya Marine and Fisheries Research Institute
KeNODC	Kenya National Oceanographic Data Center
KES	Kenyan Shilling
KFS	Kenya Forest Service
KII	Key Informant Interview
KMA	Kenya Maritime Authority
KMFRI	Kenya Marine and Fisheries Research Institute
KMMN	Kenya Marine Mammal Network
KPA	Kenya Ports Authority
KPI	Key Performance Indicator
KSG	Kenya School of Government
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
LAPSSET	Lamu Port–South Sudan–Ethiopia Transport Corridor
LMMA	Locally Managed Marine Area
M&E	Monitoring and Evaluation
MARPOL	International Convention for the Prevention of Pollution from Ships
MASC	Multi-Agency Steering Committee
MBW	Mangrove Boardwalk
MCA	Multi-Criteria Analysis
MCDA	Multi-Criteria Decision Analysis
MCS	Monitoring, Control and Surveillance
MDA	Ministry, Department and Agency
MEA	Millennium Ecosystem Assessment
MIPZ	Marine Infrastructure Protection Zone
MMO	Marine Mammal Observer
MMPI	Microbial Pollution Index
MPA	Marine Protected Area
MSP	Marine Spatial Plan / Marine Spatial Planning
MSY	Maximum Sustainable Yield

Acronym	Full Form
MTCZ	Marine Tourism, Recreation and Cultural Heritage Zone
MTP	Medium Term Plan
MUZ	Multiple Use Zone
NAP	National Adaptation Plan
NCBH	North Coast Beach Hotel
NEMA	National Environment Management Authority
NGO	Non-Governmental Organisation
NKB	North Kenya Banks
NLC	National Land Commission
NMK	National Museums of Kenya
NPAZ	Navigation, Port Access and Security Zone
NPI	Nutrient Pollution Index
NPV	Net Present Value
NRA	Navigation Risk Assessment
NRT	Northern Rangelands Trust
NSP	National Spatial Plan
OECM	Other Effective Area-Based Conservation Measure
OGEP	Offshore Oil and Gas Exploration and Production Zone
OP	Operational Policy (World Bank)
ORED	Offshore Renewable Energy Development Zone
OSCP	Oil Spill Contingency Plan
OTEC	Ocean Thermal Energy Conversion
PFMP	Participatory Forest Management Plan
PLUPA	Physical and Land Use Planning Act
PPP	Policy, Plan or Programme
PSU	Practical Salinity Unit
RAP	Restorative Action Plan
RFMO	Regional Fisheries Management Organisation
ROV	Remotely Operated Vehicle
RSLR	Relative Sea-Level Rise
SAR	Search and Rescue
SDBE&F	State Department for Blue Economy and Fisheries
SDG	Sustainable Development Goal

Acronym	Full Form
SEA	Strategic Environmental Assessment
SEA	Sexual Exploitation and Abuse
SEC	South Equatorial Current
SES	Stakeholder Engagement Strategy
SESA	Strategic Environmental and Social Assessment
SEZ	Special Economic Zone
SGR	Standard Gauge Railway
SH	Sexual Harassment
SOLAS	International Convention for the Safety of Life at Sea
SST	Sea Surface Temperature
TAC	Total Allowable Catch
TCA	Transboundary Conservation Area
TED	Turtle Excluder Device
TEU	Twenty-Foot Equivalent Unit
TOR	Terms of Reference
TRA	Tourism Regulatory Authority
TSSC	Total Suspended Sediment Concentration
TSS	Total Suspended Solids
TSSPI	Total Suspended Solids Pollution Index
TUM	Technical University of Mombasa
UNCLOS	United Nations Convention on the Law of the Sea
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UoN	University of Nairobi
VMG	Vulnerable and Marginalised Group
VMS	Vessel Monitoring System
VTS	Vessel Traffic Services
WCS	Wildlife Conservation Society
WHO	World Health Organization
WIO	Western Indian Ocean
WIOMSA	Western Indian Ocean Marine Science Association

Acronym	Full Form
WRA	Water Resources Authority

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Overview

This report presents the Strategic Environmental and Social Assessment (SESA) for the development of Kenya's Marine Spatial Plan (MSP). The MSP is a critical output of Component 1 of the Kenya Marine Fisheries and Socio-Economic Development Project (KEMFSED),[1] a five-year initiative (2020–2025) led by the State Department for Blue Economy & Fisheries (SDBE&F) and funded by the World Bank as presented in **Annex 1**.

Marine Spatial Planning (MSP) is a participatory public process for analysing and managing the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives.[2] The MSP aims to balance development demands with environmental protection while delivering transparent social and economic benefits. It also serves as a strategic framework for advancing the blue economy under the principles of Green, Resilient, and Inclusive Development (GRID). By guiding the appropriate use of ocean spaces, MSP safeguards societal needs, promotes sustainable growth of maritime economies, and enhances the utilisation of marine resources in an environmentally responsible manner. Some sectors have already identified and zoned their areas of operation, such as marine protected areas, and more recently, fisheries Joint Co-Management Areas (JCMA) and Community-Managed Areas (CMA). Other sectors, including fishing and mariculture, shipping, and maritime transport, have designated suitable operational areas but face limited regulation and enforcement, which has led to conflicts between different uses and users. Marine Spatial Planning (MSP) is therefore designed to minimise such conflicts by identifying the most appropriate uses for each area and promoting compatibility among multiple ocean activities.

1.2 Kenya Marine Spatial Planning

Kenya's MSP aims to safeguard marine natural capital and ecosystem services while enabling sustainable economic growth and strengthening governance coherence across sectors and levels of government. By identifying ecologically significant areas, sensitive habitats, migratory corridors, and ecosystem service hotspots, MSP integrates biodiversity considerations into spatial decisions on development zones, protection measures, and compatible uses. It provides a transparent framework for balancing diverse ocean activities, including fisheries, shipping, tourism, conservation, energy, and seabed infrastructure, reducing conflicts, transaction costs, and improving predictability for investment and permitting. Kenya's MSP provides a framework for organising marine space in the territorial waters and Exclusive Economic Zone (EEZ) adjacent to five coastal counties: Kwale, Mombasa, Kilifi, Tana River, and Lamu, as well as the Extended Continental Shelf (ECS).

1.3 Decision to Undertake SESA

In accordance with Section 57A of the Environmental Management and Co-ordination Act (EMCA), Cap 387, as amended by the Environmental Management and Co-ordination (Amendment) Act, 2015, and the National Strategic Environmental and Social Assessment (SESA) Guidelines of 2012, any policy, plan, or programme (PPP) that is likely to have significant environmental and social impacts is required to undergo a SESA at the early stages of the planning process. SESA, thus, serves as a range of analytical and participatory approaches designed to integrate environmental considerations into policies, plans, and programmes (PPP), while evaluating their interlinkages with economic and social dimensions.

To assess the appropriateness and relevance of undertaking a SESA for the development of MSP, a project brief was submitted to the National Environment Management Authority (NEMA) on 22nd December 2023. NEMA formally approved the MSP brief, thereby authorising the commencement of the SESA process. As a national strategic plan, the MSP was subjected to a SESA to integrate

[1] Government of Kenya. (2022). Terms of reference for Marine Spatial Planning (MSP) consultancy: Kenya Marine Fisheries and Socio-Economic Development Project (KEMFSED). State Department for Blue Economy and Fisheries.

[2] Ehler, C., & Douvere, F. (2009). Marine spatial planning: a step-by-step approach toward ecosystem-based management (IOC Manuals and Guides No. 53; ICAM Dossier No. 6). UNESCO. https://doi.org/10.25607/OBP-43 .

environmental and social considerations and identify potential impacts, thereby supporting strategic decision-making in a transparent, accountable, and environmentally sustainable manner.

The SESA outlines the current and potential risks associated with prevailing trends in the use of marine space and resources, and proposes mitigation measures. It highlights opportunities for the sustainable growth and conservation of marine ecosystems, assesses potential adverse impacts on community livelihoods, and identifies pathways for enhancing prosperity through MSP implementation. The report serves as a roadmap for the sustainable management of human activities in Kenya's marine areas while ensuring the conservation of ecologically sensitive zones. As outlined in Section 2.0 of the National Guidelines for SESA (2012), the SESA is an iterative process, encompassing repeated analyses and tasks throughout its various stages. The process is structured into four key phases: Screening, Scoping, Detailed Study, and Implementation and Monitoring, as elaborated in Chapter Three (SESA Study Approach and Methodology) of this report.

1.4 Rationale for SESA

Kenya's Marine Spatial Planning initiative is a national strategic intervention designed to guide the sustainable use, conservation, and development of marine resources. Given its policy and programmatic nature, the MSP has far-reaching and long-term implications across multiple sectors and governance levels, with impacts that are cumulative in nature. Subjecting the MSP to a Strategic Environmental and Social Assessment is therefore essential to ensure that risks and opportunities are identified and addressed at the earliest possible stage.

The legal and policy framework in Kenya provides a strong basis for this requirement. The Environmental (Impact Assessment and Audit) Regulations of 2003, as amended in 2019, operationalizes the requirement for Strategic Environmental Assessment of policies, plans, and programmes under NEMA oversight. These provisions require government agencies to integrate environmental and social considerations into strategic decision-making processes.

MSP decisions, including the designation of fisheries zones, shipping corridors, conservation areas, ports, energy sites, and other marine uses, carry significant environmental and social implications. SESA provides a structured framework for assessing cumulative effects, evaluating trade-offs, and embedding mitigation and enhancement measures into the MSP in a transparent and participatory manner.

Beyond governance, SESA operationalizes ecosystem-based management by testing alternative zoning scenarios, assessing impacts on biodiversity and ecosystem services, and embedding climate resilience and adaptive management into MSP. It also ensures that social dimensions are fully addressed. Coastal communities, small-scale fishers, women, and youth depend heavily on marine resources for their livelihoods, and SESA provides mechanisms for Free, Prior, and Informed Consultation (FPIC), grievance redress, and equitable benefit-sharing.

Finally, subjecting MSP to SESA guarantees alignment with Kenya's broader development agenda, including Vision 2030, the Medium-Term Plans (MTPs), and County Integrated Development Plans (CIDPs), while safeguarding the sustainability of the blue economy. Internationally, MSP practice, as guided by United Nations Educational, Scientific and Cultural Organization (UNESCO) , through its Intergovernmental Oceanographic Commission (IOC), emphasises ecosystem-based, inclusive, and adaptive planning principles, best embedded through SESA at the plan stage. By undertaking SESA, Kenya not only fulfils its legal obligations but also ensures that marine spatial planning is environmentally sustainable, socially inclusive, and internationally credible.

1.5 SESA Objectives

The SESA aims to ensure that environmental and social considerations are fully integrated into the Marine Spatial Plan (MSP) and its associated strategies, plans, and programmes, thereby supporting the sustainable development of Kenya's blue economy. It enhances the MSP by strengthening spatial decision-making, guiding zoning choices, and ensuring that the allocation of marine uses aligns with national development priorities, environmental sustainability, and social well-being.

The specific objectives of the SESA are to:

1. Identify, describe, and assess the potential environmental and social impacts including cumulative, indirect, secondary, and transboundary impacts arising from the spatial allocation and coexistence of multiple marine uses under the MSP.
2. Inform the MSP zoning and spatial decision-making process by identifying potential adverse impacts at an early stage and integrating appropriate avoidance, mitigation, and enhancement measures into the formulation of the MSP.
3. Assess and manage cumulative and cross-sectoral interactions among marine activities to reduce spatial conflicts and promote compatible uses within the marine planning area.
4. Ensure that environmental considerations are given equal weight alongside social and economic objectives in the development of MSP policies, zoning schemes, and management measures.
5. Evaluate the consistency of the proposed MSP with national, regional, and international environmental and social policies, legal frameworks, and commitments, including compliance with the Environmental Management and Coordination Act (EMCA), 1999 and its subsidiary legislation.
6. Assess reasonable spatial and policy alternatives, including the "do-nothing" option, to inform MSP choices at stages when planning flexibility is greatest.
7. Support the application of ecosystem-based management by ensuring that seabed habitats, critical ecosystems, and populations of key indicator species are maintained and not significantly or irreversibly affected by proposed spatial uses.
8. Integrate climate change adaptation, disaster risk reduction, and resilience into MSP zoning and management measures through ecosystem-based and nature-based approaches.

The SESA is being undertaken in parallel with the MSP formulation process. This approach ensures that environmental and social considerations are addressed in a proactive manner to better inform decision-making processes.

1.6 The Scope

The scope of the SESA for Kenya's MSP encompasses the full marine planning area, a long-term planning horizon, and a cross-sectoral perspective. Spatially, the SESA covers Kenya's nearshore waters along the coastal counties of Kwale, Mombasa, Kilifi, Tana River, and Lamu, as well as offshore waters within Kenya's territorial sea and EEZ. It explicitly considers land–sea interactions and devolved governance arrangements in nearshore areas, alongside United Nations Convention on the Law of the Sea (UNCLOS)-based rights and obligations offshore. Temporally, the SESA aligns with the MSP's strategic 20-year planning horizon, supported by adaptive management through periodic review and updating on a 10-year cycle to account for climate change, oceanographic variability, evolving marine uses, and emerging risks. Sectorally, the SESA addresses all existing and emerging marine uses and cross-cutting issues. It assesses their spatial footprints, cumulative and cross-sectoral interactions, and environmental and social implications to inform evidence-based zoning, conflict management, and ecosystem-based decision-making.

1.7 Guiding Principles

The SESA for Kenya's MSP is guided by the following principles:

1. **Sustainable and efficient resource use**
    - Promote long-term economic value from marine resources while minimizing conflicts and inefficiencies.
    - Support climate-resilient blue economy development.
2. **Biodiversity and ecosystem protection**
    - Safeguard critical ecosystems such as coral reefs, mangroves, seagrass beds, and fish spawning areas through ecosystem-based zoning.

- Apply the mitigation hierarchy (avoid, minimize, restore, offset) to achieve no net loss of biodiversity and maintain ecological connectivity.

3. **Land–sea interface integration**
    - Ensure coherence between marine spatial planning and coastal land-use planning.
    - Address land-based drivers of marine degradation.
4. **Safeguarding sensitive seascapes and heritage**
    - Protect scenic seascapes, marine heritage sites, and environmentally fragile zones from incompatible development.
    - Conserve areas of cultural and ecological significance that support tourism, identity, and ecosystem services.
5. **Inclusive and transparent participation**
    - Ensure meaningful involvement of all stakeholders, including coastal communities, small-scale fishers, women, youth, and private sector actors, in MSP decision-making.
    - Establish Free, Prior, and Informed Consultation (FPIC) processes and grievance redress mechanisms to strengthen accountability and trust.
6. **Climate resilience and adaptive management**
    - Integrate climate change projections (sea-level rise, ocean acidification, extreme weather) into MSP zoning and decision-making.
    - Promote nature-based solutions such as mangrove restoration and coral reef protection to enhance resilience of ecosystems and coastal livelihoods.
    - Establish monitoring indicators and adaptive review cycles to ensure MSP remains responsive to emerging risks and opportunities.

1.8 SESA Study Team

A team of qualified experts was assembled to ensure that the SESA process was grounded in robust data and rigorous analysis. The team included specialists in marine ecology, marine geology, marine economics, spatial analysis, stakeholder engagement, and legal matters, presented in **Table 1.** This diverse expertise provided a comprehensive foundation for evaluating environmental, social, and economic dimensions of Kenya's Marine Spatial Planning initiative, ensuring that the process was scientifically credible, participatory, and aligned with national, regional, and international best practices.

Table 1: SESA Study Team

No.	Name of the expert	Role
1.	Prof. Muthumbi Agnes	Team Leader (Marine biodiversity expert)
2.	Dr. Grace M. Mutia	Environmental/ Fisheries expert
3.	Mr. Titus Msungu	Physical Planning Expert
4.	Mr. Simon Kamau	Asst Physical Planning Expert
5.	Eng. J. Wainaina Mburu	Marine Engineer
6.	Mr. David Kinyanjui	Sociologist
7.	Prof. John Mburu	Environmental Economist
8.	Mr Okadia Derrick Otieno	Legal Expert
9.	Mr. David Kuira Gichuki	GIS Analyst and Environmental Impact Assessment/Audit Lead Expert

No.	Name of the expert	Role
10.	Mr. Onchaga Moses	GIS Analyst
11.	Mr. Andrew Gesicho	EIA/EA Lead Expert
12.	Mr. Zachary Kaimenyi	Social Development Expert
13.	Mr. Bonface Nyaila	Urban and Regional Planner
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1.9 Structure of the Report

This report is structured as follows:

CHAPTER 1 presents an introduction and background to marine spatial planning as a project of the Kenya Marine Fisheries and Socio-Economic Development Project (KEMFSED). The chapter also justifies the SESA study for the MSP.

CHAPTER 2 describes Kenya's Marine Spatial Plan, its objectives, and the process of developing Kenya's MSP.

CHAPTER 3 presents the approach and methodology followed in conducting the SESA.

CHAPTER 4 presents the legal basis of the SESA decision-making tool for Kenya's MSP. This chapter provides a concise review of the international and national legislation relevant to Marine Spatial Planning (MSP) and highlights gaps and overlaps within Kenya's marine sector laws.

CHAPTER 5 presents an analysis of baseline conditions and diagnostic assessments of Kenya's marine and coastal areas. It evaluates the ecological, physical, chemical, and socio-economic characteristics of these ecosystems, as well as ongoing and planned activities and the anticipated socio-economic impacts of current and future development plans. The diagnostic assessment focuses on identifying key stressors affecting marine and coastal ecosystems.

CHAPTER 6 presents the stakeholder engagement framework, with details on the process of stakeholder identification and mapping, the stakeholder engagement process, key issues raised by stakeholders and how they were addressed or responded to, and plans for continued stakeholder engagement during the development of the MSP.

CHAPTER 7 details the analysis of the plan alternatives.

CHAPTER 8 presents an impact analysis that includes predictions and evaluations of the plan's immediate, long-term, and cumulative effects. It addresses both the positive and negative consequences likely to arise from implementing the plan.

CHAPTER 9 focuses on mitigation measures and monitoring plans for addressing the environmental, social, and economic impacts associated with Marine Spatial Planning (MSP).

CHAPTER 10 outlines key recommendations for the Marine Spatial Plan (MSP) and its Strategic Environmental and Social Assessment (SESA), with an emphasis on sustainability, alignment with environmental policies, ecological conservation, inter-sectoral coordination, and the regular monitoring of marine ecosystems.

REFERENCES presents the literature used in developing the SESA study, including secondary data from various studies.

ANNEXURES present the details of the terms of reference that guided this study, a list of the key experts, and the impact analysis and vulnerability assessment tools.

CHAPTER 2: DESCRIPTION OF KENYA MARINE SPATIAL PLAN

2.1 Overview

Kenya's ocean space is becoming increasingly utilized, economically significant, and ecologically vulnerable. Marine waters sustain critical sectors, including fisheries, tourism, maritime trade, coastal settlements, cultural heritage, and emerging industries such as mariculture and offshore renewable energy. At the same time, these areas are subject to intensifying pressures from climate change, habitat degradation, population growth, escalating demand for coastal land, and rising competition among ocean users. Managing these complex and interdependent dynamics requires more than sector-specific interventions; it necessitates an integrated, ecosystem-based vision for how Kenya's ocean space should be planned, governed, and sustained—both in the present and for future generations.

MSP (the public process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives[3]) offers this integrated framework providing a participatory process that determines where and when human activities occur in marine areas, ensuring ecological integrity is preserved while maximizing economic and social benefits. MSP replaces fragmented decision-making with a coordinated spatial approach that enhances clarity, reduces conflict, supports investment, and safeguards the ecosystems upon which coastal communities depend.[1]

Kenya's National MSP is being developed under the KEMFSED Project and covers both nearshore and offshore waters, including the territorial sea, Exclusive Economic Zone (EEZ), and extended continental shelf. The MSP is intended to serve as an overarching framework that aligns development aspirations with ecosystem protection and harmonises decisions across sectors and governance levels. It does not replace existing regulatory systems; rather, it creates the spatial coherence needed to strengthen them.[1]

The ultimate goal of MSP is to achieve the conservation and sustainable use of marine biological diversity while ensuring the use of marine resources by all stakeholders for economic growth, ensuring compliance of national regulations and aligning with marine regional and global commitments and treaties.

2.2 Scope of Marine Spatial Plan

The scope of Kenya's MSP defines the geographic and jurisdictional area to be planned, the time horizon over which objectives and zoning scenarios are developed, and the sectors and themes that the plan must integrate:

Spatial scope

The geographical scope of the planning area covers the land-sea interface, internal waters up to the high-water mark, and adjacent to the coastal counties of Mombasa, Kwale, Kilifi, Tana River and Lamu, the territorial sea (9,700 km^2), EEZ (142,400 km^2) and the ECS (103,320 km^2) as presented in **Figure 1.**

[3] Ehler, C., & Douvere, F. (2009). Marine spatial planning: A step-by-step approach toward ecosystem-based management. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, UNESCO. IOC Manuals and Guides No. 53, ICAM Dossier No. 6. Paris: UNESCO.

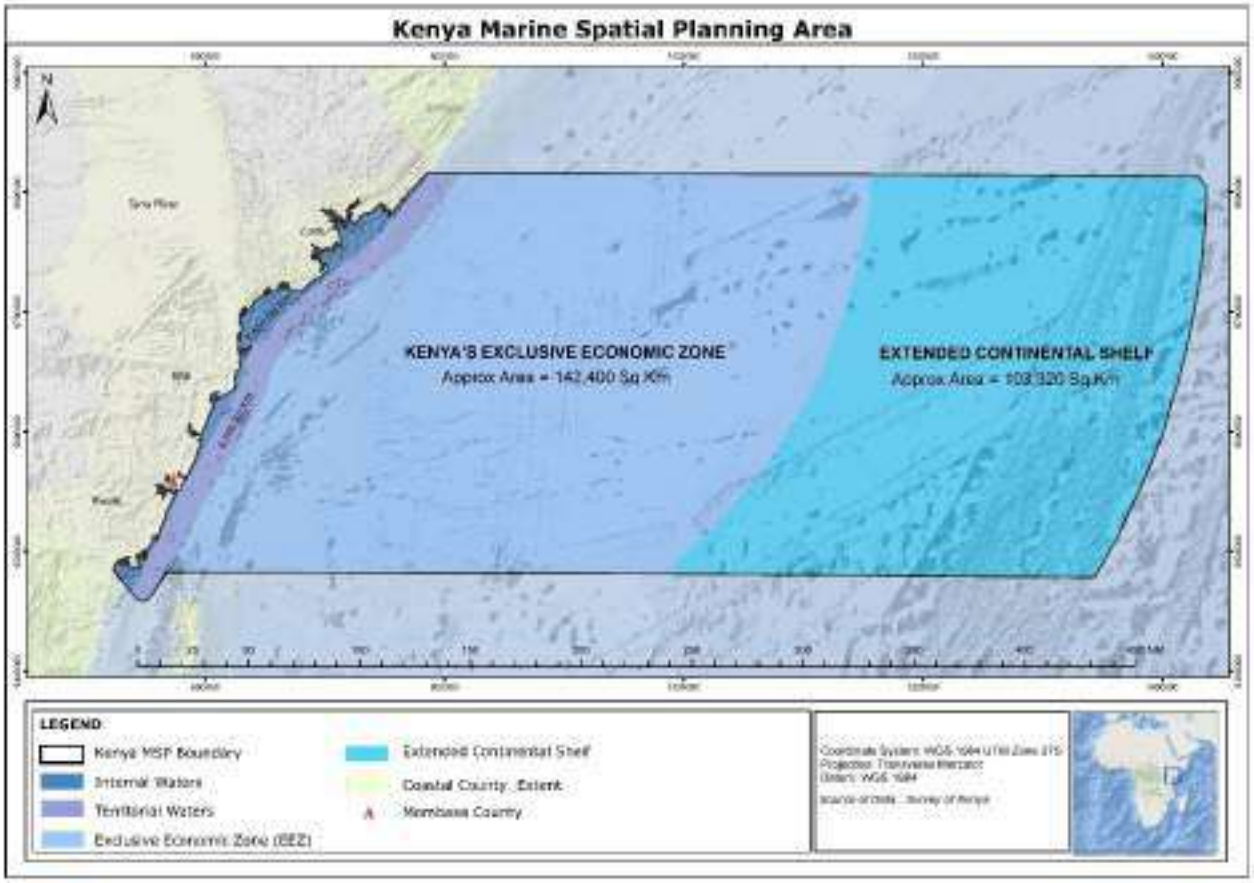

Figure **1**: Map showing the extent of the planning area

Temporal scope

The MSP is designed as a long-term, strategic plan with a 20-year outlook (2025-2045).

Sectoral scope

MSP is cross-sectoral in nature, and thus special consideration was given to how sectors interact. The sector descriptions below set out what each sector represents in Kenya's MSP, its typical spatial footprint and pressures, and the key planning questions and information layers required to meet international standards of evidence-based, ecosystem-based management.[1]

i). Oceanography

Oceanography provides the biophysical foundation for marine spatial planning by describing the physical and chemical processes that shape ecosystems, resource productivity and operational conditions for ocean uses. In Kenya's waters, oceanographic patterns such as the monsoonal current system, seasonal wind regimes, sea-surface temperature variability, and wave and storm dynamics influence navigation safety, fisheries productivity, coastal erosion and sediment transport, and the suitability of sites for offshore infrastructure.

For MSP purposes, oceanography is operationalised through mapped layers and time-series information, including bathymetry and seabed geomorphology; currents and circulation (surface and subsurface); wave climate; temperature and salinity; turbidity and water quality; and hazard layers such as storm surge exposure and coastal erosion hotspots. These datasets support: (a) zoning for safety and operability (e.g., siting of fixed structures and routing in high-risk areas); (b) identification of oceanographic features that concentrate biodiversity (e.g., fronts, upwelling zones); and (c) definition of seasonal management measures where needed (for example, temporal fishing restrictions linked to spawning periods or monsoon-driven access constraints).

ii). Biodiversity & Conservation

Biodiversity and conservation considerations ensure that MSP protects and restores the ecological integrity and natural capital that underpin Kenya's blue economy. This sector covers marine and coastal habitats (coral reefs, seagrass meadows, mangroves, beaches and dunes, estuaries, offshore pelagic systems and deep-sea habitats), species (including endangered and migratory species), and ecosystem services (fisheries productivity, shoreline protection, carbon sequestration, tourism values and cultural services). The MSP integrates conservation objectives by identifying areas of biological or ecological importance, assessing cumulative impacts from multiple uses, and designing coherent networks of protected and managed areas, including buffer zones and nature-based solutions where appropriate.

International best practice supports the use of transparent scientific criteria to identify priority biodiversity areas and to justify spatial measures. The Convention on Biological Diversity (CBD) has adopted scientific criteria for identifying Ecologically or Biologically Significant Marine Areas (EBSAs), which can be adapted for application within national jurisdiction as part of evidence-based conservation prioritisation. In Kenya's MSP, EBSA-type criteria can be used alongside national biodiversity assessments, Marine Protected Areas (MPA) effectiveness evaluations and habitat vulnerability analysis to guide zoning proposals that reduce habitat conversion, manage sensitive areas, and maintain ecological connectivity.

iii). Fisheries & Mariculture

Fisheries and mariculture are livelihood-critical sectors for Kenya's coastal communities and a strategic growth area for the blue economy. The sector includes nearshore artisanal and small-scale fisheries (often operating from beaches, landing sites and nearshore reefs), semi-industrial activities, and offshore fisheries in the EEZ, including tuna and tuna-like species fisheries governed partly through regional arrangements. Mariculture includes farming of finfish, shellfish, seaweed and other aquatic organisms in nearshore and sheltered waters, often requiring good water quality, appropriate tenure arrangements, and safeguards for habitats and navigation.

Within MSP, fisheries and mariculture are addressed by mapping current and projected fishing effort and value chains (landing sites, access routes, fishing grounds, seasonal patterns), identifying conflicts with competing uses (shipping lanes, protected areas, tourism zones, energy developments), and creating spatial and temporal management measures that maintain access while protecting nursery, spawning and critical habitats. Internationally, the ecosystem approach to fisheries provides a widely used framework for integrating ecological relationships, uncertainty and social objectives into fisheries planning and management, and it is directly relevant for MSP because spatial zoning decisions can reinforce ecosystem-based fisheries measures. Participatory engagement with counties and co-management institutions is key recognising the role of Beach Management Units (BMUs) in nearshore governance and the need to align MSP outputs with practical enforcement and monitoring capacity.

iv). Energy & Mineral Resources

Energy and mineral resources encompass existing and potential offshore developments such as oil and gas exploration and production, offshore wind and other marine renewables (tidal, wave), seabed mineral extraction where applicable, and related infrastructure (pipelines, platforms, service corridors). It also includes coastal and marine aggregates such as sand mining, which can have direct effects on shoreline stability, habitats and tourism assets. Because these activities can impose significant safety zones, exclusion areas and cumulative environmental risks, they require explicit spatial planning to avoid sensitive ecosystems, high-conflict multi-use areas and key navigation routes.[1]

MSP, therefore, uses suitability screening and constraint mapping to identify potential development zones subject to subsequent project-level assessment. This includes defining clear conditions for environmental and social assessment (including cumulative impact considerations), emergency preparedness, and decommissioning obligations, while aligning with national safety and environmental standards and international good practice.

v). Transport & Infrastructure

Transport and infrastructure cover maritime trade routes, port approaches, anchorages, pilotage areas, dredging and disposal sites, coastal and offshore infrastructure (ports, jetties, navigation aids, bridges,

pipelines, submarine cables and telecommunication corridors), and supporting coastal development. In Kenya, the sector is shaped by major gateway functions (notably the Port of Mombasa and associated shipping approaches) and by expanding logistics and infrastructure needs associated with regional trade and coastal urbanisation.

MSP strengthens maritime transport planning by mapping and protecting navigation corridors, identifying high-risk areas and sensitive receptors, and ensuring that routing and infrastructure siting are compatible with biodiversity priorities, fisheries access, and tourism assets. The diagnostic baseline incorporates trade and maritime analysis, shipping risk assessment, and hazard mapping to support evidence-based decision-making.

vi). Tourism, Sports and Recreation

Tourism, sports and recreation include beach tourism, marine parks visitation, diving and snorkelling, sport fishing, boating and yachting, cruise activities, and nature-based experiences linked to coastal landscapes and marine biodiversity. These uses depend on high environmental quality (clean beaches and waters, healthy reefs and seagrasses), safety (navigation and swimmer safety), and reliable access to attractive seascapes and cultural assets. Tourism is also tightly linked to local livelihoods and small businesses in coastal counties.

In MSP, tourism and recreation are planned through identification of high-value tourism nodes and seascapes, zoning for compatible uses (e.g., separating high-speed navigation corridors from swimming and diving zones), protecting key ecosystem assets, and managing carrying capacity in sensitive areas. Tourism (including ecotourism) and recreation is among Kenya's main MSP sectors and require consideration of cross-cutting issues such as pollution, climate change adaptation, gender and vulnerable groups, which are critical to equitable benefit-sharing and resilience in tourism-dependent communities.

vii). Cultural Heritage

Cultural heritage in Kenya's marine space includes tangible underwater cultural heritage (such as shipwrecks, submerged archaeological sites and historical artefacts), coastal cultural landscapes associated with the Swahili coast, and intangible heritage values linked to traditional maritime practices and community identity. These assets can support cultural tourism and education but are vulnerable to looting, uncontrolled diving, dredging, construction, sand mining and other seabed disturbances.

Internationally, the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage establishes a common framework for identifying, protecting and managing underwater heritage, including principles that favour in situ preservation and responsible access. Within MSP, cultural heritage is addressed through mapping known and potential heritage areas (including predictive modelling where data are limited), establishing precautionary buffer zones around sensitive sites, integrating heritage considerations into seabed infrastructure siting and licensing conditions, and aligning with national heritage authorities and community custodianship.

viii). Maritime Safety and Security (including Cabinet Memo priorities)

Maritime safety and security are enabling conditions for all ocean uses and are therefore treated as a strategic, cross-cutting sector in Kenya's MSP. The theme includes safe navigation (collision avoidance, navigation aids, port approaches and emergency anchorages), search and rescue preparedness, marine pollution prevention and response, and security measures addressing threats such as illicit trafficking, piracy-related risks, and illegal, unreported and unregulated (IUU) fishing. It also includes the spatial requirements of surveillance, monitoring and enforcement operations that safeguard marine resources and port infrastructure.

The MSP considers coordination, monitoring and surveillance across sectors and requires planning outputs that support enforcement and compliance, including zoning-related regulatory mechanisms and hazard and maritime risk analyses. International maritime security and port protection standards are informed by IMO instruments, including International Convention for the Safety of Life at Sea (SOLAS) Chapter XI-2 and the International Ship and Port Facility Security (ISPS) Code, which establish security-related requirements for ships, ports and contracting governments. In Kenya's MSP, Cabinet-level policy direction on maritime safety and security can be translated into spatial provisions

such as protected navigation corridors, designated safety zones around critical infrastructure, priority surveillance and response areas, and clear inter-agency operational protocols, consistent with national law and international obligations.

Across all sectors, the MSP applies a common analytical logic: (a) establish the baseline of ecosystems and human activities; (b) assess conflicts, compatibilities and cumulative impacts; (c) develop and consult on alternative zoning scenarios; and (d) define implementation measures that are enforceable through existing mandates and regulatory instruments. Cross-cutting themes, such as biodiversity loss, climate change, pollution, environmental impact assessment, gender equality and inclusion of vulnerable groups, are integrated in each sector assessment and in the design of management measures and indicators.

2.3 Vision and Objectives of MSP

The vision articulates the desired future state of Kenya's marine space, providing the overarching aspiration that guides the MSP. The objectives translate this vision into operational intent, establishing a hierarchy of goals for zoning decisions, sectoral integration, and performance monitoring.

2.3.1 Vision

The vision statement defines the long-term aspiration for Kenya's marine space, anchoring the MSP in principles of biodiversity conservation, economic growth, social equity, and climate resilience. The vision statement is as follows:

> ***"A healthy, productive, inclusive, and climate-resilient coastal and marine space that supports biodiversity conservation, fosters equitable economic growth through a sustainable Blue Economy, and safeguards the cultural, ecological, and livelihood interests of current and future generations of Kenyans."***

2.3.2 Objectives of the MSP

Kenya's MSP is founded on three overarching objectives reflecting the plan's core intent to deliver social, environmental and economic benefits through coordinated ocean governance. These overarching objectives are complemented, for implementation purposes, by a global-standard thematic framing (ecological, economic, social and governance) that supports clear target-setting, monitoring, evaluation and adaptive management.

Overarching Objectives

i. Provide a framework for an integrated approach to planning, management and governance of the coastal and marine space and resources for the benefit of people and the environment.

ii. Strengthen collaboration and partnerships amongst government agencies, county governments, coastal communities and other stakeholders in coastal and marine space and resource management.

iii. Promote coastal and marine biodiversity conservation and sustainable utilisation of coastal and marine resources for socio-cultural and economic benefit.

Thematic Objectives for Implementation, Monitoring and Evaluation

a) Ecological Objectives

i. Maintain and restore the health, structure and functioning of marine and coastal ecosystems, including critical habitats (e.g., coral reefs, seagrass beds and mangroves) and associated ecosystem services.

ii. Reduce cumulative environmental impacts by steering incompatible or high-impact activities away from sensitive areas and integrating spatial measures with Environmental Impact Assessment (EIA) and Strategic Environmental and Social Assessment (SESA) processes.

iii. Identify, prioritise and support effective, representative and well-connected networks of protected and conserved areas and other area-based measures, aligned with global and regional biodiversity commitments.

iv. Integrate climate risk considerations (sea-level rise, storm surge exposure, erosion and ocean warming) into spatial allocations and management measures to strengthen ecosystem and community resilience.

b) Economic Objectives

i. Enable sustainable growth of ocean-based sectors by providing spatial clarity for development zones, infrastructure corridors and multi-use opportunities while managing trade-offs transparently.

ii. Reduce conflicts among incompatible uses (and between uses and nature) to improve the enabling environment for investment and innovation in the Blue Economy.

iii. Support value-chain development and employment in priority sectors such as fisheries and mariculture, ports and logistics, tourism, and emerging industries (e.g., offshore renewables), consistent with sustainability standards.

iv. Strengthen economic resilience by diversifying ocean-based livelihoods and reducing exposure of critical assets and supply chains to climate and environmental risks.

c) Social Objectives

i. Protect and enhance livelihoods and food security for coastal communities by recognising customary uses, strengthening co-management of nearshore resources, and safeguarding areas important to small-scale fisheries.

ii. Promote equity and inclusion by ensuring meaningful participation of women, youth and vulnerable groups throughout the MSP process and assessing distributional impacts of spatial decisions.

iii. Improve access to opportunities in the Blue Economy through skills development, transparent stakeholder engagement, and targeted measures that connect coastal communities to sustainable value chains.

iv. Reduce social risk and strengthen social licence for ocean development by improving transparency in decision-making and providing accessible mechanisms for conflict resolution and grievance redress.

d) Governance Objectives

i. Establish an integrated and legally supported spatial framework that coordinates sectoral planning, licensing and compliance across nearshore and EEZ waters.

ii. Strengthen institutional arrangements for inter-agency collaboration and for alignment between national and county-level planning and implementation.

iii. Build and sustain an authoritative marine spatial data and information system (including GIS layers on ecosystems, uses, conflicts and hazards) to support evidence-based decision-making.

iv. Operationalise monitoring, evaluation and adaptive management - including periodic reviews and plan updates - to ensure the MSP remains relevant as conditions, technologies and priorities evolve.

2.4 MSP Targets and Results

The MSP Targets are adapted from the MSP process and organised by objective and thematic area. They are complemented by suggested indicators and timeframes to support monitoring and evaluation (M&E).

Objective 1: Provide a framework for integrated planning, governance and sustainable management of Kenya's coastal and marine space and resources, benefiting people and the environment.

Institutional Coordination & Policy Integration

i). Support harmonization across sectors (e.g., fisheries, energy, transport, environment) through inter-agency cooperation and clear governance structures.

Objective 2: Strengthen collaboration and partnerships among government agencies, county governments, coastal communities, the private sector and other stakeholders.

Knowledge Co-production and Joint Monitoring

i). Encourage establishment of multi-stakeholder technical working groups on marine data, enforcement, and conflict resolution.

ii). Facilitate development community-based monitoring systems, integrating Indigenous Knowledge with scientific tools.

iii). Promote joint research and innovation through university–government–community–industry partnerships

iv). Promote sustainable fisheries by fully eliminating IUU fishing through spatially defined fishing zones, science-based stock assessments, and marine biodiversity conservation

Multi-Level Governance & Institutional Coordination

i). Facilitate the establishment of a National Ocean Governance Coordination Committee comprising key state departments and coastal county governments (Mombasa, Kwale, Kilifi, Lamu, and Tana River), and develop Memoranda of Understanding (MoUs) to align mandates, roles, and enforcement.

Regional and Transboundary Cooperation

i). Facilitate collaboration with Tanzania, Somalia, and Indian Ocean Island states on shared fisheries, migratory species, and maritime security.

Stakeholder Engagement and Social Inclusion

i). Encourage inclusion of corporate actors in marine restoration and biodiversity offset programs (Corporate Social Responsibility (CSR)/ Environmental, Social and Governance (ESG) frameworks).

ii). Encourage ethical certification schemes (e.g. MSC for fisheries, eco-tourism standards).

Objective 3: Promote coastal and marine biodiversity conservation and sustainable utilisation of coastal and marine resources for socio-cultural and economic benefit.

Biodiversity Conservation

i). Facilitate effective conservation and management of MPAs and Other Effective Area-Based Conservation Measures (OECMs) to protect at least 30% of Kenya's ocean space by 2030

ii). Promote sustainable management and restoration of at least 15% critical marine ecosystems and species through spatial planning, connectivity, and protective regulations to enhance ecological health and climate resilience.

iii). Promote sustainable fisheries by eliminating 100% of IUU fishing, harmful subsidies, and overharvesting, while restoring fish stocks through science-based management and conservation of marine biodiversity by 2045

iv). Integrate indigenous and local knowledge to support culturally relevant and sustainable marine resource conservation.

v). Foster regional and international collaboration for the conservation and spatial management of marine migratory species.

vi). Support science-based planning and cooperation to monitor, minimize, and address ocean acidification impacts within marine ecosystems.

Culture and Heritage

i). Facilitate establishment of Business Zone designation requiring permittees to adopt a Coastal Business Accountability Charter

ii). Facilitate definition of Women-Led Marine Zones, where permitting criteria prioritize enterprises and co-management structures with ≥ 50 % women's leadership.

iii). Institutionalize community Priority Zones / sites through Free, Prior & Informed Consent (FPIC) processes, incorporating community-driven resource, and securing legal recognition of customary tenure arrangements.

Fisheries and Mariculture

i). Promote equitable access to marine resources for artisanal fishers by designating small-scale fishing zones and landing sites with clear boundaries and co-governance through Joint Co-management Units (JCMUs), to support sustainable livelihoods within the Blue Economy framework.

ii). Designate marine zones for large-scale fishing within EEZ, to promote sustainable offshore fisheries and contribute to the national Blue Economy target of 150 billion/year GDP contribution (BETA MTP IV)

iii). To designate mariculture zones that optimize sustainable development for enhanced economic growth.

Marine Tourism and Cultural Heritage

i). Support the expansion of sustainable diverse marine and coastal tourism products for optimized economic value.

ii). Integrate protection of marine cultural heritage for preservation of historical knowledge, cultural identity, and promoting sustainable development.

Marine Transport, Shipping/Ports and infrastructure

i). Facilitate sustainable and efficient port and maritime transport operations.

ii). Designate zones and provide spatial guidance to support decarbonization and development of climate-resilient port and shipping infrastructure.

iii). Support the identification and designation of optimal sites and development of offshore petroleum handling zones to minimize marine environmental impact, ensuring the long-term sustainability of marine ecosystems, while maximizing operational efficiency to secure energy supply and enhance economic competitiveness.

iv). Support the development of submarine fiber optic corridors and landing sites as cable protection zones to enhance onshore digital connectivity and fostering a resilient digital economy.

Offshore oil/gas

i). Facilitate the development of natural oil and gas.

Renewable Energy

i). Promote renewable energy resources development in a bid to support the realisation of 100% renewable electricity by 2030 and the reduction of GHG emissions by 32%.

Research and Biotechnology

i). To promote scientific research, technology transfer, and bio-prospecting in marine space to support sustainable ocean management.

ii). To promote marine research and bio-prospecting, targeting 2% of Blue Economy research funding by 2030 in support of sustainable ocean management

iii). Promote biotechnology and the sustainable use of seabed natural and marine genetic resources to enhance their contribution to national GDP

iv). To identify sub-seabed areas suitable for carbon storage to support international collaboration on marine-based climate solutions.

2.5 Planning Principles

To ensure the success of spatial planning, the key principles outlined in this MSP framework guided the planning process. These include:

a) Ecosystem-Based Approach

A holistic management approach was adopted to balance natural, social, and economic needs derived from the marine environment. This principle emphasizes the preservation and restoration of ecosystems

to sustain the provision of services that support human well-being. Healthy ecosystems safeguard societies against climate change impacts, provide livelihoods, and conserve biodiversity.

b) Connectivity of Ocean Space

Recognizing the ecological and economic linkages between Exclusive Economic Zones (EEZs) and Areas Beyond National Jurisdiction (ABNJs), the MSP process accounted for transboundary ecological processes such as species migration and marine transport. Planning decisions considered impacts across boundaries to ensure sustainable use of adjacent marine areas.

c) Cross-Border Dimension

The MSP process incorporated the cross-border dimension, acknowledging that decisions made within one jurisdiction can affect neighbouring countries sharing continuous marine ecosystems and resources.

d) Spatial Efficiency

Marine space and resources were allocated efficiently to optimize coexistence among sectors. Compatible and non-compatible uses were identified through research and stakeholder consultations to achieve consensus on spatial allocation.

e) Evidence-Based Planning

The planning process was grounded in the best available scientific data and international benchmarks to ensure transparent, knowledge-based decision-making. All data were reviewed and verified by the MSP Secretariat for authenticity and accuracy. Data sharing was governed by protocols aligned with the Data Sharing Act, 2019.

f) Precautionary Principle

In cases of uncertainty or insufficient evidence, the safest choices were prioritised to prevent significant or irreversible harm to the environment and society.

g) Integrative Marine and Coastal Planning

The MSP process considered land-based activities affecting marine and coastal environments, ensuring integrated planning across the land-sea interface.

h) Adaptability

The MSP process was iterative and flexible, incorporating new scientific knowledge and lessons learned from local, regional, and international experiences. Periodic monitoring, evaluation, and review ensured continuous improvement.

i) Participatory Approach

Stakeholder engagement was central to the MSP process, guided by the Constitution of Kenya, relevant legislation, and the MSP's Stakeholder Engagement Strategy. Participation occurred at multiple levels, including:

i). Community Level

From 16–23 October 2025, consultations were held in Kwale, Mombasa, Kilifi, Tana River, and Lamu. They captured local knowledge, livelihood needs, and spatial use priorities through focus groups, participatory mapping, and inclusive discussions with vulnerable groups.

ii). National-Level Engagement

Between 24th October 2025 and 2nd December 2025, national stakeholder consultations were held focussing on policy coherence, technical aspects and institutional coordination. Activities included interviews with ministries and agencies, consultative meetings with counties, partners, and civil society, and sectoral workshops to review data and proposed measures. This tier integrates community inputs with national policy objectives, strengthening the relevance and implementability of the SESA recommendations.

2.6 Zoning Framework

The Marine Zoning Framework translates the spatial strategy of the Marine Spatial Plan into a coherent system of area-based management measures that define where activities are encouraged, conditionally permitted, restricted, or prohibited. It provides the operational basis for allocating marine uses,

managing competing interests, safeguarding ecologically and culturally significant areas, enhancing maritime safety and security, and supporting the sustainable development of Kenya's blue economy.

The framework is designed to guide the equitable, efficient, and sustainable use of Kenya's marine space by balancing conservation objectives, livelihood needs, and investment priorities within a single, integrated planning system. In doing so, it establishes a practical mechanism for reducing user conflict, protecting sensitive ecosystems, strengthening regulatory clarity, and enhancing certainty for both public and private decision-making.

2.6.1 Zoning Design Principles

The zoning framework was guided by a set of internationally recognized marine spatial planning principles, including ecosystem-based management, subsidiarity, mixed use and co-location, precaution, clarity and enforceability, compatibility and conflict minimization, adaptive management, representativity and ecological connectivity, and phased and conditional development. These principles were applied as follows;

i). **Ecosystem-based management**: An ecosystem-based approach was applied by first identifying and securing ecologically sensitive and high-value areas, including critical habitats, biodiversity hotspots, and areas subject to high cumulative impact, as the ecological foundation of the zoning framework. Areas that support ecosystem-dependent livelihoods and access, particularly those relied upon by coastal communities, were then safeguarded. Compatible multi-use zones were subsequently delineated where activities could coexist under clearly defined management conditions. Higher-impact development uses were allocated only to areas of lower ecological sensitivity and lower user conflict, and were made subject to measures such as buffers, seasonal controls, restoration requirements, and other management conditions. In this way, ecological limits and ecosystem dependency provided the primary basis for determining the location, intensity, and compatibility of marine uses.

ii). **Subsidiarity**: The subsidiarity principle was applied by ensuring that zoning decisions were informed at the most appropriate level, while remaining consistent with national policy, legal, and strategic objectives. Local actors, including coastal communities, county institutions, and resource users, informed the identification of traditional fishing grounds, landing sites, community tourism areas, cultural sites, mangroves, coral reefs, seagrass beds, and local access routes. National institutions, in turn, guided the zoning of areas of wider strategic importance, including marine parks and reserves, shipping corridors, anchorage areas, port approaches, oil and gas blocks, renewable energy areas, heritage sites, and key fisheries and aquaculture zones. This ensured that the zoning framework reflected both local realities and national priorities.

iii). **Mixed use and co-location**: Mixed use and co-location were applied through the designation of compatibility zones in which different marine activities could coexist under defined management rules, provided that such coexistence did not create unacceptable ecological harm, user conflict, or navigational and safety risks. This principle enabled more efficient use of space while reducing unnecessary separation of compatible activities.

iv). **Precautionary principle**: The precautionary principle was applied by treating ecologically sensitive areas and areas of high cumulative impact as priority constraints in the zoning process. Critical habitats were secured first, and protective measures such as buffers, seasonal controls, and use restrictions were introduced around sensitive features. Higher-impact activities were directed away from areas where environmental risk or uncertainty was high. The same approach was applied in the Exclusive Economic Zone (EEZ) and the extended continental shelf, where limited data required decisions to be based on the best available information, sector evidence, technical analysis, and expert judgment. In these offshore areas, zones were delineated conservatively and subject to adaptive conditions so that spatial guidance could be provided without creating irreversible commitments in areas that remain insufficiently understood.

v). **Use of straight-lined boundaries for clarity and enforceability**: Straight-lined boundaries were used, where appropriate, to improve the clarity, enforceability, and operational practicality of the zoning framework. This was particularly important in offshore areas, where coordinate-

based boundaries are easier to communicate, monitor, administer, and enforce than irregular boundaries derived from less visible ecological features. In some cases, this resulted in the rationalization of zone shapes initially identified through spatial analysis and prioritization heatmaps, while retaining the essential planning logic and intent of the zones.

vi). **Compatibility and conflict minimization**: The zoning framework applied the principle of compatibility and conflict minimization by allocating uses according to their capacity to coexist safely and sustainably. Compatible activities were allowed within multi-use zones under defined conditions, while incompatible uses were separated through buffers, exclusions, and use-specific controls. This helped reduce spatial conflict and improve the overall efficiency and coherence of the zoning system.

vii). **Adaptive management**: Adaptive management was applied by recognizing that marine systems, patterns of use, and the evidence base will change over time. Zones and associated management conditions were therefore designed to allow periodic review and refinement as new scientific data, monitoring results, stakeholder input, and development pressures emerge. This was particularly important in offshore areas and in relation to emerging sectors, where uncertainty remains relatively high.

viii). **Representativity and ecological connectivity:** The zoning framework secured a representative range of marine and coastal ecosystems and maintained ecological linkages among habitats. In practice, this involved considering coral reefs, mangroves, seagrass beds, estuaries, offshore habitats, and ecological corridors as connected systems rather than isolated features. This principle helped ensure that zoning supports ecosystem functioning, resilience, and long-term biodiversity conservation.

ix). **Phased and conditional development**: Phased and conditional development was applied by identifying some areas as suitable for future use in principle, while requiring further assessment, safeguards, and management conditions before development could proceed. This was particularly relevant in areas where environmental sensitivity, user conflict, or data limitations required a more cautious approach. The principle allowed the Plan to provide strategic spatial direction without creating automatic approval for high-impact or insufficiently understood activities.

2.6.2 Development of the Zoning Framework

The zoning framework represents the culmination of the analytical and participatory processes undertaken throughout the preparation of the Marine Spatial Plan, including baseline assessment, future scenario analysis, priority-area identification, alternative zoning and development pathway formulation, and evaluation of alternative options. It therefore reflects the integration of technical evidence, policy direction, stakeholder knowledge, and strategic planning judgment into a single spatial framework for decision-making.

In essence, the framework presents the final synthesis of competing interests, opportunities, and constraints into one composite policy decision intended to guide Kenya toward its long-term vision. The final zoning map, as shown in **Figure 1**, is an improved and refined version of the preferred zoning scenario. These refinements were shaped by the application of the adopted zoning principles, further technical review, and stakeholder inputs received during the planning process. As a result, the zoning framework is not only technically grounded and policy aligned, but also socially informed and operationally practical.

2.6.3 Marine Zone Classifications

1. **Marine Conservation Zone (MCZ):** These are zones designated to protect ecologically sensitive and high-value ecosystems, including coral reefs, seagrass beds, mangroves, and other critical habitats. Activities within this zone are highly restricted in order to prevent ecological degradation, conserve biodiversity, and maintain essential ecosystem functions.
2. **Fisheries Management Zone (FMZ):** These are zones designated to support the sustainable development and management of fisheries resources while protecting fish breeding, spawning, and nursery areas. It includes both artisanal and industrial fisheries management and

development areas, with management measures aimed at sustaining fish stocks, supporting livelihoods, and reducing user conflict.

3. **Navigation, Port Access and Security Zone (NPAZ):** These are zones designated to ensure safe maritime navigation and to safeguard shipping corridors, anchorage areas, port approaches, and related maritime security functions. It supports the efficient movement of vessels and the safe operation of ports and associated infrastructure.
4. **Marine Infrastructure Protection Zone (MIPZ):** These are zones designated to safeguard critical marine and coastal infrastructure, including submarine communication cables, cable reserve corridors, and overhead risk areas such as bridges and transmission wayleaves. The zone ensures the integrity, safety, and operational continuity of essential infrastructure by regulating activities that may cause physical damage, interference, or navigational hazards.
5. **Marine Tourism, Recreation and Cultural Heritage Zone (MTRZ):** These are zones designated to promote marine and coastal tourism, recreation, and related visitor activities in a manner that maintains environmental integrity and protects the natural and cultural assets on which tourism depends. Activities within this zone are managed to support sustainable tourism development while minimizing ecological disturbance and conflict with other marine uses.
6. **Aquaculture Development Zone (ADZ):** These are zones designated for sustainable aquaculture development under defined environmental and management controls. It is intended to support aquaculture investment and production while ensuring that activities are compatible with ecological conditions, water quality requirements, and other marine uses.
7. **Offshore Renewable Energy Development Zone (OEIZ):** These are zones designated to facilitate offshore energy and marine infrastructure development while minimizing conflict with other uses and sensitive ecosystems. It includes areas for oil and gas exploration and development, offshore renewable energy development, and associated supporting infrastructure.
8. **Offshore Oil and Gas Exploration and Production Zone (OGEP):** This zone supports controlled offshore exploration and extraction of oil and gas resources under strict environmental safeguards, monitoring, and spatial regulation. Activities are tightly managed to balance energy development with protection of marine ecosystems and other ocean uses.
9. **Multiple Use Zone (MUZ):** These are zones designated to allow compatible marine uses to coexist under clearly defined management conditions. It is intended to promote spatial efficiency and integrated ocean use where activities can operate together without creating unacceptable ecological harm, safety risks, or user conflict.

Most of the designated zones within the Marine Spatial Plan are composite in nature, comprising multiple underlying sub-zones that reflect different uses, sensitivities, and management requirements within the same spatial framework. As such, their spatial extent is not always represented as a single uniform area but rather as an aggregation of these constituent zones, with overall space allocation summarized and presented in **Table 2.**

Vertical Zoning

Marine zoning is applied not only horizontally across geographic space, but also vertically across the surface, water column, seabed, and sub-seabed. This allows different compatible uses to occur within the same area at different depths, provided that such uses do not conflict ecologically, operationally, or legally. Vertical zoning is particularly important in supporting coexistence among activities such as navigation, fisheries, conservation, subsea infrastructure, and offshore energy development in the Kenyan ocean space

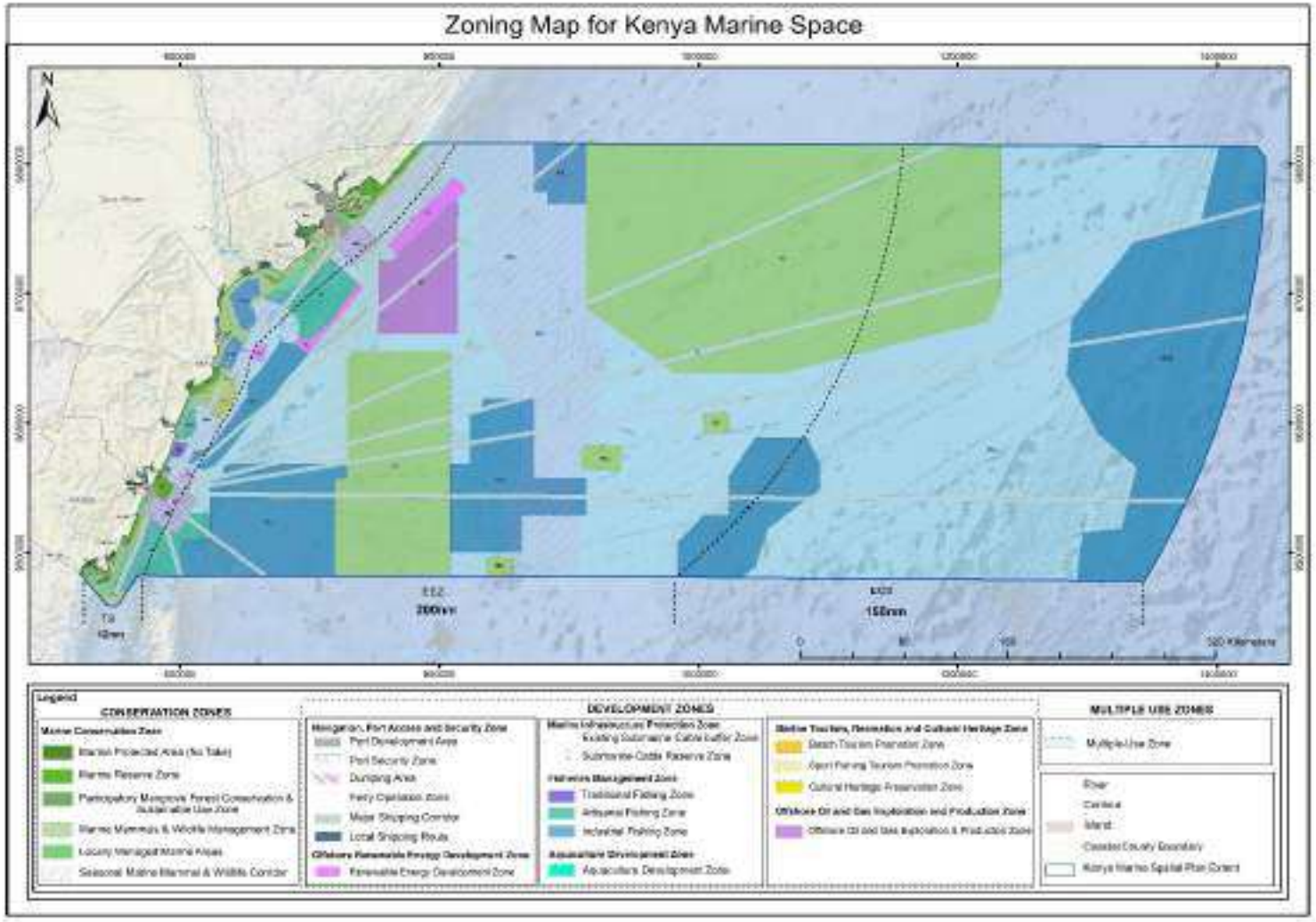

Figure 2: The zoning map

Table 2: Summary of zone classifications, spatial allocation, and proportion of total MSP area

S/No.	Zone Classification	Sub-Zones	Area Allocated (km^2)	Proportion of Total MSP Area (%)
1.	Marine Conservation Zone (MCZ)	Marine Protected Areas (MPAs)	89.74	**0.03%**
		Marine Reserves	721.72	**0.28%**
		Mangrove Conservation	789.20	**0.30%**
		Locally managed marine areas (LMMAs)	525.53	**0.20%**
		Marine mammal and wildlife management zone	70926.26	**27.39%**
		Seasonal marine mammal and wildlife corridor	Overlay layer	**0.00%**
2.	Fisheries Management Zone (FMZ)	Traditional fishing zone	106.66	**0.04%**
		Artisanal fishing zone	4300.90	**1.66%**
		Industrial - Prawn fishing zone	807.24	**0.31%**
		Industrial - Deep water crab fishing zone	2061.68	**0.80%**
		Industrial - Pelagic fishing zone	24827.50	**9.59%**
		Industrial - ECS Pelagic fisheries zone	27502.60	**10.62%**
3.	Navigation, Port Access and Security Zone (NPAZ)	Major shipping corridors	Overlay Layer	**0.00%**
		Local shipping route	Overlay Layer	**0.00%**
		Port development zones	399.75	**0.15%**
		Port security zones	1529.35	**0.59%**
		Dredged material disposal zones	190.87	**0.07%**
		Ferry operation zone	Bounded within Mombasa port development zone	**0.00%**

S/No.	Zone Classification	Sub-Zones	Area Allocated (km^2)	Proportion of Total MSP Area (%)
4.	Marine Infrastructure Protection Zone (MIPZ)	Existing submarine cable buffer zones	3080.15	**1.19%**
		Submarine cable reserve zone	198.72	**0.08%**
5.	Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)	Beach tourism promotion zone	45.92	**0.02%**
		Archeological sites	0.12	**0.00%**
		Shipwrecks	0.12	**0.00%**
		Sacred Sites	0.12	**0.00%**
6.	Aquaculture Development Zone (ADZ)		295.54	**0.11%**
7.	Offshore Renewable Energy Development Zone (ORED)	Wind energy harnessing zones	1038.45	**0.40%**
		Current energy harnessing zones	355.41	**0.14%**
8.	Offshore Oil and Gas Exploration and Production Zone (OGEP)		4735.71	**1.83%**
9.	Multiple Use Zone (MUZ)	Multiple Use Zone - Territorial Waters	3550.29	**1.37%**
		Multiple Use Zone - Exclusive Economic Zone	54940.20	**21.22%**
		Multiple Use Zone - Extended Continental Shelf	55901.25	**21.59%**
TOTAL			**258921.00**	**100.00%**

2.6.4 Zoning Attributes and Management Provisions

Marine Conservation Zone (MCZ)

The Marine Conservation Zone (MCZ) comprises a network of protected and managed areas established to conserve Kenya's critical marine and coastal ecosystems, including coral reefs, mangroves, seagrass beds, and key species habitats. Applying a precautionary, ecosystem-based approach, it enforces varying levels of protection, from strict no-take zones to controlled and community-managed areas, while permitting only low-impact, compatible activities. Collectively, the MCZ safeguards biodiversity, supports ecosystem services, and underpins the long-term sustainability of the blue economy. This zone comprises of;

1. Marine Protected Areas (1A)

Marine Protected Areas (MPAs) are established to safeguard critical habitats, biodiversity, and ecosystem services. These areas are primarily dedicated to conservation, with management measures aimed at maintaining ecological integrity, protecting nursery and breeding grounds, and enhancing resilience to environmental pressures. Governance is undertaken through a combination of national regulatory frameworks and community-based management systems, ensuring both scientific oversight and local stewardship. Within this zone, activities are strictly regulated, with priority given to conservation, research, and low-impact uses that are compatible with long-term ecosystem sustainability. They consist of;

a. Marine Parks (1Ap)

Marine parks are legally designated areas of the marine environment set aside to conserve biodiversity, habitats, and ecosystem processes through regulated or restricted human activities. They are typically managed by government authorities and allow only controlled uses, such as research, education, and low-impact tourism, consistent with long-term ecological protection. **Table 3** shows zoning attributes and management provisions for marine parks.

Table 3: Zoning attributes and management provisions for marine parks

Attribute	Provisions
Conservation Level	Strict Protection (No-Take)
Primary Objective	Ensure the strict conservation and protection of marine biodiversity
Development Codes & Areas	Watamu Marine Park - $1Ap_4$ - 40.07 km^2 Malindi Marine Park - $1Ap_3$ - 6.29 km^2 Mombasa Marine Park - $1Ap_2$ - 10.22 km^2 Kisite Marine Park - $1Ap_1$- 29.81 km^2
Permitted Activities	Non-extractive tourism (diving, snorkeling); scientific research and education; ecosystem restoration (e.g. coral gardening, mangrove planting)
Development Standards	Managed as permanent no-take zones under approved management plans; any development outside park boundaries subject to EIA/SEA demonstrating no adverse impact; tourism regulated through visitor carrying-capacity limits and internal zoning
Operational Management Measures	Access controls, visitor quotas, enforcement patrols, ecological monitoring
Potential Future Use	Climate refugia; biodiversity reference and monitoring sites

Attribute	Provisions
Prohibited Activities	All fishing and harvesting; mining, dredging, oil and gas exploration; port development; pipelines and subsea cables; dumping or discharge of waste or ballast water

b. Community Management Zones (No-take) (1Ac)

Community Management Zones (CMZs) are nearshore marine areas governed through community-led conservation frameworks that integrate sustainable resource use with ecosystem restoration. They are designed to rehabilitate degraded fishing grounds, rebuild fish stocks, and support local livelihoods through regulated artisanal activities, participatory monitoring, and adaptive management practices rooted in local stewardship. **Table 4** shows zoning attributes and management provisions for community management zones.

Table 4: Zoning attributes and management provisions for community management zones

Attribute	Provisions
Conservation Level	Community-Led Conservation and Sustainable Use
Primary Objective	Restore degraded nearshore fishing grounds, rebuild fish stocks, and improve livelihoods
Development Codes & Areas	$(1Ac_1 – 1Ac_7) – 3.34km^2$
Permitted Activities	Subsistence and artisanal fishing; community closures; habitat restoration; community-based eco-tourism; participatory research and monitoring
Development Standards	Temporal closures; small-scale infrastructure subject to screening or EIA; recognition within County Spatial Plans
Operational Management Measures	Compliance patrols; biophysical monitoring (coral cover, fish biomass); socio-economic assessments
Potential Future Use	Expansion into sustainable eco-tourism and alternative livelihoods
Prohibited Activities	Industrial fishing; destructive fishing methods

2. Marine Reserve Zones (1B)

Marine reserves are designated marine areas that allow controlled and regulated use while maintaining conservation objectives, often functioning as buffer zones to adjacent Marine Parks. They support sustainable artisanal livelihoods alongside habitat protection through managed fishing practices, seasonal closures, and co-management arrangements, ensuring ecological integrity while enabling compatible economic activities. **Table 5** shows zoning attributes and management provisions for marine reserve zones.

Table 5: Zoning attributes and management provisions for marine reserve zones

Attribute	Provisions
Conservation Level	Controlled Use / Buffer Protection
Primary Objective	Conserve habitats while supporting regulated traditional livelihoods and buffering Marine Parks

Attribute	Provisions
Development Codes & Areas	Mpunguti Marine Reserve – $1B_1$ - 12.12 km^2 Chale Marine Reserve -$1B_2$ - 80.31 km^2 Mombasa Marine Reserve -$1B_3$ - 203.66 km^2 Malindi Marine Reserve -$1B_4$ - 150.19 km^2 Kiunga Marine Reserve -$1B_5$ – 275.44 km^2
Permitted Activities	Sustainable artisanal fishing using approved gear; eco-tourism; scientific research
Development Standards	Fisheries regulated through gear restrictions, mesh-size limits, and effort controls under FMDA; seasonal/spatial closures for spawning or nursery protection; tourism or mariculture facilities subject to EIA approval
Operational Management Measures	Enforcement patrols; seasonal closures; community co-management arrangements
Potential Future Use	Fisheries recovery areas; ecological buffers for Marine Parks
Prohibited Activities	Destructive fishing methods (spear guns, beach seines, monofilament nets, ring nets, trawlers); mangrove logging; coral and sand mining

3. Participatory Mangrove Conservation and Sustainable-Use Zones (1C)

These zones are dedicated to the protection, restoration, and sustainable management of mangrove ecosystems through participatory governance frameworks that integrate community stewardship with national oversight. They aim to enhance shoreline protection, fisheries productivity, and blue-carbon storage by regulating resource use through approved management plans, controlled harvesting systems, and strict safeguards against habitat conversion, while promoting restoration, research, and low-impact livelihood opportunities such as eco-tourism and community forestry. **Table 6** shows the zoning attributes and management provisions for participatory mangrove conservation and sustainable-use zones.

Table **6**: Zoning attributes and management provisions for participatory mangrove conservation and sustainable-use zones

Attribute	Provisions
Conservation Level	Habitat Protection and Climate Resilience
Primary Objective	Enhance mangrove cover, fisheries productivity, shoreline protection, and blue-carbon storage
Development Codes & Areas	($1C_1$ – $1C_{19}$) 787.06 km^2
Permitted Activities	Mangrove restoration; community-based eco-tourism; research and monitoring

Attribute	Provisions
Development Standards	Mandatory Participatory Forest Management Plans (PFMPs); regulated harvesting through permits and quotas; EIAs required for adjacent ports, salt works, or coastal development; benefit-sharing frameworks for blue-carbon projects
Operational Management Measures	Co-management by KFS and CFAs; compliance monitoring; restoration targets
Potential Future Use	Blue-carbon finance; community forestry enterprises; mangrove-based eco-tourism
Prohibited Activities	Clear-felling; conversion to salt pans or agriculture; pollution; charcoal production; activities altering tidal flow or sediment regimes

4. Locally Managed Marine Areas (LMMAs) (1D)

Locally Managed Marine Areas (LMMAs) are community-driven conservation zones that integrate habitat protection with sustainable resource use through adaptive, site-specific management approaches. They encompass critical ecosystems such as seagrass beds, coral reefs, turtle nesting beaches, and seasonal fish replenishment areas, with measures designed to conserve biodiversity, protect breeding habitats, and support long-term fisheries productivity while maintaining compatible local livelihoods.

a. Seagrass, Nursery and Coral Reef Conservation and Sustainable-Use Zone (1Dsc)

This zone integrates interconnected nearshore ecosystems, seagrass beds, nursery habitats, and coral reefs, into a unified management framework that balances habitat conservation with sustainable community use. It is designed to protect critical life-cycle habitats that support fisheries productivity and biodiversity, while allowing regulated artisanal activities, eco-tourism, and research under strict controls that prevent habitat degradation and maintain ecological connectivity. The zone will focus on;

i. Seagrass Conservation

This component focuses on maintaining the extent and ecological function of seagrass habitats as critical nursery grounds, carbon sinks, and buffers for coastal resilience. Management emphasizes low-impact, traditional uses such as gleaning and artisanal fishing, supported by strict development controls, including mandatory environmental impact assessments for coastal infrastructure, designated mooring systems, and protection from physical disturbance, to prevent habitat degradation while enabling future blue-carbon and fisheries enhancement initiatives. **Table 7** shows the management provisions for seagrass bed conservation.

Table 7: Management provisions for seagrass bed conservation

Attribute	Provisions
Primary Objective	Maintain seagrass extent to support fisheries, carbon storage, and climate resilience

Attribute	Provisions
Development Codes & Areas	($1Ds_1$ – $1Ds_{27}$) 471.26 km^2 (These constitute both seagrass and coral reefs representation)
Permitted Activities	Gleaning; low-impact traditional fishing; research and monitoring
Development Standards	EIAs for ports, cables, pipelines, dredging; designated moorings; propeller guards for tourism boats; annual carbon stock assessments
Potential Future Use	Blue-carbon initiatives; fisheries enhancement
Prohibited Activities	Bottom trawling; drag nets; sand harvesting; anchoring in no-anchor zones

ii. Coral Reef Conservation

This component is designed to conserve coral reef biodiversity while supporting sustainable, reef-dependent livelihoods. It allows regulated artisanal fishing, eco-tourism, and small-vessel transit under strict management measures such as ecological moorings, gear restrictions, and active reef restoration, while prohibiting destructive practices to maintain reef integrity and enable long-term ecological and economic benefits through tourism and community-based conservation. **Table 8** shows the management provisions for coral reef conservation.

Table **8**: Management provisions for coral reef conservation

Attribute	Provisions
Primary Objective	Protect reef biodiversity and support sustainable reef-based livelihoods
Development Codes & Areas	($1Ds_1$ – $1Ds_{27}$) 471.26 km^2 (These constitute both seagrass and coral reefs representation)
Permitted Activities	Artisanal fishing (approved gears); snorkelling and swimming; small-vessel transit
Development Standards	Mandatory ecological moorings; coral restoration following KWS/CORDIO guidelines; gear-swap programs for illegal nets
Potential Future Use	Reef eco-tourism expansion; coral gardening; community-run tourism concessions
Prohibited Activities	Spear guns, beach seines, ring nets, dynamite; anchoring on reefs; coral mining; industrial trawling

b. Turtle Nesting Beach Protection and Compatible-Use Zones (1Dt)

This zone designates critical turtle nesting beaches and adjacent nearshore waters as protected areas under seasonal or permanent management to safeguard nesting activity and hatchling success. It restricts harmful activities such as sand mining, shoreline armouring, artificial lighting, and unmanaged tourism, while

allowing compatible community access and fisheries use through participatory beach management plans, seasonal protections, and collaborative monitoring and enforcement involving local communities and relevant authorities. **Table 9** shows zoning attributes and management provisions for turtle nesting beach protection and compatible-use zones.

Table **9**: Zoning attributes and management provisions for turtle nesting beach protection and compatible-use zones

Attribute	Provisions
Primary Objective	Maintain undisturbed nesting beaches and hatchling survival
Development Codes & Areas	($1Dt_1$ – $1Dt_{16}$) – 4.33 km^2
Permitted Activities	Conservation patrols; nest monitoring; education and research
Development Standards	Seasonal night-time access restrictions; turtle-friendly lighting; minimum 60 m coastal setback; restricted vehicular access
Potential Future Use	Conservation-based tourism; community nest-guardian schemes
Prohibited Activities	Egg harvesting; beachfront construction within setbacks; vehicle traffic; sand mining

c. Seasonal Fisheries Replenishment Zone (1Df)

This zone designates specific marine areas for temporary or periodic closure to allow fish populations to recover, reproduce, and replenish stocks. Management focuses on seasonal restrictions on fishing and other extractive activities, supported by community-led enforcement, monitoring, and adaptive management to enhance long-term fisheries productivity and ecosystem resilience. **Table 10** shows zoning attributes and management provisions for seasonal fisheries replenishment zones.

Table **10**: Zoning attributes and management provisions for seasonal fisheries replenishment zone

Attribute	Provisions
Primary Objective	Secure fish stock recruitment, support spawning success, and enhance long-term fisheries productivity while minimizing displacement of small-scale fishers through time-bound management measures.
Development Codes & Areas	$1Df_1$ – $1Df_{23}$ = 49.72 km^2
Permitted Activities	Artisanal fishing outside closure periods; non-extractive uses such as monitoring and research; transit of vessels; culturally significant and subsistence activities where compatible with closure regulations
Development Standards	Seasonal or rotational closures aligned with spawning periods; designation of no-take core areas where scientifically justified; year-round prohibition of destructive fishing gears; protection of adjacent nursery habitats; alignment with Fisheries Management and Development Act (FMDA) provisions on closed areas, seasons, and gear restrictions

Attribute	Provisions
Operational Management Measures	BMU-led surveillance and enforcement; participatory monitoring of catch, effort, and spawning indicators; adaptive management based on stock assessments; community sensitization and compliance programs; livelihood support mechanisms during closure periods
Potential Future Use	Expansion into adaptive fisheries management networks; integration with ecosystem-based fisheries management (EBFM); linkage to fisheries certification schemes and sustainable seafood value chains
Prohibited Activities	Fishing during designated closure periods; use of destructive or non-selective fishing gears (e.g., beach seines, monofilament nets, dynamite); activities that disturb spawning aggregations or degrade associated habitats

5. Marine Mammals and Wildlife Management Zones (1E)

These zones are designated to conserve critical habitats and migratory pathways for marine mammals, sea turtles, and associated pelagic species through spatial protection and activity regulation. They encompass Important Marine Mammal Areas (IMMAs), seamount ecosystems, and key aggregation zones, with management measures aimed at minimizing disturbance, protecting feeding and breeding grounds, and ensuring safe coexistence between wildlife and human activities such as fisheries, shipping, and tourism. These zones consist of;

a. Important Marine-Mammal Areas (IMMAs) (1Em)

These are designated zones that protect key habitats and migratory routes for whales, dolphins, and dugongs. They allow controlled activities such as regulated tourism and research, while restricting high-noise operations and harmful interactions to minimize disturbance and ensure species conservation. **Table 11** shows attributes and management provisions for important marine mammal areas.

Table **11**: Zoning attributes and management provisions for important marine mammal areas

Attribute	Provisions
Primary Objective	Protect critical habitats, migratory routes, and breeding/feeding grounds for whales, dolphins, and dugongs
Development Codes & Areas	$1Em_1 – 1Em_3 = 54{,}429.25\ km^2$
Permitted Activities	Regulated marine wildlife viewing; navigation and transit under speed controls; scientific research and monitoring
Development Standards	Offshore developments, seismic surveys, and port expansions subject to EIAs demonstrating avoidance and mitigation of impacts; seasonal restrictions on high-noise activities in sensitive periods; vessel speed limits ≤10 knots in high-use mammal areas; deployment of Marine Mammal Observers (MMOs) during offshore operations
Potential Future Use	Transboundary marine mammal conservation corridors; long-term marine mammal research and monitoring networks

Attribute	Provisions
Prohibited Activities	Intentional disturbance or harassment of marine mammals; use of driftnets; unmitigated high-noise activities (including seismic blasting and military sonar)

b. Sea Mount Protection Zone (1Es)

These zones are designated to conserve deep-sea ecosystems and associated biodiversity by restricting destructive activities while allowing controlled research and limited pelagic fishing. Strict safeguards—such as EIAs, vessel monitoring, and prohibition of bottom-contact activities—ensure the protection of sensitive habitats and migratory pathways. **Table 12** shows zoning attributes and management provisions for sea mount protection zones.

Table **12**: Zoning attributes and management provisions for sea mount protection zones

Attribute	Provisions
Primary Objective	Protect deep-sea seamount ecosystems, maintain ecological integrity of benthic and pelagic habitats, and ensure safe passage for migratory species
Development Codes & Areas	$1Es_1 – 1Es_3$ = 1,279.22 km^2
Permitted Activities	Scientific research (ROVs, acoustic mapping, biodiversity surveys); licensed pelagic longline and troll fishing **above** seamount features; navigation within pre-defined transit lanes
Development Standards	Mandatory Environmental Impact Assessments (EIAs) for any deep-sea exploration or industrial activity; Vessel Monitoring Systems (VMS) required for vessels >12 m; compulsory bycatch mitigation (circle hooks, bird-scaring devices, safe release protocols); strict prohibition of bottom-contact fishing on seamount slopes and summits
Potential Future Use	Deep-sea biodiversity research hubs; conservation-linked ecotourism (non-extractive); designation as an Other Effective Area-Based Conservation Measure (OECM)
Prohibited Activities	Bottom trawling; deep-sea mining; blast fishing; anchoring on seamounts; dumping of waste or spoil material

c. Marine Mammals, Sea Turtles and Fisheries Aggregation Zones (1Ea)

These zones protect key aggregation and nursery areas for marine mammals, sea turtles, sharks, and rays while allowing tightly regulated fisheries and non-extractive tourism. Management focuses on strict bycatch controls, seasonal closures, and prohibition of harmful practices to sustain both biodiversity and fisheries productivity. **Table 13** shows zoning attributes and management provisions for marine mammals, sea turtles and fisheries aggregation zones.

Table **13**: Zoning attributes and management provisions for marine mammals, sea turtles and fisheries aggregation zones

Attribute	Provisions
Primary Objective	Maintain viable populations of sharks, rays, dolphins, and sea turtles while regulating sustainable fisheries exploitation
Development Codes & Areas	$1Ea_1 – 1Ea_2 = 17{,}167.34\ km^2$
Permitted Activities	Non-extractive tourism (diving, snorkeling, wildlife viewing); scientific research, tagging, and monitoring; regulated commercial fishing of non-threatened species
Development Standards	Shark finning strictly prohibited (fins must remain naturally attached); mandatory bycatch mitigation (circle hooks, Turtle Excluder Devices (TEDs), live-release protocols); industrial fisheries required to implement observer coverage; identified nursery and aggregation areas subject to seasonal closures of not less than six months per year
Potential Future Use	Conservation-based tourism; establishment of shark and ray sanctuaries; regional and international species conservation initiatives
Prohibited Activities	Shark finning; targeted hunting of CITES-listed species; fishing in nursery areas using small-mesh or non-selective nets

6. Seasonal Marine Mammal and Wildlife Migratory Corridor (1F)

This is a dynamic, seasonal management overlay that protects key migratory pathways for marine mammals, sea turtles, and pelagic species by maintaining ecological connectivity and minimizing disturbance during critical periods. It applies time-bound measures such as vessel speed limits, activity restrictions, and bycatch controls, allowing compatible uses while preventing disruptions to migration. **Table 14** shows the zoning attributes and management provisions for the seasonal marine mammal and wildlife migratory corridor.

Table **14**: Zoning attributes and management provisions for the seasonal marine mammal and wildlife migratory corridor

Attribute	Provisions
Primary Objective	Maintain ecological connectivity and ensure the safe passage of migratory marine species, including marine mammals, turtles, and pelagic fish, during critical seasonal periods
Development Codes & Areas	Seasonal management overlay applied across identified migratory pathways (spatial extent varies temporally and overlaps with existing zones)
Permitted Activities	Navigation and transit; non-intrusive scientific research and monitoring; low-impact fishing activities compliant with seasonal regulations
Development Standards	Temporal management measures applied during peak migration periods; dynamic spatial controls informed by scientific data; mandatory adherence to vessel speed limits and bycatch mitigation measures; EIAs required for activities with potential disturbance impacts

Attribute	Provisions
Operational Management Measures	Seasonal closures or restrictions; vessel speed regulation; deployment of observers and monitoring systems; adaptive management based on real-time or periodic ecological data
Potential Future Use	Dynamic ocean management systems; real-time species tracking integration; transboundary migratory corridor coordination and protection frameworks
Prohibited Activities	Activities causing significant disturbance during migration periods, including high-intensity fishing, unmitigated seismic surveys, and high-noise operations; deliberate interference with migratory species

Fisheries Management Zone (FMZ)

The Fisheries Management Zone (FMZ) comprises a spatially defined network of artisanal, traditional, industrial, and industrial fishing areas established to ensure the sustainable use of Kenya's fisheries resources across nearshore, coastal, and offshore waters. The zone supports diverse fishing activities, from small-scale community-based fisheries to industrial and pelagic operations, while applying targeted management measures such as gear restrictions, seasonal closures, catch limits, and monitoring systems. Through differentiated sub-zones, the FMZ balances livelihood protection, food security, and economic development with ecosystem conservation, minimizing conflicts between user groups and safeguarding critical habitats. Collectively, it provides a structured framework for ecosystem-based fisheries management aligned with national priorities and international obligations. The zone is made up of;

1. Traditional Fishing Zones (4A)

Traditional Fishing Zones are designated to safeguard artisanal fisheries, local livelihoods, and nearshore ecosystems while supporting food security. They prioritize small-scale, low-impact fishing under community co-management, with regulated gear use, monitoring, and seasonal controls, while excluding industrial and high-impact activities. **Table 15** shows zoning attributes and management provisions for traditional fishing zones.

Table **15**: Zoning attributes and management provisions for traditional fishing zones

Attribute	Provisions
Primary Objective	Protect artisanal fisheries, traditional livelihoods, and nearshore ecosystems while ensuring food security
Development Codes & Areas	$4A_1 – 4A_4 = 106.66\ km^2$
Permitted Activities	Artisanal fishing using handlines, traps, and compliant gillnets; subsistence gleaning; non-motorized and small motorized canoes; small-craft navigation; non-extractive tourism; marine research
Conditional Activities	Seasonal closures; temporary gear restrictions to protect juveniles; community-based mariculture subject to approval
Regulatory Standards / Management Regulations	Guaranteed access to landing sites; monitoring of catch composition, juvenile bycatch, and habitat health; ESIA approval required for mariculture; enforcement of gear and mesh-size restrictions; co-management with BMUs
Potential Future Use	Strengthened community-managed fisheries; diversification of artisanal livelihoods (value addition, eco-tourism)
Prohibited Activities	Industrial trawling; purse seining; dredging; sand mining; oil and gas structures; offshore renewable energy installations; waste dumping

2. Artisanal Fishing Zones (4B)

These zones are designated to support sustainable small-scale fisheries, protect coastal livelihoods, and ensure food security while maintaining the health of nearshore ecosystems. They allow regulated artisanal fishing under co-management frameworks, with strict controls on gear, habitat protection, and exclusion of destructive and large-scale industrial activities. **Table 16** shows zoning attributes and management provisions for the artisanal fishing zones.

Table **16**: Zoning attributes and management provisions for the artisanal fishing zones

Attribute	Provisions
Primary Objective	Support sustainable artisanal fisheries, protect coastal livelihoods, and ensure food security while maintaining the ecological integrity of nearshore ecosystems
Development Codes & Areas	$4B_1 – 4B_4 = 4301.71\ km^2$
Permitted Activities	Artisanal fishing using approved gears (handlines, traps, gillnets with regulated mesh sizes); subsistence fishing and gleaning; operation of non-motorized and small motorized vessels; small-scale navigation; community-based eco-tourism; scientific research and monitoring
Conditional Activities	Industrial fishing (trawling, purse seining); Seasonal closures to protect spawning and nursery areas; temporary gear restrictions; small-scale mariculture subject to environmental approval; introduction of improved fishing technologies subject to assessment
Regulatory Standards / Management Regulations	Co-management through Beach Management Units (BMUs); enforcement of gear and mesh-size regulations; monitoring of catch composition, fishing effort, and juvenile bycatch; protection of critical habitats (reefs, seagrass, mangroves); mandatory compliance with fisheries management plans and licensing requirements
Potential Future Use	Strengthened community-based fisheries management; value addition and fisheries value chain development; diversification into alternative livelihoods including eco-tourism and mariculture
Prohibited Activities	Destructive fishing methods (beach seines, dynamite, poison); sand mining; dredging; offshore energy and infrastructure development; waste dumping and pollution

3. Industrial Fishing Zones (4C)

Industrial Fishing Zones are offshore-designated areas that support large-scale, commercial fisheries targeting species such as prawns, pelagic fish, and deep-water crabs under strict regulatory control. They enable efficient resource extraction through licensed operations, quotas, and monitoring systems, while minimizing ecological impacts, protecting sensitive habitats, and reducing conflicts with artisanal fisheries through spatial separation and ecosystem-based management. They consist of;

a. Prawn Fishing Zones (4Cp)

These zones support licensed industrial prawn trawling under controlled routes and strict management measures to reduce habitat damage and conflicts with artisanal fishers. They apply gear restrictions, observer monitoring, and seasonal or quota controls to ensure sustainable prawn exploitation. **Table 17** shows zoning attributes and management provisions for prawn fishing zones.

Table **17**: Zoning attributes and management provisions for prawn fishing zones

Attribute	Provisions
Primary Objective	Sustain prawn stocks while minimizing ecological impacts and conflicts with artisanal fishers
Development Codes and Area	$4Cp_1 - 4Cp_2 = 807.24\ km^2$

Attribute	Provisions
Permitted Activities	Licensed industrial prawn trawling within designated routes; artisanal prawn fishing; small-scale mariculture
Conditional Activities	Seasonal fishery closures; Total Allowable Catch (TAC) and effort limits
Regulatory Standards / Management Regulations	Licensing under an approved Prawn Fishery Management Plan; gear and mesh-size restrictions; mandatory observer coverage; Vessel Monitoring Systems (VMS); juvenile prawn protection measures; trawl routing to avoid nursery and sensitive habitats
Potential Future Use	Sustainable industrial prawn fishery; integrated artisanal–industrial coexistence frameworks
Prohibited Activities	Unlicensed trawling; destructive fishing gears; mariculture installations blocking trawl routes; sand mining

b. Deep-Water Crab Pot Fishing Zones (4Cd)

These zones enable sustainable harvesting of deep-water crab resources using low-impact trapping methods, with strict controls on bycatch, vessel licensing, and benthic protection. Activities are regulated through monitoring, catch reporting, and ecosystem-based management principles. **Table 18** shows the zoning attributes and management provisions for deep-water crab pot fishing zones.

Table **18**: Zoning attributes and management provisions for deep-water crab pot fishing zones

Attribute	Provisions
Primary Objective	Support sustainable exploitation of deep-water crab resources while protecting benthic ecosystems
Development Codes and Area	4Cd = 2061.68 km^2
Permitted Activities	Deep-water crab trapping; licensed pelagic longline fishing outside sensitive habitats; scientific research
Conditional Activities	Seasonal closures; TAC limits; observer monitoring; ecosystem impact assessments for new vessels
Regulatory Standards / Management Regulations	Licensing of industrial vessels; mandatory catch reporting; bycatch minimization protocols; regulated trap spacing to reduce benthic impact; compliance with ecosystem-based fisheries management principles
Potential Future Use	Sustainable industrial crab fisheries; future offshore mariculture in low-impact areas
Prohibited Activities	Bottom trawling in sensitive benthic habitats; destructive fishing gears; unlicensed fishing; oil and gas exploration without clearance

c. Pelagic Fishing Zones (4Cl)

These zones facilitate large-scale harvesting of pelagic species such as tuna and swordfish through regulated longlining and purse seining, guided by quotas, seasonal controls, and international fisheries obligations. Strong monitoring systems and bycatch mitigation measures ensure sustainability and reduce conflicts with other marine uses. **Table 19** shows the zoning attributes and management provisions for priority pelagic fishing zones.

Table **19**: Zoning attributes and management provisions for pelagic fishing zones

Attribute	Provisions
Primary Objective	Ensure sustainable harvest of pelagic species while minimizing conflicts with shipping, conservation, and other offshore uses
Development Codes and Area	$4Cl_1 – 4Cl_4$ = 24,872.50 km^2

Attribute	Provisions
Permitted Activities	Licensed industrial longline fishing (yellowfin, bigeye, swordfish) under quota; licensed purse seining; artisanal offshore-capable vessels
Conditional Activities	Seasonal closures; quota limits; spatial exclusions around spawning aggregations; observer coverage
Regulatory Standards / Management Regulations	Mandatory VMS/AIS monitoring; licensing and reporting requirements; compliance with IOTC measures and IUCN species protections; mandatory bycatch mitigation (circle hooks, live-release protocols)
Potential Future Use	Expanded offshore pelagic fisheries under ecosystem-based management
Prohibited Activities	Unlicensed longline or purse seining; fishing of overfished Category 4 stocks without rebuilding plans; destructive gears; spatial overlap with designated shipping lanes

d. ECS Pelagic Fisheries Zone (4Ce)

This zone extends industrial pelagic fishing into the Extended Continental Shelf, enabling offshore resource utilization under strict international compliance and ecosystem safeguards. It emphasizes advanced monitoring, quota management, and prohibition of seabed-impacting activities to ensure sustainable exploitation of offshore stocks. **Table 20** shows the zoning attributes and management provisions for the ecs pelagic fisheries zone.

Table **20**: Zoning attributes and management provisions for the ecs pelagic fisheries zone

Attribute	Provisions
Primary Objective	Enable the sustainable exploitation of pelagic fishery resources within the Extended Continental Shelf while strictly protecting seabed ecosystems and ensuring compliance with international fisheries obligations
Development Codes and Area	4Ce = 27,502.60 km^2
Permitted Activities	Licensed industrial pelagic longline fishing (e.g., yellowfin tuna, bigeye tuna, swordfish) under quota; licensed purse seining targeting pelagic stocks; transit and navigation; scientific research and stock assessment surveys
Conditional Activities	Seasonal closures based on spawning cycles and stock status; quota limits aligned with regional fisheries management measures; spatial or temporal exclusions around aggregation areas; mandatory observer coverage and electronic monitoring
Regulatory Standards / Management Regulations	Mandatory Vessel Monitoring Systems (VMS) and AIS tracking; licensing and catch reporting requirements; full compliance with Indian Ocean Tuna Commission conservation and management measures; implementation of bycatch mitigation (circle hooks, bird-scaring lines, safe-release protocols); prohibition of seabed-contact gear; adherence to ecosystem-based fisheries management principles
Potential Future Use	Expansion of offshore pelagic fisheries under adaptive, science-based management; integration of real-time monitoring and dynamic ocean management; strengthened participation in regional fisheries governance frameworks
Prohibited Activities	Bottom trawling, dredging, or any seabed-contact fishing methods; unlicensed fishing; targeting of overfished or protected species without recovery measures; disposal of fishing gear or waste; offshore infrastructure development that interferes with fishing operations or ecological integrity

Navigation, Port Access and Security Zone (NPAZ)

The Navigation, Port Access and Security Zone (NPAZ) comprise a network of designated areas that ensure safe, efficient, and secure maritime navigation and port operations across Kenya's marine space. Encompassing shipping corridors, port zones, local transport routes, and security areas, the zone provides spatial certainty for critical infrastructure and maritime activities while minimizing conflicts with other

marine uses and sensitive ecosystems through structured management and risk-based controls. This zone is made up of;

1. **Major Shipping Corridors (2D)**

These corridors safeguard high-volume international and regional vessel movement by maintaining clear, obstruction-free routes supported by strict navigation controls and safety systems. They minimize conflicts with other uses while ensuring uninterrupted maritime trade and security. **Table 21** shows the detailed zoning attributes, permitted uses, and restrictions governing navigation safety and corridor integrity.

Table **21**: Zoning attributes and management provisions for the major shipping corridors

Attribute	Provisions
Primary Objective	Safeguard uninterrupted international and regional navigation, maritime safety, and strategic sea-lane integrity
Development Codes and Area	Applies to; i. **2D$_1$** – Northern Coast / Horn of Africa (1,109.97 km²) ii. **2D$_2$** – Red Sea / Europe (1,489.89 km²) iii. **2D$_3$** – Middle East / Arabian Peninsula (2,382.83 km²) iv. **2D$_4$** – India Subcontinent (3,171.33 km²) v. **2D$_5$** – Southeast Asia (3,045.90 km²) vi. **2D$_6$** – East Asia / Trans-Pacific (2,816.73 km²) vii. **2D$_7$** – Southern Indian Ocean (278.50 km²) viii. **2D$_8$** – Southern Africa (143.09 km²) ix. **2D$_9$** – Kenya–Tanzania Coastal Corridor (275.18 km²) x. **2D** – Near-Voyage Navigation Route (172.94 km²)
Permitted Activities	National and international vessel transit; AIS monitoring and safety patrols; search and rescue operations; military and coast guard operations
Conditional / Restricted Activities	Linear crossings of undersea cables or pipelines subject to Navigation Risk Assessment (NRA); scientific research and surveys that do not obstruct navigation
Regulatory Standards / Management Regulations	Shipping corridors shall remain free of fixed or floating impediments; interim corridor width of **2 nautical miles**, subject to periodic AIS-based review; NRA mandatory for any intersecting or adjacent infrastructure; linear infrastructure shall preferentially route outside corridors; temporary exclusion zones permitted only for emergencies or maintenance
Potential Future Use	Adaptive routing and corridor widening based on traffic trends; enhanced vessel traffic services (VTS); temporary traffic separation schemes during emergencies

Attribute	Provisions
Prohibited Activities	Fixed or floating structures; routine anchoring; offshore energy installations; obstructive seabed installations; permanent dredging unrelated to navigation; offshore renewable energy installations; marine tourism facilities (floating hotels, platforms)

2. Local Shipping Route (2E)

These routes support community-level maritime transport, enabling movement of people, goods, and fisheries products while preserving traditional access and cultural connectivity. Management focuses on safety, accessibility, and compatibility with small-scale livelihoods. **Table 22** shows the provisions on permitted uses, safety controls, and protection of traditional routes.

Table **22**: Zoning attributes and management provisions for the local shipping route

Attribute	Provisions
Primary Objective	Safeguard local and community-scale maritime transport essential for livelihoods, service access, fisheries value chains, and cultural connectivity
Development Codes and Area	Development Code: **2E**. Area: 73.62 km²
Permitted Activities	Small-craft passenger and cargo transport; inter-island services; creek and river-marine navigation; emergency services; small-scale artisanal fishing; cultural and heritage transport; compatible recreational line fishing
Conditional / Restricted Activities	Tourism vessels on shared routes; crossings of port channels under approved protocols; navigation aids installation; landing-site upgrades; speed and vessel suitability controls; shellfish aquaculture with zoning safeguards
Regulatory Standards / Management Regulations	Protection of traditional routes and landing access; route marking where justified; speed limits near habitats and landing sites; minimum safety standards for landing facilities; protocols for safe channel crossings; climate-resilient routing
Potential Future Use	Organized cultural and tourism transport routes; improved safety and access infrastructure
Prohibited Activities	Infrastructure blocking routes; exclusive private marinas displacing access; large commercial shipping; offshore industrial developments; oil and gas exploration; large-scale mariculture displacing routes

3. Port Development Zones (2A)

a. Major Port Operations Zones

These zones facilitate large-scale port operations, including cargo handling, navigation, and maritime services, under strict traffic management and safety regulations to ensure efficient and secure port functioning. **Table 23** shows operational controls, permitted activities, and regulatory standards for major ports.

Table **23**: Zoning attributes and management provisions for major port operation zones

Attribute	Provisions
Primary Objective	Enable safe and efficient port operations while minimizing conflicts with surrounding marine uses
Development Codes and Area	Applies to; i. Port of Mombasa. Development Code: **$2A_1$**. Area: 61.61 km² ii. Port of Lamu. Development Code: **$2A_2$**. Area: 337.42 km²
Permitted Activities	Vessel navigation under pilotage; tug and port services; harbour operations; navigation aids; hydrographic surveys; port security; search and rescue; military operations
Conditional / Restricted Activities	Dredging and spoil disposal; ferry crossings under control; buried or armored cables; emergency anchoring; temporary construction works; coordinated scientific research
Regulatory Standards / Management Regulations	Mandatory NRA for channel-affecting works; Marine Traffic Management Plans; IALA-compliant marking; cable–dredging coordination; defined anchorage capacity; continuous inter-agency coordination
Potential Future Use	Expanded deep-water terminals; automated VTS; port-linked research zones
Prohibited Activities	All fishing and aquaculture; tourism and recreation; uncoordinated seabed works; anchoring over cables

b. Small & Local Port Operation Zones

These zones support localized port activities such as fisheries landings, small-scale transport, and tourism, emphasizing low-impact infrastructure and community-level economic functions. **Table 24** shows zoning provisions supporting sustainable local port operations.

Table **24**: Zoning attributes and management provisions for small & local port operation zones

Attribute	Provisions
Primary Objective	Support safe, efficient, and sustainable local maritime transport, fisheries, tourism, and recreation
Development Codes and Area	Applies to the following small ports: i. 2A3 Shimoni (0.068 km²) ii. 2A4 Kiunga (0.064 km²) iii. 2A5 Kilifi (0.10 km²) iv. 2A6 Malindi (0.23 km²) v. 2A7 Ngomeni (0.21 km²) vi. 2A8 Vanga (0.033 km²) vii. 2A9 Old Port (0.014 km²) It is worth noting that the areas provided above are approximations from remote sensing that need to be defined with KPA.

Attribute	Provisions
Permitted Activities	Local passenger and cargo transport; fish landing and cold-chain support; small-scale tourism; recreational boating; SAR and coast guard operations
Conditional / Restricted Activities	Temporary berthing of medium vessels; limited maintenance dredging; fueling under spill-control plans; small maritime events
Regulatory Standards / Management Regulations	Vessel size limits; low-impact port design; mandatory waste reception; maintenance-only dredging; safety buffers between uses
Potential Future Use	Incremental upgrading; eco-friendly marinas; improved fisheries infrastructure
Prohibited Activities	Large commercial vessels; heavy industry; bulk cargo handling; land reclamation; offshore energy logistics

4. Port Security Zones (2B)

These zones ensure the protection of strategic port infrastructure through controlled access, surveillance, and security operations, restricting unauthorized activities to maintain maritime safety and national security. **Table 25** for security protocols, permitted operations, and restrictions.

Table 25: Zoning attributes and management provisions for port security zones

Attribute	Provisions
Primary Objective	Protect critical port assets and ensure maritime security
Development Codes and Area	Applies to; i. Port of Mombasa Security Zone, Development Code: **$2B_1$**. Area: 864.12 km² ii. Port of Lamu Security Zone, Development Code: **$2B_2$**. Area: 665.23 km²
Permitted Activities	Military and coast guard operations; security patrols; emergency response
Conditional / Restricted Activities	Cleared commercial vessels; temporary exclusion zone expansion; security-related research
Regulatory Standards / Management Regulations	Defined security perimeters; controlled access; continuous surveillance; authority for dynamic restrictions
Potential Future Use	Enhanced maritime surveillance; incident-response staging areas
Prohibited Activities	Unauthorized entry; recreational boating; fishing; tourism

5. Dredged Material Disposal Zones (2C)

These zones provide designated areas for the controlled disposal of dredged materials from port operations, ensuring environmental safeguards through monitoring and regulated dumping practices. **Table 26** shows environmental standards, permitted activities, and disposal controls.

Table **26**: Zoning attributes and management provisions for dredged material disposal zones

Attribute	Provisions
Primary Objective	Controlled disposal of approved port-generated dredged material
Development Codes and Area	Applies to: **2C**$_1$ (94.16 km²) and **2C**$_2$ (96.71 km²)
Permitted Activities	Approved dredged material disposal; monitoring surveys; security patrols
Conditional / Restricted Activities	Temporary exclusion zones; emergency dumping under protocol
Regulatory Standards / Management Regulations	Environmental approval and testing; approved dumping plans; monitoring and post-dump verification
Potential Future Use	Beneficial reuse zones; long-term sediment management
Prohibited Activities	Disposal of contaminated material; fishing; aquaculture; tourism

6. Ferry Operation Zone (2F)

This zone ensures safe and efficient ferry transport for passengers and vehicles, supporting urban mobility through defined routes, operational controls, and integration with port systems. **Table 27** shows management measures governing ferry operations and safety protocols.

Table **27**: Zoning attributes and management provisions for ferry operation zone

Attribute	Provisions
Primary Objective	Ensure safe, reliable, and uninterrupted ferry services critical to urban mobility
Development Codes and Area	Development Code: **2F**. Area: (BOUNDED within the Mombasa Port development zone)
Permitted Activities	Scheduled ferry transit; passenger operations; terminal operations; SAR
Conditional / Restricted Activities	Jetty development; controlled channel crossings; wildlife viewing under speed control
Regulatory Standards / Management Regulations	Defined ferry lanes; time-based controls; AIS/VTS integration; emergency protocols
Potential Future Use	Low-emission ferry fleets; integrated multimodal terminals
Prohibited Activities	Cargo shipping; offshore industry; fixed fishing gear; high-speed recreation

Marine Infrastructure Protection Zone (MIPZ)

The Marine Infrastructure Protection Zone (MIPZ) comprises designated areas established to safeguard critical marine infrastructure, including submarine communication cables and overhead structures such as bridges and transmission lines. The zone ensures the integrity, safety, and uninterrupted operation of these assets by regulating activities that may cause physical damage or navigational risk, while allowing

controlled access for maintenance and compatible uses. Through strict controls on anchoring, seabed disturbance, and clearance compliance, the MIPZ supports secure connectivity, maritime safety, and the long-term functionality of essential infrastructure within Kenya's marine space. This zone is primarily made up of;

1. Existing Submarine Cable Buffer Zone (3A)

This zone protects existing submarine cables by restricting activities that may cause physical damage, such as anchoring and seabed disturbance, while allowing controlled navigation and maintenance. It ensures uninterrupted communication infrastructure through strict buffer controls and monitoring. As outlined in **Table 28**, strict buffer controls are applied to protect existing submarine cables.

Table **28**: Zoning attributes and management provisions for existing submarine cable buffer zones

Attribute	Provisions
Primary Objective	Protect existing submarine communication cables from physical damage and ensure uninterrupted connectivity and data transmission.
Development Codes and Area	3A – 3080.15 km^2
Permitted Activities	Navigation without anchoring; cable inspection, maintenance, and repair operations.
Conditional / Restricted Activities	Linear crossings (pipelines, cables) subject to approval; non-intrusive geophysical and environmental surveys.
Regulatory Standards / Management Regulations	Mandatory 250 m buffer on either side of cable routes; strict prohibition of anchoring and seabed disturbance; marking and charting of cable locations; compliance with international cable protection standards and MSP regulations.
Potential Future Use	Upgrading and maintenance of existing cable systems; integration with monitoring and surveillance technologies.
Prohibited Activities	Anchoring; bottom trawling; dredging; seabed mining; any activity that risks cable damage.

2. Submarine Cable Reserve Zone (3B)

This zone reserves strategic marine corridors for future cable installations, preventing incompatible uses that could constrain infrastructure expansion. It supports long-term connectivity planning by safeguarding space for new submarine cable systems. Future cable routing and corridor protection measures are detailed in **Table 29**.

Table **29**: Zoning attributes and management provisions for submarine cable reserve zones

Attribute	Provisions
Primary Objective	Safeguard designated corridors for future submarine cable installations to ensure long-term infrastructure expansion and connectivity resilience.
Development Codes and Area	$3B_1 – 3B_3 = 199.37$ km^2
Permitted Activities	Navigation without anchoring; strategic planning, surveys, and feasibility assessments for future cable routing.

Attribute	Provisions
Conditional / Restricted Activities	Temporary use by compatible activities subject to non-interference with reserved corridors; approved linear infrastructure crossings.
Regulatory Standards / Management Regulations	Reservation of ~5 km-wide cable corridors; prevention of incompatible seabed developments; routing coordination with other sectors; integration into national MSP and infrastructure planning frameworks.
Potential Future Use	Installation of new international and regional submarine cables; expansion of digital and energy transmission networks.
Prohibited Activities	Permanent structures; anchoring; trawling; dredging; seabed mining; any development that compromises future cable placement.

Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)

The zone comprises designated areas that promote sustainable tourism and recreational activities while safeguarding Kenya's marine and coastal cultural heritage and natural assets. Integrating cultural heritage sites with tourism and recreation areas, the zone enables controlled visitation, community-led cultural practices, and low-impact leisure activities within defined management frameworks. By balancing cultural preservation, environmental protection, and economic opportunity, the MTRZ minimizes conflicts with other marine uses while supporting inclusive and responsible blue economy growth. The zone comprises of;

1. Tourism and Recreation Zones

Tourism and Recreation Zones are designated to support safe, sustainable, and culturally respectful tourism activities across beaches and marine environments while safeguarding ecological and heritage values. They accommodate a range of uses, from passive recreation and water sports to eco-tourism and cultural experiences, under strict management controls that limit environmental impact, protect sensitive habitats, and ensure alignment with conservation and community priorities. **Table 30** shows zoning attributes and management provisions for tourism promotion zones.

Table **30**: Zoning attributes and management provisions for tourism promotion zones

Attribute	Provisions
Primary Objective	Provide safe, ecologically sensitive, and culturally respectful tourism and recreational opportunities while minimizing impact on heritage and natural resources.
Development Code, Zone Names & Areas	i. Beach Tourism Promotion Zone - 8A – 45.92 km^2 ii. Sport Fishing Tourism Promotion Zone - $8B_1$, $8B_2$, $8B_3$ iii. Eco-Tourism Promotion Zone – Marine parks, mangrove, corals, seagrass and sea-mount zones **NOTE**: The last 2 fall under marine conservation areas as allowable activities thus have aforementioned delineated areas)
Allowable Activities	- Passive beach recreation (swimming, sunbathing, walking) - Active beach sports in designated areas (volleyball, kite-surfing, fitness events) - Cultural beach events (festivals, regattas, arts performances) - Guided cultural heritage tours - Educational and interpretive programs

Attribute	Provisions
Development Standards / Management Regulations	- Tourism activities confined to designated sites and zones. - Temporary structures and event installations must be low-impact and fully removed after use. - Turtle nesting and sensitive habitat areas protected by seasonal access restrictions. - Event timing, lighting, and noise managed to prevent ecological disturbance. - Coordination with county and national heritage authorities for cultural and beach events. - Waste management and environmental stewardship practices enforced.
Potential Future Use	- Development of eco-cultural tourism circuits integrating heritage, beaches, and traditional activities - Community-managed tourism enterprises that enhance local livelihoods - Sustainable visitor infrastructure supporting interpretation and education
Prohibited Activities	- Industrial or high-impact infrastructure on beaches or heritage sites - Unregulated or high-impact tourism events in sacred or sensitive areas - Commercial tourism that displaces traditional livelihoods - Shoreline modification or dredging without approval - Waste disposal, effluent discharge, or habitat destruction

2. Cultural Heritage Preservation Zones

Cultural Heritage Preservation Zones are designated to protect archaeological sites, shipwrecks, and sacred coastal areas by maintaining their integrity, authenticity, and cultural significance while allowing controlled cultural tourism and traditional practices. Management emphasizes strict buffer protection, regulated access, and alignment with heritage authorities and community custodians to prevent damage and ensure respectful use. **Table 31** shows zoning attributes and management provisions for cultural preservation zones.

Table **31**: Zoning attributes and management provisions for cultural preservation zones

Attribute	Provisions
Primary Objective	Preserve the physical integrity, authenticity, and cultural significance of coastal and marine heritage sites while enabling controlled cultural tourism.
Development Code, Zone Name & Areas	**Archeological Zone** – $8C_1 – 8C_6$ - 0.12 km^2 (buffer = 80m) **Shipwrecks Zone** – $8D_1 – 8D_6$ - 0.12 km^2 **Sacred Sites Zone** – $8E_1 – 8E_6$- 0.12 km^2
Allowable Activities	-Guided heritage tours - Archaeological research and documentation (with permits) - Site conservation and restoration - Educational and interpretive visits - Traditional rituals and spiritual practices by custodial communities - Community-led cultural festivals and maritime heritage events

Attribute	Provisions
Development Standards / Management Regulations	- All sites managed within a 100 m protection buffer. - Visitor access controlled, with mandatory guides where required. - Research, restoration, or excavation requires prior approval from relevant heritage authorities. - Construction or temporary structures must comply with heritage architectural guidelines. - Sacred sites managed according to customary governance and access protocols. - High-impact activities restricted within 100 m buffers. - Anchoring or seabed disturbance prohibited on underwater heritage sites.
Potential Future Use	- Expanded educational and interpretive programs - Strengthened community custodianship and cultural tourism enterprises - Integration of digital heritage documentation and interactive tourism experiences
Prohibited Activities	- Excavation, removal, or alteration of heritage without authorization - Industrial or permanent construction incompatible with heritage setting - Unregulated public access or vandalism - Activities disrupting spiritual or traditional practices - Commercial exploitation without community consent

Aquaculture Development Zone (ADZ)

The Aquaculture Development Zone (ADZ) comprises designated areas for the sustainable expansion of mariculture activities, including seaweed farming, shellfish culture, and finfish production. The zone supports aquaculture investment and livelihoods while applying strict environmental controls to maintain water quality, protect sensitive habitats, and prevent conflicts with capture fisheries. Through regulated development, monitoring, and site suitability measures, the ADZ promotes a balanced approach to food production, economic growth, and ecosystem integrity within Kenya's marine space. **Table 32** shows zoning attributes and management provisions for aquaculture promotion zones.

Table **32**: Zoning attributes and management provisions for aquaculture promotion zones

Attribute	Provisions
Primary Objective	Promote sustainable mariculture development while minimizing environmental impacts and conflicts with fisheries
Development Code & Areas	$5_1 – 5_{19}$ = 295.54 km^2
Permitted Activities	Seaweed farming; oyster culture; crab fattening; shrimp ponds; small-scale finfish mariculture; research
Conditional Activities	Activities subject to ESIA approval, water-quality monitoring, site carrying-capacity assessments; seasonal closures to protect wild stocks
Regulatory Standards / Management Regulations	Licensing and zoning controls; continuous water-quality monitoring; biosecurity measures; limits on stocking density and effluent discharge; avoidance of critical habitats and migration corridors

Attribute	Provisions
Potential Future Use	Scaled industrial mariculture; integrated multi-trophic aquaculture systems
Prohibited Activities	Destructive coastal modification; unlicensed mariculture; pollution; obstruction of artisanal fishing routes

Offshore Renewable Energy Development Zone (ORED)

This zone is designated to support the sustainable expansion of offshore wind, ocean current, and co-use renewable energy, as well as regulated offshore oil and gas activities, while safeguarding ecosystems, maritime livelihoods, and cultural heritage. These zones provide spatial certainty for energy infrastructure, research, and controlled marine activities, ensuring cumulative environmental and social impacts are managed. The zones balance national blue economy priorities with conservation, fisheries, tourism, and heritage objectives through strict environmental assessments, buffer requirements, and monitoring protocols. It consists of;

1. Wind Energy Harnessing Zone (7A)

This zone supports large-scale offshore wind energy development in low-conflict marine areas while ensuring protection of ecosystems, navigation safety, and coastal livelihoods. Development is tightly regulated through mandatory environmental assessments, buffer zones, and seasonal controls, allowing only compatible activities such as low-impact fishing, conservation, and controlled tourism. **Table 33** shows the zoning attributes and management provisions for the wind energy harnessing zone.

Table **33**: Zoning attributes and management provisions for the wind energy harnessing zone

Attribute	Provisions
Primary Objective	Support large-scale offshore wind energy development in low-conflict areas while safeguarding navigation safety, marine ecosystems, and coastal livelihoods
Development Code & Areas	$7A_1 – 7A_2 = 1038.45\ km^2$
Permitted Activities	Conservation (non-extractive); limited artisanal fishing using passive gear; controlled tourism compatible with safety buffers; marine infrastructure such as subsea export cables
Conditional / Restricted Activities	Construction, operation, and decommissioning of offshore wind turbines; cable installation, inspection, and maintenance
Regulatory Standards / Management Regulations	Mandatory Environmental Impact Assessments (EIA) and stakeholder consultations prior to development; seasonal construction controls to avoid sensitive ecological periods; minimum buffers of 2 km from seabird colonies and 5 km from marine mammal habitats; enforcement of navigation safety zones during installation and operation; annual environmental monitoring and compliance audits
Potential Future Use	Expansion of offshore wind capacity aligned with national energy transition, climate commitments, and grid-integration planning
Prohibited Activities	Major shipping lanes; industrial fishing (trawling, purse seining); disturbance of cultural or heritage sites; offshore oil and gas exploration or production

2. Current Energy Harnessing Zone (7B)

This zone enables the development of ocean current energy technologies, from pilot projects to commercial-scale generation, under strict environmental and spatial controls. It prioritizes ecosystem protection and coexistence with fisheries through buffer requirements, monitoring, and adaptive management while supporting future renewable energy expansion. **Table 34** shows zoning attributes and management provisions for current energy harnessing zone.

Table **34**: Zoning attributes and management provisions for current energy harnessing zone

Attribute	Provisions
Primary Objective	Enable pilot and commercial ocean current energy generation while protecting ecosystems, fisheries livelihoods, and migratory species
Development Code & Areas	$7B_1$ = 355.41 km^2
Permitted Activities	Conservation (non-extractive); limited artisanal fishing using passive gear; controlled tourism; marine infrastructure including subsea cables
Conditional / Restricted Activities	Pilot and commercial ocean current energy devices; cable installation, inspection, and monitoring
Regulatory Standards / Management Regulations	Mandatory EIA and stakeholder consultations prior to development; minimum buffers of 2 km from seabird corridors, 5 km from marine mammal routes, and ≥3 km from key fishing grounds; seasonal construction controls for sensitive species; continuous environmental monitoring; vessel monitoring and routing to avoid critical migratory pathways
Potential Future Use	Scaled-up commercial ocean current energy generation contributing to national renewable energy targets
Prohibited Activities	Major shipping lanes; industrial fishing (trawling, purse seining); disturbance of cultural or heritage sites; offshore oil and gas exploration

Offshore Oil and Gas Exploration and Production Zone (OGEP)

Offshore Oil and Gas Exploration and Production Zones are designated to support the sustainable development of hydrocarbon resources while ensuring environmental protection, navigational safety, and coexistence with other marine users. These zones accommodate exploration, drilling, and production infrastructure in areas of proven or potential hydrocarbon reserves. Management within these zones applies a precautionary, risk-based, and ecosystem-based approach, recognizing the high environmental sensitivity and operational risks associated with offshore oil and gas activities. **Table 35** shows zoning attributes and management provisions for offshore oil and gas exploration and production zones.

Table **35**: Zoning attributes and management provisions for offshore oil and gas exploration and production zones

Attribute	Provisions
Conservation Level	Controlled Use (High-Impact, High-Regulation Industrial Zone)
Primary Objective	Enable safe and efficient offshore oil and gas exploration and production while minimizing environmental impacts and user conflicts
Development Codes & Areas	6_1 = 4735.71 km^2

Attribute	Provisions
Permitted Activities	Seismic surveys; exploratory and production drilling; installation and operation of offshore platforms and subsea infrastructure; pipeline installation; support vessel operations
Development Standards	All activities subject to ESIA/SEA approval; mandatory safety exclusion zones (minimum 500 m) around installations; infrastructure and pipeline routing to avoid sensitive habitats; compliance with national petroleum regulations and international conventions; decommissioning plans required prior to approval
Operational Management Measures	Oil Spill Contingency Plans (OSCP); real-time monitoring of operations; installation of Aids to Navigation (AtoN); vessel traffic management; environmental monitoring (water quality, seabed integrity, biodiversity); hazard marking of subsea infrastructure
Potential Future Use	Decommissioned sites repurposed for artificial reefs or renewable energy integration (subject to assessment); carbon capture and storage (CCS) where feasible
Prohibited Activities	Unauthorized fishing within safety zones; tourism and recreational activities near installations; anchoring over pipelines and subsea infrastructure; unregulated discharge of waste, oil, or hazardous substances; dumping and seabed disturbance outside approved operations

Multiple Use Zone (MUZ)

Multiple Use Zones are designated to allow the coexistence of compatible marine activities within shared marine space while maintaining ecological integrity and minimizing user conflicts. These zones support a balanced mix of economic, social, and environmental functions, including fisheries, transport, tourism, and low-impact development. Management is guided by ecosystem-based and adaptive approaches, with emphasis on compatibility, cumulative impact control, and stakeholder co-management. **Table 36**, **Table 37** and **Table 38** shows the zoning attributes and management provisions for the multiple use zone in the territorial waters, EEZ and ECS respectively.

Multiple Use Zone – Territorial Waters (TW)

Table **36**: Zoning attributes and management provisions for the multiple use zone

Attribute	Provisions
Zone Classification	Mixed-Use / High-Intensity Coastal Interface
Primary Objective	Enable safe and efficient coexistence of diverse, high-density coastal and nearshore activities
Development Codes & Areas	
Permitted Activities	Artisanal fishing; local maritime transport; tourism and recreation; small-scale infrastructure (jetties, moorings); vessel servicing; designated boat/ship building and repair yard operations
Development Standards	Designation of specific nodes for ship/boat building and repair yards to prevent spatial sprawl; clear demarcation and safeguarding of access routes to public jetties, ports, landing

Attribute	Provisions
	sites, and maritime infrastructure; application of fine-scale spatial planning to separate incompatible uses; infrastructure to be clustered where feasible
Operational Management Measures	Establishment of navigation channels and right-of-way systems; local-level coordination mechanisms among users; enforcement of designated access corridors; temporal zoning where necessary to manage peak-use conflicts
Potential Future Use	Expansion of decentralized maritime services; upgrading of landing sites into integrated maritime service hubs
Prohibited Activities	Unregulated siting of shipbuilding/repair facilities outside designated areas; obstruction of access routes to maritime infrastructure; establishment of exclusive-use developments that restrict shared access

Multiple Use Zone – Exclusive Economic Zone (EEZ)

Table 37: Zoning attributes and management provisions for multiple use zones (EEZ)

Attribute	Provisions
Zone Classification	Mixed-Use / Offshore Coordination Zone
Primary Objective	Facilitate coexistence of large-scale offshore activities through spatial coordination and compatibility management
Development Codes & Areas	
Permitted Activities	Industrial fishing; maritime navigation; offshore support services; subsea infrastructure (cables, pipelines); mobile offshore servicing activities
Development Standards	Spatial alignment of activities to minimize operational conflicts (e.g., routing of cables/pipelines away from high-intensity fishing areas where feasible); clustering of compatible infrastructure corridors; avoidance of unnecessary spatial fragmentation
Operational Management Measures	Coordination between sectoral authorities for activity scheduling and spatial allocation; designation of indicative corridors and activity zones; monitoring of cumulative use pressures and conflict hotspots
Potential Future Use	Integration of emerging blue economy sectors such as offshore aquaculture and renewable energy, where compatible
Prohibited Activities	Fixed or exclusive-use developments that unnecessarily sterilize space needed for multiple users; uncoordinated placement of infrastructure that disrupts established offshore activity patterns

Multiple Use Zone – Extended Continental Shelf (ECS)

Table **38**: Multiple Use Zone – Extended Continental Shelf (ECS)

Attribute	Provisions
Zone Classification	Mixed-Use / Strategic Reserve Zone
Primary Objective	Safeguard long-term strategic use options while allowing limited, controlled activities
Development Codes & Areas	
Permitted Activities	Scientific research; subsea cables; limited exploratory activities consistent with national jurisdiction and international law
Development Standards	Activities to be planned to avoid precluding future strategic uses; minimal spatial footprint encouraged; infrastructure to follow linear or clustered configurations where applicable
Operational Management Measures	Case-by-case evaluation of proposed activities; strategic oversight to ensure long-term flexibility; integration with national ocean policy and international obligations
Potential Future Use	Deep-sea resource utilization; carbon storage; expansion of global communication infrastructure
Prohibited Activities	Premature or large-scale exclusive developments that constrain future planning options; uncoordinated activities that compromise strategic or scientific value of the area

2.7 Joint Co-Management Areas (JCMAs) as a Nearshore Planning Framework

JCMAs are a legally recognised governance framework for nearshore fisheries in Kenya. JCMAs build upon the BMU co-management model established under the Fisheries Management and Development Act (Cap. 378) and formalised in the Fisheries (Beach Management Units) Regulations, 2024. By bringing together adjacent BMUs that share common fishing grounds, JCMAs enable coordinated management across larger spatial units than individual BMU areas, addressing the reality that fish stocks and fishing effort do not respect administrative boundaries.

Under the KEMFSED project, eight JCMA plans were developed and endorsed by KeFS and the five coastal counties (Kilifi, Mombasa, Kwale, Tana River and Lamu) in March 2024.[4] These plans cover approximately 6,300 km² of Indian Ocean waters and involve 42 BMUs.

Table 39: JCMAs in Kenya's nearshore waters

County	JCMA	Number of BMUs
Lamu	Lamu Bay	10
Kwale	Shimoni-Vanga	7
	Chale-Gazi	2
	Mwandamu-Funzi	6
Kilifi	TAMKIBO	4
	Malindi-Magarini	5

[4] See: https://kemfsed.org/new-co-management-plans-to-promote-sustainable-fisheries/

County	JCMA	Number of BMUs
Kilifi / Mombasa	KAMAMKUKI (cross-county)	5 (3 from Kilifi, 2 from Mombasa)
Tana River	Tana Delta	3

Source: Created with reference from JCMAs supported by KMFSED (https://kemfsed.org/new-co-management-plans-to-promote-sustainable-fisheries/)

JCMAs are a critical nearshore planning layer. They operationalise co-management at a meaningful spatial scale, directly informing the Fisheries Management Zone (FMZ) delineations in the MSP zoning framework. The SESA has integrated JCMAs by: (i) mapping their boundaries as primary spatial units for nearshore fisheries management; (ii) recognising their management measures (e.g., gear restrictions, closed areas) as pre-existing spatial controls that the MSP must respect and reinforce; and (iii) aligning MSP monitoring indicators (catch per unit effort, compliance rates, habitat condition) with the joint co-management plan (JCMAP) monitoring frameworks already being implemented by BMUs and county governments.[9]

The integration of JCMAs into the MSP ensures that the national-level spatial plan does not override or duplicate community-led governance structures but instead provides an enabling framework that supports, harmonises and scales up existing co-management arrangements across Kenya's nearshore waters. This directly fulfils the 9th target of the KEMFSED project: "MSP at nearshore level developed with zoning maps and JCMAs integrated."

2.8 General Sea Use and Management Regulations

These General Regulations are established under the authority of the Kenya Marine Spatial Plan (MSP) and in accordance with the Constitution of Kenya (2010), the Environmental Management and Co-ordination Act (EMCA), and other relevant sectoral laws. They provide the overarching legal and policy framework for all activities within Kenya's marine waters, from the High-Water Mark to the outer limits of the Exclusive Economic Zone (EEZ). These regulations apply to all persons, vessels, and operations, and must be read in conjunction with the more specific rules for designated zones such as Marine Conservation Zone (MCZ).

2.8.1 Part 1: General Principles and Applicability

Guiding Principles

All marine users, agencies, and developers shall adhere to the following principles:

a) **Ecosystem-Based Approach**: Activities must be managed to ensure their cumulative impact remains within levels compatible with the maintenance of good environmental status, ecosystem health, and resilience.

b) **Precautionary Principle**: Where there is a threat of serious or irreversible damage to the marine environment, including cultural resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. The burden of proof lies with the proponent of an activity.

c) **Integration:** All sectoral planning, licensing, and decision-making must be coordinated through the MSP framework to ensure coherence and avoid conflicts. This includes the integration of land-sea interactions.

d) **Public Participation and Transparency**: MSP decisions and the management of marine space shall be open, accessible, and informed by meaningful stakeholder engagement. Spatial data, planning assumptions, and decision-making processes shall be made publicly accessible.

Scope

These principles apply across all marine jurisdictional zones of Kenya, from the High-Water Mark to the outer limits of the EEZ, and govern all marine activities, users, and regulatory processes. They establish a unified decision-making framework based on ecosystem sustainability, precautionary action, cross-sector integration, and inclusive stakeholder participation, ensuring that all marine uses are planned, authorized, and managed in a coordinated and transparent manner under the MSP.

2.8.2 Part 2: Governance and Coordination

Lead Agency

The State Department for Blue Economy and Fisheries (SDBE&F) is designated as the lead agency for the overall coordination, implementation, and monitoring of the MSP and these General Regulations.

The MSP Technical Secretariat

The MSP Technical Secretariat, housed within the SDBE&F, shall serve as the central coordinating body. Its responsibilities include:

a) Maintaining the Geospatial Data Portal as the single authoritative repository for all spatial data, licenses, and permits.
b) Coordinating the inter-agency review of project applications.
c) Facilitating the Inter-Ministerial Steering Committee (IMSC) and stakeholder engagement processes.
d) Managing the MSP Monitoring, Evaluation, and Adaptive Management (M&E) framework.

Role of Sectoral Agencies

Mandated agencies (e.g., NEMA, KMA, KPA, KWS, KFS, KeFS) retain their statutory authority for licensing and enforcement. Their decisions must be consistent with the MSP and shall be guided by the MSP Technical Secretariat to ensure spatial compatibility.

Licensing and Permitting Coordination:

All applications for licenses, permits, or concessions for activities within the MSP area shall be subject to a pre-screening and coordination process led by the MSP Technical Secretariat. This process shall include the issuance of an MSP Compatibility Statement before final approval by the relevant sectoral agency.

2.8.3 Part 3: General Use and Conduct

Prohibition of Destructive Activities

The following activities are prohibited throughout the MSP area, unless explicitly permitted as part of a licensed and approved project within a designated zone:

a) The use of destructive fishing gear, including but not limited to dynamite, poison, beach seines, and ring nets.
b) Coral mining or the harvesting of live rock.
c) Unauthorized dredging, reclamation, or seabed mining.
d) The disposal of untreated sewage, industrial effluent, or solid waste into the marine environment.
e) The removal or destruction of underwater cultural heritage (e.g., shipwrecks, artifacts) without a valid research permit.

Navigational Safety

a) All vessels shall comply with the International Regulations for Preventing Collisions at Sea (COLREGs) and national maritime safety regulations.
b) Vessels are prohibited from anchoring within designated Cable Protection Areas, no-anchor zones, and within 500 meters of sensitive coral reefs unless using approved mooring buoys.

c) Vessel speed limits of ≤10 knots shall be observed within designated Important Marine Mammal Areas (IMMAs) and turtle nesting seasonally sensitive zones, unless otherwise specified.

Pollution Control

a) The discharge of ballast water, oil, garbage, or other harmful substances into Kenyan waters is strictly prohibited and shall be managed in accordance with MARPOL and national regulations.
b) All coastal developments and land-based activities must have approved waste management and wastewater treatment plans to prevent pollution of the marine environment.

Protection of Sensitive Species and Habitats

a) The disturbance, harassment, or injury of marine mammals, sea turtles, and other protected species is prohibited.
b) Shoreline development must adhere to a minimum setback of 60 meters from the high-water mark on designated turtle nesting beaches.
c) "Turtle-friendly" lighting (shielded, amber spectrum) is mandatory for all coastal infrastructure within 500 meters of a designated turtle nesting area during the nesting season.

Conduct for Marine Tourism and Recreation

a) All water-based tourism activities (diving, snorkeling, wildlife viewing) must be conducted under a valid license and in compliance with a code of conduct that minimizes disturbance to wildlife and habitats.
b) Anchoring on coral reefs is prohibited. All diving and snorkeling vessels must use designated moorings where available.
c) A minimum approach distance of 100 meters from whales and 50 meters from dolphins shall be maintained by all vessels, unless otherwise specified in a licensed wildlife viewing operation's code of conduct.

2.8.4 Part 4: Climate Change and Risk Management

Climate-Resilient Planning

All new developments and infrastructure projects within the coastal zone shall be required to demonstrate, through their ESIA, how they have integrated climate risk assessments, including projected sea-level rise, storm surge, and coastal erosion, into their design and operational plans.

Ecosystem-Based Adaptation

The conservation, restoration, and management of natural ecosystems such as mangroves, coral reefs, and seagrass beds shall be prioritized as the first line of defence against climate change impacts.

2.8.5 Part 5: Data, Monitoring, and Compliance

Data Management

All sectoral agencies and licensed operators are required to submit relevant spatial data and compliance information to the MSP Geospatial Portal to maintain a real-time picture of marine activities and pressures.

Monitoring, Evaluation, and Adaptive Management

The MSP shall be monitored against the Key Performance Indicators (KPIs) set out in the M&E Framework. The MSP will undergo a formal review every five years, with a major evaluation and potential revision every ten years, guided by the findings of the M&E process.

Compliance and Enforcement

a) The Kenya Coast Guard Service (KCGS) shall have primary responsibility for maritime security and law enforcement at sea, supported by other agency officers.

b) A graduated response system shall be applied to violations, ranging from formal warnings and administrative fines to suspension of licenses and criminal prosecution for serious or persistent offenses.

2.8.6 Part 6: Rights and Equity

Rights of Coastal Communities

The MSP recognizes and shall safeguard the rights and livelihoods of coastal communities, including traditional fishing grounds, landing sites, and cultural practices, as provided for in the Constitution and other laws. Zoning decisions that impact these rights must be made through a process of meaningful consultation and, where required, Free, Prior, and Informed Consent (FPIC).

Gender and Social Inclusion

Implementation of the MSP shall be gender-responsive and socially inclusive, ensuring equitable representation in governance, access to resources and opportunities, and the distribution of benefits from the Blue Economy.

CHAPTER 3: APPROACH AND METHODOLOGY

3.1. Introduction

Kenya's first MSP requires an assessment framework that is both legally robust and internationally credible. The Strategic Environmental and Social Assessment (SESA) has, therefore, been designed to satisfy Kenya's EMCA (CAP 387) and SEA Regulations alongside the World Bank's Operational Policies (OP), including OP 4.01 (Environmental Assessment), 4.04 (Natural Habitats), 4.10 (Indigenous Peoples), 4.11 (Physical Cultural Resources), OP 7.60 (Disputed Areas) and 4.12 (Involuntary Resettlement), ensuring that environmental and social risks are systematically managed throughout the MSP process. The assessment followed a sequential methodology that included screening, scoping, and detailed study encompassing baseline analysis, impact prediction, alternatives assessment, and mitigation formulation. Stakeholder engagement, including Free, Prior, and Informed Consultation, was continuous across all phases, integrating the knowledge and concerns of coastal communities, fishers, women, youth, and private sector actors.

3.2. Process Design

The Strategic Environmental and Social Assessment was undertaken through an iterative and consultative process designed to inform Marine Spatial Planning decision-making at the strategic level. **Figure 3** presents the overall SESA process, illustrating the sequencing and interlinkages between screening, scoping, baseline assessment, alternatives analysis, impact assessment, mitigation planning, and monitoring. The process is iterative and allows feedback between stages, ensuring that emerging issues, stakeholder inputs, and data gaps inform subsequent analytical steps.

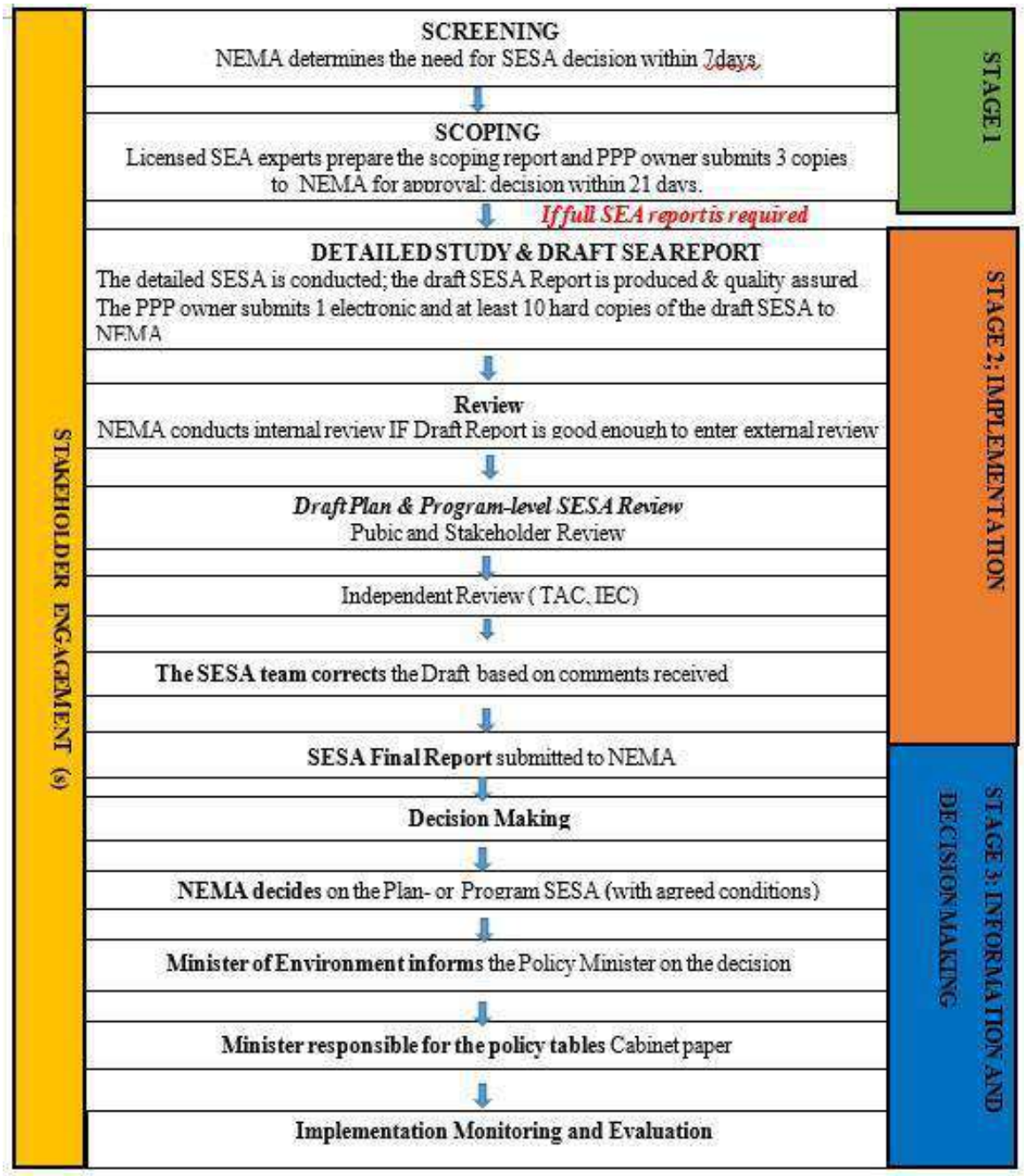

Figure 3: Process design for SESA

3.2.1 Screening Phase

A project brief for the Marine Spatial Plan was prepared and submitted to the National Environment Management Authority (NEMA) for review, in accordance with the National Guidelines for Strategic Environmental Assessment (2012). The project brief described the spatial, temporal, and technical scope of the MSP, its objectives, and the key marine sectors and activities likely to be influenced by the plan. Following review of the brief, NEMA classified the MSP as a high-risk strategic action requiring a full Strategic Environmental and Social Assessment.

This determination was based on the following criteria:

1. The Marine Spatial Plan is likely to result in significant environmental and social effects considering the magnitude, duration, and spatial extent of potential impacts;
2. Cumulative and synergistic effects arising from multiple marine uses are likely to be significant;
3. Potential transboundary and inter-county effects may occur within Kenya's marine and coastal systems;
4. Important data and knowledge gaps exist, increasing uncertainty in impact prediction;
5. High risks to ecological integrity, biodiversity, cultural heritage, and community livelihoods may arise, particularly in environmentally sensitive or socially vulnerable areas; and
6. The MSP is likely to influence decisions, behaviours, and investment patterns across government agencies, private sector actors, civil society organizations, and coastal communities.

On this basis, NEMA determined that a full SESA was mandatory to comprehensively assess the environmental and social dimensions of the MSP and to inform strategic decision-making.

3.2.2 Scoping

Scoping was undertaken to define the content, boundaries, and focus of the SESA. The objective of scoping was to identify the key environmental and social issues, receptors, and decision criteria to be addressed in the detailed assessment. The scoping process included:

1. Defining spatial, temporal, and thematic boundaries for assessment;
2. Identifying priority marine sectors and cross-cutting themes to be covered by the MSP;
3. Establishing SESA objectives aligned with national policy priorities and World Bank OP requirements;
4. Mapping stakeholders and preparing a stakeholder engagement plan for the detailed SESA study;
5. Identifying reasonable strategic alternatives, including different spatial zoning scenarios and a "no MSP" (business-as-usual) option;
6. Developing detailed Terms of Reference (TOR) and identifying the technical expertise required to undertake the SESA; and
7. Integrating relevant national, regional, and international policy, legal, and institutional frameworks.

The Scoping Report and Terms of Reference were submitted to NEMA for review and endorsement prior to commencement of the detailed SESA study.

3.3. SESA Study

The detailed SESA involved the following several key components:

i). Collection of Baseline Data

A data needs matrix was prepared, guided by the National Framework for MSP in Kenya (May 2023), to collect data on eight (8) key sectors: fisheries and mariculture, biodiversity and conservation, marine energy and mineral resources, culture and heritage, Tourism and recreation. maritime transportation and infrastructure, undersea cables and communication and ocean governance. The matrix outlined data types, sources, tools, and collection techniques, drawing on scientific literature, expert judgment, government datasets, indigenous and local knowledge, and field-based observations. By use of the framework secondary data was gathered through a review of literature, existing reports, journals, webpages, and project specific documents, including:

a) Policies, legal, and institutional frameworks, including international conventions;

b) Relevant legislation, policies, strategies, and development plans;

c) Draft Final Environmental and Social Management Framework by KEMFSED;

d) Kenya Marine Spatial Planning scoping reports;

e) County-specific plans including sectoral strategies from the five coastal counties proximity to the ocean;

f) Existing data reviews to identify current conditions and gaps.

ii). Identification of Data Gap

A matrix-based gap analysis was undertaken to assess the completeness, reliability, spatial resolution, and temporal relevance of available datasets. This analysis informed the design of field surveys and stakeholder consultations to address critical information gaps and reduce uncertainty in impact assessment. Field Survey for Gap Filling.

iii). Key Informant Interviews and Stakeholder Consultations

Stakeholder engagement for the Kenya Marine Spatial Plan (MSP) Strategic Environmental and Social Assessment (SESA) was undertaken through a structured, two-tiered, and iterative engagement model, designed to ensure inclusive, transparent, and meaningful participation across national, county, and community levels.

a) Community-Level Engagement

Community-level consultations were conducted across the five coastal counties, Kwale, Mombasa, Kilifi, Tana River, and Lamu, between 16th and 23rd October 2025, as presented in Chapter 6. These engagements formed the foundation of the SESA process and focused on capturing local knowledge, livelihood dependencies, spatial use patterns, and community priorities related to marine and coastal resources.

Engagement methods at the community level included:

i. Focus group discussions and public forums with artisanal fishers, mangrove users, beach management units (BMUs), women's groups, youth representatives, and other resource user associations;

ii. Participatory mapping exercises to document marine resource use areas, fishing grounds, seasonal activities, culturally significant sites, and areas of environmental concern;

iii. Targeted discussions with vulnerable and marginalized groups, conducted in culturally appropriate formats and local languages to ensure equitable participation.

These consultations ensured the local knowledge and community perspectives directly informed the identification of environmental and social risks, cumulative impacts, and potential mitigation and enhancement measures under the MSP

b) National-Level Engagements

Building on the outcomes of community consultations, national-level stakeholder engagements were conducted between 24th October and 2nd November 2025. These engagements focused on policy coherence, technical validation, and inter-institutional coordination. National-level engagement activities included:

i. Structured key informant interviews with representatives from national ministries, state departments, regulatory agencies, and technical institutions;

ii. Consultative meetings with county governments, development partners, civil society organizations, and non-governmental organizations;

iii. Sectoral data validation workshops, where preliminary findings, spatial analyses, and proposed mitigation measures were reviewed to ensure technical accuracy, relevance, and alignment with national policies and legal frameworks.

This tier enabled the synthesis of community-level inputs with national policy objectives, sectoral mandates, and institutional capacities, thereby strengthening the strategic relevance and implementability of the SESA recommendations.

a. Verification of Stakeholder Inputs

The data collected and assertions from consultations were cross-checked against baseline studies, secondary sources, spatial datasets, and legal/institutional frameworks. Thereafter, follow-up discussions where discrepancies emerge or where additional technical clarification is required were conducted.

b. Disclosure ,Validation and Feedback Loop

The preliminary findings and analyses from the stakeholders were taken back to the stakeholders engagement workshops for confirmation and refinement. New evidence were solicited where needed. Feedback was incorporated into the draft SESA report by transparently demonstrating how comments were addressed, and the revised report was prepared for further review and validation.

iv). Evaluation of Alternatives

SESA assessed different scenarios to inform planning options and evaluated the associated environmental and social impacts in order to determine the most plausible planning pathway. Various alternatives, including the conservation approach ,development(blue economy) approach ,business-as-usual scenario and the integrated (balanced) approach were analysed . Each alternative was evaluated against a combination of qualitative and quantitative assessment methods. The analysis applied environmental, social, economic, governance, and climate resilience criteria to assess the performance of each scenario, including:

- **Environmental parameters:** habitat condition, biodiversity value, sensitivity, ecosystem services, cumulative impacts.
- **Social parameters:** livelihoods, equity, cultural values, access rights, community well-being.
- **Economic parameters:** blue economy potential, long-term viability, employment opportunities, infrastructure needs, efficiency of resource use.
- **Governance parameters:** institutional feasibility, regulatory effectiveness, enforcement requirements, cross-sector coordination.
- **Climate resilience parameters:** vulnerability to climate risks, adaptive capacity, long-term ecological stability.

Data were drawn from sector studies, spatial analyses, cost–benefit assessments, stakeholder consultations, and expert input. This ensured that the scenario evaluation incorporated both scientific evidence and socio-economic considerations relevant to Kenya's coastal and marine context.

The assessment focused on long-term, cumulative, indirect, and transboundary impacts, recognizing that marine activities interact over time and across ecosystems, and that impacts may extend beyond national boundaries within the Western Indian Ocean region.

Evaluation of the Performance of Each Scenario

a) Scoring Framework and Criteria

Alternative scenarios were evaluated using a transparent multi-criteria approach that separates (i) the criteria used, (ii) the scoring scale, and (iii) the weighting and aggregation method. Scores were assigned for Environmental (E), Social (S) and Economic (Ec) dimensions within each sector theme.

Scoring scale and decision rules

For each sector and each dimension, reviewers assigned a Pros score (E+, S+, Ec+) and a Cons score (E-, S-, Ec-) on a 0-6 scale. Net scores were calculated as Net = Pros - Cons. To strengthen transparency, the following decision rules were applied when assigning scores:

i. Evidence-led scoring: where quantitative estimates existed in the scenario narrative (e.g., habitat extent, projected recovery/decline, cost or benefit values), those were used to justify higher or lower scores.

ii. Cumulative and long-term lens: scores reflect cumulative impacts to 2045, including indirect and transboundary effects.

iii. Precautionary treatment of high-consequence risks (e.g., oil spill risk, habitat conversion): low probability but high impact risks were reflected in Cons scores.

iv. Distributional effects: social scoring explicitly considered impacts on artisanal fishers, women, youth and vulnerable groups, including access restrictions and conflict risk.

b) Weighting and Aggregation

Dimension weights were applied to reflect the SESA sustainability lens: Environmental 40%, Social 30%, and Economic 30%. A slightly higher environmental weight was used because the blue economy depends on functioning ecosystems and because environmental degradation can create irreversible losses and long-term costs that undermine social and economic objectives. Social and economic weights were kept equal to maintain a balance between livelihoods and growth. Weighted Net scores were computed as 0.4(E Net) + 0.3(S Net) + 0.3(Ec Net).

Scenario alternatives were analysed using a Multi-Criteria Analysis (MCA/MCDA) method applying an additive weighted scoring model (Simple Additive Weighting / Weighted Sum Model) dimension weights (E=0.4; S=0.3; Ec=0.3). Net performance was computed using a Pros–Cons balance (Pros − Cons) before aggregation[5]

Scenario performance was assessed using a Pros–Cons scoring approach. For each scenario and each dimension (Environmental (E), Social (S), Economic (Ec)), reviewers assigned a Pros score to reflect the magnitude and breadth of positive outcomes described in the scenario narrative and supporting evidence, and a Cons score to reflect the magnitude and breadth of adverse outcomes and trade-offs. Net scores were calculated as Net = Pros − Cons. To reflect the SESA sustainability lens, dimension weights were applied (Environmental 40%, Social 30%, Economic 30%) and a Weighted Net score was computed as 0.4(E Net) + 0.3(S Net) + 0.3(Ec Net).

Comparative Assessment of the Planning Options

A comparative analysis was undertaken to evaluate the relative performance of the four planning scenarios, as assessed against Kenya's MSP process. The analysis compared each scenario by weighing positive impacts (pros) against negative impacts (cons) across the three required dimensions: Environmental, Social, and Economic. A net score was then calculated as Pros minus Cons (Net = Pros − Cons), where a higher net score indicates that a scenario has more positive than negative impacts overall. To reflect a balanced sustainability lens consistent with MSP objectives, the following weights were applied:

v). Impact Identification and Predictions

Potential environmental, social and economic impacts of the MSP were evaluated using a structured SESA matrix to determine consequence, likelihood and overall significance. Each impact was assessed as positive or negative and further classified as direct or indirect, cumulative or non-cumulative, and short-term or long-term/temporary or permanent.

Impact identification and prediction drew on review of proposed zones, management measures and policy provisions, supported by GIS overlays, interaction matrices, expert judgement and stakeholder inputs. Consequence was calculated as Severity + Spatial Scope + Duration, and Significance was calculated as Consequence x Likelihood. Scores were then translated into a 1-5 Likert scale to support prioritisation of

[5] Multi-Criteria Decision Analysis (MCDA), also known as Multi-Criteria Decision-Making (MCDM), involves making decisions when multiple criteria (or objectives) need to be considered together in order to rank or choose between alternatives.

mitigation, enhancement and implementation safeguards as demonstrated in **Table 40**, **Table 41** and **Table 42**.

Table **40**: Criteria for assessing significance

SEVERITY OF IMPACT	RATING	
Insignificant / non-harmful /non-beneficial	-1/ +1	CONSEQUENCE
Small/ Potentially harmful / Potentially beneficial	-2/ +2	
Significant / slightly harmful / Significantly beneficial	-3/ +3	
Great/harmful/beneficial	-4/ +4	
Disastrous/ extremely harmful / extremely beneficial	-5/+5	
SPATIAL SCOPE OF IMPACT	RATING	
Activity specific	-1/ +1	
Planning area	-2/ +2	
Local area	-3/ +3	
Regional	-4/ +4	
National	-5/+5	
DURATION OF IMPACT	RATING	
One day to one month	-1/ +1	
One month to one year	-2/ +2	
One year to ten years	-3/ +3	
Life of operation	-4/ +4	
Post closure	-5/+5	
FREQUENCY OF IMPACT	RATING	LIKELIHOOD
Rarely/ almost impossible	-1/ +1	
Very seldom / highly unlikely	-2/ +2	
Infrequent/unlikely/seldom	-3/ +3	
Often / regularly/ likely/ possible	-4/ +4	
Daily / highly likely/ definitely	**-5/+5**	

Table **41**: Significance calculation matrix

Step	Formula/range	Use in evaluation
Consequence	Severity + Spatial Scope + Duration = 3-15	Measures the magnitude of the impact.
Likelihood	1-5	Represents probability/frequency of occurrence.
Significance score	Consequence x Likelihood = 1-75	Used to rank impacts and prioritise responses.

Table **42**: Likert scale for significance

Score range	Likert	Class	Typical interpretation
0-15	1	Insignificant	No noticeable or measurable effect on values.
16-30	2	Minor	Site-specific, very low intensity and short-term effect.
31-45	3	Moderate	Localized and reversible effect felt during operations.

46-60	4	Major	Regional or long-term effect that is material but manageable/reversible.
61-75	5	Severe	Widespread, high-intensity and permanent or effectively irreversible effect.

a) Cumulative Impact Assessments

Cumulative impact screening was undertaken using the normalized receptor-sensitive matrix. Each pressure–receptor interaction was scored for severity, spatial scope, duration, likelihood and receptor sensitivity, and the cumulative score was calculated as ((Severity + Spatial Scope + Duration) × Likelihood × Sensitivity) / 5. Row scores were then aggregated by hotspot/zone cluster, habitat/resource and pressure type to derive total cumulative burden, average normalised score and cumulative class. This screening was used to identify where overlapping pressures are most concentrated within the proposed zoning plan and where stronger mitigation, monitoring and compliance controls are required.

vi). Preparation of Environmental and Social Management Plan (ESMP)

The ESMP was developed, outlining measures to be implemented during the Marine Spatial Plan's rollout to manage environmental and social risks. The ESMP includes:

a) A summary of environmental and social impacts;

b) Mitigation measures for identified impacts;

c) Institutional arrangements and responsibilities for implementing mitigation measures;

d) An implementation schedule with timing, frequency, and duration of each measure;

e) Cost estimates for initial and recurring expenses related to the ESMP.

vii). Implementation, Monitoring, and Periodic Reporting

A draft implementation and monitoring framework was developed to track the effectiveness of mitigation measures and overall MSP performance. The implementation and monitoring section entails

a. Recommended mitigation measures and indicators for monitoring;
b. A reporting framework for stakeholders;
c. A framework for assessing the environmental and social performance of the MSP.
d. Institutional arrangements for monitoring responsibilities.

viii). Reporting

The draft SESA report presents the analysis of findings, mitigation measures, and a monitoring plan to ensure the sustainability of the marine spatial plan. The report is prepared for submission to the client.

3.4. Limitations of the Study

The SESA study was undertaken with limited baseline data coverage for offshore waters, the EEZ and deep-sea environments. Consequently, the SESA baseline draws largely on secondary datasets, historical surveys and proxy layers (e.g., modelled habitats and generalized biodiversity distributions) rather than current, spatially explicit observations. These constraints limit the robustness of sensitivity and vulnerability mapping, cumulative effects analysis, and the precision of management recommendations, particularly where offshore potential and site suitability remain insufficiently characterised. Therefore, the assessment results carry elevated uncertainty in determining ecosystem condition and attributing pressure impacts, necessitating precautionary assumptions, especially for deep-sea biodiversity, seabed sensitivity, and offshore industrial footprints.

Additionally, the integration of climate change and broader global environmental change is limited by non-stationary baselines and uncertainty in future conditions. Marine ecosystems and sector footprints are expected to shift over the planning horizon due to sea-level rise, warming, ocean acidification, changes in productivity and increasing extreme events. In this context, the ability of the SESA to fully test management measures across plausible futures is constrained by limited scenario analysis, risk assessment capacity and long-term monitoring data. Therefore, management measures proposed for climate-sensitive sectors (notably fisheries, biodiversity conservation and critical habitats) may have reduced long-term reliability unless adaptive and scenario-based mechanisms are embedded; sectors perceived as less climate-sensitive remain exposed to indirect risks through storm impacts, shifting oceanographic conditions and changes in ecosystem service provision.

CHAPTER 4: POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

4.1 Overview

Kenya's coastal and marine environment is governed through an integrated (but sector-based) set of constitutional, policy, legal and institutional frameworks. At the apex is the Constitution of Kenya, 2010, which anchors sustainable development, public participation, devolution, and the right to a clean and healthy environment, while also domesticating ratified treaties and general rules of international law under Article 2(5) and (6). Sectoral laws and policies regulate key marine and coastal functions, including environmental management and safeguards (such as SEA/SESA and EIA requirements), fisheries, maritime safety and pollution control, land–sea interface planning, water resources, biodiversity conservation, and climate action. They also govern ports, tourism, extractives, energy, and coastal development, with implementation carried out through multiple national and county institutions. In addition, international and regional instruments further shape standards on maritime zones, ecosystem protection, pollution control and cooperation. Against this background, the applicable frameworks are reviewed. Further, clarifications on their implications, coordination demands, and gaps for conducting a Strategic Environmental and Social Assessment (SESA) to support Kenya's Marine Spatial Planning (MSP) process are made. A detailed legal review report is appended as **Annex 2**.

4.2 The Constitution of Kenya 2010

The Constitution of Kenya, 2010[6] stands as the grundnorm and forms the foundation of Kenya's legal system; any other law that is inconsistent with the Constitution of Kenya is invalid to the extent of its inconsistency.[7] Article 2 (5) and (6) further recognise the general rules of international law and any treaties or conventions that Kenya has ratified as part of Kenyan law.

Principles of Governance

The Constitution establishes the national values and principles of governance that are binding upon all State organs, State officers, public officers, and all persons. These values and principles include patriotism, national unity, sharing and devolution of power, adherence to the rule of law, democracy and participation of the people; respect for human dignity, equity, social justice, inclusiveness, equality, human rights, non-discrimination and the protection of marginalized groups; observance of good governance, integrity, transparency, and accountability; and the pursuit of sustainable development.[8]

The Environment

The Constitution, under Article 42, recognizes that every person has the right to a clean and healthy environment, including the right to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69. Where a person alleges that the right to a clean and healthy environment as guaranteed under Article 42 has been, is being, or is likely to be denied, violated, infringed, or threatened such a person may apply to a court for redress in addition to any other legal remedies available in respect of the matter.[9] Consequently, the court may issue any orders or directions that it deems appropriate including orders to prevent, stop, or discontinue any act or omission harmful to the environment; to compel a public officer to take measures necessary to prevent or stop such harm; or to award compensation to any person affected by a violation of the right to a clean and healthy environment.[9]

Land

[6] Constitution of Kenya. (2010). Constitution of Kenya, 2010. Government of Kenya.

[7] Constitution of Kenya (2010), Art. 2(4).

[8] Constitution of Kenya (2010), Art. 10.

[9] Constitution of Kenya (2010), Art. 70.

The Constitution defines land to include the surface of the earth and the subsurface rock; any body of water situated on or beneath the surface; marine waters within the territorial sea and the exclusive economic zone; natural resources wholly contained on or beneath the surface; and the airspace above the surface.[10] It further advances under Article 60 that land shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable in accordance with the following principles: equitable access to land; security of land rights; sustainable and productive management of land resources; transparent and cost effective administration of land; conservation and protection of ecologically sensitive areas; elimination of gender discrimination in laws, customs, and practices relating to land and property; and the promotion of community based mechanisms for the resolution of land disputes consistent with the Constitution. Article 66 of the Constitution further permits the state to regulate the use of any land, or any interest in or right over any land, in the interests of defence, public safety, public order, public morality, public health, or land-use planning.

The Constitution continues to create the National Land Commission (NLC) to manage public land on behalf of the national and county governments; to recommend a national land policy to the national government; to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya; to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities; to initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress; to encourage the application of traditional dispute resolution mechanisms in land conflicts; to assess tax on land and premiums on immovable property in any area designated by law; and to monitor and have oversight responsibilities over land use planning throughout the country.[11]

At Article 69 of The Constitution of Kenya, 2010 obligates the State to promote the sustainable exploitation, utilization, management and conservation of the environment and natural resources; as well as to ensure the equitable sharing of the benefits derived therefrom. The State is further required to work towards achieving and maintaining a tree cover of at least ten per cent of the country's land area; to protect and promote intellectual property rights and indigenous knowledge relating to biodiversity and genetic resources; to encourage public participation in environmental management, protection, and conservation; to safeguard genetic resources and biological diversity; to establish systems for environmental impact assessment, environmental audit, and environmental monitoring; to eliminate activities that may endanger the environment; and to utilize the environment and natural resources for the benefit of the people of Kenya. In the same spirit, every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.[12]

Article 71 mandates that any transaction involving the grant of a right or concession by, or on behalf of, any person, including the national government, to another person for the exploitation of any natural resource in Kenya is subject to ratification by Parliament. Further, Article 185 provides that a county assembly may receive and approve plans and policies relating to the management and exploitation of the county's resources, as well as the development and management of its infrastructure and institutions.[13]

Devolution

The Constitution promotes devolution in order to promote democratic and accountable governance; foster national unity while recognizing diversity; empower people through self-governance and participation in state decision-making; recognize community rights to manage their own affairs; protect minorities and marginalized groups; promote equitable social and economic development with accessible services across

[10] Constitution of Kenya (2010). Arts 62 and 260.

[11] Constitution of Kenya (2010), Art. 67.

[12] Constitution of Kenya (2010), Art. 69(2).

[13] Constitution of Kenya (2010), Art. 185.

the country; ensure fair distribution of resources; decentralize state organs and services from the capital; and strengthen checks, balances, and separation of powers.[14]

The Fourth Schedule of the Constitution divides functions between the national and county governments. The national government oversees international waters, marine navigation, environmental protection, and tourism policy while counties handle local agriculture, fisheries, transport, and trade development. This structure promotes shared responsibility and coordination in environmental and natural resource management, particularly in governing marine and coastal areas through cooperative management.

Collectively, these constitutional provisions establish the enabling environment for MSP by embedding sustainable development, intergovernmental agency coordination and community participation as binding governance principles.

4.3 National Policy Framework

Kenya's marine spatial planning (MSP) should be aligned to national development, environment, climate, and sector policy instruments that guide investment priorities, spatial development, safeguards, and governance across the land–sea interface. The key policies are presented in **Table *43***.

Table **43**: Summary of Key National Policies and Plans Relevant to SESA for MSP

No.	Policy / Strategy	General Provision	Relevance to Msp
1	Kenya Vision 2030	National long-term development blueprint structured around the Economic, Social and Political pillars, implemented through Medium-Term Plans. It targets accelerated growth while ensuring a clean, secure and sustainable environment.	Provides the overarching development priorities that MSP must support (e.g., blue economy growth, port and maritime infrastructure, tourism, jobs) while ensuring environmental sustainability and risk management.
2	Fourth Medium Term Plan (MTP IV) 2023–2027	Translates Vision 2030 priorities into time-bound programmes, budgets, flagship projects and performance indicators for 2023–2027, including blue economy-linked investments and infrastructure.	Enables MSP to align zoning, sequencing and monitoring with national targets for the plan period, and to identify where spatial allocations support (or constrain) scheduled investments.
3	Bottom-Up Economic Transformation Agenda (BETA) 2022–2027	Government socio-economic agenda prioritizing inclusive growth, job creation, food security, and MSME expansion, supported by enabling actions (infrastructure, climate resilience, environment, and governance).	Helps frame MSP trade-offs around livelihoods and equity (artisanal fisheries, coastal tourism, MSMEs) and informs how MSP addresses distributional impacts and benefit sharing.
4	National Spatial Plan (NSP) 2015–2045	National, long-term spatial development framework guiding the location of infrastructure, settlements, economic corridors and conservation priorities across Kenya (including the EEZ), with periodic reviews.	Direct spatial planning anchor for MSP—supports coherence between marine zones and national spatial structure (corridors, nodes, port hinterlands), and guides compatibility at the coast–hinterland interface.
5	Blue Economy Strategy (2018)	National strategy for sustainable utilisation of aquatic resources to drive economic growth, jobs, and food security across sectors such as fisheries, aquaculture, tourism, shipping, marine energy, and seabed resources.	Positions MSP as a key delivery tool by defining priority blue economy sectors, investment focus areas and coordination needs; informs sector zoning and safeguards for sustainable growth.

[14] Constitution of Kenya (2010), Art. 174.

No.	Policy / Strategy	General Provision	Relevance to Msp
6	National Integrated Coastal Zone Management (ICZM) Policy (2014)	Policy framework promoting ecosystem-based, participatory and cross-sectoral management of the coastal zone and nearshore waters, emphasizing coordination and land–sea integration.	Provides nearshore governance logic for MSP: managing multi-use conflicts, safeguarding critical habitats, integrating terrestrial drivers (sediment, pollution) and strengthening stakeholder engagement.
7	National Environment Policy (2013)	Sets national policy direction for environmental management and mainstreaming in development planning, including protection of ecosystems, pollution prevention and sustainable resource use.	Provides policy basis for MSP environmental safeguards and for SESA priorities on habitat protection, pollution control, environmental quality standards and enforcement coherence.
8	National Climate Change Policy (2016/2018) and National Climate Change Action Plans (NCCAPs)	National framework for climate mitigation and adaptation mainstreaming, implemented through successive Action Plans that prioritise sector actions, governance, finance and reporting.	Requires MSP to integrate climate risk and resilience (sea-level rise, warming), assess climate-driven cumulative impacts, and embed adaptation/mitigation measures in zoning and management rules.
9	Kenya National Adaptation Plan (NAP) 2015–2030	National plan for climate adaptation actions across sectors, including coastal and marine resilience priorities and enabling measures (information, capacity, finance).	Guides climate-risk screening (hotspots, vulnerable infrastructure and communities) and supports prioritisation of nature-based solutions (mangroves, reefs) and resilient siting.
10	National Water Policy (2021)	Policy for sustainable management, allocation and protection of water resources and water services, emphasizing catchment protection, water quality and pollution control.	Supports MSP by strengthening the land-sea interface by managing river-borne sediment and pollutants that affect estuaries, reefs and seagrass; informs land-sea coordination measures.
11	Integrated National Transport Policy (INTP, 2009)	Policy framework guiding transport sector development and regulation across modes (including maritime), focusing on safety, efficiency, infrastructure investment and environmental sustainability.	Informs MSP on spatial needs for shipping lanes, port approaches, anchorage, dredging footprints and intermodal connectivity; supports conflict avoidance with fisheries, tourism and conservation zones.
12	National Tourism Strategy (2021–2025)	Sets strategic direction for tourism growth, competitiveness, product diversification and sustainability, including coastal tourism development and destination management.	MSP should recognize and safeguard key tourism seascapes (beaches, MPAs, dive sites) while managing pressures (e.g. crowding, pollution) and ensuring compatibility with fisheries and conservation objectives.
13	National Land Use Policy (2017)	Provides guidance for sustainable, efficient and equitable land use and related resource governance, including harmonization of sectoral planning and protection of sensitive areas.	Critical for the MSP land–sea interface: informs coastal setback, shoreline protection, and the alignment of terrestrial zoning and infrastructure with marine zones.
14	National Biodiversity	National framework for conserving biodiversity and mainstreaming it across sectors, with	Sets biodiversity targets and priority actions that MSP can operationalize

No.	Policy / Strategy	General Provision	Relevance to Msp
	Strategy and Action Plan (NBSAP) 2019–2030	targets and actions for protected areas, habitat restoration and ecosystem integrity (including marine/coastal).	through spatial protection, connectivity (corridors/routes), restoration areas and compatible-use rules.
15	National Wildlife Conservation and Management Policy (2017)	Policy for sustainable wildlife management, protected area effectiveness, community conservation and benefit sharing, with relevance to coastal and marine biodiversity.	Supports MSP biodiversity zoning of MPAs, community conservation areas and strengthens governance for sensitive habitats and species, including turtle nesting beaches and marine mammal areas.
16	National Disaster Risk Management Policy (2017)	Framework for prevention, preparedness, response and recovery for disasters, emphasizing risk reduction, coordination and resilience building.	Relevant to MSP hazard mapping and siting rules for coastal infrastructure and settlements (storm surge, erosion, flooding), and for integrating emergency access and response in marine zones.
17	National Energy Policy (2025–2034)	Policy guidance for energy-sector planning, including scaling renewable energy and, where feasible, exploring offshore resource potential, while maintaining environmental safeguards.	Supports MSP identification of offshore renewable energy opportunity areas and the compatibility of these areas with shipping, fisheries, and biodiversity priorities.
18	Sector strategic plans (e.g., KMA Strategic Plan 2023–2028; Kenya Fisheries Service Strategic Plan 2023–2027)	Institutional strategies that operationalize sector mandates (maritime safety, marine pollution response, fisheries management, MCS, data, compliance and service delivery).	Provide an implementability lens for MSP to clarify sector capacity, enforcement mechanisms, and partnerships needed to operationalize zones, regulations, and monitoring actions.

4.4 Acts of Parliament and Subsidiary Legislations

Marine Spatial Planning in Kenya must be guided by compliance with the country's overarching environmental and sectoral legal framework. National laws and subsidiary regulations collectively provide the foundation for SESA, ensuring that planning and implementation safeguard biodiversity, sustain fisheries, support marine tourism, and protect community livelihoods. These instruments establish standards for environmental safeguards, resource use, and governance of marine protected areas, while county-level bylaws regulate local coastal activities. **Table 44** consolidates the relevant legislation, presenting its scope and compliance requirements to ensure MSP is lawful, effective, and socially inclusive

Table **44**: Acts of Parliament and subsidiary legislations

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
1	Environmental Management and Co-ordination Act (EMCA) Cap. 387	Serves as Kenya's overarching environmental governance framework. It establishes the National Environment Management Authority (NEMA) as the lead agency, sets	Provides the legal trigger and minimum requirements for conducting the SESA for the MSP and for subsequent project EIAs in marine/coastal zones. It underpins pollution control (water, air, waste and noise),	Environmental (Impact Assessment and Audit) Regulations, 2003 (LN 101); Prevention of Pollution in Coastal Zone Regulations, 2003 (LN 159); Water Quality Regulations, 2006 (LN 120) and

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
		environmental quality standards, and provides mechanisms for licensing, enforcement, and compliance. Critically, EMCA outlines procedures for Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA/SESA), and environmental audits, making it the central legal instrument guiding environmental safeguards in planning and implementation processes	protection of sensitive areas (wetlands/sea shore) and compliance monitoring across MSP zones.	2024 (LN 177); Waste Management Regulations, 2006 (LN 121) and 2024 (LN 178); Wetlands/Riverbanks/Lake Shores/Sea Shore Regulations, 2009; Noise & Excessive Vibration Regulations, 2009 (LN 61); Air Quality Regulations, 2014 (LN 34) and 2024 (LN 180); Sand Harvesting Regulations, 2024 (LN 179); Management of Plastic Packaging Materials Regulations, 2024 (LN 181).
2	Physical and Land Use Planning Act, 2019 (PLUPA) Cap. 303	Provides the national and county planning framework for the preparation and implementation of spatial and land-use plans. It sets procedures for plan-making, public participation, development control, enforcement and declaration/management of Special Planning Areas and strategic projects.	Offers the planning process architecture that can be adapted for MSP (zoning, plan approval, enforcement, and participation), especially at the land-sea interface (ports, settlements, access points, coastal infrastructure). It also supports the integration of MSP outputs into county/national planning instruments.	Physical and Land Use Planning (Special Planning Area) Regulations; Physical and Land Use Planning (Development Control) Regulations; Physical and Land Use Planning (Local Physical and Land Use Development Plan) Regulations; Physical and Land Use Planning (County Physical and Land Use Development Plan) Regulations.
3	Maritime Zones Act Cap. 371	Defines Kenya's maritime zones (internal waters, territorial sea, contiguous zone, EEZ and continental shelf) and the method of measurement. It sets Kenya's sovereign rights and jurisdiction for exploration, exploitation, conservation and management of resources and protection of the marine environment within those zones.	Establishes the jurisdictional and spatial extent within which MSP applies (from baseline through the EEZ). It clarifies where Kenya can regulate resource use, environmental protection and offshore installations, while recognising international navigation and cable freedoms that MSP must accommodate.	Regulations may be made by the Cabinet Secretary under the Act (subsidiary instruments to be confirmed in Kenya Law upon gazetting).

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
4	Kenya Maritime Authority Act, 2006	Establishes the Kenya Maritime Authority to regulate, coordinate and oversee maritime affairs. It mandates implementation of maritime legislation and conventions, vessel safety oversight, marine pollution prevention/response coordination and investigation of maritime incidents.	Key institutional partner for MSP implementation in shipping corridors, port approaches and safety zones. Provides the regulatory basis for managing navigation risks, marine pollution controls and compliance arrangements relevant to SESA mitigation and monitoring.	Not Applicable
5	Kenya Coast Guard Service Act, 2018	Establishes the Kenya Coast Guard Service with functions in maritime security, safety and law enforcement. It supports surveillance, interdiction, search and rescue, pollution control support, and protection of maritime resources within territorial waters and the EEZ.	Provides the enforcement and operational compliance capacity required to implement MSP zoning (e.g., MPAs, fisheries zones, shipping corridors and offshore development areas). Supports monitoring, incident response and deterring illegal activities that create cumulative impacts.	Not Applicable
6	Merchant Shipping Act, 2009 (Cap. 389)	Regulates merchant shipping, ship registration, seafarers, navigation safety and port state control. It provides for the prevention of pollution from ships, maritime security measures, and the investigation of marine casualties and incidents.	Directly informs MSP decisions on shipping corridors, anchorages, dumping/disposal controls, and port approaches. Supports SESA analysis of vessel traffic risks, spill risks, operational discharges and safety/security requirements in and near sensitive biodiversity areas.	Key MSP-relevant subsidiary legislation under Cap. 389 includes: Merchant Shipping (Fees) Regulations, 2011 (LN 192); Merchant Shipping (Maritime Security) Regulations, 2015 (LN 152); Merchant Shipping (Port State Control) Regulations, 2018 (LN 34); Merchant Shipping (Survey and Certification) Regulations, 2018 (LN 35); Merchant Shipping (Marine Casualty) (Investigations) Regulations, 2019 (LN 79).
7	Fisheries Management and Development Act (Cap. 378)	Provides for conservation, management and development of fisheries and aquatic resources and establishes the Kenya Fisheries Service and related advisory structures. It sets licensing/authorisation requirements, supports community participation	Core sector law for MSP fisheries zoning and rules (artisanal/industrial areas, seasonal measures, gear restrictions, spawning/nursery safeguards). Supports SESA by providing management tools to mitigate fisheries-related pressures and reduce conflicts with conservation and tourism zones.	Fisheries Management and Development (General) Regulations, 2024 (LN 55); (Aquaculture) Regulations, 2024 (LN 58); (Marine Fisheries) Regulations, 2024 (LN 59); (Recreational Fisheries) Regulations, 2024 (LN 60); (Safety and Quality) Regulations, 2024 (LN 61); (Beach Management Units)

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
		through BMUs, and allows declaration/management of fisheries closures and protected areas.		Regulations, 2024 (LN 62); and gazetted Fishery Management Plans (e.g., Small Purse Seine Fishery Management Plan, 2025).
8	Water Act, 2016 (Cap. 372)	Establishes the legal framework for the regulation, management, and conservation of water resources and water services. It creates the Water Resources Authority, provides for permits for abstraction and use, and prohibits unlawful discharge/pollution of water resources including estuaries and coastal waters within Kenya's jurisdiction.	Supports SESA analysis of land-based pollution pathways affecting marine space (rivers, creeks, estuaries), and regulation of abstraction/discharge activities linked to desalination, salt works, cooling water and coastal industry. Complements EMCA in setting water resource permitting and compliance obligations.	Water (Resources) Regulations, 2025 (LN 58); Water (Harvesting and Storage) Regulations, 2025 (LN 57); Water (Services) Regulations, 2025 (LN 54); and Catchment Protection/Conservation Area Orders (as gazetted).
9	Forest Conservation and Management Act, 2016 (Cap. 385)	Gives effect to constitutional obligations on forests by providing for the development, conservation, and sustainable management of forest resources. It establishes the Kenya Forest Service, provides for classification and management planning of forests, and supports the protection of mangroves and shoreline vegetation as public forests where applicable.	Provides the legal basis for mangrove conservation/restoration within MSP (blue carbon, shoreline stabilisation, nursery habitats). Supports SESA mitigation measures on mangrove buffers, catchment-driven sediment control and restrictions on clearing in sensitive coastal areas.	Forests (Charcoal) Regulations, 2009 (LN 186); and Gazette declarations/orders relating to public forests and mangrove areas (as gazetted on Kenya Law).
10	Wildlife Conservation and Management Act, 2013 (Cap. 376)	Provides for conservation and management of wildlife (including in territorial waters) and establishes the Kenya Wildlife Service. It supports establishment and management planning of protected areas, species protection measures, permitting and enforcement mechanisms.	Underpins MSP biodiversity conservation zones and management of marine protected areas and threatened species habitats/migratory routes. Supports SESA by defining conservation obligations, management planning requirements and permitting controls relevant to sensitive marine ecosystems.	Subsidiary legislation includes: Wildlife Conservation and Management (National Parks)

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
11	Land Act, 2012 (Cap. 280)	Provides for management and administration of public, community, and private land, including allocation, leases, compulsory acquisition, and easements. It contains safeguards for environmentally sensitive areas and supports the reservation of land for public purposes where applicable.	Relevant to MSP at the land-sea interface, where coastal land decisions drive marine pressures (ports, shoreline infrastructure, access, settlements). Supports SESA in addressing tenure/rights, buffer/setback considerations, and that affect coastal ecosystems.	Land Regulations, 2017 (LN 280 of 2017) and subsequent amendments (as gazetted).
12	Land Registration Act, 2012 (Cap. 300)	Provides for registration of interests in land and establishes a unified land registration system. It supports the certainty of tenure, record-keeping, and the protection of registered rights and interests.	Enables orderly management of coastal land rights that influence marine spatial outcomes (wayleaves, port footprints, tourism developments, and access corridors). Supports SESA by reducing disputes and improving clarity in the implementation of coastal interface measures.	Land Registration (General) Regulations (LN 278 of 2017); Land Registration (General) (Amendment) Regulations, 2024 (LN 77 of 2024).
13	National Land Commission Act (Cap. 280A)	Establishes the National Land Commission and provides for its functions and powers in managing public land, advising on land policy, and monitoring and overseeing land use planning. It also supports the investigation of historical land injustices and the development of land information systems.	Supports MSP governance where marine/coastal space is treated as public land under constitutional framing and where allocation/oversight decisions affect ports, foreshore access and coastal developments. Strengthens coordination and oversight required to implement land-sea interface actions from the SESA.	National Land Commission (Review of Grants and Dispositions of Public Land) Regulations, 2017 (LN 71 of 2017).
14	County Governments Act, 2012 (Cap. 265)	Gives effect to devolved government and sets out, and public participation duties for county planning, service delivery, and public participation. It provides a framework for county integrated development planning, sectoral planning, and intergovernmental coordination.	Critical for MSP implementation because coastal counties control many land-based drivers of marine impacts (waste, settlements, tourism facilities, access). Supports SESA by anchoring stakeholder engagement, disclosure and coordination of mitigation/monitoring actions with county plans and budgets.	Not Applicable
15	Mining Act, 2016 (Cap. 306)	Provides for prospecting, mining and related operations, including	Relevant where coastal/nearshore extraction occurs (construction minerals, sand harvesting, seabed	Mining (Licence and Permit) Regulations, 2017 (LN 59); Mining (Strategic Minerals)

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
		licensing and regulation of mineral rights. It establishes institutions and procedures for granting and managing mineral rights and includes obligations to comply with environmental requirements for mining activities.	materials) and where mining-related infrastructure affects coastal habitats. Supports SESA by providing the legal basis for zoning extractive uses, managing conflicts and applying environmental safeguards.	Regulations, 2017 (LN 60); Mining (Community Development Agreement) Regulations, 2017 (LN 61); Mining (Safety and Health) Regulations, 2024 (LN 66); and related guidelines/orders as gazetted.
16	Petroleum Act, 2019 (Cap. 308)	Provides for contracting, exploration, development and production of petroleum and regulation of midstream and downstream petroleum operations. It sets requirements for approvals, licensing and policy/strategic planning for the petroleum sector.	Directly relevant to MSP, where offshore exploration/production blocks, pipelines, and support logistics intersect with fishing grounds, shipping routes, and sensitive habitats. Supports SESA assessment of spill risk, cumulative	Petroleum (Information and Statistics) Regulations, 2025 (LN 97); Petroleum (Common User Facilities) Regulations, 2025 (LN 98); Petroleum (Lubricants Licensing) Regulations, 2025 (LN 100); and related instruments as gazetted.
17	Energy Act, 2019 (Cap. 314)	Consolidates energy-related laws and establishes sector institutions, including EPRA. It provides for energy policy and planning, licensing and regulation of electricity and renewable energy, including recognition of renewable sources such as wind, tidal and wave energy.	Supports MSP designation of renewable energy development zones and associated cable/landing infrastructure. Enables SESA to assess environmental and social risks of offshore renewable options and set siting/compatibility rules with navigation, fisheries and biodiversity conservation.	Energy (Energy Management) Regulations, 2025 (LN 18); Energy (Integrated National Energy Plan) Regulations, 2025 (LN 83); Energy Act (System Operations) Regulations, 2023; and other gazetted instruments under Cap. 314.
18	Climate Change Act (Cap. 387A)	Provides a regulatory framework for an enhanced response to climate change, including the mainstreaming of climate action in planning and decision-making. It establishes institutions and obligations for reporting, climate risk management, adaptation, and mitigation measures.	Requires MSP and SESA to integrate climate risks and resilience measures (sea level rise, warming, acidification, extreme events) into zoning and management measures. Supports cumulative impact analysis by requiring consideration of climate stressors alongside sector pressures.	Climate Change (Public Participation and Access to Climate Change Information) Regulations, 2023 (LN 38); Climate Change (Carbon Markets) Regulations, 2024 (LN 84).
19	Tourism Act (Cap. 383)	Provides for development, management, marketing and regulation of	Relevant to MSP tourism and recreation zones (beaches, diving/snorkelling areas, cultural	Tourism Levy Order, 2015 (LN 198 of 2015); Tourism (Tourism

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
		sustainable tourism and tourism services, including licensing and standards through sector institutions. It supports tourism strategy development and regulation of tourism activities.	seascapes). Supports SESA by enabling management of tourism pressures on reefs, beaches and marine wildlife and by guiding compatible siting of tourism facilities and activities.	Enterprises) Regulations, 2025 (LN 200 of 2025).
20	National Museums and Heritage Act (Cap. 216)	Provides for the establishment and management of the National Museums of Kenya and the protection, conservation, and preservation of cultural and natural heritage. It enables the declaration of monuments, protected sites, and heritage areas, and the management controls over protected heritage.	Supports MSP cultural heritage and tourism zoning, including protection of coastal heritage assets and underwater cultural heritage where identified. Enables SESA mitigation measures for developments that could disturb archaeological or historically significant coastal/marine sites.	National Museums and Heritage (Private Museums) Licensing Regulations, 2008 (LN 65 of 2008); Antiquities Dealers' Regulations, 2009 (LN 36 of 2009); Confirmation of Sites and Monuments Rules, 2008 (LN 128 of 2008).
21	Kenya Information and Communications Act (Cap. 411A)	Provides the legal framework for development and regulation of information and communications services and establishes the Communications Authority. It supports licensing and regulation of telecommunications infrastructure, including subsea cable systems and related facilities.	Relevant to MSP where undersea cable routes and protection zones must be designated to reduce conflicts with anchoring, dredging and trawling. Supports SESA by clarifying permitting and protection requirements for critical subsea connectivity infrastructure.	Subsidiary legislation under Cap. 411A governs licensing, service standards and subscriber registration (see Kenya Law subsidiary legislation under Cap. 411A).
22	Coast Development Authority Act (Cap. 449)	Establishes the Coast Development Authority to plan and coordinate implementation of development projects in the Coast region and related areas specified in the Act. It mandates preparation of long-term development plans, studies/surveys and coordination to avoid duplication and promote sustainable development.	Directly relevant for MSP because it provides a coordination mandate for coastal/EEZ-related development planning and multi-sector project integration. Supports SESA implementation through regional coordination of investments, environmental safeguards and conflict reduction across coastal counties.	Not Applicable

NO.	Act of Parliament	General Provision	Relevance of the Act to MSP	Relevant Subsidiary Regulations Relevant to MSP
23	Kenya Ports Authority Act (Cap. 391) (repealed by Government Owned Enterprises Act, 2025)	Previously established the Kenya Ports Authority and provided for management, operation and regulation of scheduled ports, including port services, tariffs and port development powers. Note: the Kenya Ports Authority Act (Cap. 391) is repealed by the Government Owned Enterprises Act, 2025.	Port development, dredging, disposal and vessel traffic are major MSP pressures; the SESA must address these under the current legal/institutional framework post-repeal. MSP zoning should reflect port safety, security and environmental controls and the transition arrangements introduced by the 2025 reforms.	Repealed by the Government Owned Enterprises Act, 2025 (confirm applicable transitional arrangements on Kenya Law).
24	Science, Technology and Innovation Act, 2013	Establishes the national framework for promotion, coordination and regulation of science, technology and innovation. It provides for research governance and institutional arrangements that support generation and dissemination of scientific information.	Supports evidence-based MSP by strengthening research approvals, coordination and data generation (oceanography, fisheries, biodiversity, socio-economics). Provides a basis for SESA monitoring programmes, adaptive management and innovation in blue economy sectors.	Not Applicable

4.5 World Bank Safeguard Policies

As this is a World Bank funded project, recognition of the Bank's safeguard policies within the SESA process is essential to ensure alignment with international standards and to address any gaps in Kenya's domestic legislation. These policies serve as a guiding framework for managing environmental and social risks, promoting equitable and sustainable use of marine resources, and enhancing transparency and accountability in decision-making. While not part of Kenyan law, their integration strengthens compliance with international obligations and financing requirements. Given that the Kenya MSP project was initiated prior to the adoption of the World Bank Environmental and Social Framework (ESF), this SESA review applies the legacy World Bank Safeguard Policies (Operational Policies, OPs), which remain the applicable standards for environmental and social risk management in this context. The policies reviewed are presented in **Table 45**.

Table **45**: World Bank Safeguard Policies

NO.	World Bank Policy	General Provision	Relevance to MSP
1	OP 4.01: Environmental Assessment	Requires an Environmental Assessment (EA) for Bank-financed operations to ensure environmental and social soundness and to integrate safeguards into decision-making. EA covers the project's area of influence, evaluates feasible alternatives (including the 'without project' scenario), and applies the mitigation hierarchy (avoid, minimise, mitigate, compensate). It also covers relevant social dimensions (e.g., human health and safety, physical cultural resources, and transboundary/global aspects where applicable), classifies projects (A/B/C/FI), and sets consultation/disclosure expectations.	For MSP supported through World Bank financing, OP 4.01 provides the minimum process benchmark: screening/scoping, credible baseline evidence, alternatives analysis and clear management measures. It supports a Strategic Environmental and Social Assessment (SESA) for plan-level instruments like MSP and expects meaningful consultation and disclosure of draft and final outputs. The MSP should flag which downstream investments enabled by zoning (ports, dredging, offshore energy, land reclamation, etc.) will require project-level ESIA/ESMPs.
2	OP 4.04: Natural Habitats	Affirms that conserving natural habitats is essential for long-term sustainable development and promotes a precautionary approach to natural resource management. The Bank does not support projects involving significant conversion or degradation of critical natural habitats. Where impacts on other natural habitats cannot be avoided, projects must show no feasible alternatives and include appropriate mitigation measures.	Guides MSP zoning to avoid impacts on critical habitats and maintain ecological connectivity (e.g., coral reefs, seagrass beds, mangroves and key breeding/nursery areas). The SESA should test whether proposed zones and permitted uses reduce cumulative habitat stress and prevent conversion of sensitive areas. It supports siting rules and buffers for development nodes (ports, tourism, mariculture, offshore structures) to minimise habitat disturbance.
3	OP 4.09: Pest Management	Requires Bank-financed projects to promote Integrated Pest Management (IPM) and reduce reliance on synthetic chemical pesticides. Pest management must be addressed within EA and, where relevant, through a pest management plan. Pesticide selection and handling must follow good practice and avoid highly hazardous products where safeguards cannot be assured (including WHO Classes IA and IB).	Relevant where MSP zoning enables activities that may trigger pest/vector control (e.g., aquaculture disease management, mangrove restoration, tourism developments, or public health vector control near wetlands). The MSP should include guidance to prevent pesticide runoff into estuaries and nearshore habitats, promote non-chemical controls first, and require compliance with national approvals and safe storage/handling/disposal in downstream investments.
4	OP 4.10: Indigenous Peoples	Requires respect for the dignity, rights, economies and cultures of Indigenous Peoples, using a characteristics-based approach (self-identification; collective attachment to territories/resources; distinct institutions/language; vulnerability). Mandates free, prior and informed consultation leading to broad community support before financing, and requires measures/plans to avoid adverse impacts and ensure culturally appropriate benefits. Where projects affect customary resource rights or involve the commercial use of natural/cultural resources, equitable benefit sharing and culturally appropriate compensation are	Applicable where MSP decisions may affect minority or vulnerable and marginalized coastal/island communities with customary fishing grounds, cultural sites, or strong livelihood dependence on specific habitats. The SESA should identify such groups early, ensure inclusive consultation (language/cultural considerations), protect compatible customary access, and embed benefit-sharing and grievance mechanisms. It also informs how access restrictions (e.g., MPAs or new maritime uses) should be designed to avoid disproportionate impacts.

NO.	World Bank Policy	General Provision	Relevance to MSP
		required, with physical relocation avoided where possible.	
5	OP 4.11: Physical Cultural Resources	Covers physical cultural resources of archaeological, historical, religious, aesthetic or other cultural significance, including underwater resources. Requires screening and baseline data collection within EA, assessment of potential impacts, and mitigation measures such as avoidance, protection in situ, documentation or salvage. Where relevant, a cultural resources management plan and chance-find procedures are required, aligned with national law and institutional capacity.	Relevant to MSP zoning for coastal and underwater heritage (shipwrecks, submerged archaeology, sacred sites and cultural landscapes). The MSP should map known heritage assets, set avoidance buffers and permitted-use rules (e.g., restrictions on dredging, anchoring and seabed disturbance), and require chance-find procedures plus coordination with national heritage authorities for downstream projects.
6	OP 4.12: Involuntary Resettlement	Seeks to avoid involuntary resettlement where feasible or minimize it through alternative designs. Where unavoidable, resettlement must be planned as a sustainable development program with meaningful consultation, compensation at replacement cost, and support to restore or improve livelihoods and living standards. Requires appropriate instruments (e.g., Resettlement Action Plan, Resettlement Policy Framework, or Process Framework) with implementation and monitoring.	Relevant where MSP-enabled investments could cause livelihood displacement risk or restrict access (port expansion, shoreline protection, coastal infrastructure, or protected area measures affecting landing sites). The MSP should identify displacement/access-restriction risks by zone, guide early avoidance through alternative siting/design, and set livelihood restoration requirements for downstream investments.
7	OP 4.36: Forests	Promotes sustainable forest management to reduce poverty, support growth and protect the environment. The Bank does not finance projects that cause significant conversion or degradation of critical forests or related critical natural habitats, or that contravene applicable international environmental agreements. Forest-related EAs must assess impacts on forests and on the rights and welfare of local communities; commercial harvesting support is conditional on strong safeguards (e.g., credible certification systems or time-bound action plans).	Highly relevant to mangrove forests and coastal woodlands at the land–sea interface. The MSP/should treat mangroves as critical habitats and avoid zoning that enables conversion (reclamation, aquaculture ponds, infrastructure) unless strict safeguards apply. Supports zoning for conservation/restoration, community co-management, and downstream compliance with national forestry requirements.
8	OP 7.50: Projects on International Waterways	Applies to Bank-financed projects involving international waterways and requires notification of other riparian states of proposed activities, with limited exceptions (e.g., minor rehabilitation, certain studies, or tributary projects wholly within one state where no harm is expected). Promotes cooperative arrangements among riparians and encourages good-faith negotiations where disputes arise. Where objections are raised, the Bank may rely on independent experts and proceeds only where it determines no appreciable harm will result.	Relevant where MSP implementation could lead to future investments with transboundary impacts (dredging, land reclamation, pollution discharges, pipelines/cables, large offshore infrastructure). The MSP should flag transboundary risk pathways, encourage early regional consultation, and ensure downstream projects screen for OP 7.50 applicability and notification requirements where Bank financing is involved.

NO.	World Bank Policy	General Provision	Relevance to MSP
9	OP 7.60: Disputed areas	Applies to Bank-financed projects located in an area subject to a territorial or maritime dispute. The issue must be identified early and reflected in project documentation. The Bank may proceed only in limited cases, such as where the parties agree, or where the Bank is satisfied the activity would not affect the interests of other claimants; project documents must also state that Bank support does not prejudice the legal status of the area or the parties' claims.	In the Kenya MSP context, OP 7.60 is relevant not only for offshore infrastructure, dredging, pipelines, cables, or energy development, but also for fishing-related activities in likely disputed or politically sensitive offshore areas. This includes situations where Bank-financed support could influence industrial fishing access, licensing, fisheries monitoring and enforcement, landing infrastructure, surveillance systems, or exclusion zones in offshore waters that may be treated as sensitive by neighbouring states. MSP proposal near that offshore boundary area require careful legal screening and neutral documentation to avoid prejudicing claims, jurisdictional positions, or access rights in practice. The MSP should therefore flag any such areas early, use appropriate map and legal disclaimers, and require legal review of any Bank-financed follow-on activity affecting offshore fishing or marine resource use in those zones.

4.6 International, Regional Treaties and Conventions

Under Article 2(5) and (6) of the Constitution of Kenya, ratified treaties form part of Kenyan law. The **Table 46** summarise key obligations and standards that should be reflected in MSP zoning.

Table **46**: International, regional treaties and conventions

NO.	Treaty/Convention/Instrument	General Provision	Relevance to MSP
1	United Nations Convention on the Law of the Sea (UNCLOS, 1982)	Defines maritime zones (territorial sea, contiguous zone, EEZ and continental shelf) and the rights/duties of coastal States. Requires conservation of living resources and protection of the marine environment, and regulates marine scientific research and offshore installations.	Provides the legal basis and spatial jurisdiction for Kenya's MSP zoning across the territorial sea and EEZ. Guides the allocation and regulation of fisheries, offshore infrastructure (e.g., energy, cables), navigation routes, and environmental protection measures.
2	Nairobi Convention (1985) and Protocols (Western Indian Ocean)	Regional framework for protection, management and sustainable development of the marine and coastal environment, supported by protocols on emergency response, land-based pollution, dumping, protected areas/biodiversity and ICZM cooperation.	Anchors regional coordination on pollution control, habitat protection, and transboundary ecosystem management in the Western Indian Ocean. Supports MSP measures on land–sea interface governance, cumulative impacts, and shared monitoring/response arrangements.
3	Convention on Biological Diversity (CBD, 1992)	Obliges Parties to conserve biodiversity, promote sustainable use and ensure fair benefit sharing. Promotes protected areas, ecosystem restoration, mainstreaming	Underpins ecosystem-based planning by strengthening requirements for biodiversity-sensitive zoning (MPAs, critical habitats), mitigation hierarchy, and

NO.	Treaty/Convention/Instrument	General Provision	Relevance to MSP
		biodiversity into sectoral planning, and environmental assessment for activities likely to impact biodiversity.	biodiversity mainstreaming across fisheries, tourism, ports and blue economy developments.
4	Ramsar Convention on Wetlands (1971)	Promotes the 'wise use' of wetlands and designation/management of wetlands of international importance, including coastal and estuarine systems. Encourages management planning, monitoring and maintenance of ecological character.	Supports MSP safeguards for mangroves, estuaries, tidal creeks and deltas (e.g., Tana Delta) by guiding zoning, buffer setting, and land–sea interface controls to maintain wetland ecological functions and services.
5	Convention on the Conservation of Migratory Species of Wild Animals (CMS, 1979)	Provides a framework for conserving migratory species and their habitats through cooperation, protective measures and agreements/MoUs. Covers marine migratory species (e.g., turtles, marine mammals, seabirds) and critical migration routes.	Informs MSP mapping and management of migratory corridors and seasonal/area-based measures. Supports connectivity, reduces disturbance along key routes and facilitates cross-border coordination to protect migratory species.
6	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973)	Regulates international trade in listed species through permitting, quotas and compliance controls to avoid over-exploitation. Includes marine species such as corals, turtles and some sharks/rays.	Strengthens MSP biodiversity objectives by supporting protection and enforcement for threatened species and habitats, including zoning that limits extraction/collection and improves compliance along supply chains and landing/port nodes.
7	Paris Agreement (under the UNFCCC)	Establish global obligations for climate action through adaptation, mitigation, reporting and climate finance mechanisms. Encourages resilience planning for climate risks such as sea-level rise, ocean warming and extreme events.	Provides the climate rationale for integrating sea-level rise, coastal hazards, blue carbon (mangroves/seagrass), and climate-resilient infrastructure siting into MSP. Supports climate risk screening and adaptive management measures.
8	2030 Agenda for Sustainable Development (SDGs, 2015) – SDG 14 'Life Below Water'	Sets global targets on conservation and sustainable use of oceans and marine resources, including ecosystem-based management, reduction of marine pollution and conservation of coastal/marine areas.	Offers outcome targets and indicators that can be embedded in MSP objectives, zoning rules and monitoring (e.g., protected area coverage, pollution reduction, sustainable fisheries and ecosystem health metrics).
9	International Convention for the Prevention of Pollution from Ships (MARPOL)	Primary international regime to prevent and control ship-source pollution (oil, chemicals, sewage, garbage, and air emissions) through operational standards, equipment requirements, and port reception facilities.	Supports MSP designation and management of shipping corridors, port operation zones, dumping controls and pollution-sensitive areas. Strengthens SESA measures on vessel traffic risks, waste reception planning and marine pollution prevention.

NO.	Treaty/Convention/Instrument	General Provision	Relevance to MSP
10	International Convention for the Safety of Life at Sea (SOLAS)	Sets minimum international standards for ship safety, navigation and emergency preparedness. Includes requirements supporting safe routing, ship construction standards and safety management systems.	Informs MSP navigation safety by supporting spatial separation of shipping lanes from sensitive habitats and high-conflict uses, and by guiding risk-based planning around ports, anchorages and high-traffic routes.
11	FAO Code of Conduct for Responsible Fisheries (1995) (voluntary)	Provides principles and international standards for responsible fisheries and aquaculture, emphasizing ecosystem approach, precautionary management, bycatch reduction, and effective monitoring, control and surveillance.	Guides MSP fisheries zoning, compatibility rules and management measures (seasonal closures, gear restrictions, nursery/spawning protections). Supports integration of artisanal fisheries priorities and IUU risk controls.
12	African Union Agenda 2063	Continental strategic framework promoting inclusive growth and sustainable development, including blue/ocean economy development, climate resilience and sustainable resource governance.	Aligns MSP with regional blue economy priorities and supports harmonized approaches to sustainable ocean-based growth, investment planning and capacity development across the region.
13	African Charter on Maritime Security and Safety and Development in Africa (Lomé Charter)	Encourages cooperation to address maritime insecurity, IUU fishing, piracy, trafficking and unsafe shipping, while promoting sustainable maritime governance and socio-economic development.	Strengthens the security and enforcement dimension of MSP by supporting maritime domain awareness, compliance monitoring across zones, and coordinated action to reduce illegal activities that undermine MSP objectives.
14	United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP, 2007) (non-binding)	Affirms rights of Indigenous Peoples and similar communities to culture, lands/resources, participation and free, prior and informed consent (FPIC) for activities affecting their rights and livelihoods.	Reinforces SESA requirements for inclusive stakeholder engagement, protection of customary marine uses and cultural values, and equitable benefit sharing in MSP zoning and management decisions.

4.7 Inconsistencies, Overlaps, and Gaps in Policy and Legal Frameworks for Kenya's MSP

This section reviews how existing laws and institutions support MSP and highlights gaps that constrain integrated ocean governance.

4.7.1 Adequacy of the Framework

Kenya's legal framework provides substantial coverage of environmental protection, fisheries management, maritime jurisdiction, land-use & planning, water resources regulation, climate adaptation and the broader governance of the coastal and marine environment. However, adequacy for MSP requires more than sectoral comprehensiveness; at a bare minimum it demands:

i). A statutory mandate for integrated spatial planning and governance of marine areas.

ii). Clear allocation of institutional responsibilities.

iii). Data and information systems to support ecosystem-based planning.

iv). Harmonized permitting and oversight systems.

v). Explicit spatial governance tools (e.g., zoning, suitability mapping, multi-use allocation).

Adequacy should be assessed for both coverage and fitness for purpose—whether the framework enables integrated, cross-sector, ecosystem-based and spatially coordinated marine governance. Against this test, Kenya's system has clear strengths, but also material gaps, particularly the absence of a consolidated MSP/integrated spatial planning framework and weak governance arrangements for the land–sea interface. **Table 47** highlights the frameworks' adequacy assessment.

Table **47**: Adequacy assessment of key laws for MSP

Instrument	Strengths for MSP: Adequacy	Limitations for MSP Adequacy
Environmental Management and Co-Ordination Act CAP. 387	Environmental safeguard system; supports SEA/EIA; pollution control; ecosystems protection etc.	Does not provide spatial zoning tools or MSP mandate; coordination role and road map are rather unclear
Maritime Zones Act	Defines maritime jurisdiction; aligns Kenya with UNCLOS	Lacks spatial management procedures; no multi-use planning provisions
Fisheries Management and Development Act	Supports ecosystem-based fisheries management, monitoring, and surveillance	Fisheries zoning does not integrate with other marine uses; overlapping mandates
Water Act	Regulates water resources incl. seawater; pollution control authority	Conflicts with EMCA on pollution licensing; weak marine-specific provisions
Climate Change Act	Mandates mainstreaming of climate adaptation	Lacks marine/climate integration procedures (e.g., climate-informed zoning)
PLUPA	Provides a spatial planning framework	Largely terrestrial; no binding marine planning provisions
Sector Acts (Mining, Tourism, Ports, Energy)	Provide operational governance	No cross-sector spatial integration; permit overlaps
Kenya Coast Guard Service Act, 2018	Provides the enforcement, capacity at sea including maritime safety and pollution control	It does not provide a cross-sector planning mandate.

i). Absence of a Dedicated MSP Law or Binding Framework

While MSP is currently being implemented and coordinated by Ministry of Mining, Blue Economy and Maritime Affairs in collaboration with other government ministries and agencies,[15] its legality is anchored under PULPA which sets the spatial planning system but is largely terrestrial and lacks specific provisions for marine planning.

It has been argued that among other aspects, the inherently transboundary nature of the ocean which enables the movement of diverse materials and necessitates distinct approaches to resource and ecosystem governance, renders it inappropriate to transfer philosophical frameworks, planning models and procedural methods developed for terrestrial spatial planning directly into the marine context.[16] Further, while several statutes contain provisions relevant to the marine environment, none provides:

a) an explicit mandate for marine spatial planning;

[15] https://kemfsed.org/kenya-msp/

[16] Papageorgiou, M., & Kyvelou, S. (2018). Aspects of marine spatial planning and governance: Adapting to the transboundary nature and the special conditions of the sea. European Journal of Environmental Sciences, 8(1), 31–37. https://doi.org/10.14712/23361964.2018.5

b) a lead coordinating institution for MSP; or
c) procedures for cross-sector spatial allocation at sea.

MSP is therefore pursued through interpretation and adaptation of The Constitution of Kenya, 2010 and PULPA together with other different laws rather than through a unified and specific legal foundation. This results in a system that is functionally possible but institutionally weak. It's based on the foregoing the subject framework is in fact adequate in principle but incomplete in scope lacking a dedicated MSP instrument with a clear mandate and an integrated approach to marine and coastal spatial governance.[17]

ii). Fragmented Management of Marine and Coastal Resources

Sectoral statutes were developed independently and reflect distinct regulatory philosophies. Their mandates and philosophies do not fully align with efficacious ocean governance, nor MSP needs such as cumulative impact assessment, multi-use zoning, conflict resolution and ecosystem-scale management.

For example:

- KeFS leads fisheries management under Fisheries Management and Development Act (FMDA), 2016 while the Kenya Coast Guard Service (KCGS) established under Kenya Coast Guard Service Act, 2018 (Cap 200), provides enforcement at sea. Wildlife & Biodiversity conservation (KWS, and KFS) prioritizes preservation and protection.
- Maritime transport (Kenya Maritime Authority (KMA); Merchant Shipping Act, 2009) emphasises safety, navigation and pollution control.
- Land-use planning (PLUPA) covers planning skewed towards land.
- Pollution is regulated under EMCA (NEMA) for general pollution, the Kenya Coast Guard Service Act for maritime pollution enforcement[18], and the Water Act (Water Resources Authority (WRA)) for all water resources management including pollution.

The absence of a cross-sector binding mechanism weakens Kenya's ability to harmonize these mandates spatially.

iii). Weak Integration of the Land–Sea Interface

As earlier advanced, MSP is being pursued through technical legal interpretation and adaptation of The Constitution of Kenya, 2010 and PULPA together with other different laws rather than through a unified and specific legal foundation.[19] While it is legal and possible, MSP requires seamless governance of both marine waters and the land-sea continuum, yet PLUPA is primarily oriented toward terrestrial planning and does not expressly and intentionally extend planning jurisdiction beyond the high-water mark. Marine areas, including the territorial sea and the EEZ, fall under the national government authority, with no express and specific statutory requirement for counties and national agencies to coordinate the all-inclusive governance of the marine space or spatial planning across the coastal interface.

As a result, no law expressly mandates integrated land-sea planning, leaving persistent interdependencies unaddressed. These might include:

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[17] The legal framework is adequate in principle as it embodies strong constitutional and statutory foundations that promote environmental protection, sustainable development, devolution, and public participation. However, it remains incomplete in scope because it lacks a specific law defining marine spatial planning, designating an implementing authority or prescribing procedures for marine zoning, coordination and enforcement. Existing statutes regulate marine and coastal sectors independently, without an integrated mechanism linking land and sea planning. Consequently, while the framework expresses the correct principles it in fact fails to provide the comprehensive legal and institutional structure required for coherent and enforceable marine spatial planning and management.

[18] Enforcement of pollution control is under Section 8(1)b of the Kenya Coast Guard Service Act.

[19] In particular the definition of Land under Article 62 and 260 of the Constitution of Kenya, 2010 2010, "to include the surface of the earth and the subsurface rock; any body of water situated on or beneath the surface; marine waters within the territorial sea and the exclusive economic zone."

a) Coastal development approvals issued by counties without mandatory alignment to marine sensitivity maps or adjacent marine uses;

b) Marine habitat protection is regulated separately with little to no coordination by KCGS, NEMA, KWS, KFS(Mangroves) and KeFS; and

c) Fisheries management, navigation safety, and port operations are governed by distinct national entities such as the KCGS, KeFS, KMA, and KPA.

The absence of a unified legal framework for spatial coordination across these regimes limits Kenya's ability to manage cumulative impacts and harmonise sectoral decisions in the coastal and marine zone.

iv). Limited Requirements & Regulations on Marine Specific Data, Monitoring and Research

Although institutions such as KMFRI, KeFS, KMA, NEMA and KPA collect marine and coastal data, the frameworks:

a) Do not require consolidated national marine datasets.

b) Might lack standards for oceanographic, bathymetric or habitat mapping; and

c) Offer no formal mechanism for inter-agency data sharing.

Consequently, these limits evidence-based decision making for MSP & zoning as well as cumulative impact assessments.

4.7.2 Coherence of the Framework

Coherence refers to how well the laws, policies and institutions work together towards unified objectives. It evaluates how well the divergent frameworks align substantively (normatively) and operationally (in practice). Kenya exhibits strong normative coherence driven by:

i). The Constitution of Kenya, 2010 under various provisions, including but not limited to Article 10 on national values and Article 42 and 69 on environmental rights and duties;

ii). Incorporation of international obligations under Article 2(5) And (6)-(UNCLOS, CBD, Nairobi Convention etc.)

Nevertheless, operational coherence remains weak. Sectoral statutes were enacted independently, resulting in overlapping mandates, conflicting regulatory powers and parallel licensing processes, as highlighted in **Table 48**. These inconsistencies undermine predictability, efficiency and coordination in marine decision-making.

a) Overlapping Mandates Leading to Regulatory Redundancy

There are multiple examples of regulatory duplication:

i). Pollution control: NEMA (EMCA), KCGS (KCGS Act), KMA (Merchant Shipping Act) and WRA (Water Act) all regulate water quality and effluent discharge into marine waters.

ii). Protected areas: Marine Protected Areas may fall under KWS (the Wild), KFS (the Forest Conservation and Management Act) on protection of mangroves and marine parks, KeFS (FMDA- Sec 47) on fisheries closures, or County ordinances- each with different procedures.

iii). Dredging and seabed alteration: NEMA requires EIAs, WRA is charged with the management of all water resources, including the sea, and KPA oversees dredging within port limits.

Such overlaps result in parallel approval pathways, inconsistent enforcement and institutional conflict.

Table **48**: Illustrative coherence challenges

Area of Governance	Overlapping/Conflicting Mandates	Implications for Coherence
Pollution control	NEMA (EMCA) vs. WRA (Water Act)	Parallel permits; unclear hierarchy; regulatory duplication.
Marine safety & fisheries	KMA vs. KeFS, KWS	Unclear spatial jurisdiction over enforcement zones.[20]
Marine area designation	EMCA protected zones vs. fisheries waters vs. maritime zones	Fragmented spatial categorization; no harmonized marine zoning system.
Land–sea interface	NLC, PLUPA county planners vs. national maritime authorities	Vertical incoherence; inconsistent land-sea development approvals.
Climate and environment	Climate Change Act vs. EMCA mandates	Climate adaptation not embedded in sectoral permitting.

b) National vs County Government Tensions in Coastal Governance

The Fourth Schedule of the Constitution does not fully resolve practical coordination at the coast. Critical potential areas of tension include:

i). coastal tourism regulation vs. protection of adjacent MPAs;

ii). beach management and landing sites (county) vs. fisheries regulation (national);

iii). county spatial plans vs. national port and energy infrastructure;

iv). county approvals for shoreline developments vs. national oversight.

c) Institutional Silos that Undermine Integrated Management

Most institutions operate with limited obligation to coordinate proactively. Examples include:

i). FMDA does not require KeFS to align fisheries closures with MPA boundaries set under the Wildlife Conservation and Management Act.

ii). Port development decisions by KPA may proceed with only an EIA and do not need to be aligned with fragile or high-value ecological areas mapped by KeFS or KWS. This regulatory gap enables infrastructure to be sited in ways that compromise biodiversity and ecosystem resilience.

iii). Mineral exploration and offshore petroleum blocks are allocated through sectoral procedures that are not formally coordinated with fisheries management, marine tourism planning or biodiversity conservation. Without an integrated decision process, exploration blocks may overlap with sensitive habitats, fishing grounds and tourism nodes, creating regulatory conflicts, increasing environmental risk and undermining long-term Blue Economy objectives.

[20] The mandates of the Kenya Maritime Authority and the Kenya Fisheries Service overlap because their enabling statutes assign both agencies enforcement powers within Kenya's marine space, but without clearly defining spatial boundaries or operational hierarchies. As a result, each institution can board vessels, conduct surveillance, and enforce regulations in the same areas of the territorial sea and EEZ. This ambiguity leads to duplicative enforcement, inconsistent compliance expectations for ocean users, and occasional institutional conflict; reflecting the broader sectoral nature of Kenya's marine governance framework, which was not originally designed to support integrated ocean management or Marine Spatial Planning.

These silos hinder ecosystem-based management and spatial optimisation.

4.7.3 Institutional Integration

Kenya's governance system provides for intergovernmental cooperation through the Fourth Schedule of The Constitution of Kenya, 2010 and the Intergovernmental Relations Act.[21] The governance framework is institutionally diverse, comprising environmental, maritime, fisheries, water, land, and climate institutions. Yet integration across these agencies is limited. Key institutions such as NEMA, KMA, KeFS, KFS WRA, NLC, KPA, Energy and Petroleum Regulatory Authority (EPRA) and county governments operate within siloed legal mandates and lack a formal marine coordination structure.

Existing coordination systems (e.g., Intergovernmental Relations Act, NEMA's lead agency model) are not tailored to marine governance, are inconsistently applied, and lack authority to harmonise marine spatial decisions as presented in **Table 49**.

Table **49**: Assessment of institutional integratio

Institution	Mandate	Integration Gap
NEMA	National environmental coordinator; EIA/SEA	Limited cross-agency coordination and enforcement
KMA	Maritime safety and pollution control	Overlaps with NEMA and KeFS; limited joint operations
KeFS	Fisheries management and conservation	Operates in parallel with KMA and the Coast Guard
WRA	Water regulation, including seawater	Duplicates NEMA pollution permitting; weak marine integration
County Governments	Land-use planning; coastal development approvals	No formal inclusion in marine decision-making
KMFRI	KMFRI's mandate is to generate scientific data and information in "marine and freshwater fisheries, aquaculture, environmental and ecological studies, marine research, and marine energy for sustainable development of the Blue Economy. The Institute is also mandated to "collaborate with other organisations and institutions of higher learning in a competitive capacity development for exploitation of the Blue Economy."	Research is not fully linked to spatial decision-making, with poor cross-agency coordination and enforcement

i). Structural Weaknesses

Kenya has no legally designated MSP lead agency. KMA could coordinate sea-based uses but lacks cross-sector planning powers; NEMA leads environmental oversight but has no mandate over navigation, fisheries or maritime security; KeFS manages fisheries but not conservation areas or comprehensive marine pollution; and KWS leads conservation but has limited authority over fisheries and port/industrial development.

ii). Operational Weaknesses

[21] Republic of Kenya. (2012). Intergovernmental Relations Act (Cap. 265F).

Despite the Intergovernmental Relations Act, coordination mechanisms seem to be informal, project-based or ad hoc. There are no binding statutes requiring:

a) joint decision-making committee/s for marine development applications;

b) shared inspection protocols; or

c) unified monitoring and surveillance.

As a result, enforcement is likely fragmented and often leads to conflicting or duplicative actions.

iii). Data and Information Integration Gaps

Institutions collect data independently using inconsistent methodologies. No legal requirement for:

a) Data interoperability;

b) Standardized marine spatial datasets;

c) Joint monitoring programmes, or a national ocean data portal.

This weakens the scientific foundation of MSP.

4.7.4 Environmental and Maritime Governance

Kenya's land, environmental and maritime governance framework provides a strong constitutional and statutory base for MSP (Articles 42 and 69; Fourth Schedule; PLUPA, EMCA, the Maritime Zones Act and the Fisheries Management and Development Act). However, these regimes largely operate in parallel, with limited institutional synergy. Maritime governance is comparatively mature, with KMA implementing obligations under UNCLOS, SOLAS, MARPOL and related conventions. However, integration between these regimes remains weak.

i). Disconnect Between Environmental and Maritime Frameworks

EMCA regulates environmental impacts broadly, but maritime pollution and navigation safety are governed through separate maritime statutes. Examples include:

a) Ballast water management is regulated under maritime law[22] but not expressly integrated with EMCA's pollution standards.

b) Oil spill preparedness and response involve KMA, KPA and NEMA but lack unified command protocols.

ii). Limited Integration of Fisheries, Conservation and Shipping

Areas of conflict include, but are not limited to: shipping lanes intersecting with key fishing grounds; MPAs overlapping with dredging or port-expansion zones; and marine conservation areas adjacent to tourism infrastructure or aquaculture zones. Without a spatial management and coordination mechanism, these conflicts are addressed reactively rather than through proactive planning backed by evidence and science.

4.7.5 Environmental, Water and Climate Linkages

EMCA, Water Act and Climate Change Act further form an interconnected legal regime for environmental protection, water-resource regulation and climate-resilient development. Their combined implementation is essential to sustaining coastal and marine ecosystems. It ensures pollution control and integration of adaptation measures into planning processes.

i). Water Regulation and Marine Impacts

EMCA remains Kenya's principal environmental statute. It mandates NEMA to coordinate environmental management and regulate pollution, including in coastal and marine areas. The Water Act complements EMCA by regulating water resources use and allocation, catchment protection and pollution control. It

[22] https://kma.go.ke/marine-environment/

defines "water resource" broadly to include seawater and transboundary waters, and vests WRA with authority to issue permits for abstraction and use and to enforce pollution controls. In Krystalline Salt Ltd v Water Resources Management Authority & Another [2019] eKLR, the Court of Appeal confirmed that seawater is a "water resource" within the Act, bringing coastal and estuarine abstraction within WRA's permitting mandate.

While the foregoing is commendable, EMCA and the Water Act both vest regulatory powers over effluent discharge and pollution control in NEMA and WRA respectively without expressly defining a hierarchical relationship. The Water Act's attempts to establish a conditional hierarchy, stipulating that, "the provisions of EMCA relating to water resources conservation and protection and water pollution control shall be exercised subject to the relevant provision of the Water Act (the Water Act) and only in the event that the Board has failed or neglected to take appropriate action to exercise its powers and functions under this Act."[23] This conditional precedence lacks an integrated approach and inevitably creates a risk of duplicative permitting and monitoring for industries particularly those discharging into coastal waters, and is further exacerbated by weak data sharing and joint compliance mechanisms between NEMA and WRA, likely to result or already result in parallel reporting systems.

Further, despite the Water Act including seawater within its definition of water resources, granting WRA regulatory jurisdiction. It does not fully integrate marine aspects such as hydrology, saline water processes or coastal-zone hydrodynamics.

ii). Climate Change Mainstreaming Challenges

The Climate Change Act requires all sectors to mainstream mitigation and adaptation. Yet marine and coastal risks such as sea-level rise, erosion, ocean warming, storm surges, coral bleaching and mangrove loss, are not consistently reflected in sector laws or licensing requirements. Responsibilities are distributed across agencies, and there is no single legal mechanism that compels the marine and coastal sectors to embed climate resilience in planning, permitting, and resource-use decisions.

MSP provides a strategic platform for embedding climate-risk considerations into marine zoning and the spatial allocation of uses. Yet, current statutes do not explicitly require MSP, fisheries, tourism, maritime transport, ports, energy, mining, or environmental authorities to integrate climate projections, vulnerability assessments, or ecosystem-based adaptation into their decision-making processes.

This gap limits Kenya's ability to proactively manage the impacts of climate change on coastal communities, marine ecosystems, and the blue economy.

4.7.6 Synthesized Findings

The reviewed statutes collectively demonstrate a strong normative foundation for MSP in Kenya, anchored on environmental sustainability, devolution, public participation and cross-sectoral management. However, the framework is sectoral, fragmented, and institutionally disjointed, thus limiting its ability to support integrated and efficacious marine management and MSP. Strengths and critical systemic gaps are summarised and presented in **Table 50**.

Table **50**: Frameworks Strengths and gaps of the frameworks

S/N0	Assessment Dimension	Strengths	Gaps	MSP Implication
1	Adequacy	Broad sectoral coverage; strong environmental safeguards	No MSP law; incomplete spatial planning, zoning and decision-making tools	MSP can be undertaken under PULPA but planning and zoning decisions as well as efficacious marine management, will be

[23] Section 156(5) of the Water Act.

S/N0	Assessment Dimension	Strengths	Gaps	MSP Implication
				challenging with limitations.
2	Coherence	Constitutional and policy alignment	Operational duplication with conflicting mandates	Planning unpredictable, conflicting decisions are likely
3	Institutional Integration	Strong sectoral agencies	Poor & limited marine coordination mechanisms	Fragmented governance and enforcement
4	Environmental-Maritime Nexus	Strong laws individually	Parallel regulatory regimes; weak joint action	No unified marine management system
5	Environment, water and Climate Linkages	Robust separate laws	Weak cross-regime integration	Limits climate-resilient MSP

Kenya's MSP legal and institutional base is strong but fragmented. The main constraint is the absence of a dedicated MSP law and a coordinating authority. A unified MSP statute and inter-agency structure would harmonize mandates, streamline licensing, strengthen environmental safeguards, integrate climate resilience and support sustainable Blue Economy development.

CHAPTER 5: BASELINE CONDITIONS

5.1 Overview

Kenya's marine jurisdiction spans 142,000 km² of EEZ and territorial seas bordering five coastal counties, where biophysical and socio-economic conditions define the parameters for marine spatial planning. Baseline characterisation integrates physical oceanography, ecosystem health (coral reefs, mangroves, seagrass beds), biodiversity, fisheries, mariculture, and community resource dependence through literature, field surveys, stakeholder consultations, and GIS analysis. Diagnostic assessment identifies chronic stressors such as overfishing, sedimentation, nutrient loading, habitat conversion which is compounded by climate impacts: sea-surface temperature rise, ocean acidification, and sea-level rise. Vulnerability analysis pinpoints ecosystems and communities at elevated risk, establishing the evidentiary foundation for scenario development and zoning recommendations.

5.2 Physical and Chemical Environmental Conditions

The physical and chemical characteristics of Kenya's marine environment establish the foundational conditions that shape ecosystem productivity, species distribution, and the suitability of ocean spaces for various human activities. These conditions, including tidal dynamics, ocean currents, sea surface temperature, salinity, sea level change, water pH, ocean geology, hydro-physical processes, and pollution levels, determine the ecological carrying capacity of coastal and offshore waters.

5.2.1 Tidal Pattern

The inshore waters of Kenya experience semidiurnal tides with a spring tidal range not exceeding 4 m.[24] [25]The coastal offshore waters experience swells whose magnitude varies in different periods of the year. During the northeast monsoon season, 80% of the swells originate from the northeast, with a maximum significant height of 6 m. The sea is usually calm during the inter-monsoon (March-April), and wave height drops significantly to 2.5 m, shifting clockwise to a southerly approach with large fluctuations. The waves are usually very large, with a maximum significant height of 8 m during the southeast monsoon (May-October). They approach the coast predominantly from the southeast and southwest. Calm conditions follow during the inter-monsoon period, and waves approach the coast from the northeast.[26]

Table **51**: Tidal constituents for tides in Kenya's inshore area

Tidal Constituent	Period	Amplitude		
		Tudor Creek	Kilifi Creek	Kilindini Harbour
M2; Moon's gravitational effect	12.42	1.062	1.051	1.055
S2: Sun gravitational effects	12.00	0.519	0.455	0.521
K1: The lunar diurnal constituent related to the Moon's gravitational effect	23.93	0.224	0.163	0.191
O1: Moon's orbit around the Earth with one high and one low tide each day	25.84	0.102	0.092	0.113

Source: Kenya National Marine Ecosystem Diagnostic Report (2012)

Tidal patterns along Kenya's coastline are ecologically and socio-economically vital, driving nutrient circulation that sustains mangroves, seagrass beds, and coral reefs, which in turn provide breeding and feeding grounds for fish, crustaceans, and molluscs essential to artisanal fisheries. In areas such as Mida Creek, Watamu, and Kisite-Mpunguti, tides regulate sediment transport and water quality, protecting shorelines from erosion and storm surges while maintaining clarity for tourism activities like snorkelling,

[24]Brakel, W. H. (1982). Tidal patterns on the East African coast. Journal of Marine Research.

[25]Tychsen, J. (2006). Tidal dynamics of the Kenyan coast. Geological Survey of Denmark and Greenland.

[26]Nguli, M. M. (2006). Wave climate and coastal processes in Kenya. Kenya Marine and Fisheries Research Institute.

diving, and dolphin watching. Local communities strategically align fishing practices with tidal cycles to optimize catches of species such as octopus and prawns, while cultural traditions embed tidal knowledge in calendars and rituals, reflecting deep ties to the ocean. By sustaining livelihoods, enhancing recreational opportunities, and buffering climate impacts, tidal dynamics form a cornerstone of Kenya's blue economy and must be integrated into marine spatial planning and policy frameworks to balance conservation with economic use.

5.2.2 Ocean Currents

The Kenyan marine space is governed by a complex and dynamic system of ocean currents that are primarily driven by the seasonal reversal of the monsoon winds. The foundational element of this system is the East African Coastal Current (EACC), a permanent northward-flowing western boundary current originating from the South Equatorial Current (SEC).[27] The EACC flows steadily along the coast throughout the year, but its velocity and impact are significantly modulated by the monsoons. During the Southeast Monsoon (Kusi) from April to October, the EACC is accelerated by strong southerly winds, reaching surface speeds of 1.5 to 2.5 m/s (approx. 3-5 knots).[28] Conversely, during the Northeast Monsoon (Kaskazi) from November to March, the current's speed is reduced as it encounters the southward-flowing Somali Current.[29] The interaction between these two currents creates a seasonally shifting Confluence Zone, typically located between Malindi and Lamu.

During the Northeast Monsoon, the meeting of the EACC and the Somali Current triggers a unique oceanographic phenomenon known as shelf-break upwelling, particularly over the North Kenya Banks (NKB)[28]. This upwelling process draws deep, cold, and nutrient-rich waters laden with nitrates and phosphates to the sunlit surface layers. Research indicates that these upwelling events are highly variable, with their intensity and location depending on whether the confluence zone shifts further south, which enhances productivity over the banks.[25] [30] These nutrient dynamics are the primary engine for Kenya's marine biological productivity. The "injection" of nutrients into the euphotic zone initiates massive blooms of phytoplankton, forming the base of a rich food web that supports significant fisheries, including migratory species like tuna and billfish.[31] In addition to oceanographic upwelling, coastal areas like Ungwana Bay receive further nutrient enrichment from riverine discharge (Tana and Sabaki rivers), which is critical for prawn and shrimp fisheries.[32] Understanding these current-driven nutrient patterns is essential for Marine Spatial Planning (MSP), as it allows for the identification of Ecologically or Biologically Significant Areas (EBSAs) that require targeted management and protection.

Table 52: Ocean currents during the monsoon seasons

Season	Primary Flow	Direction	Speed	Key Feature
SE Monsoon (Kusi)	Strong EACC	Northward	1.5–2.5 m/s	High energy, rough seas
NE Monsoon (Kaskazi)	EACC vs Somali	Convergent	0.5–1.5 m/s	Upwelling at North Kenya Banks

[27] Swallow, J. C., et al. (1991). Structure and transport of the East African Coastal Current. Journal of Geophysical Research.

[28] Jacobs, Z. L., et al. (2020). Shelf-Break Upwelling and Productivity Over the North Kenya Banks: The Importance of Large-Scale Ocean Dynamics. Journal of Geophysical Research: Oceans.

[29] Schott, F. A., & McCreary, J. P. (2001). The monsoon circulation of the Indian Ocean. Progress in Oceanography.

[30] Solstice-WIO (2021). The key features of the North Kenya Banks upwelling and a need for a risk-based approach to fisheries management. Policy Brief

[31] KMFRI (2024). Annual Report on the State of Marine Fisheries and Oceanography in Kenya. Kenya Marine and Fisheries Research Institute.

[32] UNESCO (2023). Marine Spatial Planning and The Blue Economy in Kenya. IOC Technical Series, 177.

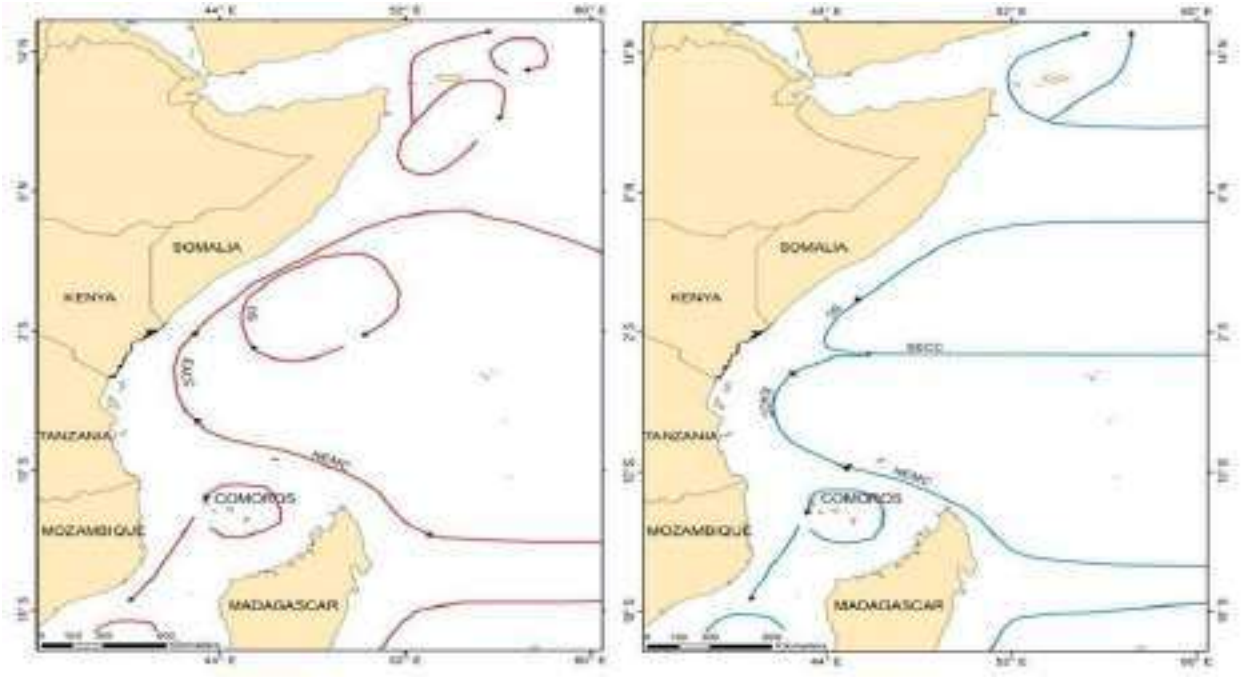

Figure **4**: Schematic representation of ocean currents in the Indian Ocean during the South East Monsoon (red) and Northeast Monsoon (blue)
Source: Kenya National Oceanographic Data Center (KeNODC)

5.2.3 Sea Surface Temperature

In general, sea surface temperature has risen in the last 100 years with an average increase of 0.59 °C.[33] Sea surface temperature (SST) in Kenyan marine waters varies between a low of 24.979°C and a maximum of 30.14°C,[34] which is attributed to the influence of the coastal current system and the monsoon seasons.[26]

Trends in sea surface temperature (SST)

a) **Long-term Increase**
Historical data indicate a significant upward trend in SSTs along the Kenyan coastline from 2000 to 2021. This increase is consistent with global trends attributed to climate change.

b) **Seasonal Variations**
SSTs in Kenyan waters vary with the seasons, typically peaking during the warmer months. They experience seasonal fluctuations, often higher during the warmer months (December to March) and lower during the cooler months (June to September). The influence of the East African monsoon also affects these temperatures.[35] [26]

c) **Marine Heat Waves**
The frequency and intensity of marine heat waves have increased over the past century, including a doubling over the satellite period. These events can have severe impacts on marine ecosystems, including coral reefs.

d) **Current Temperatures**
Recent observations show that water temperatures along the Kenyan coast range from about 25.3°C to 29.6°C, with variations depending on specific locations. During the SEM, the temperatures are generally lower, ranging between 24.5°C and 25.8°C.[26] Climate change projections indicate that SST in Kenya's coastal waters could rise by 0.5–1.0 °C by 2050. Such warming would intensify coral stress, increase

[33] Roemmich, D., et al. (2012). Global ocean warming and sea level rise. Geophysical Research Letters, 39(10).
[34] Othoche, C., et al. (2020). Sea surface temperature variability along the Kenyan coast. *Western Indian Ocean Journal of Marine Science*, 19(2), 45–58.
[35] Newell, R. E. (1959). The monsoon circulation and its effects on the Indian Ocean. *Tellus*, 11(2), 198–209.

bleaching frequency, and potentially shift fish populations to cooler offshore waters. These changes pose challenges for marine spatial planning, requiring adaptive zoning, enhanced monitoring, and proactive conservation measures. Integrating SST data into MSP ensures that zoning schemes account for ecological thresholds, fisheries seasonality, and climate risks, thereby supporting sustainable use of Kenya's marine resources.

Ecological Impacts

The rise in sea surface temperature (SST) has been associated with an increase in the frequency and severity of coral bleaching events, significantly impacting coral reefs in Kenya. These reefs have undergone considerable stress, with bleaching reported during periods of elevated temperatures, posing a serious threat to marine biodiversity and the various species that depend on these ecosystems for habitat. Additionally, warming waters have prompted shifts in fish distributions, pushing some species toward cooler areas, which could disrupt local fisheries. These changes in fish populations and their spawning cycles, driven by fluctuations in SST, directly affect the livelihoods of coastal communities that rely heavily on fishing for their economic well-being.

Socio-Economic Considerations

Higher sea surface temperatures (SST) and their ecological consequences significantly affect marine tourism, an essential component of local economies. The occurrence of coral bleaching and the degradation of marine environments can discourage tourists from visiting these areas. To address this challenge, communities and fisheries management systems must adapt to the shifting patterns of SST. This adaptation includes implementing sustainable fishing practices and conservation initiatives designed to protect vulnerable ecosystems, ensuring both ecological health and the continued viability of marine tourism.

5.2.4 Ocean salinity

Salinity falls within the range of 34–36 parts per thousand (PSU), which is consistent with tropical Indian Ocean conditions. Offshore waters within Kenya's EEZ tend to be stable, averaging around 35 PSU, while nearshore areas show greater variability. Estuarine and mangrove systems, influenced by freshwater inflows, often record lower values between 32–34 PSU, reflecting the dynamic interaction between river discharge and tidal exchange.

Seasonal variability plays a significant role in shaping salinity patterns along the coast. During the long rains from March to May, increased river discharge from systems such as the Tana and Sabaki reduces salinity in nearshore zones. In contrast, the southeast monsoon season between July and September enhances mixing and circulation, stabilizing salinity levels around 34–35 PSU. The dry season, from December to February, is characterized by reduced freshwater input, leading to higher salinity values, often exceeding 35 PSU in lagoons and reef flats where evaporation further concentrates salts.[36] [37] [38] [39]

Spatial differences are also evident across Kenya's coastline. The northern coast, including areas such as Lamu and Malindi, experiences greater freshwater influence from rivers, resulting in salinity dips to approximately 33–34 PSU. The southern coast, encompassing Diani and Shimoni, is more stable, with salinity levels averaging around 35 PSU due to limited riverine input. Mangrove estuaries are highly variable environments, with salinity ranging from 28–34 PSU depending on rainfall intensity and tidal exchange. Offshore waters within the EEZ remain uniform at around 35 PSU, reflecting minimal freshwater influence and the dominance of open-ocean conditions.[36] [37] [38] [39]

Implications: Coral reefs are vulnerable to prolonged low salinity below 32 PSU, which stresses corals and weakens reef structures. Mangroves and seagrass beds, adapted to natural salinity fluctuations, can be

[36] Obura, D. O., & Abdallah, A. M. (2017). Coastal and marine ecosystems of Kenya: Status and trends. In Coastal Oceans and Ecosystems of East Africa (pp. 123-145). Springer.

[37] McClanahan, T. R., & Obura, D. O. (1997). Sedimentation effects on shallow coral reefs in Kenya. Journal of Coastal Research, 13(4), 1050-1056.

[38] UNEP (2016). Kenya Marine and Coastal Ecosystem Management: Status and Trends. United Nations Environment Programme

[39] Kenya Marine and Fisheries Research Institute (KMFRI). (2019). Annual Report on Marine Water Quality and Salinity Patterns.

impacted by extreme changes affecting seedling survival and species composition. Fisheries rely on specific salinity ranges for spawning and nursery habitats, so shifts can disrupt recruitment and catches. Stable offshore salinity supports pelagic ecosystems and productivity, while nearshore variability enhances estuarine biodiversity and productivity. Together, these patterns underpin the resilience and ecological balance of Kenya's coastal environments.

Salinity variability significantly affects coastal communities by influencing fisheries, aquaculture, and tourism. Fisheries depend on stable estuarine salinity for sustaining prawn and artisanal fish populations, so changes can reduce catches, food security, and incomes. Aquaculture operations require careful salinity monitoring to maintain productivity and minimize losses. Tourism, reliant on healthy coral reefs, can suffer from freshwater pulses that stress reefs and reduce underwater visibility, impacting recreational activities. Additionally, salinity data is crucial for marine spatial planning to balance ecological sustainability with socio-economic needs, making salinity a vital factor for the resilience and prosperity of Kenya's coastal communities.

5.2.5 Sea Level Change

Sea levels around the world are rising, driven mainly by the warming and expansion of seawater and the accelerating loss of land ice from glaciers and ice sheets.[40] Since 1901, the global average sea level has risen by approximately 0.20 meters, and current satellite observations show it is now rising even faster, at a rate of about 3.4 to 4.0 millimetres (mm) per year.[41] In Kenya's coastal region, which lies within the Western Indian Ocean, sea level rise is keeping pace with or slightly exceeding the global average. The regional rate is approximately 3.8 to 4.2 millimeters per year, influenced by ocean currents, monsoon winds, and the redistribution of heat within the Indian Ocean.[42] This trend is confirmed by long-term measurements from the tide gauge at Kilindini Harbour in Mombasa, which show a relative sea level rise of about 2.0 to 3.2 millimeters per year, with evidence of acceleration in recent decades. [43] [44]

This gradual increase is already having clear effects. Low-lying areas in counties such as Mombasa, Kwale, and Kilifi are experiencing more frequent tidal flooding, leading to disruptions in transport, including ferry services and road networks.[43] Saltwater is intruding into coastal freshwater sources and farmland, threatening drinking water and agriculture, particularly in important regions like the Tana River Delta.[45] Coastal ecosystems like mangroves and coral reefs are under stress from changing conditions, and while some may naturally migrate landward, this is often blocked by human development.[46]

Looking ahead, future sea level rise will depend on global emissions. Projections indicate that by mid-century, sea levels at the Kenyan coast could rise by several centimeters, with increases of 0.10 to 0.15

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[40] IPCC AR6 WG I (2021). Climate Change 2021: The Physical Science Basis. doi:10.1017/9781009157896.

[41] Fox-Kemper et al. (2021). Ocean, Cryosphere and Sea Level Change. IPCC AR6 WG1, Chapter 9. doi:10.1017/9781009157896.011.

[42] IPCC. (2019). Special Report on the Ocean and Cryosphere in a Changing Climate (H.-O. Pörtner, D. C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, & N. M. Weyer, Eds.). Cambridge University Press. https://doi.org/10.1017/9781009157964.

[43] Kebede et al. (2009). Impacts of climate change and sea-level rise: A case study of Mombasa, Kenya. University of Southampton. https://www.weadapt.org/knowledge-base/climate-change-impacts/impacts-of-climate-change-and-sea-level-rise-a-case-study-of-mombasa-kenya

[44] KMD. (2024). State of the Climate Kenya 2023

[45] IPCC. (2022): Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA, 3056 pp., doi:10.1017/9781009325844.

[46] Oppenheimer et al. (2019): Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities Supplementary Material. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)].

meters possible by 2100. Under a high-emissions scenario, rises could approach 0.28 meters by 2150.[40] [47] These changes pose serious risks to Kenya's coastal economy, including ports, tourism, and farming—with potential losses for agricultural exports estimated at hundreds of millions of dollars under severe scenarios.[47]

To address these challenges, adaptation measures are essential. These can include building elevated infrastructure and coastal defenses, restoring protective ecosystems like mangroves, and carefully planning future land use based on sea level projections. By integrating such strategies, Kenya can reduce vulnerability and safeguard communities, livelihoods, and natural habitats for the future.

5.2.6 Marine Water pH

The southern and northern (towards the border with Tanzania and Somalia) water regions exhibit lower surface pH values (ranging between 8.04 and 8.08) than the other regions within the Kenyan territorial waters. This can be attributed to higher levels of dissolved Carbon dioxide (CO_2) due to the mineralization of the organic carbon generated by the adjacent mangrove ecosystem or the effect of global warming through ocean acidification. Mombasa region has a high pH level of 8.75, which can be linked to anthropogenic inputs into the ocean. The pH values in coastal waters within Kilifi County (Malindi and Kilifi towns) range between 8.1 and 8.2. The spatial surface pH distribution within the territorial waters of Kenya is presented in **Figure 5**.

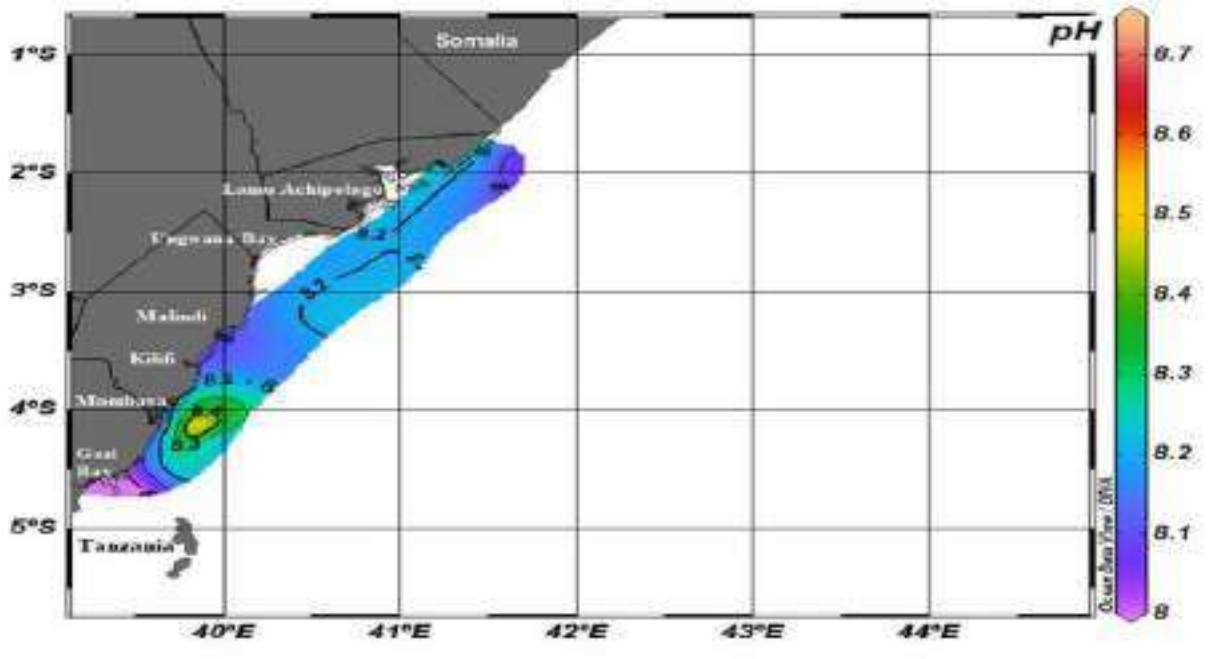


Figure 5: Spatial distribution of surface pH within the territorial waters of Kenya
Source: Kenya National Marine Ecosystem Diagnostic Analysis (MEDA)[48]

5.2.7 Ocean Geology and Geomorphology

The geological and geomorphological features of Kenya's seafloor, including bathymetry, seamounts, canyons, ridges, banks, and abyssal plains, define the physical structure of the marine environment and shape habitat distribution, sediment transport, and oceanographic processes. These features influence biodiversity patterns, fisheries productivity, and the feasibility of infrastructure development.

[47] World Bank. (2021). Climate Risk Country Profile: Kenya

[48] United Nations Development Programme. (2012). National Marine Ecosystem Diagnostic Analysis (MEDA)–Kenya. UNDP. http://hdl.handle.net/20.500.11822/25890

i). Ocean Bathymetry

Bathymetric datasets have become more useful in understanding the effects of climate change on the marine environment, particularly in gaining insight into ongoing and potential beach erosion, sea-level rise, and subsidence (land sinking), creating hydrodynamic models, e.g. tsunami run-up models and updating navigational charts with new or relevant information and demarcating fishing grounds and identification of traceable seabed areas. Over 50% of the Kenyan EEZ remains unmapped to acceptable full seafloor coverage standards (100-metre pixel size or better Acquisition and processing of bathymetric data is highly technological, and therefore, there is a need to acquire state-of-the-art instruments that would allow for data collection.[48]

ii). Seamounts

These volcanic features represent later intraplate magmatism, unrelated to the continental rifting. The Large Seamount near the Tanzania Border is a major submarine volcano, rising over 1,500 meters from the abyssal plain near the EEZ's southern limit (~5.1°S), indicating significant volcanic activity, potentially linked to the Comoros hotspot. If flat-topped, it is a guyot, signifying past emergence and wave erosion.

Ecological Significance

Seamounts of this scale are profound biological hotspots; They influence oceanographic processes by disrupting currents and forming Taylor columns that trap nutrients and drive upwelling, boosting local productivity. At the same time, they function as natural Fish Aggregating Devices, attracting pelagic predators such as tuna and swordfish, with MSP data guiding strategic fishing zones and seasons to avoid overexploitation. Their rocky slopes also host deep-sea coral communities that support high biodiversity, leading the MSP to classify them as Vulnerable Marine Ecosystems where destructive bottom-contact activities are restricted.

iii). Canyons

The submarine canyons engraving the continental slope off the Lamu Archipelago are among the most dynamic features of Kenya's margin. Their formation and function are dual in nature. These canyons originate as paleo-deltaic channels from the Pleistocene epoch. During periods of low sea level (e.g., the Last Glacial Maximum, ~20,000 years ago), the continental shelf was exposed, and major rivers like the paleo-Tana discharged directly at the shelf edge, building out deltas. The modern "sub-parallel, perpendicular" pattern of the canyons is a classic signature of these ancient distributary channels. Today, they act as primary sediment conduits, funnelling terrestrial silt and organic carbon from rivers like the Tana and Sabaki via episodic turbidity currents (underwater avalanches) down to the abyssal plain.[49]

Ecological Significance

The canyons' physical structure transforms them into major biodiversity hotspots. They force deep, cold, nutrient-rich water to up well, fuelling massive phytoplankton blooms at the surface. This elevated primary productivity supports rich populations of plankton, fish, and cetaceans. Furthermore, the complex topography provides diverse habitats: steep rocky walls host deep-water coral and sponge gardens, while the channels concentrate organic matter. Studies indicate canyon environments can support orders of magnitude more biomass than the surrounding open slope, making them critical ecological zones.

Other key ecological roles include:

- **a)** Biodiversity Hotspots: Canyons support significantly higher biomass than the surrounding open slopes. Their steep rocky walls provide critical habitats for deep-water coral and sponge gardens, which are prioritized for protection under MSP conservation frameworks.
- **b)** Fisheries Support (Upwelling): The physical structure of canyons forces deep, nutrient-rich water to the surface (upwelling), fuelling phytoplankton blooms. This process sustains the rich populations of fish and cetaceans that are vital for Kenya's industrial and artisanal fisheries.
- **c)** Sediment & Carbon Transport: Canyons serve as "sediment highways," funnelling terrestrial silt and organic carbon from the Tana and Sabaki rivers down to the abyssal plain. Understanding these

[49] Harris, P. T., et al. (2024). Geomorphology of the Western Indian Ocean margin. Elsevier.

d) Pathways allows the MSP to manage the impact of land-based runoff and pollution on deep-sea environments.

iv). Ridges, Fracture Zones, and Banks: The Structural Backbone

The tectonic and sedimentary evolution of Kenya's continental margin has produced a suite of structural features, including ridges, fracture zones, and submarine banks, that control sediment distribution, ocean circulation, and habitat heterogeneity. These features constitute the tectonic and sedimentary framework of the margin. They include

a) **Davie-Walu Ridge (Davie Fracture Zone)**: This is the dominant structural feature offshore, a transform margin relic from the Jurassic-Cretaceous breakup of Gondwana. It accommodated the northward drift of Madagascar and now exists as a steep, linear escarpment running for hundreds of kilometres. The Marine Spatial Plan recognizes this ridge as a fundamental geological boundary, separating sedimentary basins, influencing deep-ocean current pathways, and creating habitat heterogeneity on its flanks. Geophysical data confirms its role in segmenting the offshore Lamu Basin.[50] [49]

b) **North Kenya Banks (NKB):** This regionally unique feature is a broad extension of the continental shelf (~60 km offshore), contrasting sharply with Kenya's typically narrow shelf. It represents a palaeo-deltaic and shelf terrace system underlain by thick Cenozoic sediments. Its shallow, sunlit waters make it a classically productive tropical shelf, supporting extensive seagrass beds and serving as a critical ground for both artisanal and industrial fisheries. The MSP identifies the NKB as a major emerging fishery resource.[51] [52]

c) **Other Banks (Malindi, Vidal, Presgrave):** These isolated bathymetric highs on the outer shelf function as biodiversity "stepping stones" or oases. Their origins may be reefal (ancient coral cores), diapiric (mud/salt intrusions), or tectonic (fault blocks). By providing hard substrate within the photic zone, they facilitate the growth of filter-feeding communities like sponges and corals, attracting reef-associated fish and increasing local biodiversity. The MSP treats these highs as "biodiversity oases"

d) **Fracture Zones (e.g., Dante, Dantley Walk):** These linear, deep-crustal faults, perpendicular to ancient mid-ocean ridges, segment the margin into compartments, controlling sediment distribution since they guide the courses of submarine canyons, they are designated in the MSP as potential targets for mineral exploration, as their rocky escarpments are favourable for the formation of cobalt-rich ferromanganese crusts.

v). Abyssal

Consists of abyssal hills and plains as presented below

a) Abyssal Hills

These smaller (500-800 m relief), widespread features form the "rolling hills" of the abyssal plain. Primarily originating as volcanic extrusions or fault blocks at the mid-ocean ridge, they add critical topographic complexity to the deep-sea floor, influencing benthic current flows and sediment dynamics, thereby creating microhabitats for benthic organisms.

b) Abyssal Plain: The Deep-Sea Frontier

Comprising over 50% of Kenya's EEZ, the abyssal plain (depths 3,000-6,000 m) is a vast, sediment-covered region. Its flatness results from the blanketing effect of pelagic ooze (microfossil remains) and turbidite deposits from the canyons. This realm hosts significant potential for both extreme life and mineral wealth. The MSP facilitates the zoning of areas prospective for polymetallic nodules (containing Manganese,

[50] Osicki, A., et al. (2015). Geophysical interpretation of the Lamu Basin. In Proceedings of the 4th East African Petroleum Conference.

[51] Morgans, J. F. C. (1959). The geology of the North Kenya Banks. Geological Magazine, 96(4), 309–316.

[52] Onyango, S., et al. (2021). Fisheries productivity of the North Kenya Banks. Western Indian Ocean Journal of Marine Science, 20(2), 45–58.

Nickel, Copper, and Cobalt) and ferromanganese crusts. It provides a framework for future mineral exploration that avoids interference with existing maritime infrastructure like submarine cables

Ecological significance

Life in this zone can be sustained by chemical energy at cold seeps (methane/hydrogen sulphide) or hydrothermal vents, supporting unique communities of tubeworms, clams, and specialised microbes. Whale falls also create temporary, resource-rich islands of biodiversity on the plain. The key geomorphological features are presented in **Figure 6**.

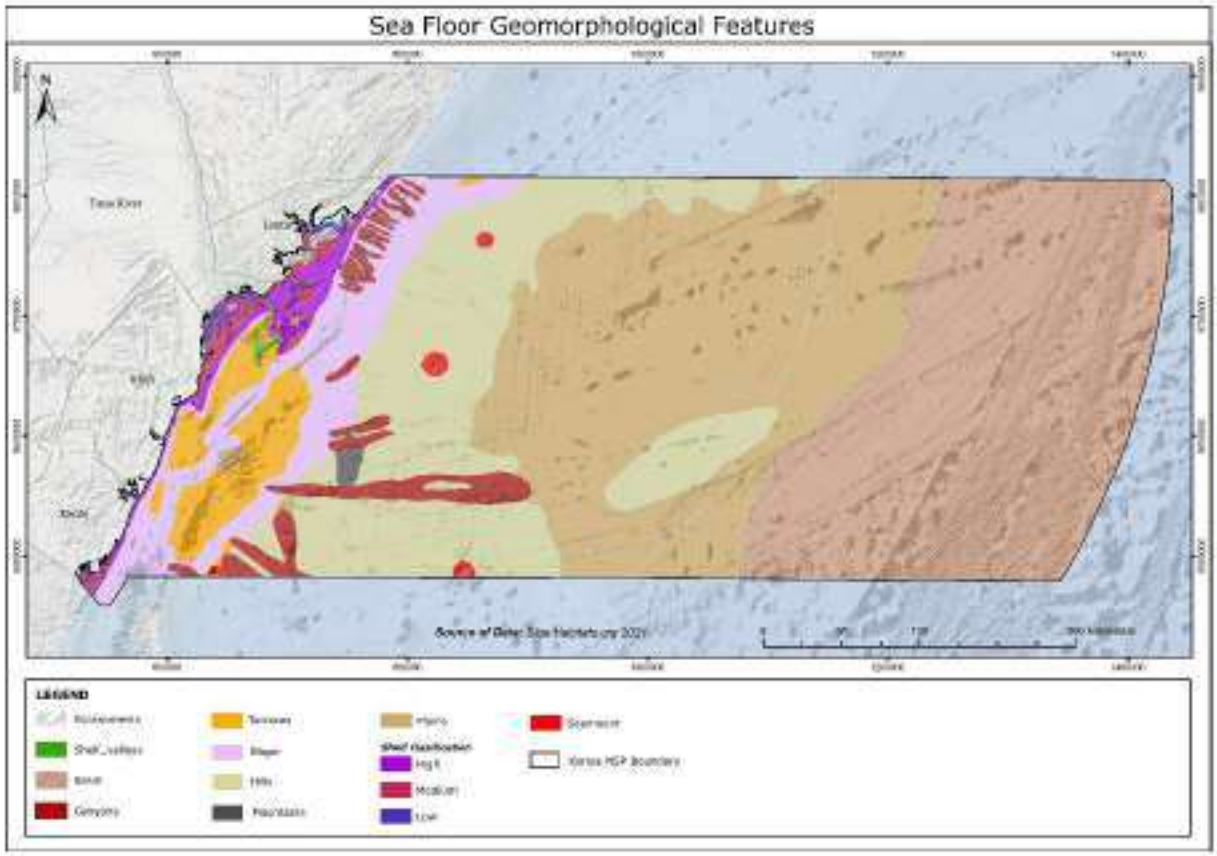


Figure **6**: Key geomorphological features

5.2.8 Hydro-physical Environment

The hydro-physical environment encompasses freshwater and sediment inputs from river discharge, groundwater flow, and the resulting turbidity and sediment plume dynamics along Kenya's coastline. These processes drive nutrient cycling, influence water quality, and shape critical habitats such as coral reefs, seagrass beds, and mangroves, making their understanding essential for integrated Marine Spatial Planning.

i). Coastal Hydrology

The coastal hydrology of the Marine Spatial Area can be described by considering the supply of freshwater and terrigenous sediments draining into the coastal marine waters. The supply of freshwater occurs through river discharges as well as through groundwater flow. The supply of terrigenous sediments occurs mainly through river discharges. The details are presented in the following sections.

a) Freshwater Discharge

Several rivers discharge freshwater into the Kenya's coastal-marine waters **Figure 7**. These include Tana, Athi-Sabaki, Umba, Ramisi, Mwache, Rare, Kombeni, Chasimba, among others.[53] [54] [55] [56] [57] [58] [59] The discharges from most of the rivers draining into the Kenya coast are highly variable. **Figure 8** and **Figure 9** shows the variability of some of the rivers for selected periods. The discharges exhibit both seasonal, inter-annual and inter-decadal variabilities that are largely driven by larger climatic variations in the East Africa region. Considering seasonal variations, the highest river discharges occur in the period between March and May (long rains) and in the period between October and December (short rains). The peak river discharges during the long-rainy season (March-April-May) occur in May, while during the short rainy season (October-November-December), the peak occurs in November.

While numerous other rivers discharge to the coast, the Tana and Athi-Sabaki rivers are the largest in terms of volume discharging into Kenya's coastal-marine waters **Figure 7** and **Table 53**. The two rivers create a large estuarine system in Malindi Bay and Ungwana Bay, both of which are rich in shrimp fishing grounds. The freshwater flows from the various coastal rivers also have a profound effect on the coastal-marine ecosystems as they influence salinity and turbidity, and provide nutrients for many fauna and biota. Consequently, they drive various marine ecological processes. [60] [61] [62] [63] [59]

[53] Kitheka, J. U. (1996). Freshwater and sediment discharge into Kenyan coastal waters. Kenya Marine and Fisheries Research Institute.

[54] Kitheka, J. U. (1997). River discharge and coastal sediment dynamics in Kenya. Estuarine, Coastal and Shelf Science, 45(4), 521–532.

[55] Kitheka, J. U. (2002). Freshwater and sediment discharge from the Tana and Sabaki Rivers, Kenya. Journal of African Earth Sciences, 35(3), 341–352.

[56] Kitheka, J. U., et al. (2003). Sediment dynamics in Kenyan coastal waters.

[57] Kitheka, J. U., et al. (2004). Sediment discharge from the Tana and Athi-Sabaki Rivers, Kenya. Journal of African Earth Sciences, 39(3–5), 421–430.

[58] Kitheka, J. U., & Mavuti, K. M. (2016). Coastal hydrology of Kenya. Kenya Marine and Fisheries Research Institute.

[59] Kitheka, J. U., et al. (2022). River discharge and coastal ecosystem dynamics in Kenya. Kenya Marine and Fisheries Research Institute

[60] Ohowa, B. (1996). Nutrient dynamics and productivity in Kenyan coastal waters. Kenya Marine and Fisheries Research Institute.

[61] Munga, C. N., et al. (2006). Fisheries and ecosystem productivity in Malindi-Ungwana Bay. Kenya Marine and Fisheries Research Institute.

[62] Munga, C. N., et al. (2016). Ecosystem services and fisheries productivity in Malindi-Ungwana Bay. Kenya Marine and Fisheries Research Institute.

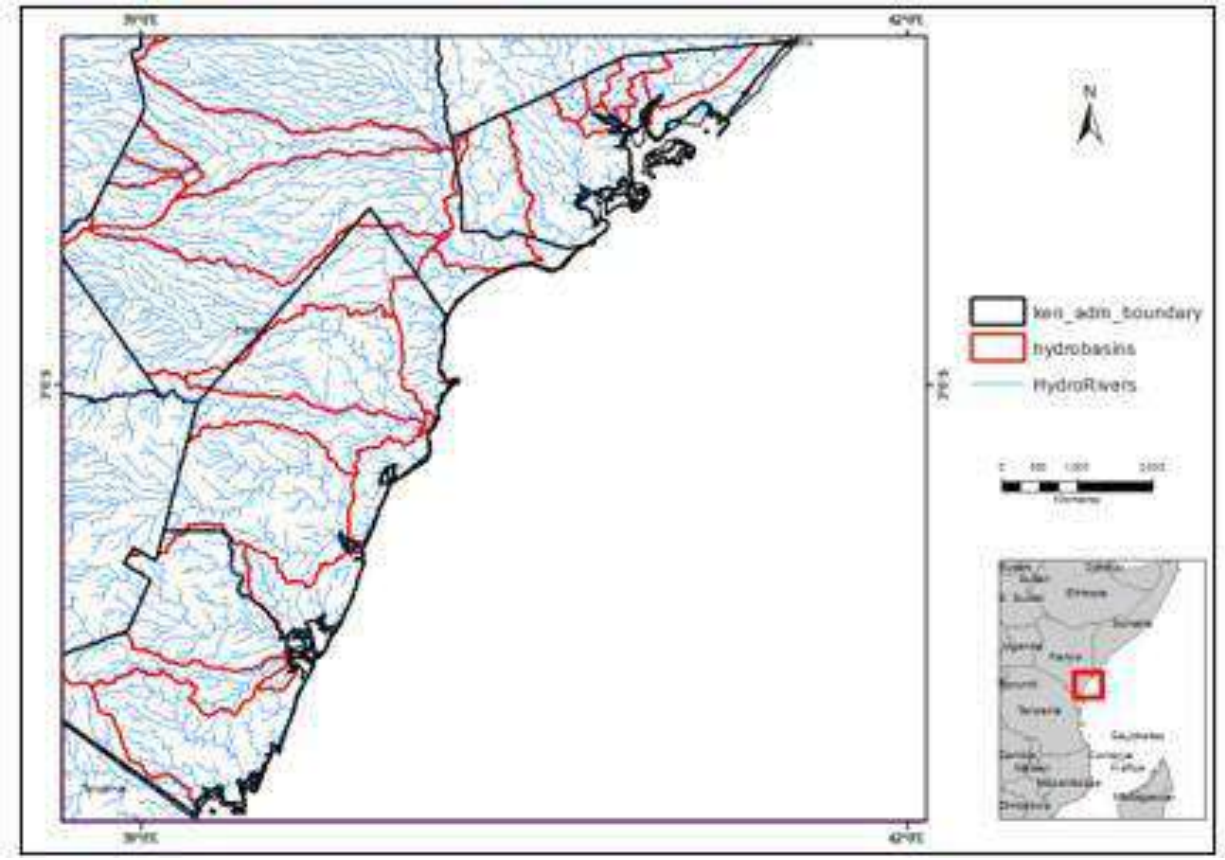


Figure 7: River basins discharging water and sediments to Indian Ocean

Kenya's estuaries and mangrove-fringed creeks that receive river discharge of freshwater provide habitat and rich nursery and spawning grounds for various species of fish, crustaceans and other marine life. Such systems include Funzi-Shirazi Bay, Gazi Bay, Mwache-Port Reitz Creek, Tudor Creek, Kilifi Creek, and Lamu-Dundori Creeks, among others. Recent studies in Mwache Port Reitz Creeks have shown a significant positive relationship between river discharge and prawn productivity. Patterns of river inflow to estuaries and creeks also influence hydrodynamic processes, including the state of the river mouths, amplitude of tidal variation, water circulation patterns and sediment deposition/erosion.[55] [57] [63] However, these systems face increasing threats from land-based activities such as agriculture, urbanisation, deforestation, and industrialisation. In addition, river damming reduces the flow of freshwater, nutrients, and sediments into coastal waters, thereby undermining biodiversity, productivity, and socio-economic systems. Climate change further compounds these challenges by altering rainfall patterns, which in turn modifies river discharges and negatively impacts fisheries and the overall productivity of coastal-marine ecosystems.

[63] Diop, S., Scheren, P., & Machiwa, J. F. (2016). Coastal and marine ecosystems in East Africa. UNEP-Nairobi Convention.

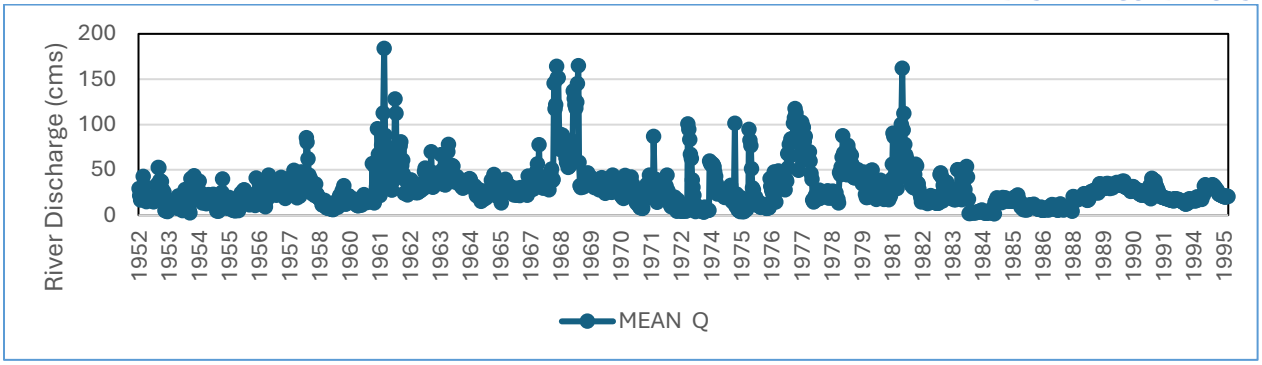


Figure **8**: The variability of Athi-Sabaki River discharge (cms) in the period 1952-1995.

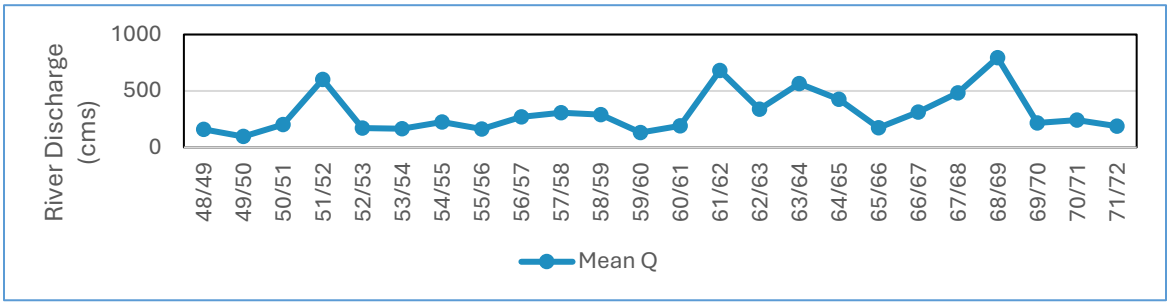


Figure **9**: The variability of Tana River discharge (cms) in the period 1948-1972.

b) Sediment Discharge

Several rivers discharge large volumes of terrigenous sediment to Kenya's coastal-marine waters, influencing turbidity and sediment accretion patterns.[55] [59] The annual terrigenous sediment load discharge by the Tana River is currently estimated to be 6.8 x 10^6 tonnes $year^{-1}$.[57] The sediment load of the Athi-Sabaki River that discharges into Malindi Bay has been estimated to range between 7.5 and 14.3 million tonnes.[64] [65] [57] Recent studies have estimated the present annual total sediment load of the Athi-Sabaki River to be in the range of 3-4 million tonnes per year.[57] [59] Changes in freshwater and sediment input in the Athi-Sabaki and Tana estuaries negatively impacts estuaries, increasing the high possibility of massive seawater intrusion, coastal erosion, degradation of mangroves and coral reef ecosystems, reduced nutrient levels, and decline in coastal fisheries.[66] [67]

Table **53**: Supply of freshwater into Kenya's segment of the Indian Ocean

S/N	River	Total Annual Runoff (m3/yr)	% of the Total Runoff
1	Umba	332,345.00	2.65
2	Ramisi	104,720.00	0.83
3	Mkurumudji	6,004.16	0.05
4	Matunga-Tiwi	19,296.90	0.15
5	Chasimba	222,955.00	1.78
6	Mwache	113,468.00	0.9
7	Kombeni	38,236.50	0.3

[64] Watermeyer, J., van Katwijk, M. M., & Meulen, F. van der. (1981). Sediment discharge from the Athi-Sabaki River. Ministry of Water Development, Kenya.

[65] Van Katwijk, M. M., Meulen, F. van der, & Watermeyer, J. (1993). Sedimentation and coral reef degradation in Malindi Bay, Kenya. Marine Pollution Bulletin, 26(12), 670–675.

[66] Obura, D. O. (1995). Environmental stress and bleaching in Kenyan coral reefs. Wildlife Conservation Society.

[67] McClanahan, T. R., & Obura, D. O. (1996). Sedimentation and coral reef degradation in Kenya. Coral Reefs, 15(3), 185–192.

S/N	River	Total Annual Runoff (m3/yr)	% of the Total Runoff
8	Mbogoli	11,583.80	0.09
9	Rare-Goshi	149,036.00	1.19
10	Mtwapa Kibuyuni	18,439.10	0.15
11	Athi-Sabaki	636,500.00	5.07
12	Tana	10,397,750.00	82.86
13	Dodori-Boni	111,774.00	0.89
14	Ijara-Bargoni	385,722.00	3.07
	TOTAL	**12,547,830.46**	**100**

NB: The data combines information from various sources, including weather models (ECMWF ERA5 LAND Precipitation), land cover maps (CCI Land Cover), and terrain data (SRTM DEM), to estimate the amount of runoff generated each year.

The discharge of high sediment load by the Athi-Sabaki River has had a negative impact on coral reef ecosystems by increasing turbidity, reducing light penetration, and causing sediment deposition that can smother corals and suppress coral recruitment, growth, and survival, particularly on reefs exposed to the river plume in Malindi Marine National Park and the Watamu Marine Reserve in Malindi Bay, particularly in Malindi Marine National Park and the Watamu Marine Reserve.[65] [67] [68] Damming of the Athi-Sabaki river through the construction of Thwake dam is expected to reduce the discharge of sediment load to Malindi bay with potential negative consequences.[69] [70] [59] The river discharges of both the Tana and Athi-Sabaki rivers are important in terms of sustaining the biodiversity and productivity of Malindi-Ungwana Bay system, which in turn supports both artisanal and industrial fisheries targeting prawns.[71] [72] [73] [62] [74] These ultimately impact the socio-economic livelihoods of coastal communities. Heavy sedimentation within Malindi Bay as a result of discharge of land-derived sediments from the Athi-Sabaki river has, in the past 50 years, led to the seaward extension of the shoreline by more than 200 m. This has led to the creation of new 'land' along the shores of Malindi Bay.

c) Water Turbidity and Movement of Sediment Plumes along the Coast

The turbidity of water within Kenya's coastal and marine environment is mainly determined by the Total Suspended Sediment Concentration (TSSC). TSSC reflects the total amount of suspended organic and inorganic matter in water.[75] [76] [77] Along the Kenya coast, turbidity shows significant spatial variability. The highest levels of turbidity and hence TSSC are found in the coastal zones that receive significant input of terrigenous sediments from river basins. The zones that are characterised by relatively high turbidity and TSSC during the rainy season are (i) Malindi Bay-Ungwana Bay-Lamu Archipelago Zone, (ii) Funzi-Shirazi Bay, (iii) Port Reitz-Tudor Creeks and (iv) Mtwapa -Kilifi Creeks (see Figure 8). During dry seasons, the turbidity levels are significantly lower as presented in **Figure 10**

[68] Fleitmann, D., et al. (2007). Sediment discharge and coastal geomorphology in Malindi Bay. University of Bern.

[69] Snoussi, M., et al. (2004). River damming and coastal ecosystem impacts. UNEP-Nairobi Convention.

[70] Kitheka, J. U. (2018). Hydrology of semi-arid and arid lands: A case study of the Tiva River Basin, Kenya. In C. M. Ondieki & J. U. Kitheka (Eds.), Hydrology and best practices for managing water resources in arid and semi-arid lands (pp. 99–124). IGI Global. https://doi.org/10.4018/978-1-5225-2719-0.ch005

[71] Ohowa, B. (1996). Nutrient dynamics and productivity in Kenyan coastal waters. Kenya Marine and Fisheries Research Institute.

[72] UNEP. (1998a). Eastern African coastal and marine environment. United Nations Environment Programme.

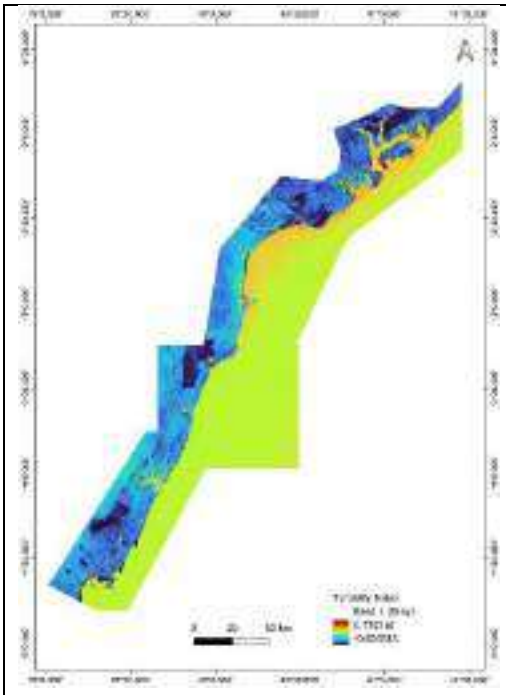
[73] UNEP. (1998b). Malindi-Ungwana Bay ecosystem assessment. United Nations Environment Programme.

[74] Mwaguni, S., et al. (2016). Coastal and marine resource management in Kenya. Kenya Marine and Fisheries Research Institute.

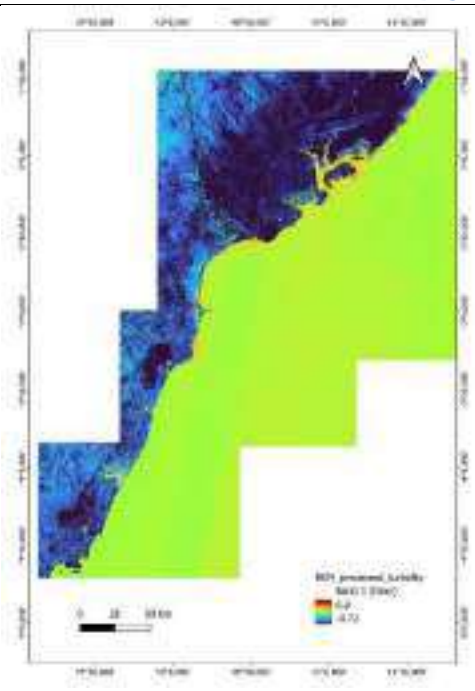
[75] Kitheka, J. U., et al. (2003a). Sediment dynamics in Kenyan coastal waters. Kenya Marine and Fisheries Research Institute.

[76] Kitheka, J. U., et al. (2003b). Turbidity and sediment plumes along the Kenyan coast. Kenya Marine and Fisheries Research Institute.

[77] Kitheka, J. U., et al. (2003c). Nutrient and sediment transport in Kenyan estuaries. Kenya Marine and Fisheries Research Institute.



a) Turbidity during high river discharge 2022-2024



b) Turbidity during low river discharge 2023-2024

Figure **10**: Turbidity during a) high and b) low river discharge

Malindi Bay-Ungwana Bay-Lamu Archipelago Zone receives huge volume of terrigenous sediments from Athi-Sabaki and Tana Rivers during the long rainy season. These are the largest rivers in Kenya that drains into the Western Indian Ocean. The turbidity plumes associated with the discharges of the two rivers moves along the coast, changing directions depending on the monsoon season. During the South East Monsoon (SEM) the plumes is driven northward due to the influence of wind-generated longshore currents (along the coast) and the East African coastal current in deeper waters.[75] [76] [77] During SEM, the sediment plumes extend northward to Lamu Archipelago creeks (**Figure 10**). However, during the NEM, the sediment plumes move southward, reaching the northern parts of Watamu-Malindi Marine Park and Reserve during periods of extreme hydro-climatic events. It is important to note that the sediment plumes are also associated with land-derived nutrients, explaining the relatively high productivity of coastal waters in the vicinity of rivers and estuaries.

Areas of Concern

Several zones along the Kenya coast receive freshwater, terrigenous sediment and nutrients load from various rivers draining into the coast. High sediment load during rainy seasons negatively impacts critical coastal – marine ecosystems such as mangroves, seagrass beds, and coral reefs. Deposition of heavy sediment load can smother seagrass beds and corals, including the breathing roots of mangroves, leading to their degradation. This, in turn, can lead to a reduction in the productivity of the coastal fisheries resources that are linked to the critical coastal ecosystems. Sediment supply also increases turbidity of coastal water, which can, in turn, reduce the penetration of solar radiation into the water column, thus affecting primary production. Rivers also supply nutrients to the coastal areas, increasing their productivity, especially when water turbidity levels are not excessively high.

The main areas of concern along the Kenya coast, based on coastal hydrology and sedimentation, are as follows:

i). Funzi-Shirazi Bay: The main rivers supplying freshwater, terrigenous sediments and nutrients into this coastal zone are the Umba and Ramisi rivers. The area is characterised by high turbidity during wet seasons **Figure 11**. The Kisite-Mpunguti Marine Park and Reserve, which is critical for the conservation of dolphins and other marine species, is found in this area. The area is also important

for the conservation of critical coastal ecosystems such as mangroves, seagrass beds and coral reef ecosystems.

ii). Mombasa-Mtwapa Creek Zone: This coastal segment is characterised by several creeks that extend inland. These include Tudor Creek, Port Reitz Creek and Mtwapa Creek. Most of the creeks in this area experience high levels of turbidity during wet seasons **Figure 11**. The zone is characterised by the presence of critical ecosystems such as mangroves, seagrass beds and coral reefs that are threatened by increased turbidity and sediment deposition.

iii). Malindi Bay-Ungwana Bay: The main rivers supplying freshwater, terrigenous sediments and nutrients into this coastal zone is Athi-Sabaki River and the Tana River. The bay is important for turtle conservation and fisheries, especially prawn fisheries. Heavy deposition of sediment load in Malindi Bay has, over the years, led to seaward extension of the shoreline, creating new grounds all the way from Vasco da Gama to Mambrui. Malindi-Watamu Marine Park and Reserve, situated within this zone, is usually affected by terrigenous sediment load and nutrients from the Athi-Sabaki river, especially during periods of extreme hydroclimatic events such as the El-Nino.

Huge supply of nutrients and sediments in this zone explains high productivity experienced in this zone, which is the most productive along the Kenya coast. Damming of the Athi-Sabaki and Tana rivers is a threat as this will reduce freshwater, nutrients and terrigenous sediment supply into Ungwana Bay. This in turn has potential of impacting fisheries productivity with major socio-economic consequences.

iv). Lamu Archipelago: This coastal zone is characterised by several creek systems that are fed by two main seasonal rivers that originates from north-eastern Kenya. These include Dodori and Boni seasonal rivers. The discharge from the Tana River also affects Lamu-Archipelago coastal zone, especially during the South East Monsoon when the nutrient-laden turbid water from the river is transported northward by nearshore currents. The area is characterised by high turbidity during wet seasons (**Figure 11**). The area harbours critical ecosystems especially the mangroves and is one of the most productive in terms of fisheries.

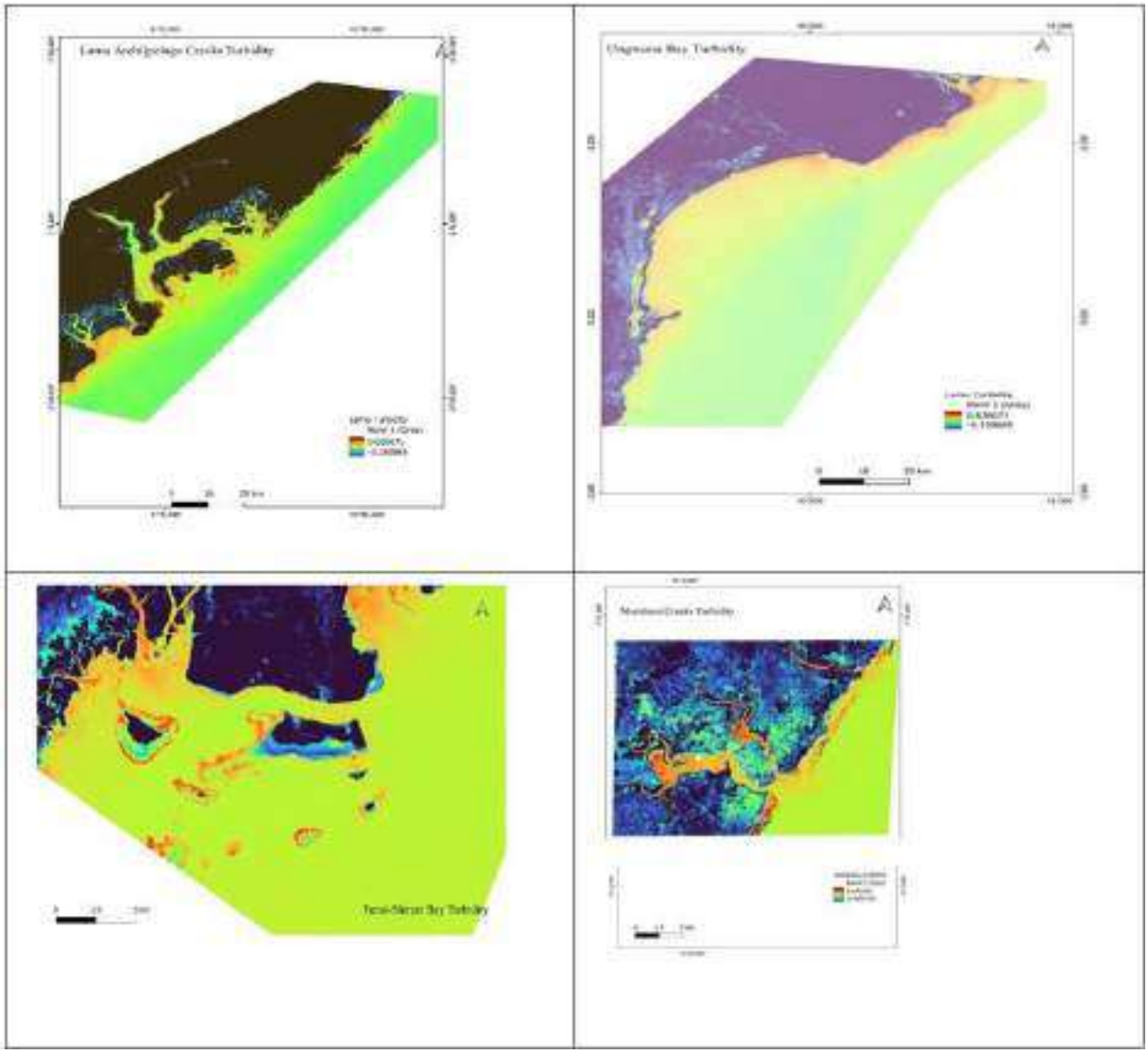


Figure **11**: Turbidity of various zones during high river discharge (2023-2024)

d) Groundwater Flow to the Coast

Groundwater flow to Kenya's coastal-marine environment is important, although this subject has received limited attention in terms of research and management in the recent past. The flow of groundwater to the coast occurs mainly from groundwater aquifers located along the coast. Groundwater flow is predominantly towards the north-east and south, driven by hydraulic pressure.[78] The major aquifers include Tiwi-Diani aquifer, which is an important source of freshwater that is supplied to Kwale and Mombasa counties. Other important aquifers include the Msambweni aquifer, Sabaki aquifer, Mombasa-Bamburi-Utange aquifer and Lamu aquifer. Lamu aquifers consist of longitudinal dunes.[78] The recharge and flow of groundwater is also influenced by the bimodal rainfall pattern, with recharge and high flow rates occurring during the long rainy season (April-June) and short rainy season (October-December). Groundwater quality is a significant concern due to saltwater intrusion, particularly as a result of high abstraction rates and the porous nature of the underlying coral limestone formation.[78]

[78] Kuria, Z. (2013). Groundwater resources and coastal aquifers in Kenya. Kenya Marine and Fisheries Research Institute.

Significant submarine groundwater discharge occurs at Diani and Nyali beaches, supplying vital nutrients and freshwater that sustain coastal ecosystems such as mangroves and lowland tropical forests. However, rapid urban development, population growth, and over-exploitation of aquifers have caused declining groundwater levels and reduced coastal flows. Over-pumping, combined with sea level rise, has further led to seawater intrusion and increased groundwater salinity. Future pressures from climate change and land conversion are expected to exacerbate these declines, threatening the productivity and resilience of coastal ecosystems. This underscores the urgent need for detailed studies on groundwater flux to Kenya's coast

5.2.9 Marine Pollution

Marine pollution was measured against the physical indicators (TSS; marine litter), chemical indicators (nutrients, nitrates, and phosphates) and biological indicators (microbial contamination—*E. coli*).

i). Nutrient Pollution Status and Trends (NPI)

Nutrients (nitrogen and phosphorus) are essential for productivity but, at elevated concentrations, indicate pollution from wastewater discharge, urban runoff, and riverine inputs, with potential to cause eutrophication and harmful algal blooms (HABs). "No nutrient pollution" was reported at the monitored sites during the reported sampling years, implying that based on available data coastal waters assessed are generally suitable for zoning as sensitive habitats and for aquaculture siting from a nutrient-loading standpoint. However, land–sea integration is still required because nutrient plumes and drivers originate upstream and require alignment with watershed planning and ICZM. Even where current nutrient status is classified as "no pollution," nutrients remain a key early-warning variable for future coastal development (ports, settlements, aquaculture intensification) and should be embedded into MSP monitoring using NPI as a routine indicator.

ii). Suspended solids and turbidity (TSSPI)

TSS is a priority physical indicator because it reduces light penetration, transports contaminants, and drives sedimentation stress on sensitive habitats. Many locations within the planning areas fall within no-to-moderate TSS pollution, with some showing higher concern categories in specific years. There is likely to be ecological consequences of elevated TSS, including light limitation (reduced photosynthesis for seagrass/corals), smothering and sedimentation impacts, and oxygen depletion where organic-rich sediments increase decomposition demand. This might result to socioeconomic impacts through reduced fisheries recruitment (loss of nursery habitats), reduced tourism attractiveness in turbid waters, aquaculture mortality risk, and higher dredging/siltation costs for ports and navigation channels. Low-TSS areas should be prioritized for coral/seagrass conservation, directing port expansion and dredging to more tolerant zones away from sensitive ecosystems, establishing buffer/mixing zones at river mouths, and overlaying TSS with nutrient and microbial indices to map multi-stressor hotspots for cumulative impact management.

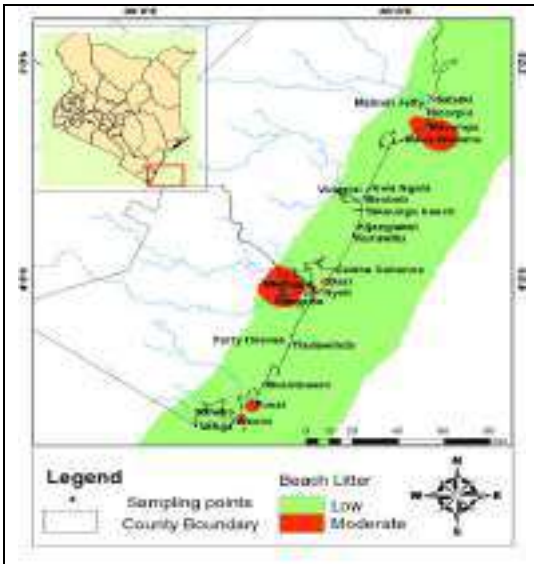
iii). Microbial pollution status and trends (MMPI)

Microbial indicators are sensitive to wastewater discharges and runoff, and provide an immediate human-health and seafood-safety lens because pathogens affect mariculture/shellfish areas. Strong spatial variability, including sites rated excellent/acceptable alongside locations rated polluted/highly polluted, indicates that microbial contamination is highly location-specific and likely associated with point-source discharges and urban/industrial drainage. High microbial loads can stress marine organisms, increase disease risk, and contribute to oxygen depletion through organic matter decomposition. Socioeconomically, it highlights elevated risks to public health, tourism reputation, and market confidence in filter-feeding mariculture products. Only "excellent" and "acceptable" waters be considered for recreation zoning and mariculture siting, and that wastewater discharge points be regulated to meet discharge limits (including siting in well-flushed areas and away from sensitive uses). Dynamic closure rules (e.g., beach closures following heavy rainfall when microbial loads spike) as a safeguard measure.

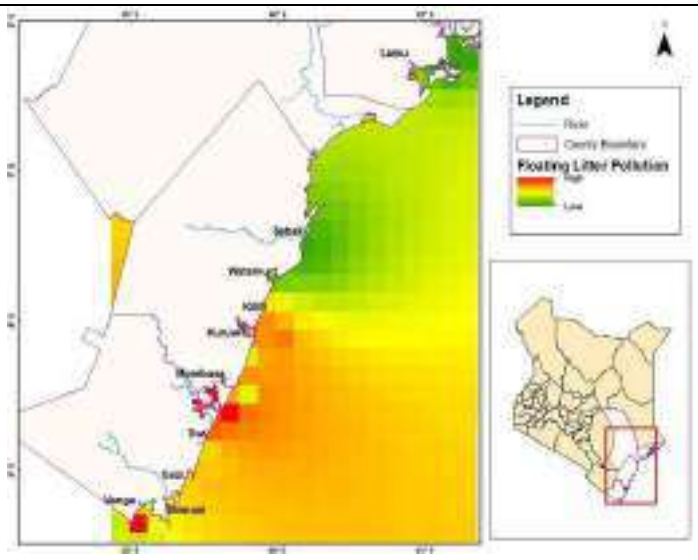
iv). Marine litter (beach macro-litter and floating litter)

Marine litter was assessed through beach and floating litter surveys as indicators of physical pollution pressures affecting ecosystems and coastal economies. Between 2019 and 2023, nearshore surveys classified floating litter densities using established thresholds, ranging from very low (<1,000 items/km²) to very high (>1,000,000 items/km²). Most sites fell within low-to-moderate categories, though occasional

higher levels were recorded at specific locations and years (**Figure 12**). Litter contributes to habitat degradation in corals, mangroves, and seagrass beds, causes ingestion and entanglement of marine species, damages fishing gear, including ghost nets, reduces the tourism value of beaches and dive sites, and creates navigation hazards, making it a cross-sector risk. To address these pressures, high-litter areas should be designated as clean-up priority zones and monitoring sites, buffer zones established near urban and riverine inputs to reduce land-based sources, and litter layers integrated into cumulative impact assessments alongside other pressures such as overfishing and climate change



Beach microplastic pollution levels along the Kenyan coastline



floating litter pollution along the Kenyan nearshore waters

Figure **12**: Map showing beach microplastic and floating litter pollution

5.3 Biological Environment

Kenya's marine biodiversity is characterized by a diverse range of ecosystems, including coral reefs, seagrass meadows, mangrove forests, intertidal zones, estuaries, deltas, lagoons, and designated marine conservation areas. These habitats support a wide array of marine fauna fish, seabirds, mammals, reptiles, and invertebrates across pelagic and benthic environments. Key species of conservation concern include dugongs, dolphins, whales, sharks, rays, and five species of marine turtles (olive ridley, green, leatherback, hawksbill, and loggerhead), alongside important fisheries resources. While these ecosystems provide critical ecological services and underpin social, cultural, and economic livelihoods, their abundance and distribution remain poorly established due to limited and costly assessments, resulting in data gaps that necessitate future updates. This ecological profile, therefore, offers a scientific baseline for understanding biodiversity patterns, ecosystem services, and conservation priorities, highlighting current conditions, pressures, and threats. Collectively, it provides an evidence base to guide strategic planning and adaptive management within Kenya's marine spatial planning framework

5.3.1 Marine Ecosystem

The main marine ecosystem consists of mangrove forest, seagrass bed, coral reefs, rocky shores and hard bottom deltas and estuaries, as presented in **Figure 13**.

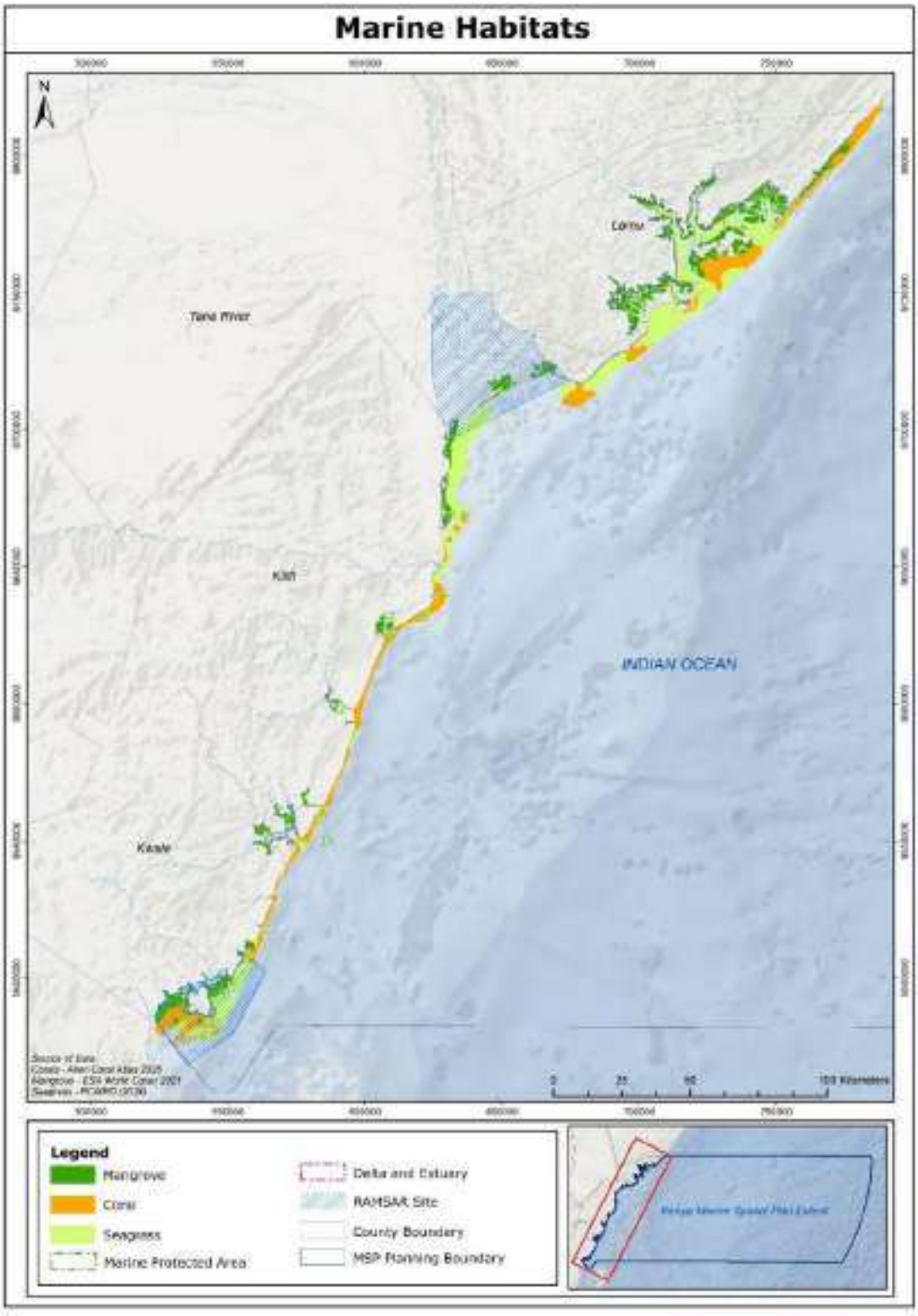


Figure **13**: Map of the marine ecosystem and habitats in the Kenya's share of the Indian Ocean

a) Coral Reef

Kenya's coral reef ecosystems are distributed along the entire coastline and form two main spatial systems with distinct ecological characteristics. The southern coast supports an almost continuous fringing reef system extending from Malindi to Shimoni, covering approximately 200 km, while the northern coast, particularly around Lamu and the Bajuni Archipelago, consists of more fragmented patch reefs and fore-reef slopes spanning about 100 km. These reefs occur as discrete hard substrate patches interspersed among extensive seagrass and algal beds. Coral diversity and structural complexity are highest in the southern region and gradually decline northwards due to the influence of the cold-water Somali Current system.[79]

Figure **14**: Coral reef within the Kenya marine space

Coral Health Status

The health status of Kenya's coral reefs reflects strong spatial variation (**Figure 15**) driven by climatic disturbances, local pressures, and management effectiveness. Average live coral cover across many reef systems is estimated at 25–30%, with more than 50 coral genera and up to 200 commonly recorded species.[80] However, the 1998 global coral bleaching event resulted in widespread mortality, with coral cover declining by approximately 51–70% in many areas.[80] Recovery patterns remain uneven, with reefs in well-managed areas such as Kisite-Mpunguti, Watamu Marine Park, and community-managed sites like Kuruwitu LMMA showing higher coral cover, improved reef complexity, and increasing fish biomass. In contrast, reefs exposed to high sedimentation, coastal development, and intense fishing pressure particularly in Malindi Watamu, parts of Diani Chale, and sections of Lamu continue to exhibit limited recovery and increased macroalgal dominance[81] [82]. At a national scale, Kenya's coral reef ecosystems are classified as Endangered under the IUCN Red List of Ecosystems due to biotic disruption and loss of structural complexity, although localized resilience persists in effectively protected sites.[82]

[79] Obura, D. O. (2012). Coral reef biodiversity and distribution in Kenya. Western Indian Ocean Journal of Marine Science, 11(2), 115–130

[80] Obura, D. O. (2012). The diversity and biogeography of Western Indian Ocean reef-building corals. PLoS ONE, 7(9), e45013. https://doi.org/10.1371/journal.pone.0045013

[81] Gudka, M., Obura, D., Treml, E., Samoilys, M., Aboud, S. A., Osuka, K. E., Mbugua, J., Mwaura, J., Karisa, J., Knoester, E. G., Musila, P., Omar, M., & Nicholson, E. (2024). Leveraging the Red List of Ecosystems for action on coral reefs through the Kunming-Montreal Global Biodiversity Framework. Conservation Science and Practice, 6(12), e13255.

[82] Obura, D., Gudka, M., Samoilys, M., Osuka, K., Mbugua, J., Beigbeder, Y., Monteiro, M., Maiyo, N., Musembi, P., Rosendo, S., & Thoya, P. (2022). Vulnerability of Western Indian Ocean coral reefs to climate change and local stressors. Frontiers in Marine Science, 9, 801339. https://doi.org/10.3389/fmars.2022.801339

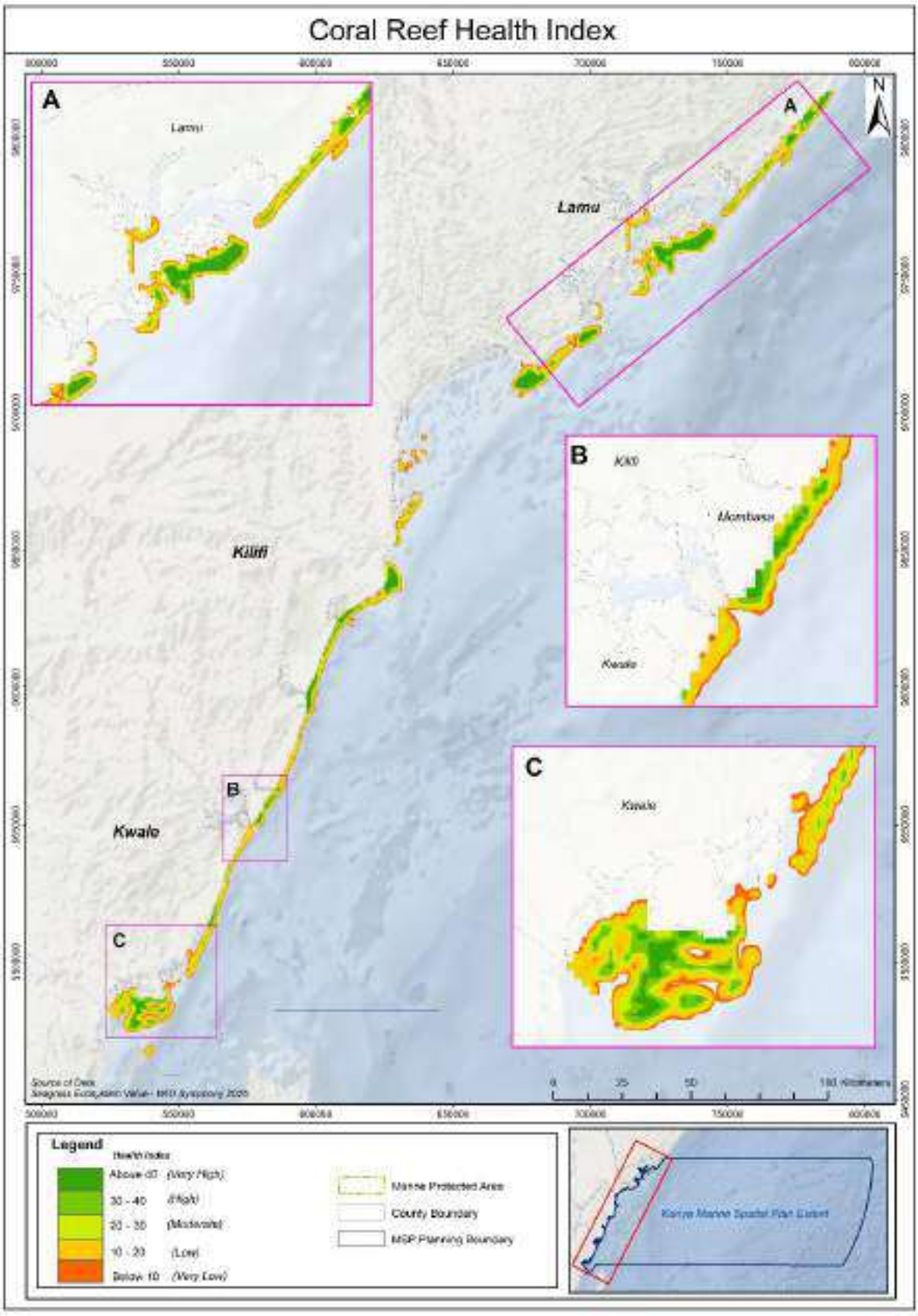


Figure **15**: Map showing coral health index

Ecosystem Services

Coral reefs along the Kenyan coast provide critical ecosystem services that support both ecological functioning and socio-economic wellbeing. Ecologically, they sustain high biodiversity and function as essential spawning, nursery, and feeding grounds for reef-associated fish and invertebrates. Fish biomass is typically estimated at 1,500–2,000 kg per hectare, although this varies depending on reef zone, sediment influence, and fishing intensity[83] [84] [85]. Coral reefs also play a vital role in coastal protection by dissipating wave energy, reducing shoreline erosion, and buffering adjacent ecosystems such as seagrass meadows and mangroves. Economically, reefs underpin artisanal fisheries and tourism activities, particularly within Marine Protected Areas, contributing significantly to local livelihoods and Kenya's blue economy. In addition, coral reefs hold cultural, educational, and scientific value, supporting long-term monitoring, conservation planning, and marine spatial planning initiatives.

Key Threats and Drivers of Change

The condition and persistence of Kenya's coral reefs are shaped by interacting climatic and anthropogenic drivers of change. Climate-related stressors, including rising sea surface temperatures, marine heatwaves, and mass coral bleaching events, represent the dominant large-scale threats to reef survival and recovery[81]. Localised pressures such as coastal development, sedimentation from river systems, pollution, and overfishing further exacerbate reef degradation, particularly in areas lacking effective management. Increased sediment loads reduce water clarity and inhibit coral recruitment, while overfishing alters trophic structure and weakens reef resilience.[82] Conversely, positive drivers include the establishment of Marine Protected Areas, Locally Managed Marine Areas, and Joint Collaborative Management Areas, which have demonstrated improved coral condition, higher fish biomass, and enhanced community stewardship. These governance interventions highlight the importance of sustained protection, co-management, and restoration in strengthening coral reef resilience within Kenya's marine spatial planning framework.[82] [81]

b) Seagrass Bed

Habitat mapping and field surveys show that seagrass meadows occur along the entire Kenyan coastline, with the highest density in the Lamu Archipelago, which supports approximately 62% of national seagrass coverage, particularly within sheltered bays. National scale estimates for seagrass cover have been reported to be approximately 317.1 km² with an estimated annual loss of 0.85% yr^{-1}[86].

The Kenyan coastal seagrass species distribution patterns between counties differ significantly because of diverse habitats and environmental elements (**Table 54**). The mosaic nature of sheltered bays, channels, and reef flats in Lamu and Kwale creates diverse ecological spaces which support ten species of seagrass. The mixed reef and lagoon environments of Mombasa and Kilifi counties support 10 and 9 species of seagrass respectively. The Tana River supports only four seagrass species because of its limited sheltered areas and the estuarine and deltaic systems that create conditions that prevent extensive meadow growth.

Table **54**: Seagrass species distribution along the Kenyan coastline adjacent to respective counties

Family	Species	Lamu	Tana River	Kilifi	Mombasa	Kwale
CYMODOCEACEAE	*Cymodocea rotundata*	√		√	√	√
	Cymodocea serrulata	√		√	√	√
	Halodule uninervis	√	√	√	√	√
	Syringodium isoetifolium	√	√	√	√	√

[83] Samoilys, M. A. (1988). Abundance and species richness of coral reef fish on the Kenyan coast: The effects of protective management and fished areas (Technical Report). Kenya Marine and Fisheries Research Institute (KMFRI).

[84] McClanahan, T. R. (1994). Kenyan coral reef lagoon fish: Effects of fishing, seagrass distribution, and sea urchins. Freshwater Biology, 32(1), 203–220. https://doi.org/10.1111/j.1365-2427.1994.tb00878.x

[85] McClanahan, T. R. (1998). Primary succession of coral-reef algae: Differing effects of herbivory and r-selection. Marine Ecology Progress Series, 166, 125–141. https://doi.org/10.3354/meps166125

[86] Harcourt, W. D., Briers, R. A., & Huxham, M. (2018). The thin (ning) green line? Investigating changes in Kenya's seagrass coverage. Biology letters, 14(11), 20180227.Traganos et al. (2022)

Family	Species	Lamu	Tana River	Kilifi	Mombasa	Kwale
	Thalassodendron ciliatum	√	√	√	√	√
HYDROCHARITACEAE	*Enhalus acoroides*	√			√	√
	Halophila ovalis	√		√	√	√
	Halophila stipulacea	√		√	√	√
	Halophila minor			√	√	√
	Thalassia hemprichii	√	√	√	√	√
ZOSTERACEAE	*Zostera capensis*	√				√
Number of species		**10**	**4**	**9**	**10**	**10**

Health Status of Seagrass

KMFRI monitoring data (2016–2024) show generally good seagrass health **(Figure 16)** along the Kenyan coast, assessed using species composition, cover, shoot density, and canopy height. *Thalassodendron ciliatum* dominates nationally, especially in Tana River and Kwale due to strong river/sediment–nutrient influence (notably the Tana Delta). Mombasa has the highest proportion of *Thalassia hemprichii*, while Kilifi has a more balanced mix dominated by *Cymodocea rotundata* and *Halodule uninervis*. Lamu is the most diverse, including species like *Syringodium isoetifolium*, *Enhalus acoroides*, and *Zostera capensis*, and shows more opportunistic species. High shoot density and canopy height across counties support the overall good condition, with differences mainly driven by geomorphology, river influence, and coastal development as presented in **Table 55.**

Table 55: Estimates of health metrics for seagrass based on existing datasets spanning 2016-2023 (KMFRI)

Species / Category	Metric	Lamu	Tana River	Kilifi	Mombasa	Kwale
Total (Aggregate)	Cover (%)	66	69	67	70	74
	Density (shoots m^{-2})	486	393	771	533	484
	Height (cm)	20	18	21	36	31
Cymodocea rotundata	Cover (%)	2	–	10	4	1
	Density (shoots m^{-2})	271	272	612	320	679
	Height (cm)	10	5	17	9	12
Cymodocea serrulata	Cover (%)	8	–	1	1	2
	Density (shoots m^{-2})	236	224	–	–	560
	Height (cm)	15	12	–	–	18
Enhalus acoroides	Cover (%)	3	–	–	–	1
	Density (shoots m^{-2})	97	–	–	–	48
	Height (cm)	56	–	–	–	39
Halodule uninervis	Cover (%)	3	–	7	4	3
	Density (shoots m^{-2})	1029	278	1173	1200	1146
	Height (cm)	7	4	14	12	10
Halophila ovalis	Cover (%)	–	–	1	–	–
	Density (shoots m^{-2})	501	176	635	–	560
	Height (cm)	3	2	4	–	3

Species / Category	Metric	Lamu	Tana River	Kilifi	Mombasa	Kwale
Halophila stipulacea	Cover (%)	2	–	2	–	–
	Density (shoots m^{-2})	420	–	863	–	514
	Height (cm)	4	–	6	–	5
Syringodium isoetifolium	Cover (%)	14	5	9	3	6
	Density (shoots m^{-2})	1064	261	1524	–	1117
	Height (cm)	13	10	22	–	18
Thalassia hemprichii	Cover (%)	4	6	7	24	8
	Density (shoots m^{-2})	195	64	354	336	392
	Height (cm)	12	8	16	13	12
Thalassodendron ciliatum	Cover (%)	29	58	31	34	53
	Density (shoots m^{-2})	304	203	520	500	383
	Height (cm)	38	15	37	45	41
Zostera capensis	Cover (%)	1	–	–	–	–
	Density (shoots m^{-2})	1439	–	–	–	–
	Height (cm)	8	–	–	–	–

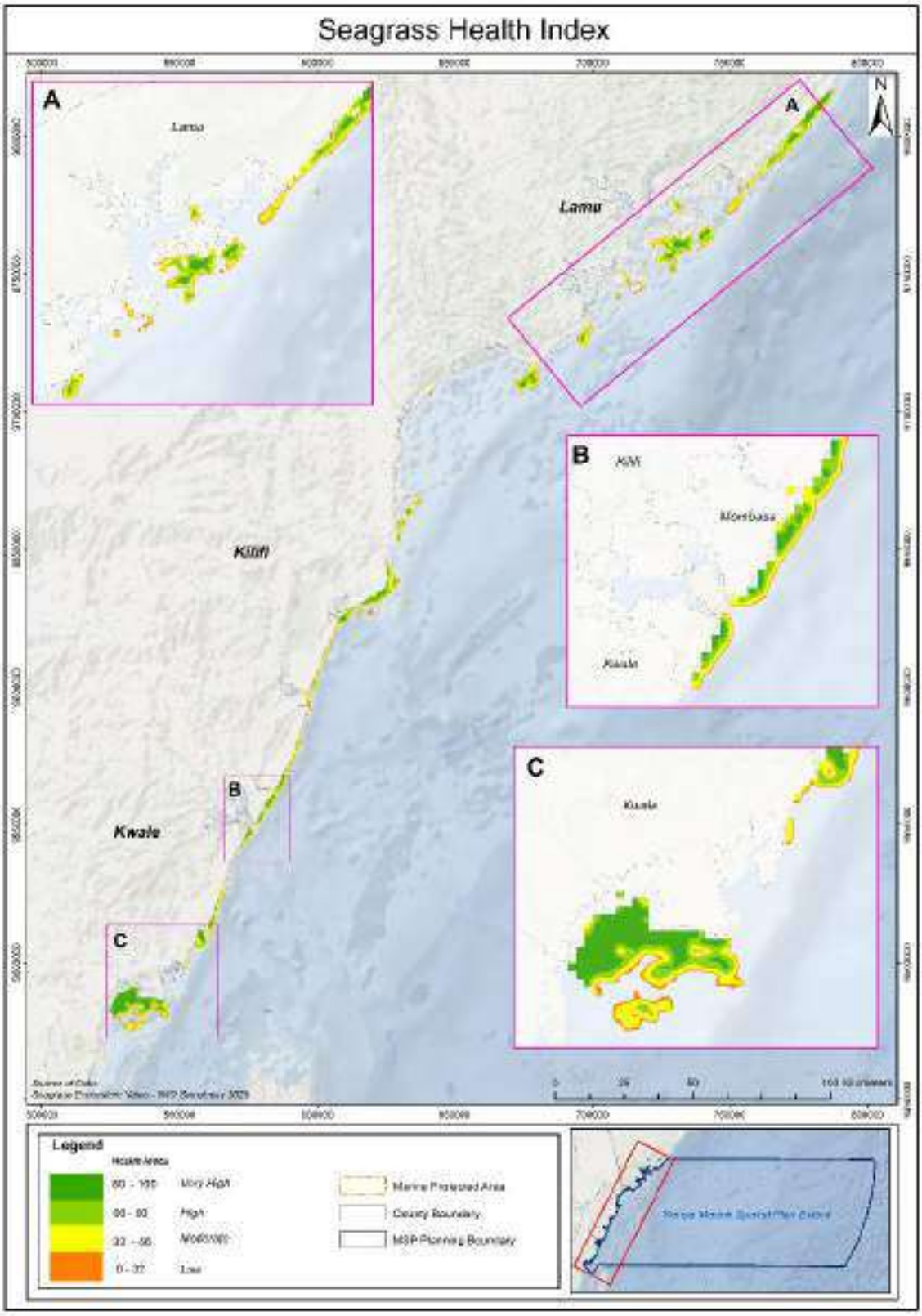


Figure **16**: Map showing sea grass health Index

Ecosystem Services and Goods from Seagrass Ecosystems

The key ecosystem services provided by sea grass are as presented in **Table 56**.

Table 56: Ecosystem services provided by sea grass

Category	Seagrass services (SS)
Supporting	▪ Provide detritus that fuels benthic food webs ▪ Serve as critical habitat for diverse marine species (fish, crustaceans, mollusks, echinoderms, sea cucumbers) ▪ Provide direct food for marine herbivores (green turtles, dugongs) ▪ Support invertebrate and fish populations through detritus and associated microorganisms. ▪ Support the health of adjacent coral reefs.
Provisioning	▪ Sustain artisanal fisheries (rabbitfish, parrotfish, prawns, sea cucumbers), contributing to food security and local economies.
Regulating	▪ Stabilize sediments and control coastal erosion ▪ Maintain water clarity through effective particle trapping ▪ Cycle nutrients by absorbing and storing nitrogen and phosphorus ▪ Act as long-term blue carbon sinks via biomass production and sediment accumulation. ▪ Stabilize sediments with root and rhizome systems, reducing coastal erosion and storm impacts. ▪ Moderate water movement and promote sediment deposition, increasing coastal stability and resilience to sea-level rise.
Cultural	▪ Support eco-tourism and recreational activities (snorkelling, diving) in areas like Mombasa, Watamu, Diani, and Lamu, creating employment ▪ Offer educational and conservation awareness opportunities ▪ Provide nature-based recreation, including turtle and dugong viewing within seagrass meadows.

Key Threats and Drivers of Change

Kenyan seagrass ecosystems face multiple threats from climate change, human activities, and natural stressors, all of which affect their condition, spatial extent, and ecological functioning.

i). Climate Change Impacts

Climate change has introduced rising sea levels, higher water temperatures, and shifting rainfall patterns, which collectively increase sedimentation, smothering seagrass beds, and forcing meadows landward where space is limited, sometimes resulting in habitat loss.[87] [88] Thermal stress reduces productivity and alters species composition, particularly in shallow and intertidal areas. Intertidal meadows show signs of ultraviolet radiation stress, such as leaf reddening and banding, indicating potential long-term damage. The impacts of ocean acidification remain unclear, as elevated CO_2 levels may promote growth but could disrupt grazing patterns and nutrient cycles, destabilizing these ecosystems.

ii). Anthropogenic pressures

Human activities further exacerbate these stresses. Coastal development, including urbanization, port construction, and tourism infrastructure, destroys and fragments seagrass habitats. Dredging, land reclamation, and sediment runoff from rivers such as the Tana and Sabaki increase water turbidity, while untreated sewage and agricultural runoff contribute to nutrient enrichment and pollution.[89] Destructive fishing practices, including beach seining, trawling, and anchoring, physically damage seagrass beds and

[87] Intergovernmental Panel on Climate Change. (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (H. Lee & J. Romero, Eds.). IPCC.

[88] Unsworth, R. K., Nordlund, L. M., & Cullen Unsworth, L. C. (2019). Seagrass meadows support global fisheries production. Conservation Letters, 12(1), e12566.

[89] Mwikamba, E. M., Githaiga, M. N., Huxham, M., & Briers, R. A. (2024). Understanding the drivers of seagrass loss in Kenya: Evidence for the impacts of population and fishing. Aquatic Conservation: Marine and Freshwater Ecosystems, 34(7), e4229.

remove essential fish nursery areas.[90] [91] Uncontrolled tourism and recreational activities, including trampling in shallow lagoons, also degrade these habitats.

iii). Natural stressors

Natural stressors, including El Niño events, marine heatwaves, storms, and cyclones, impact seagrass distribution and health by causing sediment burial, uprooting, and mortality. Reduction of predator populations in specific areas has led to overgrazing by herbivores such as sea urchins, creating barren patches. These natural pressures are intensified by anthropogenic stressors, further reducing the resilience of seagrass ecosystems.

The combined effects of these threats have significant ecological and socio-economic consequences. Declining seagrass extent reduces fish and invertebrate populations, diminishing artisanal fisheries and threatening food security for coastal communities. It also weakens the ecosystems' capacity to store blue carbon, limiting their role in climate change mitigation, while simultaneously jeopardizing habitats for dependent species, including fish, turtles, and dugongs.[89]

c) Mangrove forest

Mangrove forests are found in tidal estuaries, creeks, and protected bays along the entire Kenyan coastline. These forests cover an estimated 61, 271 ha, representing only 3.0% of the national forest area. The largest coverage of mangrove forests occurs in Lamu County (61%) with Mombasa and Tana River Counties having the least as presented in **Table 57**

Table **57**: Distribution of Mangroves

Mangrove Distribution (per county)		
County	**Hectarage area (ha)**	**% Cover**
Lamu	37,350	**61**
Tana River	3,260	**5**
Kilifi	8,536	**14**
Mombasa	3,771	**6**
Kwale	8,354	**14**
Total	**61,271**	**100**

Source: National Mangrove Ecosystem Management Plan 2017- 2027[92]

All nine mangrove tree species recorded in the Western Indian Ocean (WIO) region occur in Kenya. This includes *Rhizophora mucronata, Bruguiera gymnorhiza, Ceriops tagal, Sonneratia alba, Avicennia marina, Lumnitzera racemosa, Xylocarpus granatum, Xylocarpus moluccensis and Heritiera littoralis*. The forest is, however, dominated by *Rhizophora mucronata* (Mkoko) and C*eriops tagal* (Mkandaa), which occupy more than 70% of the formation

i). Ecosystem services

Mangroves provide goods and services with economic, ecological, and environmental value. Using the broad Millennium Ecosystem Assessment (MEA) categories, the goods and services provided by mangroves in Kenya could be summarised as **Table 58**.

Table **58**: Ecosystem services provided by mangroves

S/no	Ecosystem service	The services
1.	Provisioning role	Wood products (building poles, fuelwood), non-wood forest products (fishery, local

[90] WmIBkA, J. G. (1995). The potential human-induced impacts on the Kenya seagrasses. Coastal systems and sustainable development in Africa, 176.

[91] Ochieng, C. A., & Erftemeijer, P. L. A. (2003). The seagrasses of Kenya and Tanzania. World atlas of seagrasses, 82.

[92] Republic of Kenya. (2017). National Mangrove Ecosystem Management Plan 2017–2027. Ministry of Environment, Water and Natural Resources, Kenya Forest Service.

S/no	Ecosystem service	The services
		medicine)
2.	Regulatory	Shoreline protection; carbon sequestration; nutrient, pollutants and sediment filtration
3.	Supporting services	Nutrient cycling, primary production, habitat, breeding grounds
4.	Cultural services	Sacred sites, education, research, tourism, recreation

Based on empirical data, the total economic value of mangroves in Kenya has been estimated to be KES 269,448.3/ha as presented in **Table 59**.

Table **59** : Economic value of mangrove

S/no	Product and services	KES $ha^{-1}yr^{-1}$
1.	Building poles	30,659.5
2.	Fuelwood	4,505.0
3.	Onsite fisheries	9,612.7
4.	Beekeeping	1,249.5
5.	Integrated aquaculture	408.0
6.	Education & Research	65,469.6
7.	tourism	782.0
8.	Carbon sequestration	21,896.0
9.	Shoreline protection	134,866.1
10.	Total	269,448.3

Mangrove forests in Kenya face several threats arising from both anthropogenic and natural causes. Between 1985 and 2009, the country lost about 20% of its mangrove. cover; translating to about 450 ha of mangrove area per year. At least 40% of mangroves across the coast are degraded (**Table 60**). Losses of mangroves are disproportionately higher in urban centres than in rural areas. In Mombasa County, for instance, the loss of mangroves is reported to exceed 80% in the last decade.

Table **60**: Areal coverage of mangrove forest areas per county and the degraded proportion

County	Mangrove area (ha)	Degraded mangrove (ha)	% Degraded area
Lamu	37,350	14,47	**38.6**
Tana River	3,260	1,180	**36.2**
Kilifi	8,536	3,422	**40.0**
Mombasa	3,771	1,850	**49.1**
Kwale	8,354	3,725	**44.6**
Total (ha)	**61,271**	**24,585**	**40.1**

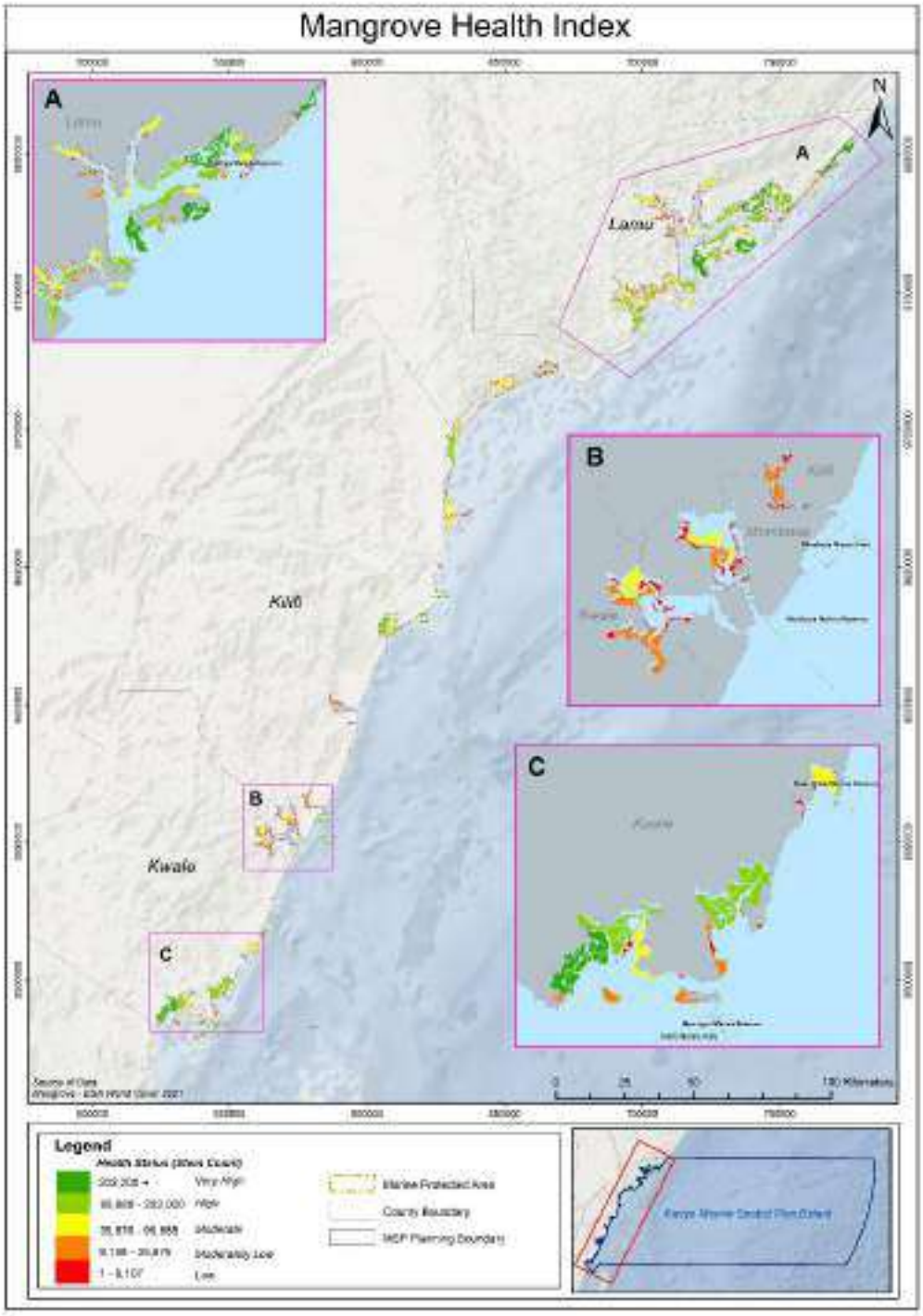


Figure **17**: Map Showing mangrove health index

Key Threats and Drivers of Change

a) Climate Change

Mangroves thrive at the freshwater – saltwater interface, but extreme fluctuations in salinity impair growth and survival.[93] Rainfall patterns also affect seedling establishment, which is vital for ecosystem regeneration. Heavy rains can dislodge seeds before they anchor, while extended droughts hinder germination and recruitment. Additionally, precipitation influences sediment dynamics – intense rainfall increases sediment delivery, enabling mangroves to accrete elevation and maintain stability. Consequently, mangroves in high-rainfall, high-runoff zones tend to develop the most structurally complex and productive forests.[94]

Mangroves are inherently resilient to long-term sea-level fluctuations along coastlines, as evidenced by paleoenvironmental records showing their adaptation to diverse sea-level changes over thousands of years.[95] Their ability to cope with rising seas hinges on the balance between sediment accretion and the rate of relative sea-level rise (RSLR).[96] However, responses differ by location and species—for instance, Avicennia marina exhibits variable tolerance to prolonged inundation and sea-level rise.[97] Landward migration in response to rising seas is a key adaptive mechanism, but varies by site, with failure to migrate risking submergence and significant habitat loss. In Kenya, such losses could elevate the proportion of coastline highly exposed to coastal hazards from 16% to 41%.[98]

b) Anthropogenic Pressures

The anthropogenic pressures on mangrove include:

- ***i.*** Over-exploitation and illegal harvesting, particularly of Rhizophora and Ceriops species for poles and fuelwood.
- ***ii.*** Conversion of mangroves to aquaculture ponds and salt production, causing direct habitat loss and hypersaline groundwater seepage.
- ***iii.*** Large-scale infrastructure development (e.g., LAPSSET corridor, port expansion, dredging) resulting in mangrove clearance and increased sediment loads.
- ***iv.*** Unsustainable upstream land-use practices, increasing sediment runoff and smothering mangrove roots.
- ***v.*** River damming for agriculture, water supply, and hydropower, reducing freshwater and sediment inflows.
- ***vi.*** Coastal erosion and sediment imbalance due to degradation of coral reefs and seagrass beds.
- ***vii.*** Pollution from sewage, solid waste, plastics, and oil spills, particularly near urban centres such as Mombasa.

c) Natural Stressors

The natural stressors of mangrove include:

- ***i.*** El Niño events causing prolonged inundation, excessive sedimentation, and mangrove dieback.
- ***ii.*** Historical extreme events (e.g., 1997/98 El Niño) causing widespread damage in Gazi Bay, Mwache, Tana Delta, and Kiunga.

d) Deltas and Estuaries

Kenya's coastal zone is characterised by a mosaic of estuarine and deltaic systems that underpin both ecological integrity and socio-economic wellbeing. The Tana Delta, Sabaki (Athi-Sabaki) Estuary, and

[93] Jennerjahn, T. C., Gilman, E., Krauss, K. W., Lacerda, L. D., Nordhaus, I., & Wolanski, E. (2017). Mangrove ecosystems under climate change. Mangrove Ecosystems: A Global Biogeographic Perspective: Structure, Function, and Services, 211-244.

[94] Lugo, A.E. and Medina, E., 2020. Mangrove forests. Coastal and Marine Environments, (781 I), 117–133.

[95] Woodroffe, C.D., Rogers, K., McKee, K.L., Lovelock, C.E., Mendelssohn, I.A., and Saintilan, N., 2016. Mangrove Sedimentation and Response to Relative Sea-Level Rise. Annual Review of Marine Science, 8, 243–266.

[96] Alongi, D.M., 2015. The Impact of Climate Change on Mangrove Forests. Current Climate Change Reports, 1 (1), 30–39.

[97] Mangora, M.M., Mtolera, M.S.P., and Björk, M., 2014. Photosynthetic responses to submergence in mangrove seedlings. Marine and Freshwater Research, 65 (6), 497 504.

[98] Hamza, A. J., Esteves, L. S., & Cvitanović, M. (2022). Changes in mangrove cover and exposure to coastal hazards in Kenya. Land, 11(10), 1714.

Ramisi River mouth are the principal estuarine systems, each supporting unique habitats, biodiversity, and ecosystem services.

i). The Tana Delta

The Tana Delta's coastal-marine system remains ecologically important but increasingly degraded. The Ramsar core (~163,600 ha) contains extensive mangroves (~45%), seagrass meadows (~35%) and scattered coral patches (≈5–10%), with coral live cover at healthier patches ~15–35%, but many sites show algal overgrowth and reduced complexity. It is Kenya's largest wetland, spanning approximately 130,000–163,600 hectares, is designated as a Ramsar Site, Important Bird Area (IBA), and Key Biodiversity Area (KBA). Only 62km^2 of the delta is within the planning area. It hosts diverse habitats, including mangrove forests (with all nine Kenyan species), dunes, riverine forests, floodplain grasslands, and intertidal zones. The delta supports endangered primates such as the Tana River Red Colobus and Mangabey, marine turtles, dugongs, elephants, and over 345 bird species. Its mangroves, covering about 4,500 hectares, buffer against storms and sea-level rise while supporting fisheries and aquifer recharge.[99.] However, upstream damming, water abstraction, and land-use changes have altered sediment dynamics and reduced flooding. Pollution from agriculture and industry has deteriorated water quality, while increased salinity and sediment loss have reshaped delta morphology and stressed mangrove health.

ii). Sabaki Estuary

The Sabaki Estuary, even though it is not yet gazetted, is identified as an Important Bird Area (IBA) and Key Biodiversity Area (KBA). The estuary is under a state of ecological stress, but remains a highly significant biodiversity hotspot. Located north of Malindi, it comprises sandbanks, mudflats, dunes, marshes, and mangroves, supporting over 186 bird species, marine turtles, crustaceans, and 339 insect taxa.[99] It sustains artisanal and semi-industrial fisheries and provides vital ecosystem services, including water filtration and storm buffering. However, reduced freshwater input and increased sedimentation have led to accretion and turbidity in Malindi Bay, affecting coral reefs and seagrass beds in Malindi Marine National Park. Mangroves are re-establishing in lower sections, but upstream land use and urban effluents continue to degrade water quality.

iii). Ramisi River Mouth Estuary

The Ramisi River mouth near Funzi Island supports extensive mangrove ecosystems, seagrass beds, and adjacent coral reefs. It serves as a biodiversity refugium for fish, invertebrates, and crocodiles, and sustains artisanal fisheries. Mangrove zonation is distinct, with Avicennia species dominating saline fronts and Rhizophora mucronata inland. Water quality challenges include elevated pH levels (up to 9.53), high mineralisation from geothermal inflows, and nutrient pollution from agricultural runoff. Elevated arsenic and cadmium levels exceed WHO limits, posing risks to biota and human health.

Pressures and Threats

The pressures and threats on the deltas and estuaries include:

1. **Land Use Change**: Expansion of agriculture, deforestation, and settlement in catchment areas increases sediment loads, reduces water quality, and exacerbates flooding and drought cycles.
2. **Tourism**: Unregulated tourism development threatens sensitive habitats, increases pollution, and disrupts traditional livelihoods
3. **Agricultural Runoff**: Use of agrochemicals (e.g., pyrethrins, dimethoate, paraquat, glyphosate) and fertilisers leads to nutrient loading, eutrophication, and contamination of estuarine waters.
4. **Industrial and Urban Effluents**: Discharge of untreated wastewater, heavy metals, and persistent organic pollutants (PAHs, DDT, PCBs) degrade water quality and accumulate in biota.

[99] National Environment Management Authority. (2023). Sabaki estuary management plan, 2023–2028 https://naturekenya.org/wp-content/uploads/2024/01/Sabaki-Estuary-Management-Plan-2023-2028.pdf

5. **Solid Waste**: Poor waste management results in leachate and surface runoff polluting wetlands and estuaries.
6. **Overexploitation and Habitat Degradation**
7. **Mangrove Harvesting**: Overharvesting for wood, charcoal, and construction materials reduces mangrove cover and impairs ecosystem services.
8. **Fisheries Pressure**: Overfishing, illegal gear use, and trawling deplete fish stocks, increase bycatch, and damage habitats.
9. **Invasive Species**: Prosopis juliflora and other invasives outcompete native vegetation, alter hydrology, and reduce biodiversity.
10. **Climate Change Impacts** and Sea-Level Rise
11. **Extreme Weather**: Increased frequency and intensity of droughts and floods disrupt hydrological regimes, exacerbate resource conflicts, and threaten ecosystem resilience.
12. **Temperature Increases**: Rising temperatures affect species distributions, increase invasive species, and alter ecosystem function

e) Sand Beaches and Dunes

Dunes are naturally formed accumulations of wind-blown sand, often located behind sandy beaches, and can be dynamic, shifting due to wind and water movement. The Lamu area is known for extensive dune systems that stretch along the coast. These dunes are vital for protecting the coastline from erosion and sea-level rise. The Malindi coastal area also has significant dunes as natural buffers against ocean forces. Dunes play a critical role in protecting inland areas from storm surges, high tides, and coastal flooding. Dunes also support species that rely on both terrestrial and marine environments, including sea turtles that nest on beaches and forage in nearshore waters, coastal birds, and intertidal organisms. By storing rainwater, dunes maintain freshwater flows into coastal wetlands, supporting mangroves, estuaries, and shallow marine habitats

Sandy beaches from Mombasa to Lamu, including Diani and Watamu, are key components of the marine ecosystem. They provide primary nesting sites for the endangered Green Turtle (Chelonia mydas), Critically Endangered Hawksbill Turtle (Eretmochelys imbricata), and Vulnerable Olive Ridley Turtle (Lepidochelys olivacea). These species depend on nearby coral reefs and seagrass beds for feeding, highlighting the ecological connectivity between beaches and marine habitats. Beaches also dissipate wave energy, protecting shallow-water ecosystems such as reefs and seagrass meadows from excessive sedimentation and physical damage. By linking dunes, reefs, and estuarine zones, sandy beaches create continuous ecological corridors that support fish spawning, invertebrate communities, and migratory shorebirds Threats, challenges, and issues; the Coastal sand beaches and dunes are exposed to both natural and anthropogenic pressure as detailed below:

1) Coastal development and tourism expansion cause shoreline modification and sand mining, leading to loss of turtle nesting habitats, disrupted sediment movement, erosion, and biodiversity decline.
2) Population growth and urbanisation increase plastic pollution and runoff, degrading beaches, causing hatchling mortality and aquifer contamination, and reducing water quality and tourism value.
3) Unsustainable resource exploitation through sand harvesting and aquifer overuse results in loss of dune vegetation, weakened ecosystem resilience, reduced sediment supply, and aquifer contamination.
4) Climate change with sea-level rise and stronger storms intensifies erosion, making beaches and dunes more vulnerable, accelerating habitat loss, reducing protection for reefs and seagrass, and causing economic losses.
5) Combined human and climate pressures compound biodiversity threats, degrade ecosystem services, and drive long-term decline in coastal resilience and sustainability.

f) Rocky Shore and Hard-Bottom Habitats

Rocky shores and hard-bottom habitats along Kenya's coastline occur adjacent to mangrove stands, seagrass beds, and coral patches, forming interlinked ecosystems of high ecological integrity. These areas support diverse species, including mangroves such as Avicennia marina, Rhizophora mucronata, Sonneratia alba, and Ceriops tagal, alongside seagrasses, macroalgae, molluscs, crabs, and fish nurseries that provide critical functions in nutrient cycling, shoreline stabilisation, and nursery grounds.[100] Ecologically, the habitats are vulnerable: Sonneratia alba and Xylocarpus granatum are regionally threatened, while Rhizophora mucronata faces local overharvesting risks. Many rocky shore–mangrove complexes fall under the jurisdiction of the Kenya Forest Service, yet several remain unprotected and open to exploitation. Pressures include coastal erosion, sedimentation, and pollution from upstream catchments, compounded by sea-level rise, salinity shifts, and temperature stress that alter species composition and reduce biodiversity resilience. Oil pollution poses an acute threat, smothering intertidal organisms such as barnacles, limpets, and mussels, reducing larval recruitment, and leaving toxic residues in rock crevices. These challenges highlight the need for strengthened management frameworks, community-based stewardship, and integration of tourism and recreation into conservation strategies.

g) Pelagic Habitats

Kenya's pelagic zone begins beyond the continental shelf at depths greater than 200 meters, where productivity is limited by light and nutrient availability. Primary production is driven by phytoplankton, which form the base of the food web, while zooplankton provide secondary production and transfer energy to fish, marine mammals, and seabirds. Seasonal monsoon systems shape these dynamics: the southeast monsoon enriches shelf waters through river discharge and Somali Current upwelling, boosting plankton growth and fish reproduction, while the northeast monsoon offers calmer, more stable conditions that favour artisanal fishing. These cycles sustain migratory stocks such as tuna, skipjack, trevally, sardinella, mackerels, marlins, sailfish, and swordfish, which are ecologically critical and economically valuable. Despite this importance, pelagic fisheries contribute less than one-fifth of Kenya's marine production, with deep-sea game fishing accounting for only a small fraction. Offshore fishing by local and foreign vessels is undermined by weak surveillance and unlicensed poaching within Kenya's territorial waters and Exclusive Economic Zone, highlighting the urgent need for stronger governance and enforcement to secure stock sustainability.

5.3.2 Marine Species of Concern

The Kenyan marine waters, owing to the rich and diverse ecosystems, are reported to host more than 35 species of marine mammals, including dugongs (*Dugong dugong*), humpback whales (*Megaptera novaeangliae*) and dolphins (*Tursiops* spp.) **Figure 18**.

[100] UNEP-Nairobi Convention & WIOMSA. (2015). Regional state of the coast report for the Western Indian Ocean. UNEP.

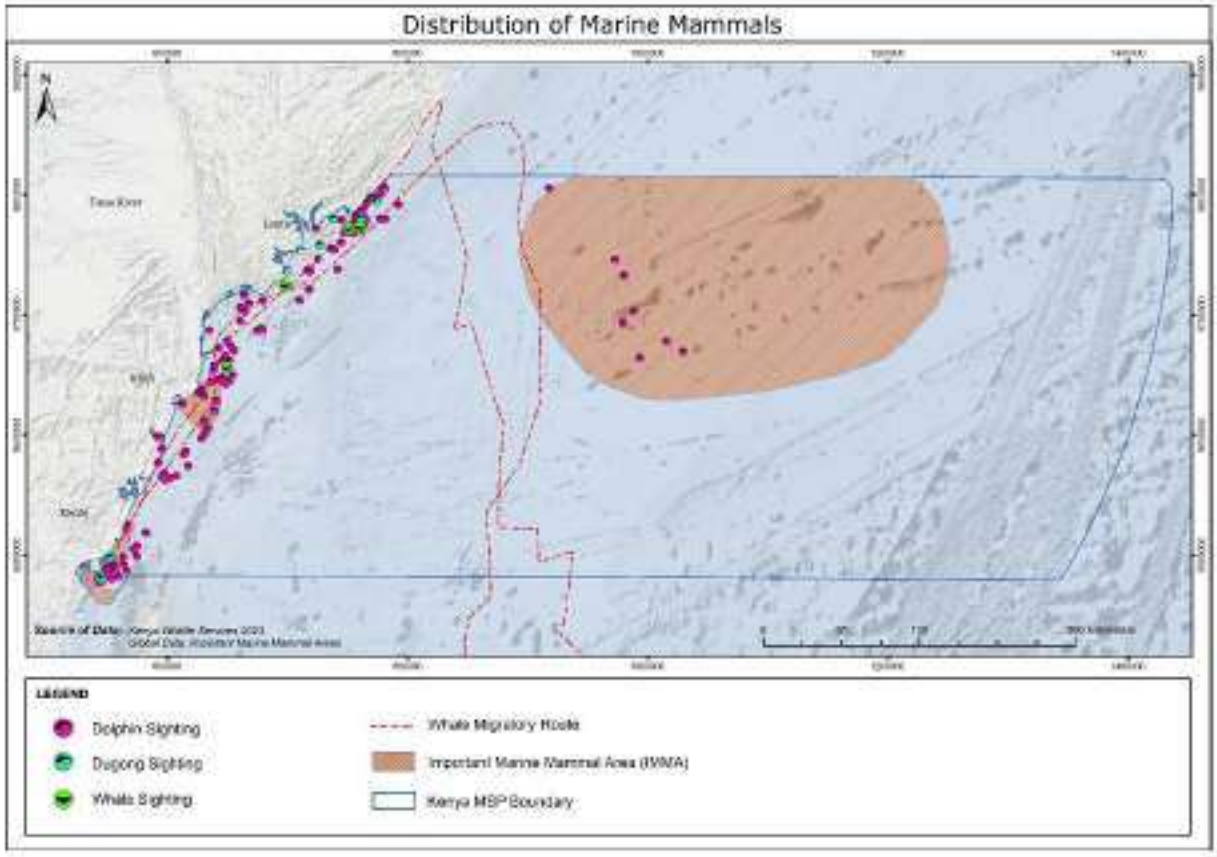


Figure **18**: Distribution of marine mammals within the Kenya's share of the Indian Ocean

a) Dolphins

Kenya hosts a total of 14 species of dolphins, which are distributed across different parts of the marine space, with only 11 species identified between 2011 and 2019 accounting to 762 sightings as presented in **Table 61**. This includes bottlenose (*Tursiops* sp.), common dolphin (*Delphinus* sp.), humpback (*Sousa chinensis*), spinner dolphin (*Stenella longirostris*), spotted dolphin (*Stenella attenuata*), Fraser's dolphin (*Lagenodelphis hosei*), Risso's dolphin (*Grampus griseus*), and the striped dolphin (*Stenella coeruleoalba*) (Wamukoya et al., 1996). Indo-Pacific bottlenose and humpback dolphins are resident in several coastal areas. Most frequently sighted species include the Indo-Pacific bottlenose dolphins (*Tursiops aducus*), Indian Ocean Humpback dolphins (*Sousa plumbea*) and spinner dolphins (*Stenella longirostris*). The species' hot spot areas are Shimoni-Vanga as well as the Lamu Archipelago.[101] The blackfish (*Orcinus orca*), the largest dolphin, is occasionally reported offshore. Threats to dolphins include fisheries bycatch, which has contributed to the decline of the Indian Ocean humpback dolphin.[102]

[101] Mwango'mbe, M., Wambiji, N., Munga, C. N., Obura, D. O., & Omondi, R. (2021). Distribution and abundance of dolphins in Kenyan coastal waters. Western Indian Ocean Journal of Marine Science, *20*(1), 15–28.

[102] Braulik, G. T., Findlay, K., Cerchio, S., & Baldwin, R. (2015). Conservation status of the Indian Ocean humpback dolphin (Sousa plumbea) in the Western Indian Ocean. Marine Mammal Science, *31*(3), 1021–1041.

Table **61**: Data on species sightings collected in the period 2011–2019

Marine users (MU)	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Common bottlenose dolphin	0	0	0	0	0	0	0	0	2	**2**
Indian Ocean humpback dolphin	1	3	3	0	0	0	0	0	17	**24**
Indo-Pacific bottlenose dolphin	1	76	24	0	0	0	0	7	71	**179**
Killer whale	4	1	0	0	0	0	1	2	0	**8**
Pantropical spotted dolphin	0	0	0	0	0	0	0	0	1	**1**
Risso's dolphin	0	0	0	0	0	0	0	0	1	**1**
Short-finned pilot whale	0	5	1	1	0	2	1	0	3	**13**
Spinner dolphin	2	22	2	0	0	0	0	0	6	**32**
Total	8	107	30	1	0	2	2	9	101	**260**
Dedicated surveys (DS)										
Indian Ocean humpback dolphin	2	7	11	0	3	5	3	1	2	**34**
Indo-Pacific bottlenose dolphin	69	114	94	49	31	40	39	19	16	**471**
Spinner dolphin	0	3	7	0	0	0	0	0	0	**10**
Total	71	124	112	49	34	45	42	20	18	**515**
MMO										
False killer whale	0	0	0	1	0	0	0	0	0	**1**
Indo-Pacific bottlenose dolphin	0	0	0	3	0	0	0	0	0	**3**

Marine users (MU)	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Melon-headed whale	0	0	0	1	0	0	0	0	0	**1**
Risso's dolphin	0	0	0	4	0	0	0	0	0	**4**
Short-finned pilot whale	0	0	0	7	0	0	0	0	0	**7**
Spinner dolphin	0	0	0	1	0	0	0	0	0	**1**
Total	**0**	**0**	**0**	**17**	**0**	**0**	**0**	**0**	**0**	**17**

Source: Cetacean research and citizen science in Kenya[101]

Threats

Threats on dolphins include:

i. Bycatch and Entanglement: Mortality and injury primarily from artisanal gillnets.
ii. Vessel Impacts: Disturbance and collision risks from dolphin-watching tourism and general boat traffic, including significant noise disturbance.
iii. Habitat Degradation: Caused by coastal development, including port expansion.
iv. Pollution: Contamination of the marine environment.
v. Prey Depletion: Reduction of fish stocks due to overfishing.

b) Whales

Within the Kenyan marine, seven distinct species of whales have been observed. The humpback whale (*Megaptera novaeangliae*) is the most frequently observed species. Additional species that have been documented include the minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), the toothed sperm whale (*Physeter macrocephalus*), the killer whale (*Orcinus orca*), the false killer whale (*Pseudorca crassidens*), the melon-headed whale (*Peponocephala electra*), and, most recently, the blue whale (*Balaenoptera musculus*). Three species are considered endangered, and three others are considered vulnerable.[101]

i). Key Whale Species in Kenyan Waters

The waters of Kenya serve as a migration route for several species of whales, particularly baleen whales. The most common whale species in Kenya's marine waters include:

a) **Humpback Whale (*Megaptera novaeangliae*)**: These are the most frequently seen whales in Kenyan waters, especially during their migration season from June to December. They migrate between feeding grounds in the Antarctic and breeding grounds in the warm waters off the East African coast. The humpback whale is known for its acrobatic breaches and long, complex songs.
b) **Bryde's Whale (*Balaenoptera edeni*)**: This species is sometimes seen off the Kenyan coast, particularly in deeper offshore waters. Bryde's whales are smaller and more elusive than humpback whales, often found in tropical and subtropical waters year-round.
c) **Sperm Whale (*Physeter macrocephalus*)**: Though sightings are rare, sperm whales have been known to pass through deeper offshore areas along the Kenyan coast. These deep-diving whales are usually found in waters with a significant depth, far from the coast.
d) **Blue Whale (*Balaenoptera musculus*)**: Blue whales are some of the largest marine animals. They are usually offshore and in very deep waters. In Kenya they were first sighted between 2014 and 2015 during a seismic survey at a depth of 2 990 to 4 705 m deep. However, it was not possible to identify the subspecies (BM intermedia, brevicauda or indica) sighted.[103]
e) **Minke Whale (*Balaenoptera acutorostrata*)**: Minke whales may also pass through Kenyan waters, though they are less commonly observed than humpback whales.

Between 2011 and 2018, a total of 663 sightings were reported to the KMMN by marine users (fishermen, tour operators, divers). Humpback whale sightings are higher because of increased observer effort during the migration period, with most of the sightings reported to the KMMN happening during their peak migration period from July to September (**Table 62**). Since the majority of the reports are given by frequent and local marine users, a few species were unidentified.

Table **62**: Whale sightings in Kenya Marine Space

Core Locations / Hotspots	Common Name	Scientific Name	IUCN Status	Species Diversity Notes	Time Series (2011–2018) – Sightings
Malindi–Watamu MPA, Kisite–Mpunguti MPA; migratory corridor	Humpback whale	*Megaptera novaeangliae*	LC	Most common whale species seasonally	1 (2011), 78 (2012), 114 (2013), 43 (2014), 35 (2015), 66 (2016), 70 (2017), 198 (2018) → Total: 605
Offshore Kenya	Bryde's whale	*Balaenoptera edeni*	LC	Few records	2 (2013), 1 (2017)

[103] Barber, R., Sikora, I., & Nimak-Wood, M. (2016). Blue whales Balaenoptera musculus in offshore waters of Kenya. African Journal of Marine Science, *38*(2), 279–284. https://doi.org/10.2989/1814232X.2016.1182590

Core Locations / Hotspots	Common Name	Scientific Name	IUCN Status	Species Diversity Notes	Time Series (2011–2018) – Sightings
Offshore	Dwarf minke whale	*Balaenoptera acutorostrata*	LC	Very rare	2 (2013) only
Offshore deep-water, incl. Kiunga	Killer whale	*Orcinus orca*	DD	Rare but conspicuous when present	4 (2011), 1 (2012), 1 (2017), 2 (2018) → Total: 8
Offshore north of Malindi, MMO offshore	False killer whale	*Pseudorca crassidens*	NT	Rare	MMO + 1 (2016) in dedicated survey
Deep canyons off Lamu/Malindi	Sperm whale	*Physeter macrocephalus*	EN	Endangered	1 (2011), 1 (2015), 1 (2018) → Total: 3
Offshore migratory path	Blue whale	*Balaenoptera musculus*	EN	Critically important record	MMO only noise sensitivity
Offshore	Sei whale	*Balaenoptera borealis*	EN	Rare	MMO only
Offshore Lamu/Kiunga	Longman's beaked whale	*Indopacetus pacificus*	DD	Data deficient	1 (2014)
Recorded via strandings	Pygmy sperm whale	*Kogia breviceps*	DD	Rare	Stranding 2018
Offshore	Melon-headed whale	*Peponocephala electra*	LC	Rare; MMO & strandings	MMO only
Strandings; offshore	Blainville's beaked whale	*Mesoplodon densirostris*	DD	Rare	Strandings only

ii). Whale Migration Routes

The Kenyan coast is thought to be part of a major migration route for humpback whales, which travel thousands of kilometres from their feeding grounds in the Southern Ocean (near Antarctica) to warmer waters off East Africa to mate and give birth. The migration season occurs between June and December, with peak sightings from August to October.[101] Whale migration off the Kenyan coast is driven by seasonal changes in ocean temperature and food availability. As the waters off the East African coast warm, they become ideal breeding grounds, particularly for humpback whales. Humpback whales were seen on their migration through Kisite and Watamu. High numbers of animals were reported by deep sea fishermen on the Watamu Banks (71 sightings) and around "The Rips" (14 sightings).[104]

Whales hold significant ecological and socio-economic importance across Kenya's marine planning area. Ecologically, baleen species such as humpbacks regulate prey populations and enhance nutrient cycling through the "whale pump," supporting phytoplankton growth, food web stability, and carbon sequestration via whale falls. These processes strengthen biodiversity and contribute to climate mitigation. Socio-economically, humpback whale migrations along Watamu, Diani, and Kisite-Mpunguti underpin marine tourism, generating revenue through eco-friendly whale-watching while reinforcing cultural values in coastal communities where whales are respected as symbols of marine heritage. For SESA in MSP, integrating whale ecology and socio-economic roles ensures protection of migratory corridors, sustains tourism livelihoods, and secures ecosystem services vital to Kenya's blue economy

Threats to Whale Populations

Threats to whale populations in Kenya's coast include the following:

a. Whales, particularly humpbacks, are at risk of entanglement in fishing gear such as gillnets and long lines. Entanglement can cause injuries or death, as whales struggle to free themselves from the gear.

[104] Hammond, P. S., et al. (2012). Whale migration and distribution in the Western Indian Ocean [Report]. International Whaling Commission.

b. The increase in boat traffic along Kenya's coast, especially during whale migration season, poses a risk of ship strikes. Collisions between whales and vessels can result in severe injuries or death for the whales.

c. Underwater noise from shipping, industrial activities, and tourism boats can disrupt whale communication, navigation, and feeding behaviours. Noise pollution interferes with whales' use of echolocation, which is critical for finding food and mates.

d. Rising sea temperatures and changes in ocean currents due to climate change may affect whale migration patterns and food availability. Changes in krill, fish, and other prey species distribution may force whales to alter their migration routes or travel greater distances to find food.

e. Chemical pollutants, including heavy metals, pesticides, and plastics, threaten whales. These pollutants can accumulate in whale tissues, leading to health problems and reproductive issues.

f. Whale stranding on the beaches: About 25 mammals were stranded between 2014 and 2919. However, this number rose to 12 in 2020 and 18 in 2021, indicating a sharp rise in mammal stranding at the coast. When these stranded animals are rescued in time, they survive, but left alone, many of them die.

c) Dugong

Dugongs (Dugong dugon) are herbivorous marine mammals found in the tropical and subtropical coastal waters of the Indo-West Pacific and Indian Ocean, where their distribution is closely linked to seagrass availability. As the only surviving species of the family Dugongidae within the order Sirenia, they are highly vulnerable to extinction, particularly since their close relative, Steller's sea cow (Hydrodamalis gigas), was driven to extinction through overexploitation. Historically, dugong populations along the Western Indian Ocean, including Kenya, have experienced drastic declines over the last few decades due to habitat loss, human activities, and hunting. In Kenya, dugongs were once abundant, with large herds exceeding 500 individuals observed in the 1950s and 1960s along both northern and southern coasts, particularly around Vanga, Shimoni, Msambweni, Malindi, and the Lamu Archipelago. However, by the 1980s and 1990s, sightings had plummeted to near zero in most regions, with only a small remnant population persisting around the Kiunga Marine National Reserve (KMNR), which consistently recorded relatively higher numbers compared to other areas.

Threats

The sharp decline of dugongs in Kenyan waters is primarily attributed to illegal, unlicensed, and unregulated (IUU) fishing, seagrass habitat degradation, and disturbance from increased marine traffic and coastal development associated with tourism and marine parks. These pressures have fragmented and reduced their feeding grounds, forcing dugongs to relocate or perish due to loss of food sources. Statistical analyses show a significant decline in dugong sightings over time, especially in the Kiunga region, underscoring the need for urgent conservation action. Currently, dugongs are classified as *Vulnerable* by the IUCN, and their presence along the Kenyan coast is now rare and localized—mainly confined to Kiunga and Kisite Marine Protected Areas (MPAs). Conservation efforts must prioritize these key habitats and historical migratory routes to protect the remaining population from extinction and ensure the recovery of this once-thriving marine species.

d) Sea Turtles

The Kenyan coastline is home to five of the seven sea turtle species known globally.[105] These include the green turtle (Chelonia mydas), hawksbill turtle (Eretmochelys imbricata), and olive ridley turtle (Lepidochelys olivacea), which nest and forage in Kenya. The loggerhead (Caretta caretta) and

[105] Olendo, M. I., Okemwa, G. M., Munga, C. N., Mulupi, L. K., Mwasi, L. D., Mohamed, H. B., Sibanda, M., & Ong'anda, H. O. (2016). Current status of sea turtle protection in Lamu Seascape, Kenya: Trends in nesting, nest predation and stranding levels. Journal of the Marine Biological Association of the United Kingdom, *96*(8), 1–10. https://doi.org/10.1017/S0025315416001703

leatherback (Dermochelys coriacea) turtles use Kenya's coastal waters (as presented in **Figure 19**) primarily as migratory routes and foraging grounds.[106]

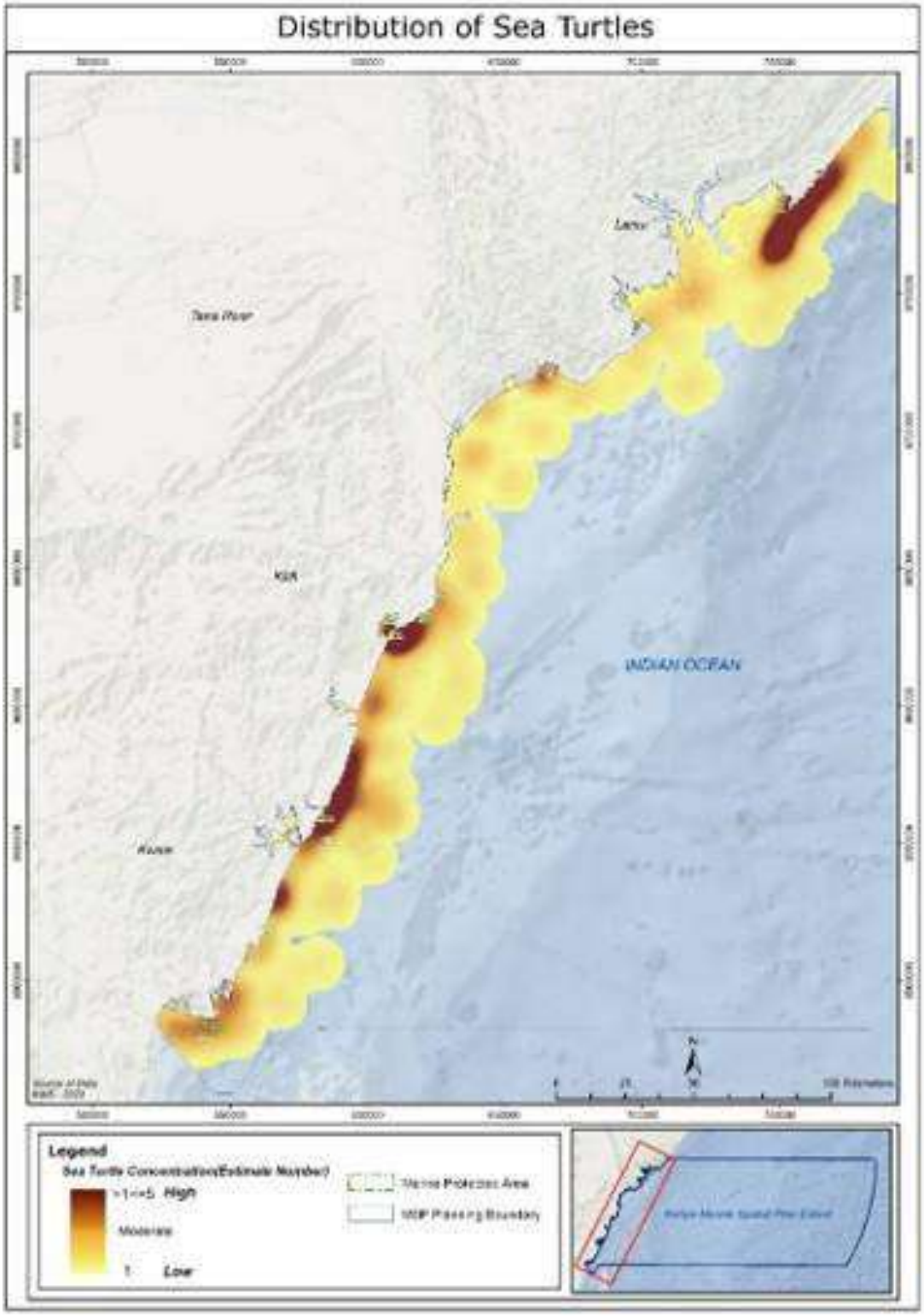


Figure **19**: Distribution of sea turtles in the Kenya's share of the Indian Ocean

[106] Wamukota, A., & Okemwa, G. (2009). Perceptions about trends and threats regarding sea turtles in Kenya. In J. Hoorweg & N. Muthiga (Eds.), Advances in coastal ecology: People, processes and ecosystems in Kenya (pp. 193–205). African Studies Centre.

A total of 453 turtles were encountered during the 2023 survey[107] as presented in **Table 63**. The turtles showed a wide distribution along the Kenyan coastline, with more sightings within the 20 m isobath and fewer in deeper waters. Of these, green turtles and hawksbill turtles were positively identified. Notably, considerable concentrations were observed in Marine Protected Areas (MPAs) and adjacent community-managed zones. No turtle tracks or mortalities were recorded during this survey.

Table **63**: Species of sea turtles

Species	IUCN Red list	Total Sum of Estimate
Green turtle	Least Concern (Global), but Endangered in some subpopulations	394
Hawksbill turtle	Critically Endangered (Global)	4
Unidentified turtles		55
Grand Total		453

Green turtles are the most common nesting species in Kenya, with important nesting beaches located in Kiunga, Watamu, and Mombasa. Monitoring along the south coast has revealed significant nesting activity, with approximately 350–450 green turtle clutches laid each season—representing about 0.3% of the total clutches laid in the Western Indian Ocean (WIO) region.[108] Nesting peaks between March and June, with May being the most active month.

Kiunga is the only site in Kenya where hawksbill nesting is reported regularly.[109] Olive ridley nesting is occasionally observed along the coast but occurs more consistently in Watamu.[110] Loggerhead and leatherback turtles are rarely sighted, though they utilize Kenya's waters for migration and foraging. Juvenile hawksbills are known to forage in areas such as Watamu, Kiunga, Kipini, and Funzi Island. Post-nesting tracking data shows that females often aggregate in key feeding areas, particularly around Watamu-Malindi.[109]

Issues and threats

Kenya's marine ecosystems face mounting ecological and socio-economic pressures that threaten sea turtle populations and their habitats. Ecologically, climate change is altering sand temperatures, which affects hatchling sex ratios and nesting success. Weak enforcement and continued use of illegal fishing gear undermine conservation efforts and sustainable livelihoods. Bycatch incidents, especially from trawlers, longlines, gillnets, and purse seines, continue to harm turtles. Pollution, particularly ingestion of plastics and marine debris, poses a significant threat. Poaching and illegal trade, both commercial and subsistence, target turtle eggs and meat. Habitat destruction from coastal and beach infrastructure development encroaches on nesting sites. Invasive species and disease outbreaks increase predation on eggs and hatchlings. Boat strikes from high-speed propellers injure or kill turtles, while artificial lighting discourages nesting females and disorients hatchlings, making it difficult for them to reach the ocean. Additionally, unregulated human activities in the marine domain have degraded seagrass beds and coral reefs, critical foraging grounds for sea turtles.

5.3.3 Fisheries resources

Fisheries resources within Kenya's marine space comprise both finfish and non-fish organisms, including molluscs, crustaceans, echinoderms, seaweeds, and algae. These resources underpin food security, livelihoods, and economic activity along the Kenyan coast and contribute significantly to

[107] Wildlife Research and Training Institute, Kenya Wildlife Service, & International Fund for Animal Welfare. (2023). Distribution patterns of coastal and marine megafauna in Kenya: Final aerial survey report along the Kenya coast for the year 2023. Kenya Wildlife Service.

[108] Van de Geer, C., & Anyembe, S. (2016). Sea turtle nesting activity in Kenya: Annual report. Local Ocean Trust, Watamu.

[109] Van de Geer et al. (2022). Marine turtles of the African east coast: Current knowledge and priorities for conservation and research. Endangered Species Research, *47*, 297–331. https://doi.org/10.3354/esr01180

[110] Van de Geer et al. (2024). Two decades of community-based conservation yield valuable insights into marine turtle nesting ecology. Oryx, *58*(3), 310–322. https://doi.org/10.1017/S0030605323001011

national development objectives. The distribution and productivity of marine fisheries are closely linked to nearshore habitats, oceanographic processes, and spatially distinct breeding and nursery areas.

Kenya's marine fisheries resources are predominantly concentrated within nearshore and shelf waters, particularly in ecologically productive areas such as the Lamu Archipelago, Ungwana Bay, Watamu Marine Park and Reserve, Malindi Marine Park and Reserve, Kisite–Mpunguti Marine Park and Reserve, and Kiunga Marine National Reserve.[111] Additional important fishing grounds include Kuruwitu, Tiwi, Bureni, Kanamai, and adjacent coastal areas.[112] These areas support artisanal and small-scale fisheries and are closely linked to coastal ecosystems that provide critical life-cycle functions for multiple species.

Fish nursery areas of national importance have been identified in the Tana Delta, Ungwana Bay, Malindi, Shimoni–Vanga, and the Lamu Archipelago[113] as well as Msambweni, Kibuyuni, Shimoni, and the North Kenya Banks.[114] [115] The spatial overlap between fishing activity and ecologically sensitive habitats highlights the need for integrated marine spatial planning and targeted management interventions.

5.3.4 Key Habitats Supporting Fish Breeding, Spawning, and Nursery Functions

Kenya's marine fisheries productivity is sustained by a network of interconnected habitats, notably mangroves, seagrass meadows, coral reefs, and offshore banks. These habitats provide essential breeding, spawning, and nursery functions for a wide diversity of species.

i). Mangrove Ecosystems

Mangrove habitats play a critical role as nursery and feeding grounds for a wide range of fish and crustacean species. Commonly associated species include small pelagic fishes such as anchovies and sardines, juvenile stages of demersal fishes including snappers (Lutjanidae), mullets (Mugilidae), silver biddies (Gerreidae), gobies (Gobiidae), and mudskippers (Periophthalmus spp.). Mangrove systems also support commercially important crustaceans, particularly penaeid shrimps, including *Fenneropenaeus indicus*, *Penaeus monodon*, *Metapenaeus monoceros*, *Penaeus semisulcatus*, and *Penaeus japonicus*, with estuarine systems such as the Tana and Sabaki estuaries being of particular importance.

ii). Seagrass Meadows

Seagrass ecosystems function as highly productive nursery habitats supporting early life stages of numerous reef-associated and demersal fish species. Surveys have documented high diversity and abundance of juvenile fish assemblages, with dominant families including Lutjanidae, Siganidae, Mullidae, and Lethrinidae. Ichthyoplankton studies have identified a wide range of fish larvae representing multiple genera and species, underscoring the importance of seagrass meadows in supporting recruitment to adjacent reef and offshore fisheries.[116] The ecological connectivity between seagrass beds, mangroves, and coral reefs is a defining feature of Kenya's coastal fisheries system.

iii). Coral Reef Systems

Coral reefs support diverse assemblages of reef-associated fish species, including parrotfishes (Scaridae), angelfishes (Pomacanthidae), butterflyfishes (Chaetodontidae), surgeonfishes (Acanthuridae), damselfishes (Pomacentridae), wrasses (Labridae), groupers (Serranidae), snappers (Lutjanidae), and clownfishes (Amphiprioninae). These species contribute both directly and indirectly to fisheries productivity through trophic interactions, habitat maintenance, and larval export to

[111] Ruwa, R. K. (2006). Fisheries resources and marine ecosystems in Kenya. Kenya Marine and Fisheries Research Institute, Mombasa.

[112] Kawaka, J., et al. (2015). Artisanal fishing grounds in Kenya. Kenya Marine and Fisheries Research Institute.

[113] Kundu, R. (2021). Fish nursery areas in Kenya's coastal waters. Kenya Marine and Fisheries Research Institute.

[114] Kenya Marine and Fisheries Research Institute. (2021). Fisheries stock assessment report. KMFRI.

[115] Jacobs, Z., et al. (2020). Fish nursery habitats in the North Kenya Banks. Kenya Marine and Fisheries Research Institute.

[116] Mwaluma et al. (2022). Seasonal occurrence and relative abundance of marine fish larval families over healthy and degraded seagrass beds in coastal Kenya. Diversity, *14*(9), Article 730. https://doi.org/10.3390/d14090730

surrounding areas.[117] Coral reefs therefore represent both ecological assets and socio-economic resources requiring careful spatial management.

iv). Offshore and Northern Kenya Banks

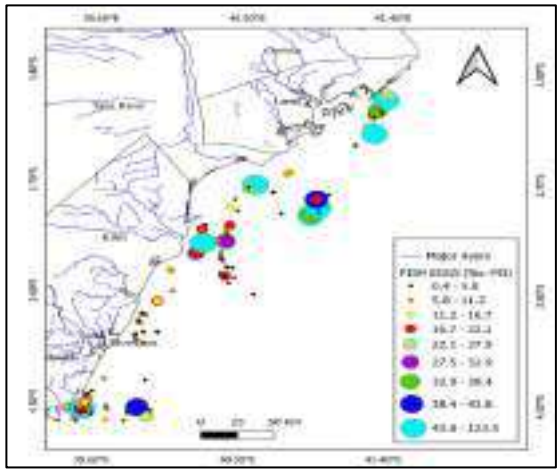
The offshore waters and northern banks of Kenya support important pelagic and demersal fisheries resources. Pelagic species include tunas (*Thunnus albacares*, *T. obesus*, *T. alalunga*), swordfish (*Xiphias gladius*), and oilfish (*Gempylus serpens*), while demersal assemblages include snappers (*Lutjanus* spp.), groupers (*Epinephelus* spp.), and deep-water species such as *Etelis* and *Pristipomoides* spp. These offshore systems are increasingly relevant in the context of spatial planning, particularly in relation to emerging offshore development pressures.

v). Critical Fish breeding grounds

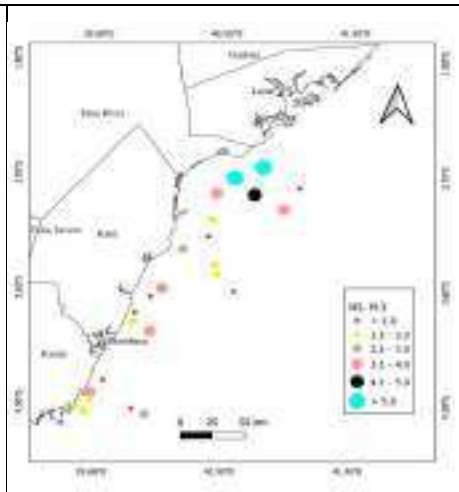
Marine fish species exhibit considerable variation in breeding habitat preferences and reproductive strategies. To assess spatial patterns of reproduction within Kenya's marine waters, ichthyoplankton surveys were conducted within the Exclusive Economic Zone (EEZ) during the 2023–2024 period. The analysis revealed pronounced spatial heterogeneity in reproductive activity across the continental shelf.

While adult fish populations were observed across much of the shelf, effective spawning and early life-stage concentration were found to be spatially constrained. A distinct latitudinal gradient was evident, with the northern EEZ particularly waters off Kilifi, Malindi, and the Lamu Archipelago emerging as the primary breeding and spawning zone. Fish eggs were distributed along much of the coastline, with isolated concentrations in southern waters (**Figure 20**); however, the highest and most consistent egg densities were recorded in northern waters, suggesting favorable oceanographic conditions for spawning.

Larval distribution exhibited a more restricted spatial pattern than eggs, with peak abundances largely confined to northern waters off Malindi(**Figure 20**). This contraction indicates that the northern EEZ functions not only as a high-intensity spawning area but also as a critical larval retention zone, where hydrodynamic processes enhance larval survival and recruitment. These findings suggest the presence of a source–sink dynamic in which northern spawning areas contribute disproportionately to the replenishment of fish populations along the broader Kenyan coast.



Distribution of fish eggs



Distribution of fish larvae

Figure **20**: Distribution of fish eggs and fish larvae

Ecologically, degradation of northern spawning grounds threatens fisheries productivity and risks long-term stock decline. Economically, these habitats underpin the sustainability of Kenya's fisheries sector, where overexploitation would erode natural capital, reduce yields, and heighten vulnerability of coastal livelihoods. Socially, stewardship responsibilities fall heavily on northern communities, yet the benefits of conservation extend along the entire coastline, highlighting the need for equitable, inclusive management frameworks. Targeted spatial protection of these hotspots offers a cost-effective national

[117] Munga et al. (2011). Status of coral reef fish communities within the Mombasa Marine Protected Area, Kenya, more than a decade after establishment. Western Indian Ocean Journal of Marine Science, *10*(2), 169–184.

strategy to secure fisheries productivity while balancing conservation with social and livelihood considerations

5.3.5 Primary Productivity

Primary productivity—commonly proxied by satellite-derived chlorophyll-a (Chl-a) is the ecological "engine" that supports fisheries production, biodiversity patterns, and coastal food-web stability. Mapping productivity hotspots and seasonal shifts provides an evidence base to safeguard high-value fishing grounds and nursery habitats, screen zones with elevated seafood safety and public health risk from HAB toxins, and design spatial safeguards around ports, aquaculture, and land–sea pollution pathways.[118] [119] [120]

Kenya's coastal waters generally exhibit higher Chl-a concentrations in nearshore areas particularly estuaries and mangrove-lined creeks, where nutrient inputs and physical processes elevate productivity, while offshore waters tend to be more oligotrophic due to weaker nutrient supply and reduced upwelling influence. This nearshore–offshore gradient aligns with where artisanal fisheries and ecological "nursery" functions are concentrated, and it also identifies where cumulative pressures from river discharge, urban effluent, and coastal infrastructure can most readily translate into eutrophication risk.[118] [121]

Over the multi-decadal period analysed in the report, seasonal Chl-a anomalies show pronounced variability associated with monsoon and rainfall regimes, indicating that productivity and therefore fish availability and ecosystem stability shifts across the year. The report notes moderate productivity ranges during the Southeast Monsoon, higher contrast conditions during the Northeast Monsoon, intermediate values during the short rains, and relatively lower productivity during the long rains, highlighting why MSP management tools should be season-aware (e.g., seasonal monitoring intensity, adaptive fisheries advisories, and timing of high-disturbance activities such as dredging).[118]

i). Fisheries Productivity Linkages and Ecosystem Function

Primary productivity is foundational to fisheries because phytoplankton biomass fuels zooplankton and higher trophic levels, shaping recruitment success and the spatial distribution of fish biomass. However, the report emphasises that productivity quantity alone is not sufficient: high phytoplankton abundance may occur alongside low diversity and low evenness, which can indicate bloom dominance and ecological stress rather than "healthy productivity." For SESA, this means zoning should interpret Chl-a hotspots alongside community structure indicators to differentiate stable, resilient, productive areas from systems trending toward eutrophication and bloom risk, especially in estuary-influenced fisheries zones.[121] [122]

ii). Seafood safety constraints and HAB risk context

HABs form taxa that contaminate seafood through toxins and can also disrupt ecosystems through hypoxia and food-web instability. It highlights localised warning signals (including fish death events and high-risk conditions near development nodes) and stresses that HAB susceptibility is amplified by nutrient enrichment and habitat disturbance, particularly in estuaries, semi-enclosed creeks, and areas experiencing intensified coastal development. For MSP-SESA, seafood safety must therefore be treated

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[118] Kamau et al. (2020). Employing multivariate analysis to determine the drivers of productivity on the North Kenya Bank and in Kenyan territorial waters. Western Indian Ocean Journal of Marine Science, Special Issue 1, 33–41.

[119] Food and Agriculture Organization. (2021). Impacts of harmful algal blooms on marine aquaculture in a low-carbon future. FAO AGRIS. https://agris.fao.org/search/en/records/65ded528b766d82b18fe9000

[120] Soltani et al. (2017). World Health Organization and international guidelines for toxin control, harmful algal bloom management, and response planning. In D. M. Anderson, S. F. E. Boerlage, & M. B. Dixon (Eds.), Harmful algal blooms (HABs) and desalination: A guide to impacts, monitoring and management (IOC Manuals and Guides No. 78, pp. 223–250). Intergovernmental Oceanographic Commission of UNESCO.

[121] Okuku et al. (2020). aseline meso-litter pollution in selected coastal beaches of Kenya: Where do we concentrate our intervention efforts? Marine Pollution Bulletin, *158*, Article 111420. https://doi.org/10.1016/j.marpolbul.2020.111420

[122] Oduor et al. (2023). Nutrients and harmful algal blooms in Kenya's coastal and marine waters: A review. Ocean & Coastal Management, 233, Article 106454. https://doi.org/10.1016/j.ocecoaman.2022.106454

as a cross-cutting constraint linking land-based nutrient control, coastal infrastructure management, aquaculture siting, and routine surveillance aligned to recognised HAB guidance.[123] [124] [119] [120]

iii). Pressures and Receptors

The key pressures most likely to alter productivity patterns and increase HAB probability include land-based nutrient enrichment (riverine inputs and urban wastewater), sediment mobilisation and turbidity from dredging and port construction, nutrient retention in semi-enclosed bays/creeks, and aquaculture nutrient loading where flushing is limited. Priority receptors include artisanal fishing grounds and landing sites (food security and livelihoods), estuaries/mangroves/seagrasses (nursery habitat and nutrient filtration), coral reefs and MPAs (biodiversity and tourism), aquaculture and shellfish harvesting areas (highest seafood toxicity exposure), and adjacent coastal communities (public health). Mitigation priorities should therefore emphasise on strengthened land–sea nutrient governance, protection/restoration of mangrove buffers, careful siting and performance standards for aquaculture (including effluent controls), and construction safeguards for coastal infrastructure (sediment controls, seasonal windows, and monitoring triggers).[118] [122] [124]

5.3.6 Marine Protected Areas

Kenya has four Marine National Parks located in Kilifi, Kwale, and Mombasa Counties: Kisite, Mombasa, Watamu, and Malindi Marine National Parks. Together, they cover a total gazetted area of 54 km², with Mpunguti Marine Park being the largest and Malindi Marine Park the smallest. The Kisite-Mpunguti Marine Protected Area Management Plan (2015–2025) was finalized and gazetted through Gazette Notice No. 1896 of March 2016. Malindi and Watamu Marine Parks are grouped and are internationally recognised by UNESCO as Man and Biosphere Reserves.

In addition, there are six Marine National Reserves distributed across Lamu, Kilifi, Mombasa, and Kwale Counties, covering a total of 871 km². These reserves generally serve as appendages to the Marine National Parks, except Diani Chale and Kiunga Marine National Reserves. Among them, Kiunga Marine National Reserve is the largest, followed by Mombasa Marine National Reserve, while Mpunguti Marine National Reserve is the smallest. Malindi and Watamu are also internationally recognized as UNESCO Man and Biosphere Reserves. Currently, Diani Chale Marine National Reserve is the only reserve without a finalized management plan, while the others are at various stages of development. The Kisite-Mpunguti Management Plan was formally gazetted in 2016.

These marine parks and reserves form a vital network of protected areas that conserve coral reefs, mangroves, seagrass beds, and diverse marine fauna under internationally recognized IUCN categories and national legal frameworks. as detailed in **Table 64**.

Table **64**; Marine Parks and Reserves

SN	Name	Area Coverage	Designation Status	IUCN Category	Species Diversity
1.	Kiunga Marine Reserve	250km2	IUCN Category VI	VI	~180 coral species (44–51 genera, incl. rare Horastrea, Siderastrea, Craterastrea); 189 reef fish species (19 families); 8 of 9 mangrove species (Rhizophora, Avicennia, Ceriops, etc.); 8 seagrass species (Thalassodendron ciliatum dominant); ~10,000 breeding roseate terns; dugongs (historically), whales, dolphins, sharks, rays.

[123] GEOHAB. (2010). Global ecology and oceanography of harmful algal blooms: GEOHAB core research project: HABs in fjords and coastal embayments. Scientific Committee on Oceanic Research / Intergovernmental Oceanographic Commission.

[124] Anderson et al. (2017). Harmful algal blooms (HABs) and desalination: A guide to impacts, monitoring, and management (IOC Manuals and Guides No. 78). Intergovernmental Oceanographic Commission of UNESCO.

SN	Name	Area Coverage	Designation Status	IUCN Category	Species Diversity
2.	Malindi Marine National Park	6km2	Protected under Legal Notice No.98 of 1968	II	145 hard coral species; >600 fish species; 12 echinoids; 135 gastropods; 200 benthic algae species; breeding turtles (hawksbill, green, olive ridley).
3.	Malindi National Reserve	213km2	Protected under Legal Notice No. 99 of 1968	II	
4.	Mombasa Marine National Park	26.093km1		II	Sharks, rays; turtles (leatherback, hawksbill, green).
5.	Mombasa Marine National Reserve	200km2	Protected	II	Sea turtles (5 species: leatherback, green, hawksbill, loggerhead, ridley); dolphins (spinner, humpback, bottlenose); tropical reef fish (parrotfish, zebra fish, butterfly fish, leopard moray)
6.	Diani Chale Marine National Reserve	165km2	Protected	VI	Sea turtles (5 species); dolphins (spinner, humpback, bottlenose); tropical reef fish (parrotfish, zebra fish, butterfly fish, leopard moray)
7.	Kisite Marine National Park	28km2	Protected under Legal Notice No. 216 of 1978 -no take zone	II	45 coral species; ~350 fish species; cetaceans (729 sightings, 2006–2010); seagrass beds, mangroves, coastal forests, intertidal zones; Key Biodiversity Area (KBA), Important Bird Area (IBA).
8.	Mpunguti National Reserve	11km2	Protected under Legal Notice No. 216 of 1978	VI	
9.	Watamu Marine National Park	10km2	Protected under Legal Notice No. 98 of 1968	II	>500 fish species; whale shark; rays; turtles (green, hawksbill, leatherback, olive ridley).
10	Watamu Marine National Reserve	13 km2	Protected under Legal Notice No. 98 of 1968	II	Hosts 11 of 12 East African seagrass species, incl. IUCN Red-listed Zostera capensis; associated fish and invertebrate diversity.

In marine reserves, the Wildlife Act permits certain low-impact extractive uses, such as traditional fishing practices, but strictly prohibits activities like oil and gas exploration. By contrast, marine parks are designated as fully protected zones where no extractive activities are allowed. Within these parks, all biological and physical resources are safeguarded, and removal or disturbance of marine life or habitats is only permitted for essential monitoring or scientific research aimed at assessing management effectiveness.

Threats, Pressure and Issues

A range of threats continues to undermine both ecological integrity and Kenya's Marine Protected Areas, as presented:

i. Climate change drives rising sea levels, coral bleaching, and seagrass stress, leading to reduced ecosystem resilience.
ii. Sedimentation and siltation cause habitat degradation, accelerating the decline of corals and mangroves.
iii. Invasive species disrupt ecological balance, resulting in loss of native biodiversity.
iv. Pollution, particularly solid waste and runoff, deteriorates water quality and weakens reef and seagrass ecosystems.
v. Dredging and oil spills introduce physical and chemical disturbances that hasten reef and mangrove decline.
vi. Destructive fishing gears such as beach seines, gillnets, and dynamite fishing increase juvenile bycatch, damage habitats, and heighten turtle mortality.

vii. Illegal trawling intensifies overexploitation, depleting fish stocks and stressing ecosystems. Tourism pressure disturbs reefs and marine mammals, contributing to biodiversity loss. Governance conflicts and weak enforcement reduce compliance, undermining conservation effectiveness. and

viii. Limited livelihood alternatives perpetuate dependence on marine resources, creating socio-economic vulnerability and driving unsustainable exploitation.

5.3.7 Locally Managed Marine Areas (LMMAs)

Locally Managed Marine Areas (LMMAs) are community (or locally) managed marine spaces that have some form of protection or regulation (e.g., no-take zones, gear restrictions), often implemented through local institutions like Beach Management Units (BMUs). In Kenya, they're also referred to by names such as community conservation areas and "tengefu" ("set aside") and are 24 in number as presented in **Table 65**.

Table **65**: List of 24 Kenyan LMMAs

S/NO	LMMA	Year formed	Size (km²)	Intervention	Status	Lead group/agency	Legislation
1.	Mida Creek MBW	1995	–	Mangrove restoration	Active	A-Rocha Kenya	Forest Act
2.	Gazi Women MBW	1999	–	Mangrove restoration	Active	Gazi Women group	Forest Act
3.	Wasini Women MBW	2000	–	Mangrove restoration	Active	Wasini Women group	Forest Act
4.	Majaoni Youth MBW	2003	–	Mangrove restoration	Active	Majaoni Youth group	Forest Act
5.	Dabaso MBW	2006	–	Mangrove restoration	Active	Mida creek Community Conservation	Forest Act
6.	Kuruwitu	2006	0.29	No take zone	Active	Local residents & fishers, KCWA	Fisheries Act
7.	Wasini	2008	0.31	No take zone	Active	EAWLS/FFI	Fisheries Act
8.	Kibuyuni	2010	0.275	No take zone	Active	EAWLS	Fisheries Act
9.	Kanamai-Mradi	2011	0.22	No take zone	Active	WCS	Fisheries Act
10.	Mkwiro	2013	0.155	Gear restriction	Active	EAWLS/FFI	Fisheries Act
11.	Bureni	2013	0.52	No take zone	Active	Bureni Turtle Watch	Fisheries Act
12.	Nyari-Kikadini	2009	0.125	No take zone	Inactive	WCS	Fisheries Act
13.	Jimbo	2009	–	Gear restriction	Inactive	EAWLS/FFI	Fisheries Act
14.	Tradewinds	2009	0.118	Gear restriction	Inactive	WCS	Fisheries Act
15.	Vanga	2010	–	Gear restriction	Inactive	EAWLS/FFI	Fisheries Act
16.	Shimoni	2010	–	Gear restriction	Inactive	EAWLS/FFI	Fisheries Act

S/NO	LMMA	Year formed	Size (km²)	Intervention	Status	Lead group/agency	Legislation
17.	Kiweni	2010	3	No take zone	Inactive	LamCOT	Fisheries Act
18.	Majoreni	2010	–	Gear restriction	Inactive	EAWLS/FFI	Fisheries Act
19.	Munje	2015	0.7	No take zone	Newly established	COMRED	Fisheries Act
20.	Mkunguni	2015	0.27	No take zone	Newly established	CORDIO EA	Fisheries Act
21.	Mwaembe	2015	0.46	No take zone	Newly established	WCS	Fisheries Act
22.	Rewa	2015	9.69	Gear restriction	Newly established	TNC/ NRT-Coast	Fisheries Act
23.	Majunguni	2015	10.66	Gear restriction	Newly established	TNC/ NRT-Coast	Fisheries Act
24.	Chipopo	2015	17.3	Gear restriction	Newly established	TNC/ NRT-Coast	Fisheries Act

They are important in Kenya because marine conservation has increasingly shifted toward co-management (less "top-down", more community-engaged). LMMAs have also emerged partly because government marine parks/reserves (no-take zones managed by KWS) have sometimes been perceived by resource users as offering limited direct benefits to local communities, so communities created LMMAs to participate in management and improve livelihoods.

Purpose/objectives in Kenya commonly include: conserving fisheries and habitats, helping rebuild depleted fishing grounds, reducing destructive fishing practices, and supporting alternative livelihoods (for example, tourism-related activities and mangrove boardwalk initiatives in some sites)

5.3.8 Ecological connectivity

Marine ecosystems along Kenya's coast provide critical services that underpin fisheries, tourism, coastal protection, and climate resilience. Their functions are interconnected; degradation in one habitat cascades into others, affecting species, livelihoods, and the broader Blue Economy. **Table 66** summarises ecosystem service dependencies, highlighting connectivity and sectoral relevance in the Kenyan context.

Table **66**: Ecosystem Service Dependency Matrix

Ecosystem / Habitat Component	Key Ecosystem Services	Main Dependent Beneficiaries / Sectors	Connectivity & Relevance (Impacts if degraded)
Mangroves	▪ Nursery and breeding habitat for prawns, mud crabs, and juvenile reef fish ▪ Shoreline protection Sediment/pollutant filtration ▪ Carbon sequestration	▪ Artisanal fisheries and traders ▪ Coastal settlements/infrastructure ▪ Climate mitigation initiatives	▪ Loss of nursery habitat reduces recruitment of reef fish and prawns, affecting seagrass and coral reef fisheries ▪ Higher erosion/flood risk undermines coastal communities ▪ Pollution exposure increases for adjacent seagrass and reef ecosystems ▪ Carbon sequestration value lost
Seagrass Meadows	▪ Nursery habitat for rabbitfish, parrotfish, and invertebrates ▪ Sediment stabilization and water clarity regulation ▪ Blue-carbon storage	▪ Small-scale fisheries ▪ Megafauna ▪ conservation/tourism ▪ Coral reef health via clarity/connectivity	▪ Reduced fish recruitment impacts artisanal fisheries and reef ecosystems ▪ Higher turbidity undermines coral reef resilience ▪ Loss of blue-carbon stocks weakens climate mitigation ▪ Feeding habitat loss for turtles and dugongs, reducing ecotourism value

Ecosystem / Habitat Component	Key Ecosystem Services	Main Dependent Beneficiaries / Sectors	Connectivity & Relevance (Impacts if degraded)
	▪ Feeding habitat for green turtles and dugongs		
Coral Reefs	▪ Biodiversity habitat and spawning grounds ▪ Feeding grounds for reef fish ▪ Tourism and recreation value ▪ Wave energy dissipation	▪ Artisanal fisheries (snapper, grouper) ▪ Tourism operators ▪ Coastal protection	▪ Bleaching collapse reduces fish habitat, affecting mangrove and seagrass recruitment linkages ▪ Coastal defense weakened, exposing mangroves and beaches ▪ Tourism declines due to biodiversity loss ▪ Recovery is slow under cumulative stress
Estuaries / Deltas / Creeks	▪ Nursery function for prawns, mullets ▪ Land–sea filtration ▪ Salinity/sediment control	▪ Fisheries ▪ Birdlife-based tourism ▪ Downstream coastal ecosystems	▪ Catchment changes increase turbidity, stressing seagrass and coral reefs ▪ Nursery losses reduce fisheries recruitment ▪ Sediment imbalance undermines mangrove stability
Beaches / Dunes	▪ Nesting habitat for green and olive ridley turtles ▪ Storm buffer ▪ Sediment reservoir	▪ Turtle conservation programmes ▪ Tourism operators ▪ Coastal communities	▪ Shoreline erosion reduces turtle nesting success ▪ Sediment loss destabilises nearshore habitats, affecting mangroves and seagrass ▪ Climate-risk exposure compounded
Megafauna (turtles, cetaceans, dugongs)	▪ Flagship biodiversity and cultural value ▪ Recreation/tourism attraction ▪ Indicator of ecosystem health	▪ Tourism operators ▪ Conservation agencies ▪ Local stewardship programmes	▪ Disturbance/bycatch undermines biodiversity targets ▪ Loss of feeding/nesting habitats in seagrass, mangroves, and beaches ▪ Signals wider ecosystem degradation across connected habitats

The above matrix demonstrates that Kenya's coastal ecosystems are ecologically and socio-economically interconnected. Protecting mangroves, seagrass, coral reefs, estuaries, beaches, and megafauna is not only vital for biodiversity but also for sustaining fisheries, tourism, and coastal resilience. These linkages underscore the need for integrated, ecosystem-based management within the Marine Spatial Plan, ensuring that sectoral development remains within ecological carrying capacities.

5.4 Social Environment

A baseline assessment of social and cultural conditions establishes the foundation for understanding human well-being in Kenya's coastal and marine areas. The analysis focuses on demographic trends, land use, settlement patterns, community structure, employment, income distribution, recreation, public health, and safety. Cultural characteristics, community aspirations, historical significance, and public perceptions of the Marine Spatial Plan (MSP) are also examined. Data were collected through public meetings, key informant interviews, and focus group discussions. This mixed-methods approach yielded a comprehensive understanding of social and cultural dynamics across Kenya's coastal counties, establishing the baseline required to inform inclusive MSP development. The analysis assesses potential impacts of the MSP on local well-being and social systems, with emphasis on demographics, community structure, cultural heritage, economic livelihoods, land use, and public health. Public perceptions and stakeholder concerns were systematically documented to ensure that community voices inform planning and that mitigation measures address identified social risks.

5.4.1 Demographic and Population Dynamics

i). Current Population Distribution, Density, and Demographic Profile

According to the 2019 Population and Housing Census,[125] Kenya's coastal region had a total population of 4,329,474, comprising 2,147,457 males, 2,181,931 females, and 86 intersex persons as presented in **Table 67**. Population growth has been consistent, increasing from 1.34 million in 1979 to an estimated 4.72 million by 2023. The region's average population density is 40 persons/km², lower than the national average (66 persons/km²), but population distribution is highly uneven, with dense urban settlements concentrated along the shoreline and critical marine-dependent economic zones. Approximately 44% of coastal residents live in urban areas, predominantly in Mombasa, while rural populations dominate in Kwale, Kilifi, Tana River, and Lamu counties

Table **67**: Summary of population in Kenya coast respective counties

Counties	Male	Female	Intersex	Total	Growth Characteristic
Kilifi	704,089	749,673	25	1,453,787	Fast-growing, peri-urban expansion
Lamu	76,103	67,813	4	143,920	Small but fastest proportional growth
Kwale	425,121	441,681	18	866,820	Rapid rural–urban transition
Mombasa	610,257	598,046	30	1,208,333	Highly urbanized, land-constrained
Tana river	158,550	157,391	2	315,943	Rural, youthful, high fertility

Source: KNBS. (2022)

ii). Population Projections and Growth Trends

The population projections and growth data for Kenya's coastal counties (**Table 68**) indicate consistent growth from 2020 to 2045, probably driven by natural increase and economic development.

Table **68**: Population projections by county (2020-2045)

County	2020	2021	2022	2023	2024	2025	2030	2035	2040	2045
Mombasa	1,228,079	1,256,006	1,283,933	1,311,860	1,339,787	1,367,714	1,504,530	1,635,074	1,757,673	1,872,463
Kwale	879,076	900,872	922,668	944,464	966,260	988,056	1,112,022	1,246,928	1,385,948	1,524,725
Kilifi	1,488,572	1,518,160	1,547,747	1,577,335	1,606,922	1,636,510	1,785,800	1,933,624	2,077,150	2,214,483
Tana River	325,873	334,765	343,657	352,549	361,440	370,332	420,374	475,138	532,615	590,644
Lamu	154,774	158,960	163,146	167,332	171,519	175,705	198,455	222,752	247,918	273,139

Growing populations increase competition for marine and coastal space (fishing grounds, landing sites, tourism zones, ports). Counties with faster growth (Kilifi, Kwale, Lamu) will face rising pressure on fisheries, mangroves, and nearshore ecosystems, which are critical livelihood zones. Therefore, must proactively allocate space for small-scale fisheries, aquaculture, tourism, ports, and conservation, accounting for future population increases.

iii). Age Structure and Dependency Profile

The demographic profile (as presented in **Table 69**) indicates that a significant proportion of the population falls within the working-age bracket. This demographic is expected to create a rising demand for employment opportunities, particularly within marine and coastal sectors such as fisheries, aquaculture, tourism, port services, and marine transport. MSP frameworks disproportionately prioritize capital-intensive, offshore activities, there is a heightened risk of youth exclusion and unemployment. Such an approach may limit access to livelihoods for coastal communities, thereby undermining inclusive growth objectives and exacerbating socio-economic disparities. This may further widen the poverty among the coastal counties, thereby weighing down the overall gains of the MSP. As such, a balance approach that would cater for all demographics is essential.

[125] KNBS. (2019). 2019 Kenya population and housing census: Population by county and sub-county (Vol. I). Kenya National Bureau of Statistics. KNBS.

Table **69**; Age structure of coastal counties (2019)

County	0–14 Years (%)	15–64 Years (%)	65+ Years (%)	KNBS-Based Demographic Interpretation
Mombasa	29.9	66.9	3.2	Transitional / Urban working-age dominant
Kilifi	37.6	56.8	5.6	Youthful population
Kwale	42.1	54.2	3.7	Very youthful population
Tana River	48.4	48.5	3.1	Extremely youthful population
Lamu	45.6	51.1	3.3	Youth-dominated population

Source: 2019 Kenya Population and Housing Census[125] and Economic Survey[126]

To mitigate these risks, MSP zoning should deliberately safeguard and expand labour-intensive, nearshore economic activities. Priority sectors include:

i. Artisanal fisheries sustaining traditional livelihoods and food security.
ii. Seaweed farming promoting climate-resilient, low-carbon value chains.
iii. Small-scale aquaculture enhancing income diversification and nutrition security.
iv. Coastal tourism value chains generating broad-based employment across service and supply chains.

Failure to integrate these labour-intensive sectors into MSP zoning may intensify poverty, drive illegal and unregulated fishing practices, and accelerate ecosystem degradation. Such outcomes would undermine both environmental sustainability and the World Bank's twin goals of reducing poverty and fostering shared prosperity.

5.4.2 Coastal Ethnic Communities

Diverse ethnic communities are found in the coastal region. The indigenous Mijikenda ethnic communities are (Giriama, Rabai, Chonyi, Duruma, Digo, Kambe, Kauma and Ribe), Swahili, Pokomo, Sagala, Orma, Taita and Taveta. Other communities are from other inland tribes of Kenya, Europeans, Asians, Arabs, Americans and Somali. Additionally, Vulnerable and marginalized communities in the coastal region are the Watha, Aweer/Boni, Saanye, Wakifundi, Washiranzi, Makonde, Malakote and Wachwaka.

5.4.3 Gender Dimensions and Social Vulnerability

Across Kenya's coastal counties, women constitute slightly over half of the population, yet face systemic disadvantages in access to and control over marine and coastal resources, particularly in Kwale, Kilifi, and Lamu, where a high prevalence of unregistered marriages weakens women's land and inheritance rights. Women are concentrated in lower-return, spatially fixed livelihood activities such as fish trading and processing, seaweed farming and other mariculture work, firewood collection, harvesting of reeds, grasses and palm leaves, collection of wild foods and medicines, and some forms of inshore fishing, while men dominate offshore fishing, boat-based activities, quarrying, and other higher-mobility resource uses. The main challenges women face include:

i. Cultural and traditional barriers that limit their access to some livelihoods, especially activities seen as "male," such as offshore fishing and some leadership roles.
ii. Restricted livelihood choices, with women concentrated in lower-return activities such as fish trading, shrimp sourcing, seaweed farming, firewood collection, makuti making, and small businesses.
iii. Limited capital to start businesses, which prevents women from entering more profitable enterprises.
iv. Unequal opportunities despite perceptions of equality. Men often said opportunities were equal, but women reported that this was not true in practice.

[126] KNBS. (2023). Economic Survey 2023.

v. Lower participation in higher-value marine activities, especially offshore fishing and boat-based work, which are dominated by men.
vi. Heavy dependence on spatially fixed resources such as beaches, mangroves, reefs, and seaweed farms, making women more vulnerable to access restrictions under MSP.
vii. Low education levels, which can weaken decision-making power and long-term economic mobility.
viii. Group and governance barriers, including mistrust within associations, women avoiding group responsibilities where men are involved, and weaker representation in some BMU and government structures.
ix. Exposure to resource-use conflicts, including conflicts with fishers, traders, leaders, and other users that affect their livelihoods. be equal.[127]

Social vulnerability is further compounded by high teenage pregnancy rates of approximately 11–15% in rural coastal counties, which limit girls' educational attainment and long-term economic participation.[128]

Restrictions on access to beaches, fish landing sites, and mangroves may therefore disproportionately affect women and children, increasing risks of household income loss, food insecurity, and child labour where alternative livelihoods are limited. To mitigate these risks, MSP must integrate gender-responsive zoning and governance, including secure access to landing and processing areas, protection of subsistence mangrove use, and meaningful participation of women and marginalized groups in marine decision-making, in line with national gender policy and World Bank OP 4.12 – Involuntary Resettlement and OP 4.01 Environmental Assessment.

5.4.4 Poverty Levels and Vulnerability in Coastal Counties

Kenya's coastal counties experience elevated poverty and multidimensional deprivation, with marked spatial and livelihood-based inequalities affecting fishing and coastal-dependent communities. Evidence from the Kenya National Bureau of Statistics (KNBS) demonstrates that Tana River 66.7% and Kilifi counties 53 % record some of the highest poverty and deprivation levels nationally, while Kwale and Kilifi exhibit persistent poverty pockets linked to rurality, natural resource dependence, and limited-service access (**Table 70**). Poverty in the coastal region is multidimensional, encompassing income poverty, food insecurity, low asset ownership, limited access to health and education services, and inadequate housing and infrastructure. These conditions are exacerbated by structural vulnerabilities in the coastal economy, including declining fish stocks, environmental degradation, climate-induced shocks, and weak economic diversification.

Table **70**: Poverty and Multidimensional Poverty Index (MPI) Coastal Counties

County	Overall Poverty Rate (%)	Multidimensional Poverty Index (MPI)	Poverty Severity (KNBS Interpretation)
Mombasa	27%[129]	Low (≈0.05)	Urban poverty with service access gaps
Kilifi	53%[129]	High (≈0.23)	High rural and coastal deprivation
Kwale	51%[129]	High (≈0.21)	High multidimensional poverty
Tana River	66.7%[129]	Very High (≈0.34)	Extreme poverty and deprivation
Lamu	35.6%[129]	Very High (≈0.31)	Severe poverty and vulnerability

The poverty patterns highlight that marine and coastal resources constitute a critical safety net for poor households, particularly in high-MPI counties such as Tana River, Lamu, Kilifi, and Kwale. In these contexts, restrictions on access to fishing grounds, landing sites, mangroves, or nearshore areas if not

[127] Mulwa et al. (2024). Poverty and gender perspectives in marine spatial planning: Lessons from Kwale County in coastal Kenya (pp. 22–24, 35–42, 49–50). UNESCO-IOC.
[128] Kenya National Bureau of Statistics (KNBS), 2019 Kenya Population and Housing Census, Volume I; Kenya Demographic and Health Survey (KDHS), 2014 and 2022.
[129] Kenya National Bureau of Statistics (KNBS). (2024). Gross County Product 2024; Insights into the economic pulse of the counties.

carefully designed, risk disproportionately affecting poor and vulnerable populations, potentially worsening income poverty, food insecurity, and social exclusion.

In line with World Bank principles on poverty reduction and inclusive growth, Marine Spatial Planning must therefore prioritise pro-poor spatial outcomes, including safeguarding access to traditional fishing areas for vulnerable communities; supporting value addition, market integration, and post-harvest infrastructure to increase household returns; facilitating livelihood diversification through blue economy initiatives, and directing infrastructure and service investments to remote and underserved coastal areas.

To ensure effectiveness and accountability, MSP implementation should incorporate systematic monitoring of poverty and wellbeing indicators, including income poverty, food security, asset ownership, and access to basic services, enabling adaptive management and ensuring that spatial planning decisions contribute measurably to poverty reduction and improved wellbeing across all five coastal counties.

5.4.5 Livelihood Dependency Ratios on Marine Resources

Livelihood dependence on marine and coastal resources is exceptionally high in Kenya's coastal counties, particularly in counties with elevated multidimensional poverty, such as Tana River, Lamu, Kilifi, and Kwale. KNBS socio-economic profiles and fisheries sector assessments indicate that more than 50% of households in these counties depend directly or indirectly on marine resources for food, income, or energy. Artisanal fisheries provide primary or supplementary livelihoods for hundreds of thousands of coastal residents, while associated activities, including fish processing, trading, boat repair, and mangrove fuelwood collection, support extensive informal employment, especially among women and youth. The FAO estimates that small-scale fisheries contribute over 90% of marine fisheries employment in Kenya, underscoring their importance for poverty reduction and social stability.

SESA implication: Given these high dependency ratios, MSP zoning must explicitly safeguard traditional fishing grounds, landing sites, and nearshore ecosystems, as loss or restriction of access would pose a high risk of livelihood collapse and social conflict.

5.4.6 Cultural Heritage Sites and Assets

Culture and heritage are integral to Marine Spatial Planning because they reflect the historical, spiritual, and livelihood connections of indigenous and coastal communities to marine and coastal spaces. Built heritage, sacred sites, underwater cultural heritage, and living maritime traditions depend on specific locations and marine spaces that require protection from incompatible uses and unmanaged tourism. Integrating culture and heritage into MSP supports community rights, safeguards culturally significant marine spaces, and aligns planning decisions with international safeguards on Indigenous Peoples and cultural heritage, including OP 4.11: Physical Cultural Resources.

Inventory of Cultural Heritage Sites and Activities

Cultural heritage sites (as demonstrated in **Figure 21**) and activities along Kenya's coast and marine areas reflect the deep historical, spiritual, and livelihood connections of indigenous and coastal communities to specific marine spaces. The inventory includes built and archaeological heritage, sacred sites and cultural landscapes, underwater cultural heritage, living maritime traditions, and cultural festivals distributed across Kwale, Mombasa, Kilifi, Lamu, and adjacent marine areas. These sites depend on clearly defined coastal and marine spaces and face pressures from tourism, coastal development, and environmental change, making their identification and protection essential to informed Marine Spatial Planning.

i). Lamu County

Lamu hosts the highest concentration of cultural heritage assets, including Lamu Old Town and Lamu Museum, Matondani, Mwano Mariyamu, Takwa Milinga Ruins, and Takwa National Monument, characterized by historic Swahili urban architecture and archaeological ruins. The county also contains sacred sites such as Pate Kibla Mbili Mosque and living maritime heritage areas in Amu and Shela, alongside underwater cultural heritage including the Ngomeni and Santo Antonio de Tanna shipwrecks. Key challenges include over-tourism, coastal erosion, structural degradation, unregulated diving, and pressure on living cultural practices.

ii). Kilifi County

Kilifi's heritage assets include Ras Kitoka, Shanga Ruins, Kilepwa, and Mbaraki Pillar, comprising archaeological ruins and monuments linked to early Swahili settlements. The county also hosts living maritime heritage areas such as Kuruwitu and underwater cultural heritage sites near Malindi, including shipwrecks. Major challenges are site fragility, erosion, unmanaged visitor access, and disturbance of underwater heritage resources.

iii). Mombasa County

Mombasa's cultural heritage is represented by monuments such as the Mbaraki Pillar and underwater cultural heritage sites including the Vuma and Fish Eagle wrecks. These resources are exposed to urban pressure, vandalism, anchoring impacts, and unregulated visitation, particularly in high-use marine and coastal zones.

iv). Kwale County

Kwale contains numerous sacred cultural landscapes and kayas, including Kinondo Ngarani, Jiwe la Mtu, Jiwe la Jahazi, Chuyu, Kiweni, and Kisite and Mpunguti Kayas, which are closely tied to indigenous spiritual practices and community custodianship. Living maritime heritage in Wasini and Kibuyuni reflects traditional fishing and dhow culture. Key challenges include unauthorized access, commercialization of sacred sites, and disturbance of cultural landscapes.

Underwater Cultural Heritage

Underwater Cultural Heritage (UCH) comprises submerged physical remains of human activity, including shipwrecks, cargo, and associated artefacts lying on or beneath the seabed. The National Museums of Kenya (NMK) is the designated custodian of these assets under the National Museums and Heritage Act (Cap. 216). Systematic underwater archaeological surveys along Kenya's coastline, conducted by NMK in collaboration with international partners, have documented over 40 shipwreck sites distributed from Mombasa to Lamu. These span several centuries of Indian Ocean maritime trade and include vessels of Portuguese, Arab, Chinese, and European origin.[4]

Notable documented shipwrecks include:

Ngomeni Shipwreck (Kilifi County): A 16th-century Portuguese vessel discovered in Ngomeni Bay, Malindi. Excavations have recovered elephant tusks, copper ingots bearing the Fugger mark, millstones, stone cannon balls, lead strips, and Chinese porcelain dating to the Hongzhi (1488–1505) or Zhengde (1506–1521) reigns.[5] Hull remains include approximately 100 structural timbers.

Santo Antonio de Tanna (Mombasa County): A Portuguese frigate sunk off Fort Jesus in 1697 during the Omani siege. Excavated between 1976 and 1982, it was the first underwater archaeological project in sub-Saharan Africa.[7] Much of the site remains buried near Fort Jesus World Heritage Site.

Zheng He Shipwreck (Lamu County): A Chinese merchant vessel from the Ming Dynasty fleet of Admiral Zheng He, reportedly wrecked off Pate Island around 1458. Survivors are said to have settled at Shanga Village, and local oral traditions claim Chinese descent.

Globe Star and Sussex (Mombasa County): 19th-century European shipwrecks recorded in Mombasa waters.

Additional UCH assets include stone anchors, cannon, and ceramic shards of Persian, German (Rhenish stoneware), and Chinese origin recovered from multiple sites.

The National Museums and Heritage Act (Cap. 216) prohibits unauthorised excavation, removal, or disturbance of underwater heritage. Kenya has prepared to ratify the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage, which will provide a binding international framework for in-situ preservation, responsible access, and cooperation against treasure hunting. NMK has initiated an underwater museum project at Ras Ngomeni, Kilifi County, combining in-situ preservation with land-based artefact displays.

Priority sites for protection and sustainable tourism development include Santo Antonio de Tanna, Ngomeni, Globe Star, and Sussex shipwrecks. These assets have high potential for cultural tourism, research, and public education, contributing to Kenya's blue economy while safeguarding heritage for future generations.

5.5 Key Marine Economic Sectors

Kenya's marine and coastal space supports a diverse portfolio of economic activities that contribute directly to national GDP, foreign exchange earnings, and coastal livelihoods. These activities include tourism and recreation, fisheries and mariculture, maritime transport and infrastructure, and marine energy and mineral resources. Each sector has distinct spatial footprints, resource dependencies, and environmental pressures, and they increasingly compete for space within the same nearshore and offshore waters. Uncoordinated expansion has led to user conflicts, habitat degradation, and cumulative impacts on ecosystem services. Characterisation of each sector covers current activities, economic significance, spatial distribution, and key stressors.

5.5.1 Tourism and Recreation Activities

Tourism and recreation activities along Kenya's coast are spatially diverse and extend across nearshore waters, beaches, lagoons, creeks, marine protected areas, and culturally significant coastal and underwater sites. The sector includes beach recreation, marine wildlife tourism, cruising and boating, diving and snorkelling, water sports, sport fishing, and heritage-based tourism, with concentrations in Kwale, Mombasa, Kilifi, Lamu, and Tana River counties. These activities rely on shared coastal and marine spaces that also support fisheries, conservation, ports, and community uses, resulting in distinct spatial patterns and areas of overlap relevant to Marine Spatial Planning**.** **Figure 21** presents the inventory of tourism and recreation activities and spatial distribution.

i). **Cruising and Sailing**: Prominent in Kwale (Shimoni and Pemba Channel, Wasini Island, Ramisi Creek), Mombasa (Mtwapa Creek, Mombasa Port), Kilifi (Takaungu, Kilifi and Mida Creeks, Kuruwitu Lagoon), Lamu (Archipelago Channels, Lamu Port), and Tana River (Sabaki/Galana Estuary). Activities rely on deep marine channels, estuaries, lagoons, and port-adjacent waters. Key challenges include vessel disturbance to marine fauna, anchoring impacts, habitat degradation, pollution, and port development pressures.

ii). **Marine Wildlife Tourism**: Focused in Kwale (Vanga Mangrove, Gazi Mangrove, Kisite-Mpunguti Marine Park, Mpunguti Marine Reserve), Kilifi (Watamu-Malindi Marine Reserve, Tana Delta). These activities engage mangrove forests, coral reefs, and delta wetlands, with pressures from overharvesting, visitor overcrowding, anchor damage, sedimentation, and land-use conflicts.

iii). **Heritage and Cultural Tourism**: Sites include Kwale (Marine Kaya landscapes, Shimoni-Chale-Vanga cluster), Mombasa (Fort Jesus, Old Town, submerged shrines), Kilifi (Gede-Jumba la Mtwana corridor, sacred kayas, Malindi heritage cluster, Kuruwitu lagoon), and Lamu (Lamu Old Town). Activities involve archaeological ruins, sacred forests, submerged cultural sites, and living cultural landscapes. Key challenges are over-tourism, site fragility, coastal erosion, and unmanaged visitor impacts.

iv). **Protected Area Ecotourism**: Located in Kwale (Kisite Marine Park, Mpunguti, Diani–Chale Marine Reserves), Mombasa (Marine Park and Reserve), Kilifi (Watamu, Malindi Marine Parks and Reserves), and Lamu (Kiunga Marine Reserve). Uses focus on coral reefs, seagrass, and wildlife habitats with pressures from unregulated activities, coral stress, sedimentation, and visitor intensity.

v). **Recreational Diving and Snorkelling**: Found in Kilifi (Watamu Lagoon, Kisite-Mpunguti, Kuruwitu, Diani Reef Patches), utilizing coral reefs and lagoon ecosystems. Challenges include coral damage, overcrowding, and anchoring impacts.

vi). **Sport Fishing (Recreational)**: Concentrated in Kilifi (Watamu-Malindi, Ngomeni, Lamu Channel). Activities take place in marine waters, facing overfishing, habitat disturbance, and conflicts with tourism.

vii). **Non-Motorised Water Sports**: Occur in Kwale (Diani, Mvureni Lagoon), Mombasa (Nyali, Mtwapa), and Lamu (Shela-Lamu), within lagoons and nearshore waters. Challenges involve user conflicts, seagrass disturbance, and unregulated access.

viii). **Motorized Water Sports**: Concentrated in high-speed corridors in Kwale (Diani), Mombasa (Nyali, Bamburi), and Kilifi (Watamu). Key issues include collision risks, noise pollution, coral damage, and user conflicts.

ix). **Passive Beach Recreation**: Across Lamu (Shela, Kipungani, Kiwayu), Tana River (Kipini, Ungwana Bay), Kilifi (Watamu, Malindi, Bofa, Kuruwitu, Kikambala), Mombasa (Nyali, Bamburi, Pirates, Shanzu), and Kwale (Diani, Tiwi, Gazi, Funzi Island). Challenges include overcrowding, littering, coastal erosion, and development pressures.

x). **Active Beach Sports**: Present in Kilifi (Watamu, Malindi–Casuarina), Mombasa (Bamburi, Shanzu), and Kwale (Diani, Tiwi), with pressures from habitat disturbance, user conflicts, and safety risks.

xi). **Cultural Beach Events**: Occur in Lamu (Shela, Kipungani), Kilifi (Watamu, Malindi–Casuarina), and Kwale (Diani), affecting beach habitats and cultural site integrity.

xii). **Built Heritage and Archaeological Tourism**: Sites include Lamu (Lamu Old Town, museums, Pate, Takwa ruins) and Kilifi (Shanga Ruins, Ras Kitoka, Mbaraki Pillar, Kilepwa), with challenges from over-tourism, site fragility, and unmanaged visitor pressure.

xiii). **Sacred Sites and Living Cultural Landscapes**: Kwale (Nyuma ya Maji, Jiwe la Mtu, Chuyu, etc.) and Lamu (Pate Kibla Mbili Mosque, Shimoni Slave Cave, Chale Shrine), facing unauthorised access, ritual disturbance, and tourism pressures.

xiv). **Underwater Cultural Heritage (Shipwrecks)**: Lamu (Ngomeni, Santo Antonio de Tanna) and Kilifi (shipwrecks near Malindi Marine Reserve, Kiunga, Mombasa), challenged by artefact removal, anchoring, and habitat disturbance.

xv). **Living Maritime Culture and Events** – Lamu (Amu, Kuruwitu, Sii, Wasini, Kibuyuni), engaging coastal cultural landscapes with pressures from the displacement of traditional fishing and habitat modification.

This inventory highlights the spatially diverse and multi-use nature of tourism and recreation along Kenya's coast, revealing ecosystem pressures, user conflicts, and heritage sensitivities that must inform MSP zoning and management.

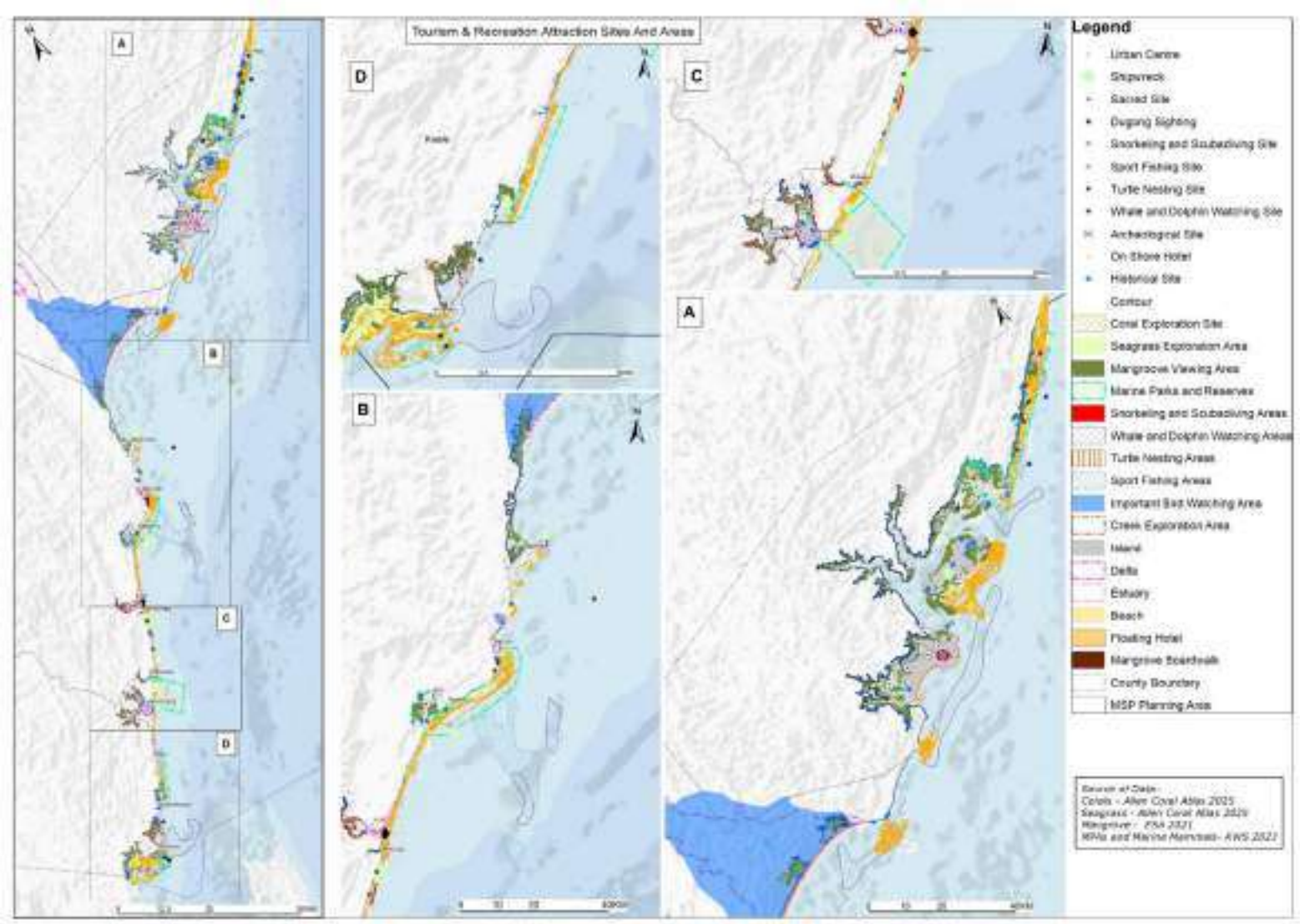

Figure **21**: Tourism and recreation attraction sites and areas

Conflicts Between Tourism and Other Coastal and Marine Uses

Tourism and recreation activities overlap spatially with several other coastal and marine uses, creating recurring conflicts as presented in **Table 71**. In nearshore waters and lagoons, tourism activities such as snorkelling, diving, water sports, and boat excursions compete with small-scale fisheries for access and space, leading to gear damage, safety concerns, and tension with fishing communities.

In port and shipping areas, including Mombasa Port, Kilindini Harbour, and Lamu Port, tourism vessels and recreational boating conflict with commercial shipping, increasing navigational risks and exposure to pollution. Tourism activities in and around marine protected areas intersect with conservation objectives, where high visitor numbers, anchoring, and wildlife viewing can undermine habitat protection goals. Along beaches and cultural sites, tourism development and events conflict with community access, traditional cultural practices, and heritage protection, particularly where beach management and zoning are weak or inconsistent.

Table **71**: Tourism-related conflicts

Tourism Activity	Conflicting Use(s)	Location / Context	Nature of Conflict
Boat excursions, snorkelling, diving	Small-scale fisheries	Nearshore waters, lagoons, reefs	Competition for space; damage to fishing gear; safety risks
Recreational boating, cruising	Commercial shipping, ports	Mombasa Port, Kilindini Harbour, Lamu Port	Navigational risks; congestion; exposure to pollution
Marine wildlife tourism	Conservation objectives	Marine parks and reserves	Wildlife disturbance; anchoring impacts; pressure on protected habitats
Water sports (motorised & non-motorised)	Swimming, artisanal fishing	Beaches, lagoons, nearshore zones	User safety conflicts; spatial congestion
Beach recreation and events	Community access, cultural practices	Public beaches, cultural sites	Restricted access; disruption of traditional uses
Tourism development near heritage sites	Heritage conservation	Coastal ruins, sacred sites, Old Towns	Physical damage; overcrowding; loss of cultural integrity

Tourism and recreation place direct pressure on sensitive coastal and marine ecosystems, including coral reefs, mangroves, seagrass beds, beaches, and estuaries. Key environmental considerations, as presented in **Table 72**, include coral damage from anchoring, diving, and water sports; mangrove degradation linked to boating and shoreline development; beach erosion and habitat loss from intensive recreation; and pollution from vessels, coastal facilities, and unmanaged waste.

Climate change further compounds these impacts through sea-level rise, coastal erosion, coral bleaching, increased storm intensity, and flooding of low-lying tourism infrastructure and heritage sites. These pressures reduce ecosystem resilience and directly threaten the natural and cultural assets on which tourism depends, underscoring the need for MSP measures that limit incompatible uses, manage visitor intensity, and integrate climate adaptation into tourism planning and zoning.

Table 72: Key environmental considerations from tourism and recreation

Environmental Aspect	Key Considerations / Impacts
Coral reefs	Physical damage from anchoring, diving, snorkelling; coral stress and reduced resilience
Mangroves and estuaries	Degradation from boating, shoreline development, pollution
Seagrass beds	Disturbance from water sports, grounding, and repeated shallow-water use
Beaches and dunes	Erosion, vegetation loss, littering, and habitat disturbance from intensive recreation
Marine fauna	Noise, vessel traffic, and close-contact tourism causing stress and behavioural change
Pollution	Waste discharge from vessels and coastal facilities affecting water quality
Climate change	Coral bleaching, sea-level rise, coastal erosion, stronger storms affecting tourism assets
Heritage sites	Flooding, erosion, and saltwater intrusion threatening coastal and underwater heritage

5.5.2 Fisheries and Mariculture

a) Artisanal Fisheries

Artisanal marine fisheries are the backbone of Kenya's coastal blue economy, contributing 81.9% of national marine fisheries output as of 2024. The fisher population increased from 9,017 (2004) to 17,628 (2024), operating ~4,000 vessels from 213 gazetted landing sites. Fishing effort is uneven: Kwale County hosts ~30% of artisanal fishers, while Tana River accounts for ~2.6%.[130]

The artisanal fishery is multi-species and multi-gear, spanning reefs, lagoons, seagrass and mangrove-estuarine systems. In 2024, demersal fish dominated landings (40.8%), followed by pelagic fish (38.8%); crustaceans (9.8%), molluscs/sea cucumbers (9.1%) and elasmobranchs (4.5%) comprised the remainder. County patterns differ: Lamu has high demersal landings; Kilifi is dominated by pelagics; Kwale has relatively higher crustaceans and molluscs, while Tana River records the lowest aggregate catches.

Available assessments indicate widespread overfishing in coastal stocks, with exploitation rates for several priority species above sustainable reference points as presented in **Table 73**. Small and medium pelagics show temporal variability but remain at risk. Sea cucumber fisheries are overfished and require recovery-oriented controls; shallow-water lobster, mud crab (Scylla serrata) and octopus are reported as closer to optimal exploitation in some areas.[131] [132]

Table 73: Growth, mortality and exploitation estimate for selected priority species in small-scale fisheries.

Species	L_{inf}	Z	M	F	E	Stock status
Eptoscarus vaigiensis	41.2	1.45	0.44	1.01	0.7	Overfishing
Scarus ghobban	84.2	0.53	0.27	0.56	0.58	Overfishing
Lethrinus harak	59.1	2.77	0.47	2.31	0.83	Overfishing
Siganus sutor	52.3	3.58	0.71	2.87	0.08	Overfishing
Lethrinus lentjan	51.6	1.58	0.58	1	0.64	Overfishing

[130] Kenya Fisheries Service (KeFs). (2025). 2024 Fisheries Statistical Bulletin.

[131] Okemwa. (2017). Spatio-Temporal Dynamics of The Marine Aquarium Fishery and Recruitment of Reef Fishes in Coastal.

[132] Muthiga et al. (2010). Strengthening capacity to sustainably manage sea cucumber fisheries in the western Indian Ocean.

Management is provided under the Fisheries Management and Development Act (2016) and related plans and regulations, including gear restrictions, mesh-size controls and size limits (e.g., prohibition on landing Panulirus ornatus below 70 mm carapace length and retention of berried females). Given persistent high exploitation rates, additional spatial measures (time-area closures and/or no-take zones in critical nursery areas) may be required, with safeguards for livelihoods and compliance.[133]

The key issues and sensitivities include:

i. Management priorities for SESA: strengthen spatial planning with BMUs, improve compliance and monitoring, and protect nursery/critical habitats (including through time-area closures where feasible).
ii. Spatial footprint: fishing occurs across reefs, seagrass, mangroves and nearshore waters that also support tourism and conservation; conflicts are likely where zoning restricts access without co-management measures.
iii. Livelihood exposure: the artisanal fishery supports a large, expanding workforce and is highly sensitive to spatial restrictions, habitat decline and market shocks.
iv. Stock status: multiple priority coastal species are overfished (**Table 73**); sea cucumber is overfished and requires recovery measures.

b) Industrial Fisheries

Kenya's industrial marine fishery remains under-developed relative to potential in the South-West Indian Ocean. The industrial fleet is modest, comprising an estimated nine prawn trawlers, four industrial longliners, two deep-water crab vessels, and two purse seiners operating intermittently within the EEZ.[134] Estimated sustainable industrial harvest potential is ~150,000 metric tonnes per year, while reported industrial landings in 2024 were 8,777 metric tonnes. The gap reflects limited domestic fleet capacity, infrastructure constraints and reliance on licensed foreign-flagged vessels.[135]

Industrial fishing is concentrated in three main zones: (i) shallow-water trawling in Malindi-Ungwana Bay, influenced by Tana and Sabaki river estuaries; (ii) deep-water crab fishing along the continental slope off Kilifi; and (iii) pelagic longlining across the EEZ targeting transboundary tuna and tuna-like species.[136] Industrial landings vary by sub-sector. In 2024, shallow-water trawl landings were 2,089 MT (down from 2,219.64 MT in 2023); deep-water crab landings were 142 MT; pelagic longline landings were 216.6 MT (down from 452.6 MT in 2023); and purse seine landings were reported at 6,324 MT (single-year data point).[137] Industrial landings are linked to port and processing infrastructure. Mombasa (Li watoni Fisheries Complex) remains the primary hub; Malindi continues as a landing site; Lamu is increasingly used by trawl and deep-water crab vessels; and Shimoni provides access on the southern coast for local and transboundary operations.

i). Industrial Trawling

Industrial bottom trawling for prawns occurs mainly in Malindi-Ungwana Bay under the Prawn Fishery Management Plan (2010). MSY estimates for the bay include ~433 tons per year (Fmsy ~5.5 per year) and

[133] Republic of Kenya. (2025). The Lobster Fishery Management Plan, 2025.
[134] Kamau et al. (2023). Marine Spatial Planning and the Blue economy in Kenya
[135] Ministry of Agriculture, Livestock and Fisheries. (2013). Kenya Tuna Fisheries Development and Management Strategy 2013-2018
[136] Kenya Marine and Fisheries Research Institute (KMFRI). (2007). Malindi-Ungwana bay: Status of the Artisanal Fishery and Socio-economic Implications.
[137] KeFs (Kenya Fisheries Service). (2024). 2023 Fisheries Annual Statistical Bulletin.

earlier MSY ranges of 352-391 tons for prawns and 499-602 tons for fish, indicating a fully exploited fishery.[138] [139] [140] [141] [142]

The Prawn Fishery Management Plan (2010) sets a TAC of 400 MT for prawns and caps maximum fishing effort at four trawl vessels. Trawl effort is concentrated in fishing grounds off the Tana and Sabaki river estuaries, with occasional offshore expansion (e.g., 2020). Fishing effort increased to over 5,000 hours by 2019, declined in 2020 during COVID-19 restrictions, and rebounded thereafter. Prawn catches peaked at 133 MT in 2019 and remained below 90 MT between 2021 and 2024. In trawl catches, finfish account for ~79.3% and prawns for ~19.1% (other taxa each <1%). The trawl fishery remains under-performing relative to TAC (400 MT) and MSY estimates (352-602 MT), operating at <25% of potential. Bycatch is dominated by finfish (~79%) rather than prawns (~19%), reducing value capture from high-value prawn exports.

Trawling in estuarine and nearshore nursery areas can compete with artisanal fisheries (space conflicts, gear interactions) and may affect juvenile fish, with implications for coastal food security. Management arrangements require updating and clearer rights/benefit-sharing provisions. Reported bycatch ratios of ~4:1 indicate high removal of non-target biomass. Continuous trawling in nursery grounds can disturb benthic habitats, resuspend sediments and degrade breeding areas.

ii). Industrial Longline Pelagic Fisheries

Kenya exports approximately 0.1-1,426 MT of pelagic fish per month, valued at 0.3-3,145 million KES. Large pelagics account for ~85.9% of exports, while small pelagics contribute ~1.1%.[143] [144].Pelagic stocks are targeted through purse seining, pelagic trawling, drift netting and longlining. Longlining uses a mainline with baited hooks attached by snoods/gangions.[145] Between 2016 and 2024, an estimated eight industrial longline vessels operated in Kenya as presented in **Figure 22**. Reported landings for 2016-2024 total 3,378 MT, with an estimated fishing effort of 17.1 million hooks. Effort declined in 2021 during the COVID-19 period and increased in 2022-2023.

[138] Fulanda et al. (2011). Fishery trends, resource-use and management system in the Ungwana Bay fishery, Kenya.

[139] Munga et al. (2012). Bottom shrimp trawling impacts on species distribution and fishery dynamics; Ungwana Bay fishery Kenya before and after the 2006 trawl ban.

[140] Swaleh et al. (2015). Ecosystem-based assessment of a prawn fishery in coastal Kenya using ecological indicators.

[141] Mwatha. (2005). Stock assessment and population dynamics of Penaeid prawns in the prawn trawling grounds of Malindi-Ungwana Bay: The challenges of managing the prawn fishery in Kenya.

[142] Ochiewo. (2006). Harvesting and Sustainability of Marine Fisheries in Malindi-Ungwana Bay, Northern Kenya Coast.

[143] Maina. (2012). A baseline report for the Kenyan small and medium marine pelagic fishery (Report). Ministry of Fisheries Development; South West Indian Ocean Fisheries Project (SWIOFP); EAF–Nansen Project. https://aquadocs.org/handle/1834/6835

[144] Maina. (2012). A baseline report for the Kenyan small and medium marine pelagic fishery (Report). Ministry of Fisheries Development; South West Indian Ocean Fisheries Project (SWIOFP); EAF–Nansen Project. https://aquadocs.org/handle/1834/6835

[145] Ruwa. (2006). Coastal and Offshore Marine Fisheries of Kenya: Status and Opportunities. KMFRI Technical Report/2004/FP/1.

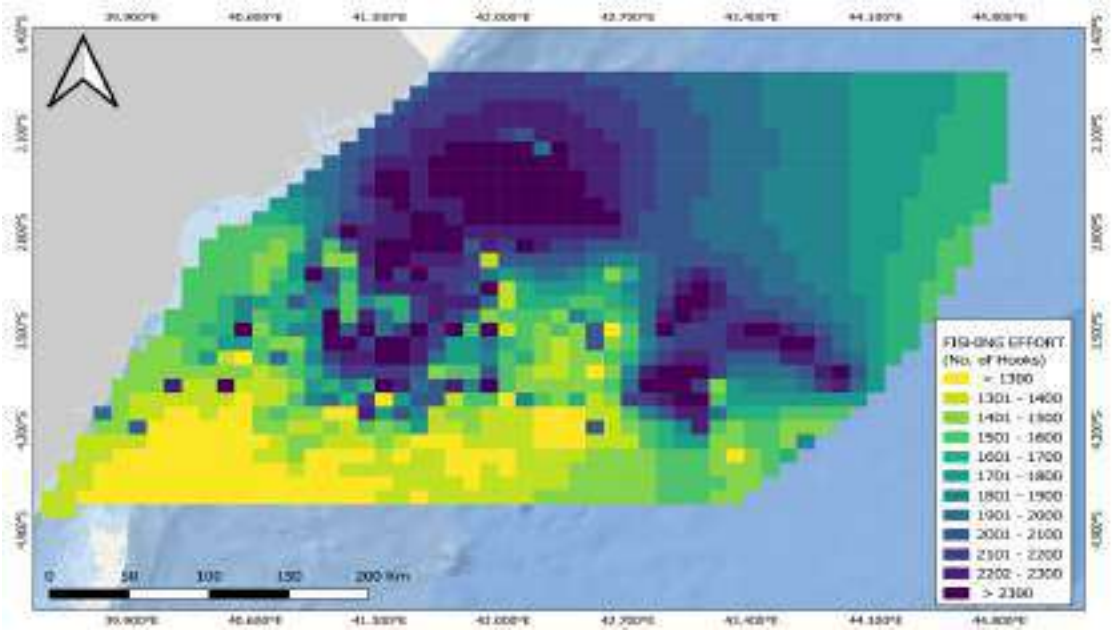

Figure **22**: Pelagic longline fishing effort (number of hooks) in Kenya's EEZ (2016-2024).

Under Indian Ocean Tuna Commission measures, the 2024 yellowfin tuna catch limit for the Indian Ocean was 340,000 MT, with Kenya allocated 3,654 MT. **Table 74** Summarises tuna and tuna-like stock status categories relevant to Kenya's industrial pelagic fishery.

Table **74**: Indicative status of Indian Ocean tuna and tuna-like species

Category	Status on Species fishing	Species/Species groups
1	Not overfished and are not subject to overfishing (sustainably exploited)	Yellowfin tuna, Skipjack tuna, albacore, Indo-Pacific king mackerel, Sailfish, swordfish and the blue shark.
2	Not overfished, but are currently experiencing overfishing	Black marlin
3	Overfished, but are currently not subject to overfishing	Kawa Kawa
4	overfished and are currently undergoing overfishing	Bigeye tuna, Longtail tuna, Narrow-barred Spanish mackerel (Kingfish), Blue marlin, Striped marlin and shortfin mako shark
5	Stock status unknown	Porbeagle shark, Bullet tuna, Frigate tuna, scalloped hammerhead shark, Silky shark, Bigeye thrasher shark

Kenya's pelagic fishery shows mixed stock status. Category 4 stocks (e.g., bigeye tuna, longtail tuna and some billfish) present the highest risk due to ongoing overfishing. Several shark species have elevated conservation concern and are subject to precautionary management, including prohibitions in the Indian Ocean for some species.[146][147][148]

[146] Rigby et al. (2019). Carcharhinus longimanus. The IUCN Red List of Threatened Species, 2019, e.T39374A2911619.

[147] Rigby et al. (2019). Alopias pelagicus. The IUCN Red List of Threatened Species, 2019, e.T161597A68607857.

[148] Indian Ocean Tuna Commission (IOTC). (2025). Resolution 25/08: On the conservation of sharks caught in association with fisheries managed by IOTC (Conservation and management measure).

Key considerations (industrial fisheries): priority risks include bycatch and interactions with threatened sharks/billfish, habitat disturbance from trawling in nursery areas, and navigation and safety issues where industrial fishing overlaps shipping routes and proposed offshore developments. Marine Spatial Planning should apply time-area controls, establish clear fishing corridors and exclusion zones around critical habitats and MPAs, and strengthen monitoring (VMS/observers), compliance and grievance mechanisms to reduce conflict with artisanal users.

5.5.3 Maritime Transportation and Infrastructure

The maritime transport system constitutes a critical pillar for Kenya's economic transformation, facilitating over 90%[149] of the County's imports and exports. This infrastructure is foundational to regional trade and competitiveness across East and Central Africa. The sector is anchored by major gateway assets notably the Port of Mombasa and the emerging Port of Lamu which are complemented by a network of smaller coastal ports, jetties and privately operated industrial and oil terminals.

The maritime ports, shipping services, and related infrastructure contribute to GDP in two connected ways: directly, through the value added recorded under transport and logistics services (port operations, cargo handling, vessel services, storage and forwarding), and indirectly, by enabling trade and production across the wider economy. The sector contributed KES. 244.9 billion in 2024 contributing 6% of the GDP[150] and secured direct employment of 5985 people at the ports according to the KPA.

Operational performance at the main gateway port translates into economic activity through fees, service contracts, jobs, and logistics spending. For example, Kenya Ports Authority reports that the Port of Mombasa handled 41.1 million tonnes of cargo in 2024 (up from 36.0 million tonnes in 2023) and surpassed 2 million TEUs in the same year—volumes that underpin port and corridor service revenues and associated business activity.[151]

Major Ports

Kenya's maritime gateway is anchored by two major ports: the Port of Mombasa, the primary hub for regional trade, and the Port of Lamu, an emerging deep-water facility under the LAPSSET Corridor framework. A network of secondary ports and harbours, including Shimoni, Kilifi, Malindi, Ngomeni, Kiunga, Mtwapa, Vanga, Kipini, and Funzi, supports local fisheries, passenger transport, tourism, and small-scale coastal trade. These ports provide essential infrastructure for containerised cargo, bulk handling, and transshipment.

i). Port of Mombasa

The Port of Mombasa is the primary gateway for the Northern Corridor and is pivotal to national and regional trade, employment, and Blue Economy growth.

a. Berths, Terminals and Capacities of the Port of Mombasa

The port comprises 22 operational berths with deep-water and multipurpose facilities located at Kilindini and Kipevu Harbours, handling containerized, bulk and liquid cargo. Container operations are concentrated at the Mombasa Container Terminal (Berths 16–18) and the Second Container Terminal (CT2), with a combined handling capacity of approximately 2.3 million TEUs per year.

In 2024, the port recorded a throughput of 2,005,076 TEUs,[152] a 23.5% increase from 1,623,080 TEUs in 2023.[153] This growth is attributed to deeper berths, modern yard systems, and improved cargo evacuation

[149] Ministry of Transport. (2012). Sessional Paper No. 02 of 2012 on Integrated National Transport Policy. Government Printer.

[150] KNBS.(2024). Quarterly GDP Report. Third quarter 2024. KNBS. https://www.knbs.or.ke/reports/quarterly-gross-domestic-product-third-quarter-2024/

[151] https://www.kpa.co.ke/Media/Read/2?

[152] https://maritimafrica.com/en/the-port-of-mombasa-handled-a-total-of-41-1-million-tons-of-cargo-in-2024/

[153] https://www.kenyanews.go.ke/mombasa-port-records-14-percent-surge-in-cargo-throughput/

through the Standard Gauge Railway (SGR) and upgraded road corridors.[154] The performance highlights the port's increasing strategic importance, alongside rising pressure on available space and infrastructure. Planned expansion aims to increase capacity to 3.1 million TEUs[155,] creating an immediate need for strategic land-use planning to support future terminal development, logistics zones, and intermodal connectivity.[156] At the same time, rapid expansion within a constrained spatial environment presents risks of encroachment on adjacent marine and coastal ecosystems. Integrating marine spatial planning into port development is therefore necessary to balance economic growth, ecosystem protection, and long-term blue economy objectives.

b. Hinterland Linkages

In terms of hinterland linkages, the port connects to key hinterland transport networks that extend its reach across East and Central Africa.

- The Northern Corridor highway links Mombasa–Nairobi–Malaba, enabling trade with Uganda, Rwanda, and the DRC.
- The Standard Gauge Railway (SGR) moves freight to Nairobi and Naivasha ICDs, though fluctuating use raises efficiency concerns.
- The Kipevu Oil Terminal also connects to the Kenya Pipeline Company network, serving regional petroleum markets.

Despite these linkages, growth is constrained by inefficiencies in transport connections, customs processes, and yard utilization. Enhancing performance and maximizing blue economy benefits will require better alignment between hinterland infrastructure and port operations, while ensuring sufficient space for anchorage, navigation channels, and cargo yards without adverse impacts on the environment or adjacent communities.

c. Future Development Plans for Port of Mombasa

KPA proposes to undertake the following projects in the future:

1) **Dongo Kundu SEZ**: By 2027, multi-purpose port facilities will be established at Dongo Kundu to handle a diverse mix of cargo, including steel, vehicles, dry bulk, and general cargo.
2) **Decongesting Mombasa**: The development of Dongo Kundu will ease pressure on the conventional cargo berths at Mombasa (Berths B1–B14), eliminating the need for further expansion of this infrastructure.
3) **Cargo Diversion to Lamu**: From 2035 onwards, as Mombasa and Dongo Kundu near capacity, part of the growth in conventional cargo demand will be redirected to Lamu.
4) **Container Traffic Strategy**: Container services will progressively shift to Lamu once port infrastructure, hinterland connections, and related services are sufficiently developed.
5) **Expansion of Container Terminals**: In Mombasa, additional container terminals will be constructed adjacent to Berth B21, with expansion extending up to Berth B27 by 2047 to accommodate rising container volumes.
6) **Phased Development**: The number and timing of new berths in Mombasa will be demand-driven and will depend on the extent of cargo traffic diverted to both Lamu and Dongo Kundu.

ii). Port of Lamu

The Port of Lamu is an emerging deep-water port under the LAPSSET Corridor framework, designed to complement Mombasa and handle transshipment traffic.

a. Berths, Terminals and Capacities of the Port of Lamu

Development of Lamu Port is ongoing. Key financial models and public–private partnership (PPP) transaction plans have been completed, and the port is planned to integrate both commercial and industrial

[154] Mombasa Port Infrastructures, Kenya Ports Authority

[155] https://www.kpa.co.ke/Ports/PortOfMombasa

[156] Kenya Ports Authority. (2023). Strategic Plan 2023/24–2027/28 (Popular version). KPA.

zones. The first three berths, with a combined length of 1,200 meters and a depth of 17.5 meters, are operational and have a design capacity of 1.2 million TEUs per year. Despite this, operational activity remains limited due to inadequate cargo-handling equipment, incomplete navigation aids, and weak hinterland connectivity.

Additional commercial berths are planned for completion by 2030 and are intended to support containerized, dry bulk, liquid bulk, and general cargo. Their delivery is contingent on financing, engagement of terminal operators, and improved corridor connectivity. Industrial berths and a shipyard, proposed for the 2030–2040 period, are intended to support livestock handling, roll-on/roll-off operations, ship repair, and oil and gas activities. The Port of Lamu is expected to handle 2.2 million TEUs in 2037 and 4.7 million TEUs by 2047.[157] These components face environmental and resettlement-related challenges. Lamu Port has significant potential to expand Kenya's maritime capacity; however, progress has been constrained by unresolved issues, including unmarked security zones, conflicts with fishing communities, stalled advisory services, and gaps in port governance. [158.]

iii). Secondary Ports

Beyond the main gateways, a network of 11 smaller facilities supports local and specialized maritime activities such as fisheries, tourism and local trade. **Table 75** and **Table 76** elaborates the nature and proposed future uses of the secondary ports. Of the small ports, the Shimoni port is considered as the third port and is earmarked for expansion as 50,000 DWT fishing port.[159.]

Table **75**: Secondary ports

Port Name	Category	Current Structures	Future Plans	Traffic & Vessels
Shimoni Port	Medium	Existing Jetty	New Jetty (75m x 30m), Causeway (135m x 7m)	Current: 10,000 MT; Projected: 100,000 MT. Vessels up to 1,000 DWT (Cargo/Fishing boats).
Kilifi Port	Small	Existing Jetty	Luxury Marina (200 mooring points)	Current: 260 MT. Vessels up to 10,000 DWT (Yachts/Fishing boats). Bridge Vertical Clearance: 17 m.
Malindi Port	Small	Existing Jetty & Pier	Floating pontoon, Boat repair yard	Current: 1,250 MT. Accommodates Fishing boats.
Ngomeni Port	Small	None	Jetty, Fish port, Special Economic Zone	Current: 2,050 MT. Accommodates Fishing boats.
Kiunga Port	Small	Existing Jetty	Jetty, Fish port, Cold storage, Dredged channel	Current: 3,500 MT. Accommodates Fishing boats.
Mtwapa Port	Small	None	Jetty, Marina	Accommodates Yachts and Fishing boats. Bridge Vertical Clearance: 15 m.
Vanga Port	Small	None	Jetty	-
Kipini Port	Small	None	Jetty	-

[157] KPA. (2019). KPA Master Plan 2018–2047.

[158] Multinational: LAPSSET—Lamu Port–South Sudan–Ethiopia—P-Z1-DD0-010—Implementation Progress and Results Report. https://www.afdb.org/en/documents/multinational-lapsset-lamu-port-south-sudan-ethiopia-ipr-january-2024

[159] https://www.kpa.co.ke/Media/Read/176

Port Name	Category	Current Structures	Future Plans	Traffic & Vessels
Old Port Mombasa	Medium	-	-	-
Old Port Lamu	Small	-	-	-
Takaungu Port	Small	-	-	-

Table **76**: Proposed future port use

Future port use	Shimoni	Kilifi	Malindi	Ngomeni	Mtwapa	Kiunga	Vanga	Kipini	Lamu	Funzi
Fishing port	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
Conventional cargo	Yes	-	-	-	-	-	-	-	-	-
Cold storage facilities	Yes	-	Yes	-	-	-	-	-	-	-
Reefer stations	Yes	-	-	-	-	-	-	-	-	-
Fish processing plants	Yes	-	-	-	-	-	-	-	-	-
Marina	-	Yes	Yes	-	Yes	-	-	-	-	-
Boat repair	-	Yes	-	-	-	-	-	-	-	-
Special Economic Zone (SEZ)	-	-	-	Yes	-	-	-	-	-	-

In addition to small ports, several supporting facilities play an important role in maritime operations. A total of 79 jetties provide loading, passenger, and supply access in areas without deep-water berths, supporting small-scale trade and fishing activities. Mombasa County accounts for 37 of these public and private jetties.

Private terminals, including Kipevu Oil Terminal, Shimanzi Oil Terminal, and Grain Bulk Handlers, complement public ports by improving operational efficiency and facilitating the handling of strategic imports such as fuel, grain, and fertiliser. Despite their importance, performance is constrained by poor berthing infrastructure, siltation, weak road connectivity, and fragmented land ownership.

iv). Vessel Calls and Trends

The Port of Mombasa has demonstrated resilience and gradual growth in vessel traffic over the past two decades, with its role being sustained through adaptive infrastructure and operational reforms. Vessel calls increased from 1,731 in 2005 to a peak of 1,873 in 2024,[160] despite experiencing periodic declines (e.g., in 2010 and 2022) due to external pressures like global trade slowdowns or operational bottlenecks as demonstrated in **Figure 23**. The port's capacity to consistently rebound, evidenced by strong recoveries in recent years, underscores its continued relevance in regional maritime trade.

[160] KNBS. (2006-2025). Economic Survey Reports.

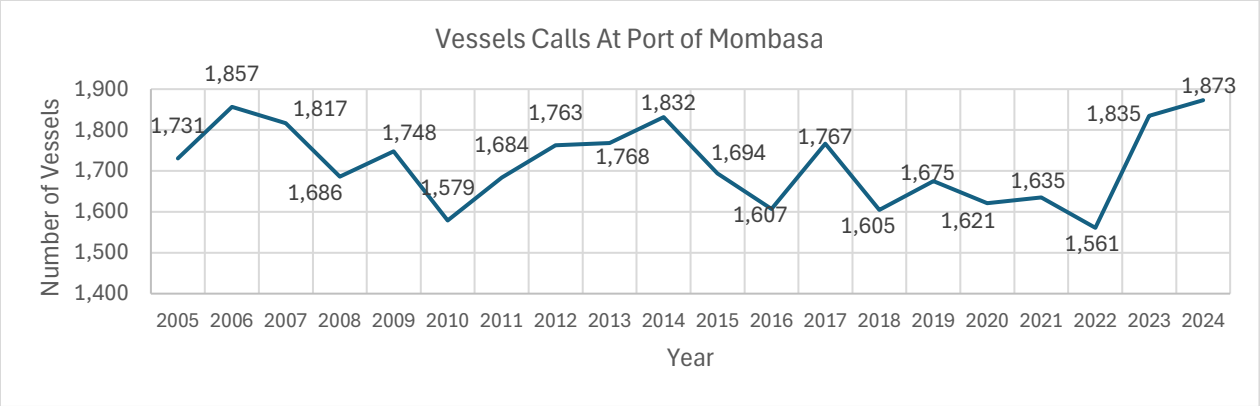

Figure **23**: Vessel calls at the Port of Mombasa

Management of this rising traffic has been achieved through strategic adaptation, including expansion and dredging of berths to accommodate larger vessels, and integration with inland container depots (ICDs) and the Standard Gauge Railway (SGR) to enhance cargo evacuation. The increasing vessel calls intensify the demand for berthing, pilotage, and yard space, requiring continuous investment. With traffic projected to remain high, further modernization, including green port initiatives and enhanced stakeholder coordination, will be essential to mitigate congestion risks and maintain the port's competitive edge.

v). Issues Associated with Maritime Ports and Infrastructure

The maritime transport and infrastructure are faced with several issues, as elaborated in **Table 77**.

Table **77**: Issues associated with maritime ports and infrastructure

Issue	Port of Mombasa	Port of Lamu	Secondary/Smaller Ports
Environmental	Noise and light from congested anchorages (M1–M5): Stakeholders report disturbance to marine species.	Underwater noise and intense lighting from large vessels: Stakeholders report disturbance to offshore marine fauna and continuous industrial activity affecting wildlife behaviour.	Environmental sensitivity, given the proximity of mangroves, coral reefs, and marine protected areas, requires environmentally responsible planning and engineering.
	Siltation and dredging sediment plumes offshore: Reported to reduce visibility and complicate small-vessel operations.	Disruption of pelagic species movement: Stakeholders link offshore disturbances to altered movement patterns of species important for offshore fishing.	-
	Dredging exclusion zones: Temporarily shift activities away from affected offshore areas.	Sediment dynamics affecting offshore conditions: Shifting sediments are reported to reduce depth reliability in offshore approach corridors, influencing safe operating conditions	-
Social	Higher large-vessel traffic offshore: Stakeholders report increased collision risk and unsafe crossings for artisanal craft.	Higher safety risks for artisanal craft: New deep-water traffic routes through traditional fishing areas increase interactions between industrial vessels and small craft, raising crossing and collision risks.	Institutional coordination, particularly between KPA and county governments, which is essential for operations, maintenance, and integration with land-based transport systems;

Issue	Port of Mombasa	Port of Lamu	Secondary/Smaller Ports
	Dense anchorage clusters: Communities report reduced navigational clarity and higher safety hazards offshore.	Growing spatial competition offshore: Expansion of anchorage and approach zones into previously unconstrained waters creates competition between vessel clusters, fishing activity, and tourism use areas.	Data and planning gaps, as limited operational data constrains evidence-based investment and service planning
	Approach lanes overlapping fishing grounds: Fishers report unsafe operating conditions and damage to fishing nets.	Increased navigational risk near vessel clusters: Stakeholders report that operating near anchorage/approach areas reduces safety margins for small craft	-
Economic	Losses to offshore fishing: Fishers report gear loss, net damage, and reduced access to productive grounds.	Displacement of fishing effort: Stakeholders report redirected offshore traffic through fishing areas leading to reduced access and displacement from historically used grounds.	Infrastructure limitations, including inadequate berthing facilities, shallow drafts, and limited cargo and passenger handling areas
	Disruption during dredging: Temporary displacement and downtime due to offshore exclusion zones.	Operational disruption to artisanal fishing: Increased interactions with industrial traffic and unreliable depth profiles complicate fishing operations and increase downtime/avoidance of certain areas.	-
	Constraints on fishing and tourism space: Anchorage congestion limits usable marine space, affecting local livelihoods	Pressure on tourism and fishing space: Expanding offshore anchorages and approaches into activity areas reduce available marine space for fishing and tourism-related livelihoods	-

Undersea Cables

Undersea telecommunications cables are a critical national infrastructure in Kenya's marine space, supporting international connectivity, digital services, and regional data exchange. Kenya's submarine cable system is spatially concentrated along the southern coast, with all international cable landings located in the Mombasa area. This concentration increases the strategic importance of the Mombasa nearshore zone and also heightens spatial sensitivity in nearshore and port-adjacent waters. Kenya is served by multiple international submarine cable systems, including TEAMS, SEACOM, EASSy, LION2, DARE-1, PEACE, and 2Africa, which converge offshore before landfall within or adjacent to port-related infrastructure.

i). Interaction with Navigation and Dredging Activities

The Likoni Channel is Kenya's primary port access corridor and is subject to routine maintenance, dredging and periodic deepening to support large-vessel navigation. The presence of EASSy, SEACOM, and TEAMS within this channel creates direct spatial interaction with:

1) High-density vessel traffic
2) Dredging footprints and sediment disposal dynamics
3) Anchoring and emergency manoeuvring zones

This is described as a recurrent risk over the operational life of the cables, because dredging and navigation activities occur continuously rather than as one-off events.

ii). Emerging Vulnerability Issues

The current condition of critical undersea cables (EASSy, SEACOM, and TEAMS) presents significant spatial planning and operational risks within the port and nearshore marine environment. Three core issues define these vulnerabilities:

1. **Spatial Co-location Risk:** The physical overlap of these three vital cables with an active navigation and dredging corridor significantly increases the risk of damage. This co-location raises the likelihood of physical cable severance, alteration of their protected burial depth, or exposure due to direct mechanical interaction and sediment movement caused by maritime activities.
2. **Operational Visibility Gaps:** Despite formally mapped routes, the locations of these cables are not consistently integrated into day-to-day navigation management, anchorage control, or standard port operations. This gap elevates the risk of accidental damage from activities such as anchor drag or seabed-disturbing work by port vessels.
3. **Consequence Concentration:** Given that EASSy, SEACOM, and TEAMS collectively carry substantial volumes of national and regional data traffic, any single disruption within the Likoni corridor results in a disproportionately high concentration of negative economic and connectivity impacts across the region.

These factors elevate the status of undersea cables from a background infrastructure component to a core spatial planning concern that must be actively managed within the marine environment.

Navigation and Shipping Routes

Kenya's navigation and shipping routes include international shipping corridors transiting the Exclusive Economic Zone (EEZ) and a network of local routes serving coastal communities. These passages facilitate trade, passenger transport, fisheries, and connectivity across the five coastal counties.

i) Local Shipping Routes

Local shipping and marine transport rely on an informal, shared network of unmarked, short- to medium-distance routes. These channels frequently operate without designated navigation corridors, fixed schedules, or consistent navigational aids. Consequently, reliability and safety are variable, being strongly influenced by tidal cycles and seasonal conditions.

Key route patterns include:

- **Creek and Nearshore:** Routes around urban centers such as Tudor, Port Reitz, Mtwapa (Mombasa), and Kilifi creeks, linking neighborhoods and landing sites to the open sea.
- **Inter-county Coastal:** Links, including Kilifi–Malindi, Malindi–Kipini, and Lamu–Kipini, that facilitate the transfer of passengers, fisheries products, and general supplies.
- **Cross-border and Tourism:** Routes in the south connecting Shimoni to Pemba, Tanga, and Zanzibar, and specialized tourism circuits like Shimoni–Wasini–Kisite–Funzi.
- **River–Marine and Delta:** Waterways in Tana River County (Ozi–Kipini, internal Tana Delta) where channels shift seasonally due to flooding and siltation.
- **Island–Mainland:** Connections in archipelagic settings, notably Lamu–Pate–Mkokoni–Kiunga, alongside numerous smaller inter-village links.

Several locations have been identified by communities as potential local transport hubs and corridors (e.g., Malindi, Vanga, Shimoni, Mtwapa, Likoni, Shela, Watamu, Kipini), which could form a more coherent network with proper zoning and investment. Routes are characterised by a dense mix of simultaneous activities:

- Fishing, tourism, local cargo, and passenger transport frequently share the same space (e.g., creek routes and routes like Old Port–Marine Park/Diani).
- Ferry lines, particularly the main ferry channel, serve as focal points for high-volume local and inter-county mobility for passengers, vehicles, and tourists.

- In deltas and estuaries (Tana, Sabaki), boats transport a mix of fish, farm produce, building materials, and passengers, with routes dictated by seasonal channel changes.

ii) International Shipping Routes

The key international shipping routes are as described below:

- **Container Vessel Traffic:** 174 container ships called at Kenyan ports in 2023. These vessels are typically regional scale (under 8,000 TEU). Regular services primarily link Kenya to the Middle East and South Asia (often via the Middle East), and East Asia.
- **International Trade Fleet:** The total international fleet calling at Kenyan ports comprised 672 distinct vessels in 2023, with bulk carriers and container ships accounting for 60% of this traffic according to the Kpler Report.[161]
- **Passing Trade: 139 distinct vessels**, mostly bulk carriers and oil/chemical tankers, transited Kenya's Exclusive Economic Zone (EEZ) without making a port call. While this fleet provides no direct benefit currently, it represents a potential opportunity for economic gain and CO_2 emissions reduction through the implementation of a green shipping corridor.
- **EEZ Traffic:** Mombasa, in Southern Kenya, records the most vessel movements within the EEZ. The major global transit corridors are located outside Kenya's EEZ, closer to the Seychelles.
- Intra-Kenyan Fleet: This fleet consists of 56 distinct vessels (including passenger, research, container, and cargo ships) operating between Kenyan ports or spending a portion of time along the East African coast. Fishing vessels and tugboats are notable components of this domestic fleet due to their time spent within the EEZ.

Shipping and Port Risk Assessment

The planned expansion of Kenyan ports, new construction, and increased traffic within the Exclusive Economic Zone (EEZ) pose significant, interlinked environmental and socio-economic risks. These risks span ecosystem degradation, physical coastal changes, and impacts on local livelihoods.

i) Environmental and Ecosystem Degradation

Port development and associated maritime activities introduce multiple stressors that degrade environmental quality and ecosystem integrity. These stressors include physical disturbance during construction, pollutant discharges from vessels and port operations, and air emissions from machinery and ships.

- **Loss of Biodiversity and Habitat**: Port development (land reclamation, clearing, and construction) disrupts marine and terrestrial ecosystems, leading to biodiversity loss. Essential habitats, such as mangrove forests, are cleared. This habitat loss has directly displaced local fishing communities (e.g., approximately 300 to 466 fishermen affected by the SGR Yard and Mombasa Port Master Plan).

- **Water Quality and Marine Pollution:** Dredging, reclamation, and ship maintenance increase turbidity and introduce pollutants. Excessive nutrient loading can cause oxygen depletion and harmful algal blooms. Effluents from land-based and ship-based sources (sewage, stormwater, ballast water, oily residues) contain high levels of BOD, suspended solids, and chemicals, degrading water quality. Oil waste from port equipment and vessels is a source of long-term marine pollution. Kenya has implemented the National Marine Spills Response Contingency Plan to enhance preparedness for oil and hydrocarbon pollution.

- **Air Emissions**: Port operations are a major source of air pollutants (e.g., SO_2, CO_2, NO_x, black carbon, particulate matter) from ships, auxiliary engines, and cargo-handling equipment, contributing to local air quality deterioration.

[161] https://www.kpler.com/

ii) Physical and Coastal Risks

Physical alterations to the shoreline and seabed from port infrastructure and maintenance activities can disrupt natural coastal processes, leading to long-term geomorphological changes and increased vulnerability to erosion and flooding.

- **Alteration of Coastal Processes:** Construction of piers, breakwaters, and reclamation areas significantly alters coastal dynamics (water currents, wave patterns, and tidal flows). This leads to increased erosion, altered sediment transport, coastal inundation, and geomorphological shifts. Large-scale reclamation, such as the Port Reitz expansion, modifies natural processes.

- **Dumping of Dredged Materials**: Dredged material from projects (e.g., Kipevu Oil Terminal, Mombasa Port Development) is disposed of at a designated offshore site (30 km from Mombasa Port), selected to avoid sensitive areas (fishing grounds, coral habitats, etc.). However, dumping still creates suspended sediments that can impact sensitive ecosystems and marine life.

iii) Socio-Economic Risks

Displacement of fishing activities, restricted access to traditional grounds, and exclusion from port planning processes generate socio-economic risks that disproportionately affect artisanal fishing communities dependent on marine resources for livelihoods and food security.

- **Impacts on Fisheries:** Port construction and dredging displace fish populations due to high turbidity and hydroacoustic noise, resulting in reduced catch volumes. Security restrictions around port zones also limit access to traditional fishing grounds, further affecting fish availability.

- **Impacts on Livelihoods:** Reduced catch volumes and restricted access to fishing grounds undermine the economic stability of artisanal fishers and their households. Fishers in areas such as Lamu and Bagamoyo have reported displacement and exclusion from port planning processes, compounding livelihood vulnerability and eroding community trust in maritime governance.

5.5.4 Marine Energy and Mineral Resources

Marine energy and mineral resources serve as catalysts for economic growth, energy security, and climate resilience. Under the Kenya Vision 2030 framework, the mineral sector is projected to contribute 10% to the national GDP, positioning it as a transformative driver of long-term growth.[162] While the Blue Economy currently contributes approximately 4.5% to GDP, integrating marine resources into MSP is critical to meeting these industrialization targets. Therefore, The MSP provides a structured roadmap for the equitable allocation of Kenya's 250,000 km^2 maritime space. By mapping offshore energy and mineral deposits, the framework prevents "sectoral overlap"—minimizing conflicts with shipping lanes, conservation zones, and artisanal fishing grounds. This will ensure alignment with Global Sustainable Development Goals (SDGs 7, 14, and 15) and Kenya's Bottom-Up Economic Transformation Agenda (BETA). The Kenya marine space has potential for both renewable and non-renewable energy including mineral resources as follows:

Renewal Energy

Kenya's marine space holds significant potential for renewable energy generation, offering opportunities to diversify the national energy mix, enhance energy security, and contribute to climate change mitigation. Offshore wind, ocean thermal energy conversion (OTEC), ocean current power, floating photovoltaics (FPV), and wave power represent the main technologies under consideration. Their development, however, requires careful spatial planning to balance energy infrastructure with biodiversity conservation, fisheries, navigation safety, and community livelihoods.

i). Offshore Wind Energy Potential

Kenya's offshore areas exhibit significant wind energy potential, with an estimated annual production capacity of approximately 78,840 Gigawatt-hour (GWh). Recorded wind speeds range from 4.9 to 7.6 m/s

[162] Republic of Kenya. (2024). Kenya Vision 2030: Annual progress report 2023. Vision 2030 Delivery Secretariat.

at 100 m height, averaging 5–7 m/s at 50 m height as demonstrated in **Figure 24**. Spatial assessments identify the highest potential zones offshore of Lamu, Malindi, Kilifi, and Mombasa, where wind regimes are consistent and technically viable for energy generation.

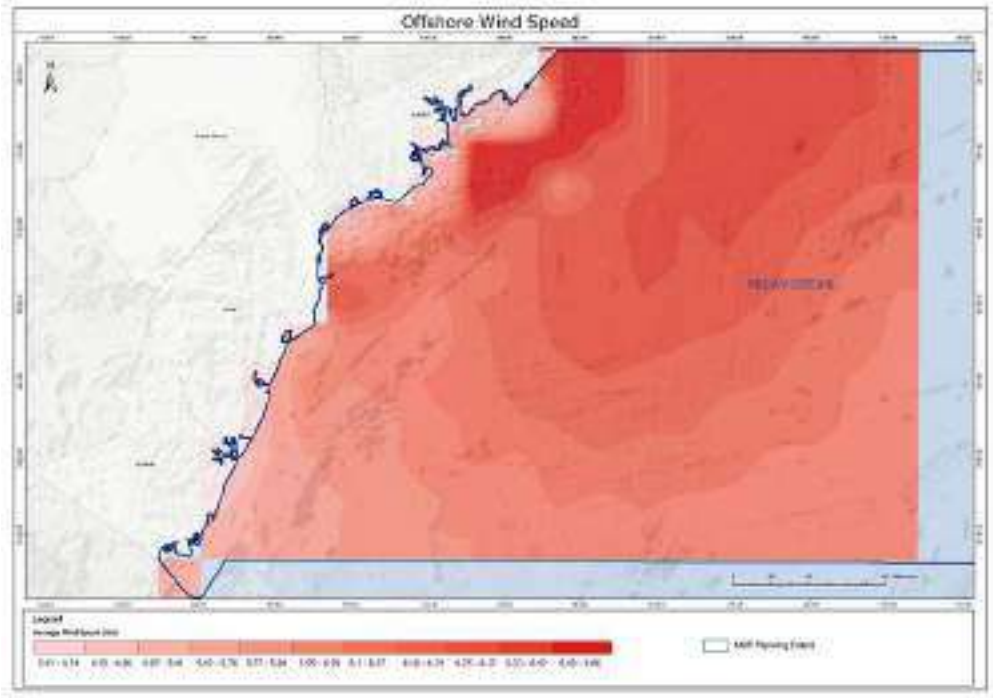

Figure **24**: Map showing wind energy potential assessment

Offshore wind in Kenya is technically possible using fixed-bottom turbines in shallow shelf waters and floating turbines in deeper areas, but suitable sites are limited by water depth (bathymetry) and marine protected areas. Development could create space-use conflicts (especially with artisanal fishers), plus navigation and safety concerns if governance is weak. Ecological risks include disturbance from turbines, cabling, and vessel traffic to coral reefs and marine parks, adding to existing pressures (e.g., shipping, sand mining). Overall, MSP is essential to balance wind development with biodiversity protection, livelihoods, and other ocean uses.

ii). Ocean Thermal Energy Conversion (OTEC) Potential

Kenya's coastal and offshore waters exhibit theoretical OTEC potential, driven by the temperature gradient between warm surface waters and colder deep waters. Recorded differences of 20–22 °C, as demonstrated in **Figure 25**, are sufficient to support OTEC systems, which rely on this thermal contrast to generate electricity.

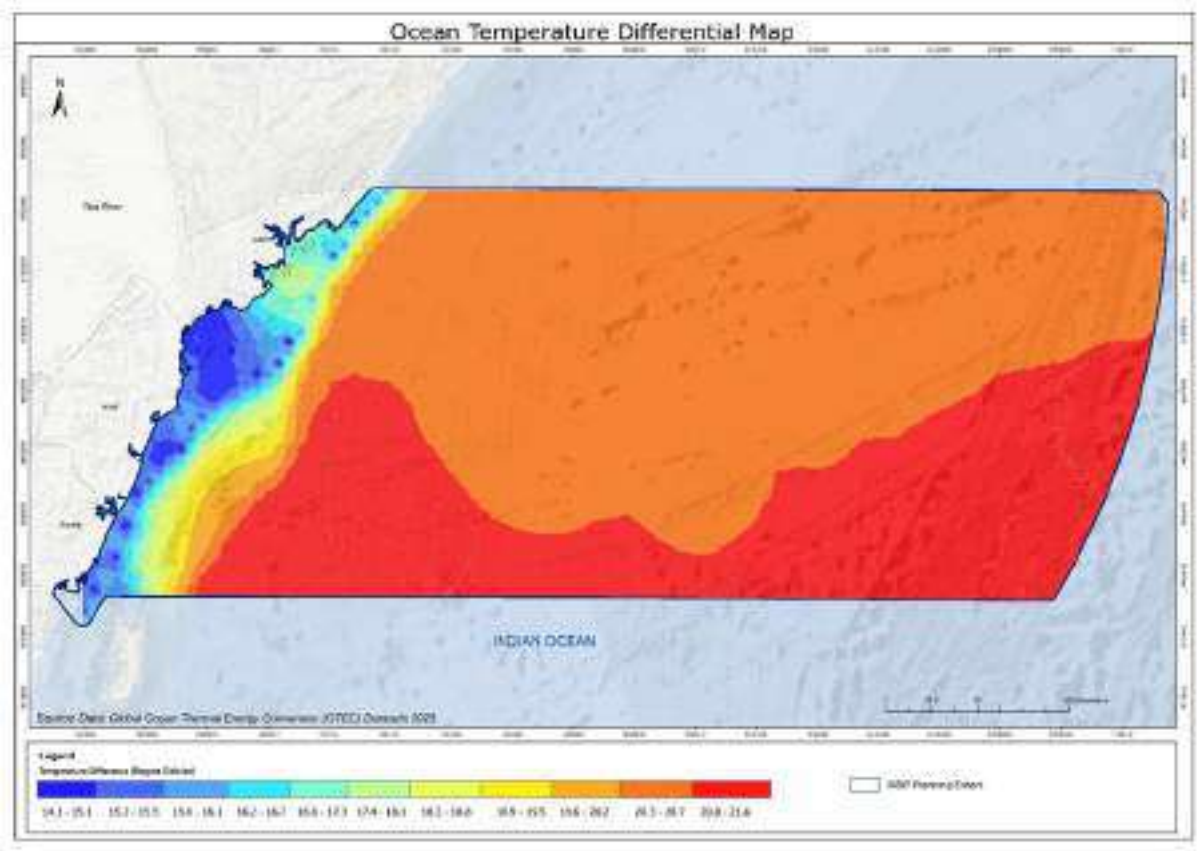

Figure 25: OTEC Potential assessment

Available assessments (e.g., NREL Marine Energy Atlas and peer-reviewed studies) suggest an individual OTEC plant could generate >50 MW and provide continuous baseload power (unlike wind/solar), supporting Kenya's energy security alongside geothermal, hydro, wind and solar. Key risks are mainly spatial and ecological. This includes potential conflict with artisanal fishing grounds, overlap with marine parks/biodiversity hotspots (habitat fragmentation, tourism impacts), and possible effects from noise/thermal plumes on sensitive species and corridors. Navigation safety and governance gaps can increase disputes and poor siting, so integrated marine spatial planning and strong regulation are essential

iii). Ocean Current Power

Kenya's offshore waters are influenced by several major ocean current systems that hold relevance for ocean current energy generation. These include the East African Coastal Current, which flows predominantly northward along the Kenyan coast, the South Equatorial Current that moves westward across the Indian Ocean toward East Africa, the Equatorial Counter Current flowing eastward near the equator, and the Somali Current, which reverses direction seasonally in response to monsoon systems[163] Together, these currents create a dynamic oceanographic environment with significant theoretical energy potential.

Technical assessments suggest that consistent current speeds of about 1.5 m/s represent high technical potential, while speeds of around 1 m/s may still be extractable under certain conditions. **Figure 26** indicates that the northern part of Kenya's contiguous zone offers the highest average speeds year-round, making it the most promising area for exploration. Energy conversion concepts under consideration include

[163] Benny. (2002). Data on Kenyan ocean currents relevant to ocean current energy. Schott, F., et al. (2009). Data on Kenyan ocean currents relevant to ocean current energy. Phillips, O., et al. (2021). Data on Kenyan ocean currents relevant to ocean current energy.

submerged current turbines, which function similarly to underwater wind turbines, and underwater kite systems that amplify flow speed across turbines[164]. Ocean current and tidal power are still early-stage technologies globally, and Kenya has no operational projects. Stakeholder inputs indicate few or no pilots implemented to date, with progress largely dependent on improved technology and investment. A tidal energy initiative proposed for Jomvu has been identified during engagement, but it remains a future proposal, not an active development.

Key pressures relate to navigation and local livelihoods: turbines, anchors, and subsea cables could obstruct or alter traditional routes used by small fishing boats, passenger vessels, and creek/nearshore transport raising collision risk, forcing rerouting, and increasing operating costs. This can affect fishing and aquaculture access rights, food security, and incomes. Ecologically, installation and cabling may disturb or fragment sensitive habitats (especially coral reefs and seagrass beds), with secondary economic impacts through reduced tourism appeal and diminished ecosystem services. Overall, development would require strong safeguards for navigation safety, fisheries, community livelihoods, and biodiversity.

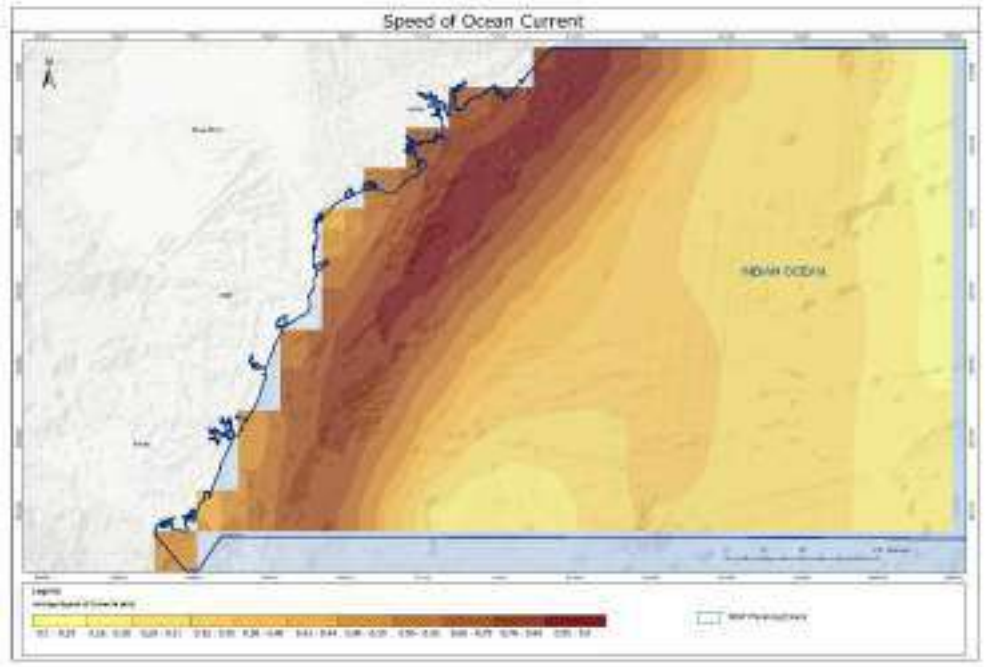

Figure **26**: Potential assessment of ocean current

iv). Marine Floating Photovoltaics (FPV)

Marine floating photovoltaics (FPV) represent a promising offshore renewable energy option, particularly for countries with extensive coastlines and high solar irradiance such as Kenya. The technology is designed to harness solar energy at sea, offering highly predictable diurnal and seasonal generation patterns. Unlike land-based solar, marine FPV systems are deployed on floating platforms anchored in deep waters, typically at depths of 40–50 meters or more. This minimizes seabed disturbance and reduces ecological impacts. The systems comprise floating structures, photovoltaic panels, mooring and anchoring systems, submerged transmission cables, and onshore substations to deliver electricity to the grid. In principle, marine FPV aligns well with Kenya's Blue Economy strategy, which emphasizes sustainable use of ocean resources for energy, livelihoods, and climate resilience.[164] [165]

[164] African Development Bank. (2021). Ocean current, tidal, wave, and floating photovoltaic (FPV) energy potential: Technical assessments and future outlook. Abidjan: AfDB.

[165] ESI Africa. (n.d.). Marine FPV technical considerations and challenges. https://www.esi-africa.com/industry-sectors/generation/worlds-first-recommended-practice-for-floating-solar-projects/

At present, however, Kenya has no operational marine FPV projects in its offshore waters. Most solar initiatives remain land-based or involve inland floating PV systems on reservoirs and lakes. Cations should be taken to ensure the seafloor is not altered, reduce noise pollution and the natural habitats and biodiversity are well protected and reduce conflict with other ocean users

v). Wave Power Potential

Kenya's offshore waters have high theoretical wave-energy potential (estimated ~3,620.6 GW within the EEZ), with average wave power typically 8–15 kW/m and seasonal/inter-annual variability. The most suitable development zones are nearshore and selected EEZ areas where wave power is stronger and more consistent, while the central EEZ (often ~5–10 kW/m) is generally less viable for large-scale extraction.

No commercial wave-energy projects are operating in Kenya yet; activity remains pre-commercial, limited to prototypes and small demonstrations aimed at testing feasibility under local conditions.

Key pressures likely to emanate from wave energy include changes to sediment transport from nearshore devices (risking erosion or unnatural accretion), plus space-use conflicts with fisheries, tourism, and navigation that may affect community access and livelihoods. These impacts can drive up costs through mitigation and engineering requirements, reducing competitiveness unless carefully planned and managed.

Non-Renewal Energy

Offshore oil and gas resources represent a strategic component of Kenya's energy sector, with potential to contribute to national energy security, revenue generation, and industrial development. Their exploration and extraction, however, introduce spatial pressures that require careful integration into Marine Spatial Planning to avoid conflicts with fisheries, conservation areas, and other ocean uses.

Offshore Oil and Gas

Kenya's offshore oil and gas resources are primarily concentrated in the Lamu Basin, which contains a total of 29 exploration blocks, of which 17 are offshore. Several of these blocks—such as L21, L22, L15, L9, and L10 extend partly onshore (**Figure 27**). Out of the offshore blocks, eight (L21, L22, L15, L16, L8, L7, L9, L10, and L6) have been identified for licensing.

Exploration activities have revealed speculative to indicative natural gas potential, with the most notable discovery in Block L10 (formerly L8), operated by Eni Kenya. Here, gas resources are estimated at 2.5–3.0 trillion cubic feet (TCF), equivalent to about 430–520 million barrels of oil equivalent (BOE). Importantly, this figure represents energy equivalence rather than crude oil volumes. Several international companies currently hold offshore blocks in the basin, including Total Energies and Crown Energy, reflecting growing private sector interest in Kenya's offshore hydrocarbon potential.[166]

[166] Nairobi Convention Secretariat. (2023). Environmental impacts of wave energy, sediment dynamics, and nearshore considerations. Nairobi: UNEP. African Development Bank. (2021). Ocean current, tidal, wave, and floating photovoltaic (FPV) energy potential: Technical assessments and future outlook. Abidjan: AfDB.

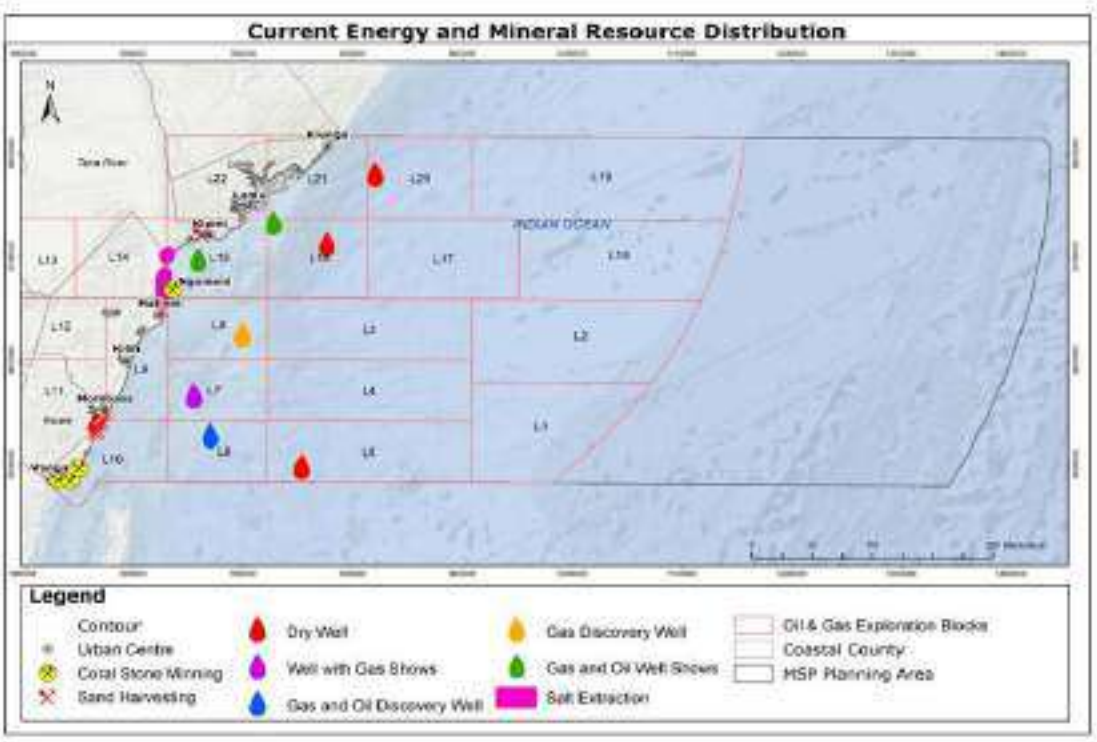

Figure 27: Existing Energy and mineral marine resource related activities

Kenya's offshore oil and gas sector is still in exploration/early development planning, with no offshore production to date. Several wells in the Lamu Basin were drilled and later closed after not proving commercially viable. The most advanced project is Block L10, which has progressed into development planning, including proposals for a Floating Liquefied Natural Gas (FLNG) export facility.

Key pressures include spill and pollution risks (oil spills, flaring, seabed disturbance), and spatial overlaps with sensitive ecosystems (coral reefs, mangroves, seagrass, marine mammal areas) and protected areas such as the Kiunga Marine Reserve. Exploration areas also overlap with artisanal fishing grounds, community conservation areas (JCMAs), and shipping corridors, creating potential conflicts over access, livelihoods, food security, and navigation safety. Past seismic work with limited community awareness has contributed to mistrust, increasing the need (and cost) for stronger safeguards, engagement, and conflict management especially to protect fisheries and tourism

Mineral Resources

Kenya's coastal zone supports active extraction of salt and construction aggregates, contributing to local economies and industrial supply chains. Salt production, in particular, is the most established mineral extraction activity, operating at the land–sea interface along the Kilifi and Malindi coasts.

a) Offshore Salt Mining

Salt production in Kenya represents a major coastal economic activity, though it is based on tidal flats rather than deep offshore saline extraction. Commercial salt is produced through solar evaporation ponds located behind mangrove zones, primarily between Ngomeni and Kurawa in Kilifi and Malindi coastal areas. These operations occur at the land–sea interface, where tidal flats provide suitable conditions for evaporation and crystallization, rather than in deep offshore waters.[167] Historically, Kenya's salt industry has involved large-

[167] FAO. (n.d.). Coastal survey and field reports: Tidal flats, saltworks locations, and historical areas under production (~7,900 ha). Rome: FAO. Helgi Library. (n.d.). Kenya's coastal salt operations.

scale salt works occupying up to ~7,900 hectares of tidal flats along the Ngomeni–Kurawa stretch, with some sites still active and others abandoned. The sector has been dominated by five major companies Kensalt Ltd, Krystalline Salt, Kurawa Industries, Malindi Salt Works, and Kemu Salt Packers—with a combined installed capacity of about 850,000 metric tonnes per year, though typically operating at around 60% capacity.[168]

Annual salt output has varied over time, with production figures of approximately 300,000 metric tonnes per year reported in the mid-2010s, and likely increasing with improvements in industry efficiency and infrastructure.[169] Salt production in Kenya is currently concentrated along the Ngomeni–Kurawa belt north of Malindi, where several large-scale operations are active. These salt works involve processes such as sequential brine concentration, drainage, washing, drying, and harvesting. However, escapes into mangrove areas and tidal flats have raised environmental concerns.[170] The sector operates under government oversight, with efforts focused on strengthening licensing compliance, royalty audits, and enforcement of regulations to ensure more sustainable management of coastal salt production.

b) Issues, Conflicts, Threats, and Pressures

Kenya's coastal salt industry result to a range of environmental, social, and economic challenges. Environmentally, salt works contribute to mangrove degradation, brine wastewater discharge, coral bleaching, flooding from trapped seawater, and declining fish populations. Socially, tensions arise between artisanal communities and commercial operators, particularly where salt production competes with mangrove conservation, creating disputes over resource use and access rights. Economically, the sector is affected by illegal or unlicensed operations, land encroachment, water-use conflicts, and export volatility, all of which undermine stability, sustainability, and fair competition.

5.5.5 Blue Economy Trade Matrix

Kenya's marine-dependent trade is concentrated in three sectors: fisheries (KES 5.9 billion exports), maritime transport (2 million TEUs, 41 million tonnes cargo), and coastal tourism (KES ~294 billion) as demonstrated in Table 78. Each sector depends directly on the ecological condition of marine and coastal assets, and each is subject to environmental pressures that MSP zoning can mitigate or exacerbate.

Fisheries (artisanal and industrial) produce 48,608 MT valued at KES 15.2 billion annually, of which exports account for KES 5.876 billion.[171] Overfishing of priority species (Table 72, CBA) and IUU fishing (estimated USD 100 million annual loss) indicate that current Fisheries Management Zones (FMZ) are not fully effective. The SESA recommends that FMZ regulations be strengthened with enforceable quotas for ornamental fish collection and that export value be incorporated into MSP monitoring indicators to track the economic impact of stock recovery measures.

Maritime transport handles 2,005,076 TEUs of containerised cargo and 41.1 million tonnes of bulk cargo annually, generating KES 67.04 billion in port revenue. These activities impose cumulative environmental pressures: dredging plumes, underwater noise, ballast water discharge, and collision risk with marine mammals. The Navigation, Port Access and Security Zone (NPAZ) and Marine Infrastructure Protection Zone (MIPZ) provide spatial separation and operational controls. Residual risks persist in high-traffic areas (Likoni Channel, Mombasa port approaches), where dredging and vessel congestion overlap with seagrass and coral habitats.

Coastal tourism is the largest service export, with an estimated marine-share value of KES 293.93 billion (65% of national tourism earnings of KES 452.2 billion). This sector is highly sensitive to environmental

[168] KAM. (n.d.). Salt sub-sector profile: Industry capacity, companies, and operations. Nairobi: Kenya Association of Manufacturers.

[169] NEMA. (n.d.). State of the coast: Historical production data (~300,000 MT per year), coastal salt industry, and environmental impacts. Nairobi: National Environment Management Authority.

[170] FAO. (n.d.). Coastal survey and field reports: Tidal flats, saltworks locations, and historical areas under production (~7,900 ha). Rome: FAO

[171] KeFS. (2025). Fisheries Statistical Bulletin 2024.

degradation: coral bleaching, seagrass loss, beach erosion, and marine litter reduce destination appeal and directly erode trade value. The Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ) provides spatial safeguards (no-anchor zones, turtle-friendly lighting, wastewater controls). Climate-driven bleaching events and land-based pollution remain beyond the MSP's direct control.

Digital infrastructure, including, submarine fibre optic cables (TEAMS, SEACOM, EASSy, PEACE, etc.), is a high-value, low-footprint trade service. The PEACE cable alone represents KES 44 billion (≈USD 400 million) in investment, though recurring trade value (service exports) is not separately reported. The MIPZ protection zones prohibit anchoring and trawling in cable corridors, safeguarding digital connectivity. The SESA recommends that cable protection buffers be strictly enforced and that any future cable routing be subject to mandatory seabed habitat surveys to avoid sensitive benthic ecosystems.

Mineral resources such as solar evaporated salt, hsve an installed production capacity of 850,000 tonnes per year, typically operating at ~300,000 tonnes per year. However, export value is not reported in available trade statistics (KNBS data gap). The activity occurs within Mangrove Conservation Zones, where brine discharge degrades adjacent seagrass and mangroves.

Marine biotechnology, including seaweed (carrageenan) farming and ornamental fish collection, are active sectors that generate local livelihoods. Seaweed farming occurs in Aquaculture Development Zones (ADZ) in Kwale County (Gazi, Kibuyuni, Mwazaro, Mkwiro). Ornamental fish collection involves approximately 300,000 fish annually from reef-associated zones. No economic values (export volumes or revenues) are systematically reported for either sector in baseline datasets or the CBA. Without these values, zoning decisions that affect these sectors (e.g., ADZ water quality requirements, Coral Conservation Zones restricting collection) may impose unquantified opportunity costs.

Offshore energy, consisting of natural gas in Block L10 (2.5–3.0 trillion cubic feet recoverable), has not yet entered commercial production. No trade value currently exists. The Offshore Oil and Gas Exploration and Production Zone (OGEP) is designated but conditional; it overlaps Kiunga Marine Reserve, with associated spill and seismic risks. As such, no production be permitted until a full environmental and social impact assessment is completed and that any future trade value be monitored against agreed environmental safeguards.

Table 78: Trade aspects of the blue economy

Sector	Traded Commodity / Service	Trade Type	Annual Value / Volume
Fisheries	Marine fish (artisanal + industrial)	Domestic / export	48,608 MT valued at KES 15.2 billion (2024)
	Fish and fishery products (exports)	Export	8,616 tonnes valued at KES 5.876 billion (2024)
	Ornamental fish	Export (niche)	Data gap: ~300,000 fish collected annually; value not systematically reported
Maritime transport	Containerised cargo	Import / export	2,005,076 TEUs (2024)
Maritime transport	Bulk cargo	Import / export	41.1 million tonnes (2024)
Maritime transport	Marine transport services	Service export / domestic	KES 67.04 billion revenue (FY2023/24)

Sector	Traded Commodity / Service	Trade Type	Annual Value / Volume
Coastal tourism	International tourism (beach, marine wildlife, cruise, diving)	Service export	KES 293.93 billion (65% of KES 452.2 billion total, 2024)
Digital infrastructure	Submarine fibre optic data transmission (TEAMS, SEACOM, EASSy, PEACE, etc.)	Service export	PEACE cable: KES 44 billion (≈USD 400 million) investment
Mineral resources	Solar evaporated salt	Export	Data gap: installed capacity 850,000 tonnes/year; typical operating ~300,000 tonnes/year (value not reported)
Marine biotechnology	Seaweed (carrageenan)	Export	Data gap: active farming in Kwale (Gazi, Kibuyuni, Mwazaro, Mkwiro); volume and value not systematically reported
Marine biotechnology	Ornamental fish (already covered above)		
Offshore energy (future)	LNG (natural gas)	Potential export	Block L10 gas: 2.5–3.0 trillion cubic feet (TCF) – no commercial production yet

Source: Adopted from Economic Survey Reports by KNBS; Statistical Bulletins by KeFS and Tourism Annual Performance Reports.

Kenya's marine-dependent trade is anchored by coastal tourism, maritime transport and fisheries exportsof which depend on ecological integrity and effective MSP zoning. The MTCZ, NPAZ, MIPZ, and FMZ provide essential safeguards, but residual risks of dredging, overfishing, and climate impacts persist. Digital infrastructure relies on cable protection buffers; salt, seaweed, and ornamental fish trade lack reported values, creating unquantified opportunity costs. Therefore, targeted economic valuation for data-poor sectors and integration of trade indicators into MSP monitoring to ensure sustainable management within ecological limits.

5.6 Marine and Coastal Hazards

Hazards, either natural or human-induced events, have the potential to cause harm to human safety, infrastructure, ecosystems, and livelihoods within Kenya's marine and coastal space. Understanding the spatial distribution, frequency, intensity, and cumulative nature of these hazards is, therefore, essential for MSP. Kenya's marine planning area is exposed to four categories of hazard: natural hazards, climatic and oceanographic hazards, technological and human-induced hazards, and biological hazards.

5.6.1 Natural Hazards

Natural hazards are driven by oceanographic, atmospheric, and geological processes. Their impacts are often amplified by climate change and unplanned coastal development. They include coastal erosion, sea-level rise, coastal flooding, extreme waves and agal bloom.

Coastal Erosion

Approximately 16% of Kenya's coastline is experiencing critical erosion, with local retreat rates exceeding 2–3 metres per year in areas of Kilifi and Kwale counties.[172] Erosion hotspots include the shoreline between Malindi and Mambrui (driven by sediment starvation following damming of the Athi-Sabaki River),

[172] Government of Kenya. (2017). State of the Coast Report II. Enhancing Integrated Management of Coastal and Marine Resources in Kenya. National Environment Management Authority (NEMA), Nairobi.

sections of the Diani-Galu beach complex, and parts of the Lamu Archipelago. Erosion threatens tourism infrastructure, turtle nesting beaches, and the stability of coastal roads and settlement areas.

Storm Surges and Coastal Flooding

The monsoon-driven wave generates episodic storm surges, particularly during the Southeast Monsoon (May–October) when significant wave heights can reach 8 metres.[173] Low-lying areas in Mombasa (Likoni, Tudor, Port Reitz), the Tana River Delta, and Lamu's island communities are vulnerable to inundation during spring tides coincident with storm events. Flooding disrupts transport (including ferry services), damages landing sites and fish-drying areas, and increases salinisation of freshwater lenses.[174]

Extreme Wave Events (Swells)

Offshore swells with significant heights of up to 6 metres during the Northeast Monsoon and 8 metres during the Southeast Monsoon pose navigation hazards for small craft and increase the risk of grounding and mooring failure in exposed anchorages.[175] Offshore wind energy zones are sited to avoid the highest wave-energy regimes where technically feasible, but residual risks remain for installation and maintenance vessels.

5.6.2 Climatic and Oceanographic Hazards

Climatic and oceanographic hazards refer to changes in the physical and chemical state of the marine environment that can cause harm to ecosystems, infrastructure, or human wellbeing. In Kenya's marine planning area, these hazards include marine heatwaves, ocean acidification, sea-level rise, and harmful algal blooms, each of which interacts with existing pressures to affect fisheries, tourism, and coastal communities.

Marine Heatwaves (MHWs)

Satellite sea surface temperature (SST) records show that the frequency and intensity of MHWs in Kenya's waters have increased over the past four decades. The 1998 and 2016 events caused widespread coral bleaching, with live coral cover declining by 51–70% in some reef systems.[176] More recently, MHWs in 2020 and 2023 triggered localised bleaching in Kisite-Mpunguti and Malindi Marine Parks. These events reduce reef resilience, alter fish community composition, and affect tourism-dependent livelihoods.[177]

Ocean Acidification

The pH of surface waters in Kenya's territorial sea ranges between 8.04 and 8.75. Lower values (8.04–8.08) are observed in the southern and northern zones near estuarine systems (e.g., Umba and Ramisi rivers), reflecting elevated dissolved CO_2 from organic carbon mineralisation in adjacent mangroves. Acidification impairs calcification in corals, molluscs, and some plankton species, with long-term implications for reef structure and shellfish mariculture potential.

Harmful Algal Blooms (HABs)

Monitoring by the Kenya Marine and Fisheries Research Institute (KMFRI) has detected toxin-producing phytoplankton species, including Alexandrium spp., Gymnodinium spp., and Pseudo-nitzschia spp., in nearshore waters, particularly in semi-enclosed creeks (Tudor, Mtwapa, Kilifi) and during the rainy season

[173] Nguli, M. M. (2006). Wave climate and coastal processes in Kenya. Kenya Marine and Fisheries Research Institute.

[174] Government of Kenya. (2017). National Disaster Risk Management Policy. Nairobi: Ministry of Interior and Coordination of National Government.

[175] KMD. (2026). State of the Climate in Kenya 2025.

[176] Obura, D. O. (2012). The diversity and biogeography of Western Indian Ocean reef building corals. PLoS ONE, 7(9), e45013. https://doi.org/10.1371/journal.pone.0045013

[177] Gudka, M. et al. (2024). Leveraging the Red List of Ecosystems for action on coral reefs through the Kunming Montreal Global Biodiversity Framework. Conservation Science and Practice, 6(12), e13255.

when nutrient-laden runoff is elevated.[178] While no major human poisoning events have been recorded, HABs pose a risk to seafood safety (shellfish), public health, and marine tourism through water discolouration and fish kills. Areas with regular HAB occurrences require enhanced water-quality monitoring and, where appropriate, dynamic closure protocols for shellfisheries and recreation.

5.6.3 Technological and Human-Induced Hazards

Technological and human-induced hazards arise from industrial activities, maritime operations, and coastal infrastructure development. In Kenya's marine planning area, these hazards include oil and chemical spills from shipping, underwater noise from vessels and seismic surveys, marine litter and ghost gear, and shipping collisions or groundings. Such hazards can cause acute environmental damage, disrupt livelihoods, and pose risks to public safety and marine biodiversity.

Oil and Chemical Spills

The Port of Mombasa and the emerging Port of Lamu are focal points for spill risk. Vessel traffic data indicate that major shipping corridors transiting Kenya's EEZ include oil and chemical tankers, bulk carriers, and container vessels. The Kenya Maritime Authority's National Marine Spills Response Contingency Plan designates high-priority areas for spill preparedness, including the Likoni channel, the port approach zones, and the offshore anchorage areas.[179] Spatial overlap between shipping lanes and sensitive habitats (coral reefs, seagrass, mangrove-fringed creeks) defines the highest-risk zones for ecological damage in the event of a spill.

Underwater Noise Pollution

Noise from vessel propulsion, seismic surveys, port construction, and dredging can disturb marine mammals, fish, and invertebrates. Important Marine Mammal Areas (IMMAs) identified in the MSP, including Watamu-Malindi, Kisite-Shimoni and Lamu Offshore, are exposed to noise from shipping corridors and offshore energy exploration.[180] Chronic noise can mask communication, displace animals from feeding or breeding grounds, and increase stress levels. Mitigation measures include seasonal restrictions on high-noise activities during peak migration periods and mandatory use of quieter technologies where feasible.

Marine Litter and Ghost Gear

Beach and floating litter surveys (2019–2023) show that most sites fall within low-to-moderate litter densities, but localised hotspots occur near urban centres (Mombasa, Malindi) and river mouths (Tana, Sabaki).[181] Lost or discarded fishing gear ("ghost gear") continues to entangle turtles, dolphins, and seabirds and damages coral and seagrass habitats. High-litter areas are priority zones for clean-up campaigns and for the installation of port reception facilities compliant with MARPOL Annex V.[182]

Shipping Collisions and Grounding

High vessel traffic in the Mombasa approach channel and the Lamu port development area increases the risk of collisions between large commercial vessels and small-scale fishing craft, as well as grounding on unmarked shoals or coral patches. The MSP's Navigation, Port Access and Security Zone (NPAZ) reduces this risk by designating major shipping corridors and mandating Navigation Risk Assessments (NRA) for any infrastructure intersecting those corridors.

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[178] Oduor, N. et al. (2023). Nutrients and harmful algal blooms in Kenya's coastal and marine waters: A review. Ocean & Coastal Management, 233, 106454.

[179] KMA. (2019). National Marine Spills Response Contingency Plan. Nairobi: Government of Kenya.

[180] Mwango'mbe, M. G. (2021). Cetacean Research and Citizen Science in Kenya. Frontiers in Marine Science, 8, 642399.

[181] Okuku, E. O. (2020). Baseline meso-litter pollution in selected coastal beaches of Kenya: Where do we concentrate our intervention efforts? Mar Pollut Bull. 2020 Sep;158:111420. doi: 10.1016/j.marpolbul.2020.111420.

[182] MARPOL Annex V (Regulations for the Prevention of Pollution by Garbage from Ships) came into force on 31 December 1988. It specifies the distances from land in which materials may be disposed of and subdivides different types of garbage and marine debris.

5.6.4 Biological Hazards

Biological hazards in the marine environment refer to harmful or potentially harmful organisms, or the conditions they create, that can adversely affect human health, marine ecosystems, or economic activities. In Kenya's marine planning area, biological hazards include the introduction and spread of invasive species via ballast water, as well as disease outbreaks in wild fisheries and mariculture operations. These hazards can reduce biodiversity, compromise food security, and impose economic losses on coastal livelihoods and the blue economy.

Invasive Species

Ballast water discharge from international shipping is the primary pathway for introducing non-indigenous marine species into Kenya's waters. The Caribbean tubeworm (Hydroides sanctaecrucis) and the green mussel (Perna viridis) have been recorded in port areas. Invasive species can outcompete native fauna, alter benthic communities, and increase maintenance costs for submerged infrastructure. Kenya has ratified the IMO Ballast Water Management Convention, and the Kenya Maritime Authority enforces ballast water exchange and treatment requirements for all incoming vessels.

Disease Outbreaks in Mariculture

The Aquaculture Development Zone (ADZ) includes areas for finfish and shellfish farming. Outbreaks of bacterial (e.g., Vibrio spp.) or parasitic diseases can cause significant economic losses and may require fallowing or treatment.

The marine and coastal hazards affecting Kenya's planning area span natural, climatic, technological, and biological categories, many of which are intensifying under climate change and rising human activity. Failure to account for these hazards in spatial planning can increase risks to coastal communities, infrastructure, and ecosystems, undermining the long-term sustainability of the blue economy. Integrating hazard assessments into marine spatial planning supports risk-informed zoning, emergency preparedness, and adaptive management, thereby reducing vulnerability and enhancing resilience.

CHAPTER 6: STAKEHOLDER ENGAGEMENT

6.1 Overview

Stakeholder engagement under the MSP process fulfilled the constitutional principles of public participation, inclusiveness, transparency, and accountability set out in Articles 10 and 232 of the Constitution of Kenya (2010), and the participatory planning requirements of the Physical and Land Use Planning Act (PLUPA), 2019. The process ensured the meaningful involvement of national and county governments, sectoral agencies, coastal communities, private-sector actors, civil society organisations, and vulnerable and marginalised groups in identifying marine uses, priorities, conflicts, and management needs. Consultation outputs, including the objectives, scope, institutional arrangements, methods, and key issues raised, were systematically integrated into MSP zoning, scenario development, safeguards, and implementation measures, thereby strengthening the legal validity, social legitimacy, and practical implementability of the MSP.

6.2 Purpose and Objectives

The purpose and objectives of stakeholder engagement are outlined below.

6.2.1 Purpose

Stakeholder engagement in the MSP process was undertaken to ensure that its preparation was participatory, inclusive, transparent, and accountable, in accordance with Articles 10 and 232 of the Constitution of Kenya (2010) and the public participation requirements of the Physical and Land Use Planning Act (PLUPA), 2019. The engagement aimed to secure meaningful involvement of all stakeholders with interests, rights, and responsibilities in Kenya's marine space to strengthen the legal validity, social legitimacy, and practical implementability of the MSP, while promoting equitable, sustainable, and conflict-sensitive use of marine and coastal resources.

6.2.2 Objectives

The specific objectives of stakeholder engagement in the MSP process were to:

1. Identify and engage relevant stakeholders, including national and county governments, sector agencies, coastal communities, private sector actors, civil society organisations, and vulnerable and marginalised groups.
2. Provide timely and accessible information on the MSP process, its legal basis, scope, timelines, and expected outcomes.
3. Collect stakeholder inputs on marine uses, spatial conflicts, socio-economic priorities, environmental concerns, and governance challenges.
4. Integrate local knowledge, traditional practices, and sectoral expertise into MSP zoning, scenario development, safeguards, and management measures.
5. Promote equity and inclusion by ensuring the effective participation of women, youth, vulnerable and marginalised groups, and small-scale resource users.
6. Facilitate dialogue and consensus-building among competing marine users to prevent and manage spatial conflicts.
7. Build stakeholder ownership, coordination, and long-term commitment to MSP implementation and compliance.
8. Ensure transparency and accountability by documenting stakeholder views and demonstrating how inputs informed the final Marine Spatial Plan.

6.3 Scope and Institutional Arrangements

The scope and institutional arrangements for stakeholder engagement are outlined below.

6.3.1 Scope of Stakeholder Engagement

The stakeholder engagement process for the MSP covered the full spatial, institutional, and procedural scope of the planning exercise. Engagement extended across Kenya's marine area, including coastal waters,

offshore areas, and the Exclusive Economic Zone (EEZ), with focused engagement at national, county, and community levels along the coast. Stakeholders engaged included national and county government institutions, sector agencies, coastal communities, private sector actors, civil society organisations, academia, and vulnerable and marginalised groups with interests or responsibilities in marine and coastal resource use.

Engagement activities were undertaken throughout the MSP lifecycle, including scoping and baseline assessments, identification of marine uses and spatial conflicts, scenario development, zoning options, safeguards, and preparation of implementation and monitoring frameworks. The scope was designed to capture sector-specific and location-specific issues and to ensure that stakeholder inputs informed both technical analyses and policy decisions underlying the Marine Spatial Plan.

6.3.2 Institutional Arrangements

Stakeholder engagement for the MSP was implemented through a coordinated, multi-level institutional framework to ensure clarity of roles, accountability, and statutory compliance. Overall oversight was provided by the lead MSP secretariat, supported by a Multi-Agency Steering Committee (MASC) that provided strategic guidance and facilitated inter-agency coordination among institutions with marine, environmental, planning, and sectoral mandates.

The technical team and the Consultant were responsible for planning and executing engagement activities, working closely with sector agencies and county governments. County-level coordination mechanisms facilitated engagement with local institutions, community representatives, and other stakeholders, ensuring alignment with devolved governance structures and county development priorities. Throughout the process, clear feedback and documentation mechanisms were applied to ensure transparency and systematic integration of stakeholder inputs into MSP outputs, thereby strengthening the credibility, legitimacy, and implementability of the Marine Spatial Plan.

6.4 Methodology

This section describes the methodology the Consultant applied to undertake stakeholder engagement and public consultation for the Marine Spatial Planning (MSP) and Strategic Environmental and Social Assessment (SESA) processes. The methodology aligned with the Constitution of Kenya (2010), the Physical and Land Use Planning Act (PLUPA), 2019, and the World Bank Environmental and Social safeguards policies on Stakeholder Engagement and Information Disclosure. The process followed a structured, participatory, and iterative approach across all MSP phases, as illustrated in **Figure 28.**

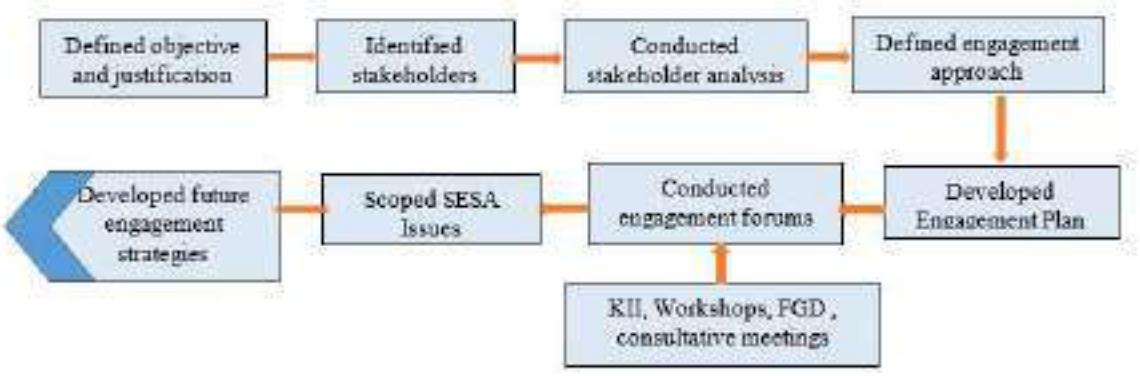

Figure **28**: Stakeholder engagement process

6.4.1 Development of the Stakeholder Engagement Strategy (SES)

A Stakeholder Engagement Strategy (SES) was developed to guide and manage consultation and engagement throughout the MSP and SESA processes. The SES was prepared through a participatory and consultative process involving state actors and key technical experts. It defined who would be engaged,

when engagement would occur, and how stakeholders would participate at different stages of the MSP process. The SES served as:

a) A guiding framework to ensure transparency, coordination, and accountability in stakeholder engagement;
b) A planning tool to define the timing and sequencing of stakeholder involvement; and
c) A reference for appropriate engagement methods to support meaningful and active participation throughout the MSP process.

6.4.2 Stakeholder Identification

Stakeholder identification was informed by desk reviews, recommendations from the project proponent, consultations with government and non-government organisations active in the marine and coastal region, and the SESA team's expert judgement. Stakeholders were identified at the national, county, and community levels, encompassing institutions, groups, and individuals with mandates, interests, rights, or dependencies related to marine and coastal resources.

Stakeholder Identification Criteria

The stakeholder identification process classified stakeholders into three categories:

a) Vulnerable and disadvantaged groups: individuals or groups who may require targeted engagement because of their vulnerability. These are persons who may be disproportionately affected or further disadvantaged by the Project relative to other groups, and who may therefore require specific measures to ensure their meaningful representation in consultation and decision-making processes associated with the Project.
b) Project-affected parties: stakeholders who are affected, or likely to be affected, by the Project. In this process, they include relevant national government ministries, the five coastal county governments, and community members directly engaged in marine-related activities, including fishers, transporters, and other marine resource users.
c) Interested parties: individuals, groups, or entities that may not experience direct impacts from the Project but have an interest in it because of its location, associated natural resources, institutional mandate, or relationship to affected parties. These stakeholders may perceive their interests to be influenced by the Project and may also influence its implementation and outcomes.

To facilitate stakeholder analysis and engagement, stakeholders were further grouped into the six broad categories presented in **Table 79**.

Table **79**: Stakeholder Categorization

S/N	Category
i).	**Public Sector:** Key Ministry Agencies and Lead Agencies, Key Public Institutions
ii).	**Private Sector Actors/ Investors / Associations:** Beach Management units, members of the fisheries Value Chain Common Interest Groups, etc.
iii).	**Elected leaders/ politicians, including** Governors from five counties (Lamu, Tana River, Mombasa, Kilifi, and Kwale).
iv).	**Academic and Research Institutions, for example,** WIOMSA, Pwani University, UoN, Bandari Maritime Academy, TUM, etc., COMRED, East African Wildlife Society, Watamu Marine Association, Local Ocean Conservation
v).	**Civil Society Organizations (CSOs), for example,** IUCN, Nature Kenya, TNC, EAWLS, CANCO, Big Ship, MoKIFA, TUFACK, etc.
vi).	**Representatives of the local communities, including** Vulnerable and Marginalized Groups, including groups for Disabled Stakeholders

A comprehensive list of mapped stakeholders is presented in **Annex 3**.

6.4.3 Stakeholder Analysis

Identified stakeholders were analysed based on their level of interest and influence across different phases of the MSP and SESA processes. Stakeholders were also grouped into three thematic spheres—governance, social, and environmental—to guide targeted engagement approaches. Government regulatory agencies with high influence over planning, environmental management, and sector governance were engaged strategically through executive-level forums, including the Project Executive Committee and the Multi-Agency Steering Committee (MASC).

Stakeholders were further categorised using an influence–interest matrix (**Table 80**) to determine the level and intensity of engagement required, recognising that stakeholders with high interest and/or influence required more extensive and continuous engagement.

Table **80**: Categorization of stakeholders based on level of Influence (power) and interest

Influence/power of Stakeholder	**High Interest & Low Influence:** Specialized information provided during all the phases of the SESA – planning and implementation: • Government Agencies (national/County) • CSO (national/county) • Private Sector • Institutions For Example: Department of Resource Survey and Remote Sensing, Kenya Space Agency, Ministry of Water, Sanitation and Irrigation, Climate Change Council, Coast Development Authority	**High Interests & High Influence:** Partnerships developed for each phase of the MSP – planning and implementation: ● Government Agencies (national/County) ● CSO (national/county) ● Private Sector ● Institutions For example, the State Department of Blue Economy and Fisheries, the Kenya Fisheries Service (KFS), the National Environment Management Authority (NEMA), the Kenya Forest Service (KFS), and the Kenya Coast Guard Service (KCS).
	Low power & low interest: Lay-language information is provided on MSP activities and the reasons for SESA. It may not require much attention, but do not drop completely. • Government Agencies (national/County) • CSO (national/county) • Private Sector • Institutions Example: East African Wildlife Society; Law Society of Kenya (LSK); Kenya Union of Journalists	**Low power & high interest:** Plan for the Involvement of stakeholders with strong influence but low interest during all the phases of SESA and MSP activities – planning and implementation. Keep them Informed • Government Agencies (national/County) • CSO (national/county) • Private Sector • Institutions • VMGs For example: The National Museums of Kenya, the Ministry of Foreign and Diaspora Affairs, Planning, and the National Treasury.
	Interest of stakeholders	

Source: *Mendelow, A. L. (1991). Environmental Scanning: The Impact of the Stakeholder Concept. Proceedings of the Second International Conference on Information Systems*.

6.4.4 Tools Development

To support consistency and meaningful participation, the technical team developed a suite of engagement tools, including simplified awareness presentations, participatory mapping materials using satellite imagery, focus group discussion guides, key informant interview tools, and structured attendance and demographic registers. These tools enabled systematic capture of stakeholder inputs, spatial knowledge, and inclusivity metrics.

6.4.5 Capacity Building of the Planning team

A three-day capacity-building workshop held in Kilifi from 6–8 October 2025 strengthened the planning and facilitation team's readiness. The workshop focused on harmonising engagement tools, refining GIS

maps and spatial datasets, piloting engagement approaches, and strengthening inter-institutional coordination. This ensured consistent, high-quality facilitation across Kilifi, Lamu, Kwale, Tana River, and Mombasa counties.

6.4.6 Stakeholder Engagement Plan

In line with the engagement approach, a detailed Stakeholder Engagement Plan was developed (***Table 81***). The plan guided stakeholder involvement across the SESA screening, scoping, and study phases, with tailored engagement strategies including workshops, interviews, focus group discussions, and online meetings to ensure systematic input into MSP zoning, scenario development, and safeguard formulation.

Table **81**: Stakeholder Engagement Plan for the SESA

SESA Phase	Stakeholders Engaged	Core Engagement Focus	Methods Used
SESA Screening	National and county public sector institutions	▪ Define MSP/SESA scope, objectives, boundaries, and timelines ▪ Assess if the project requires a full SESA ▪ Establish institutional roles, governance structures, and coordination mechanisms	▪ Workshops ▪ Meetings
SESA Scoping	Public sector; private sector; NGOs/CSOs; research & academia; community representatives; VMGs	▪ Identify and map marine uses, ecosystems, and socio-economic activities ▪ Validate baseline conditions and sector data ▪ Identify spatial conflicts and compatibilities ▪ Review preliminary scenarios and alternatives	▪ Consultative workshops ▪ Key Informant Interviews ▪ Focus Group Discussions
SESA Study	Public sector; private sector; NGOs/CSOs; research & academia; community representatives; VMGs	▪ Analyse Blue Economy development options ▪ Refine scenarios and MSP zoning proposals ▪ Define zone-specific management measures and safeguards ▪ Agree on implementation, institutional responsibilities, and monitoring indicators	▪ Targeted interviews and FGDs ▪ • Online meetings and document review

6.4.7 Free, Prior, and Informed Consultation

The stakeholder engagement process for the Marine Spatial Plan (MSP) was guided by the three core principles of Free, Prior and Informed Consultation (FPIC) as an overarching framework for meaningful, transparent, and accountable engagement with all stakeholders – including national and county governments, sectoral agencies, coastal communities, private sector actors, civil society organisations (CSOs), academia, research institutions, and vulnerable and marginalised groups (VMGs).

Role of FPIC in the Engagement Process

FPIC principles served as a procedural and ethical framework to ensure that all stakeholders were not merely informed but were genuinely able to understand, participate in, and influence decisions affecting Kenya's marine space. FPIC was applied as a best-practice standard across the entire stakeholder engagement process, ensuring that engagement was:

- Free: Voluntary, without coercion, intimidation, or undue influence.

- Prior: Conducted before key decisions (e.g., zoning, scenario selection) were finalised.
- Informed: Based on complete, accessible, and understandable information.

Table 82 summarises the role of each FPIC principle in the MSP stakeholder engagement process.

Table **82**: Role of FPIC Principles in MSP stakeholder engagement

Principle	Role in MSP Stakeholder Engagement
Free	Ensured that participation by all stakeholders was voluntary and without coercion, inducement, or pressure.
Prior	Ensured that engagement occurred before zoning decisions, scenario selection, and safeguard design were finalised, allo stakeholders to influence outcomes.
Informed	Ensured that all stakeholders received complete, accessible, and understandable information about the MSP process, the rights, and how their inputs would be used.

How FPIC Principles Were Deployed

The three core FPIC principles were operationalised through specific engagement mechanisms designed to reach all stakeholder categories – from national government agencies to local community members. **Table 83** summarises how each principle was deployed, the stakeholder categories targeted, the specific engagement methods used, and the intended outcome.

Table **83**: Deployment of FPIC principles across all Stakeholders

Principle	Stakeholder Categories Targeted	Deployment in MSP Engagement	Intended Outcome
Free	All stakeholders (government, private sector, CSOs, academia, communities, VMGs)	Participation was voluntary. No coercion or inducement was applied. Multiple entry points (in-person, online, written, verbal) were provided to accommodate different stakeholder capacities and preferences.	Stakeholders participated without fear, pressure, or expectation of reward, ensuring genuine and voluntary engagement across all categories.
Prior	All stakeholders (government, private sector, CSOs, academia, communities, VMGs)	Engagement occurred **before** zoning decisions were finalised. Notices were issued at least 14 days in advance of meetings. Draft scenarios, preliminary zoning options, and safeguard proposals were shared for feedback before the MSP was adopted.	All stakeholders had adequate time to prepare, deliberate, and formulate responses before decisions were made.
Informed	All stakeholders, with tailored approaches for VMGs	Information was provided through multiple channels: simplified presentations, technical reports, visual maps with landmark features, and online portals. For VMGs and community stakeholders, information was provided in Swahili and local languages, using participatory mapping and visual aids.	All stakeholders understood the MSP process, its implications, and how their inputs would be used. VMGs received information in culturally appropriate and accessible formats.

Outputs and Outcomes from the Application of FPIC Principles

The application of FPIC principles across the entire stakeholder engagement process produced tangible outputs that directly informed the MSP and SESA processes. **Table 84** presents the key outputs and their corresponding outcomes.

Table **84**: Outputs and outcomes from FPIC-aligned stakeholder engagement

Output	Outcome
Participatory maps documenting fishing grounds, breeding areas, navigation routes, culturally significant sites, and infrastructure corridors (from community and VMG engagements)	Local and traditional spatial knowledge was integrated into MSP zoning and baseline data.
Documented stakeholder priorities, concerns, and recommendations from all categories (government, private sector, CSOs, academia, communities, VMGs)	Stakeholder inputs directly informed scenario development, safeguard design, and zone-specific management measures (see **Annex 4**).
Verified feedback on draft zoning, scenarios, and management measures from all stakeholder categories	Stakeholders confirmed that their inputs were accurately captured; disputes and misinterpretations were resolved before finalisation.
Increased awareness of MSP objectives, timelines, and implications across all stakeholder categories	Stakeholders understood what the MSP would and would not do, reducing fear, mistrust, and misinformation.
Documented record of engagement (attendance registers, meeting notes, feedback matrices, signed participant lists)	Evidence base was established for accountability, future monitoring, and World Bank compliance.

Utility of Applying FPIC Principles to the Entire Stakeholder Engagement Process

The application of FPIC principles – as a framework for good practice stakeholder engagement across all stakeholder categories – provided several tangible benefits to the MSP process. **Table 85** summarises the utility of applying FPIC principles across the entire stakeholder engagement process.

Table **85**: Utility of Applying FPIC principles to all stakeholders

Utility	Explanation
Building trust	Early, transparent, and culturally appropriate engagement reduced scepticism and mistrust across all stakeholder categories, particularly in areas with historical mistrust of government-led planning (e.g., Lamu, Tana River).
Ensuring transparency	All stakeholders understood the MSP process, its legal basis, and how their inputs would be used. The feedback loop (validation workshops, documented responses) demonstrated accountability.
Embedding equity	FPIC principles ensured that even stakeholders with traditionally less power – women, youth, VMGs, artisanal fishers – had meaningful opportunities to participate and influence decisions, alongside more powerful stakeholders (government, private sector).
Reducing future conflict	By documenting stakeholder concerns and resource-use areas before zoning was finalised, the MSP reduced the likelihood of future disputes, grievances, and displacement claims.
Strengthening legitimacy and implementability	The MSP's zoning and management measures are more likely to be accepted, complied with, and implemented because all stakeholders – including those who may be affected by zoning decisions – participated in their design.
Meeting legal and policy requirements	The FPIC-aligned approach ensured compliance with the Constitution of Kenya (Articles 10, 69, 232), the Physical and Land Use Planning Act (PLUPA), 2019, and World Bank OP 4.10 (Broad Community Support).

6.5 Stakeholder Engagement Activities

Stakeholders were engaged through three phases aligned to the SESA process: (i) Screening, (ii) Scoping, and (iii) SESA Study. The engagement combined key informant interviews, focus group discussions, stakeholder workshops, participatory mapping, and online tools to ensure inclusive participation, evidence-gathering, and the systematic integration of stakeholder inputs into the SESA and MSP processes. The last phase will involve national validation of Draft SESA findings

6.5.1 Phase I: SESA Screening

Phase I engagement supported early SESA screening by raising awareness, building sector readiness, and identifying preliminary issues that required deeper assessment during scoping and study

Key Informant Interviews (KII)

During the SESA screening exercise, fifteen (15) KIIs were conducted with selected institutions and stakeholder representatives (**Table 86**). The KIIs aimed to:

a) Raise awareness on the SESA process and its role in informing MSP;
b) Build understanding of how different sectors would participate in the SESA study; and
c) Identify preliminary issues, risks, and priorities for further analysis during scoping.

Table **86**: KII respondents during the Screening Phase

S/No	Name	Institution	Designation	Email
1.	Tsiganyiu Dadley	Kenya Wildlife Service (KWS)	Senior warden	Charlessigar396@gmail.com
2.	Charles Sigar	English Point Marina	Food and beverage manager	hr@marineenglishpoint.com
3.	Vincent Agumba	English Point Marina	Human resource manager	Cecilia.ndeti@msc.com cnndanu@gmail.com
4.	Cecilia Ndeti	Oceanfreight (EA) Ltd MSC	Legal claims and UAC Manager	aokema@kpa.co.ke
5.	Aggrey Okema	Kenya Ferry Services	Administrative officer	bmkirathe@gmail.com
6.	Benson Kirathe	Regional Office-State Department Blue Economy and Fisheries	ADF	deer@kcgs.go.ke karungoje@yahoo.com
7.	John Wanyoike	Kenya Coast Guard Service	Director of enforcement and emergency response	Mbeyumbidzo2021@gmail.com
8.	Rose Mweni	Coast Development Authority	Kilifi County coordinator	Omarsaida00@gmail.com
9.	Saida Omar	Coast Development Authority	Finance Officer	Charlessigar396@gmail.com
10	Hassan K. Mohamed	Coast Development Authority	Finance Assistant	Kullow08@gmail.com

S/No	Name	Institution	Designation	Email
11	Mercy Wasai Mghanga	Coastal Women in Fisheries Entrepreneurship CBO	Chairperson and co-founder	mercymghanga@yahoo.com
12	Rukia Pamba Juma	Pweza Women Group	Chairlady	Rukiajay71@gmail.com
13	Henry Chico Mzungu	Kilifi central BMU	Chairperson	Mzunguhenry3@gmail.com
14	Charles Nyale	Kilifi Beach Management Unit network	chairperson	Charlesnyale74@gmail.com
15	Aziza A Abdalla	Lamu Fish Processors	charlady	Azizaaliabdallahmamashumi005@gmail.com

Focus Group Discussions (FGD)

Focus group discussions were held with selected community representatives, including but not limited to youths, women People living with Disabilities (**Table 87**) to capture livelihood realities, local priorities, and early concerns relevant to SESA screening.

Table **87**: Focus Group Discussion Sessions During the SESA Screening Phase

S/No	Group	Contact
1.	Coastal Women in Fisheries Entrepreneurship CBO	mercymghanga@yahoo.com
2.	Pweza Women Group	Rukiajay71@gmail.com

Issue Raised during KII and FGDs

Key issues raised during Phase I included:

a) Perceived insufficient empowerment of local fishing communities amid competition from industrial and foreign vessels;
b) Outdated fishing equipment among artisanal fishers and concerns about environmentally harmful gear;
c) Strong interest in expanding mariculture and marine fish farming to utilise marine space sustainably;
d) Employment opportunities linked to cruise tourism and related skills development;
e) Need for stronger government support to unlock Blue Economy potential;
f) Support for low-impact tourism (e.g., bird watching) in protected areas where it is compatible with conservation;
g) Institutional enforcement tensions, including between KWS and county fisheries officers regarding illegal gear;
h) Concern over the absence of a clear lead authority for MSP and risks of institutional fragmentation;
i) Anticipated challenges in engaging diverse stakeholders and sustaining participation;
j) Concerns that zoning could restrict harvesting and resource access if not well communicated;
k) Community concerns about potential resettlement or relocation implications for island settlements (requiring careful assessment under SESA).

6.5.2 Phase II: SESA Scoping Study

Phase II of the SESA process focused on scoping and evidence gathering to inform the development of Kenya's Marine Spatial Plan (MSP). The phase was designed to establish baseline conditions, validate

priority environmental and social issues, and collect sector-specific and location-specific inputs required for a robust SESA and technically sound MSP.

The objectives of the Stakeholder Engagements in this phase

The objectives of Phase II workshops were to:

a) Strengthen stakeholder understanding of MSP and its benefits for sustainable marine resource management;
b) Build a shared vision across NGOs/CSOs, research institutions, public agencies, county governments, and the private sector aligned to national Blue Economy priorities;
c) Strengthen stakeholder capacity to participate meaningfully in SESA and MSP;
d) Collect sector-specific and location-specific data to support evidence-based SESA and MSP decisions;
e) Establish mechanisms for continued collaboration, feedback, and sustained engagement; and
f) Review progress and maintain alignment with agreed objectives.

Engagement Schedule

A structured programme of stakeholder workshops was undertaken between April and May 2024, engaging national and county government agencies, NGOs and CSOs, academia and research institutions, the private sector, the Marine Affairs Steering Committee (MASC), and scientists from the Kenya Marine and Fisheries Research Institute (KEMFRI). Addtionalaly meeting with VMGs was held on 5th December, 2025. **Table 88** summarises the schedule of stakeholder workshops conducted during the SESA scoping phase. A fully signed copy of the attendance list is presented in **Annex 4**.

Table **88**: Engagement Schedule During SESA Scoping Phase

S/NO.	Stakeholder category	When	Where	Participants	
				M	F
1.	NGOs and CSOs	15th – 16th April 2024	CDA, Kilifi	31	12
2.	Academia and Research Organisations	18th – 19th April 2024	KALRO, Naivasha	23	8
3.	Public sector	22nd-23rd April 2024	KALRO, Naivasha	42	12
4.	MASC	25th April 2024	KARLO, Naivasha	36	14
5.	County Government	29th - 30th April	CDA, Kilifi	52	18
6	Private sector	14th – 15th May 2024	CDA, Kilifi	29	15
7.	KEMFRI	16th May 2024	KEMFRI Mombasa	15	9
8	Vulnerable and Marginalised Groups (VMGs)	5th December,2024	North Coast Beach Hotel	17	7

Issues Raised by Stakeholders during the SESA Scoping Study

Across all stakeholder groups, the Phase II consultations highlighted the following key issues:

a) Marine-use conflicts, particularly between industrial and artisanal fisheries, arising from competing spatial claims and weak zoning enforcement.
b) Biodiversity degradation, resulting from destructive fishing practices (notably trawling), marine pollution, and unplanned coastal and offshore development.
c) Weak institutional coordination, including overlapping mandates among national and county agencies, unclear roles, and limited inter-agency collaboration
d) Significant data and information gaps, which constrain evidence-based marine spatial planning, scenario development, and impact assessment.

e) Limited enforcement capacity and implementation challenges, including inadequate human and financial resources, high implementation costs, and weak compliance monitoring.
f) Governance and political economy concerns, notably political interference, insufficient legal anchoring of the Marine Spatial Plan (MSP), and the need for stronger alignment with national legislation and international commitments.
g) Inadequate integration of security and transboundary considerations, particularly regarding maritime safety, cross-border resource use, and regional cooperation.
h) Jurisdictional and planning concerns raised by county governments, including the need for clearer allocation of responsibilities, realistic implementation timelines, and equitable benefit-sharing mechanisms.
i) Social equity and inclusion issues, emphasised by NGOs, CSOs, and research institutions, including impacts on vulnerable groups, gender considerations, and equitable access to marine resources.
j) Environmental safeguards and climate change considerations, including cumulative impacts, ecosystem resilience, climate variability, and long-term sustainability of marine ecosystems.
k) Knowledge systems and data integrity concerns, highlighting the importance of reliable scientific data, recognition of seasonality, integration of traditional and indigenous knowledge, and improved data management and sharing.
l) Livelihood diversification and community engagement needs, including support for alternative livelihoods, sustained community sensitisation, and continuous stakeholder engagement throughout MSP implementation.

Other key issues raised are presented in **Table 89**.

Table **89**: Cross-cutting issues during SESA Scoping

S/No.	Question	Response / Action
1.	How will data gaps, quality, formats, and accessibility be addressed across sectors?	There will be an established centralized data-sharing platform with clear data standards, typologies, timelines, quality scales, naming conventions, and data safety measures; allow mixed datasets and identify data-holding institutions; and build capacity in data management.
2.	How will all stakeholders be meaningfully and inclusively engaged?	A comprehensive stakeholder engagement plan covering county, private sector, fishing communities, indigenous peoples/VMGs, academia, oil & gas, and regional actors, with validation forums and feedback mechanisms, will be implemented.
3.	How will capacity gaps in institutions and stakeholders be addressed?	By conducting capacity needs assessments and providing targeted capacity building (e.g., MSP/SESA processes, data management, community engagement).
4.	How will current and future conflicts of use be managed?	Through the integration of conflict analysis into MSP/SESA, establish grievance redressal and alternative dispute resolution mechanisms, monitor sectoral activities (e.g., shipping, fishing, dredging), and plan for adaptive conflict management.
5.	How will MSP align with existing policies, laws, and institutions?	By anchoring MSP within existing legal frameworks (e.g., PLUPA), review and align relevant policies (including land policy), clarify institutional roles, and strengthen policy support principles.
6.	Are timelines sufficient for effective MSP and SESA implementation?	Adequate time shall be allowed for scoping, data collection, and decision-making; communicate clear timelines while

S/No.	Question	Response / Action
		recognizing MSP as a long-term, iterative process beyond project cycles.
7.	How will spatial boundaries, mapping, and zoning be clarified?	There will be clearly defined terrestrial–marine interfaces and regional boundaries; map key activities and impacts (seawater intrusion, shipping, dredging, oil & gas); validate spatial data with stakeholders.
8.	How will livelihoods and social impacts be safeguarded?	By Integrating social and livelihood assessments, applying mitigation measures, ensuring community participation, and prioritize approaches that support coastal livelihoods.
9.	How will environmental protection and restoration be incorporated?	By use of MSP/SESA to address pollution, integrate restoration measures, and apply ecosystem-based and nature-based solutions.
10.	How will communication and information flow be managed?	Communication and information flow will be managed by establishing formal communication channels, implementing a strategic communication plan, setting up stakeholder feedback platforms, and issuing official data requests through the appropriate authorities.
11.	How will transboundary and regional issues be addressed?	Cross-jurisdictional impacts will be recognized, and regional and transboundary MSP considerations, including information sharing, will be progressively integrated.
12.	How will MSP remain adaptive to future changes and activities?	By treating MSP as a dynamic process with periodic review, flexibility for future uses, and adaptive management mechanisms.

A detailed inventory of the issues raised during the scoping study is provided in **Annex 4**.
The issues raised in Phase II scoping directly shaped the scope, methods, and focus of the Full SESA in four practical ways:

1. **Influenced the scope of the SESA** (priority themes and receptors). Stakeholders consistently flagged fisheries conflicts, biodiversity loss, marine pollution, coastal development pressures, and climate change risks. Hence, the Full SESA uses these as core assessment themes and tests how MSP scenarios/zones affect habitats, fisheries productivity, water quality, and coastal ecosystems.
2. **Strengthened the baseline and data plan** (what data is needed, from whom, and how). Concerns about unclear data requisition, conflicting datasets, outdated information, and data-sharing protocols led the full SESA to develop a strengthened baseline and data plan. The study specified the required datasets and their spatial extent, established clear submission standards including file naming conventions and metadata requirements, agreed on data validation rules across agencies, and targeted additional evidence collection to address critical gaps, such as high seas and nearshore delineation. Stakeholder-identified data gaps and the need for inclusive decision-making informed the adoption of a mixed-methods approach that combined spatial analysis, secondary data review, expert judgment, and targeted field consultations.
3. **Focused on the impact pathways and mitigation in the Full SESA.** Scoping issues (e.g., bycatch/gear problems, anchorage needs for artisanal fishers, pollution effects on biotic systems, potential displacement/restricted access, and unmanaged tourism/port expansion impacts) informed which significant impacts the Full SESA must evaluate in detail and what mitigation/enhancement measures to design—such as fisheries management controls, pollution prevention requirements, social

safeguards (livelihood alternatives/compensation considerations), and measures to reduce user conflicts through zoning and operational rules.

4. **Clarified governance, legal, security, and monitoring requirements for implementation**. Requests for a clear legal pathway for the Marine Spatial Plan, including the potential need for an MSP Act or transitional arrangements together with calls for clarity on national–county mandates, integration of classified security inputs, and transboundary considerations, shaped the Full SESA's analytical focus. These inputs informed a detailed assessment of institutional arrangements, legal and policy consistency, security-sensitive consultation approaches, and a monitoring and accountability framework. The framework emphasizes realistic timelines, clearly defined roles, and mechanisms for effective implementation and enforcement.

Figure **29**: Stakeholder engagement session
Source: Geodev (K) Ltd ,2025

6.5.3 Phase III: SESA study

Phase III comprised stakeholder engagements conducted as part of the complete SESA study. These engagements targeted coastal communities, NGOs and CSOs, the private sector, county governments, Vulnerable and Marginalised Groups (VMGs), and national Ministries, Departments, and Agencies (MDAs).

Objective

The following objectives guided the stakeholder engagements undertaken during this phase:

1. To raise awareness and strengthen stakeholder understanding of the MSP process and its role in advancing Kenya's Blue Economy;
2. To collect and validate local knowledge and technical information on current and emerging uses of marine and coastal resources;
3. To identify key challenges, spatial conflicts, and development opportunities within the marine and coastal space;
4. To document community and sectoral priorities, perspectives, and recommendations for integration into the national Marine Spatial Plan; and

5. To enhance meaningful stakeholder participation and capacity by introducing participatory tools, including the GRM and participatory mapping approaches.

Methods of Engagement

1. Focus Group Discussions (FGDs)

Participants were organised into sector-based groups (fisheries and mariculture; tourism; culture and heritage; biodiversity and conservation; and transport, infrastructure, energy, and mineral resources). Facilitated discussions focused on mapping current resource uses, identifying key challenges and conflicts, highlighting development opportunities, and proposing priority zones for protection, development, and compatible multiple use, as shown in **Figure 30**.

Figure **30**: A Focus Group Discussion session in Lamu County
Source: Geodev (K) Ltd ,2025

2. Participatory Mapping

Using satellite images, community maps, and GIS layers, participants identified and marked key marine and coastal features, including fishing grounds, breeding areas, navigation routes, sand-harvesting sites, and environmentally sensitive areas as presented in **Figure 31**. This method integrated local knowledge with scientific data and captured spatial realities that were not readily apparent in secondary sources or remote sensing.

Figure **31**: Participatory mapping exercise in Kilifi and Tana River
Source: Geodev (K) Ltd ,2025

Key Informant Interviews (KIIs)

Key Informant Interviews were conducted with selected individuals to obtain in-depth technical, institutional, and sector-specific insights. These interviews complemented and validated information generated through FGDs and mapping exercises.

Overview of Participant Turnout

Table 90 summarises the stakeholder engagements conducted between October and December 2025 during Phase III of the SESA study. The table presents the categories of stakeholders engaged, dates and venues of the engagements, and participation levels disaggregated by gender and age, illustrating the breadth, inclusivity, and representativeness of the consultation process across community, county, national, civil society, private sector, VMG, and MDA stakeholders. **Annex 4** presents a signed copy of the participants' list for all the stakeholders' engagement events.

Table **90**: Summary of the stakeholders engaged during Phase III-SESA Study

S/N	Category		Date	Participants	Gender		Age		Venue
					M	F	>35	<35	
1.	Community stakeholders	Kilifi	9th Oct 2025	42	39	3	34	8	CDA– Kilifi
		Lamu	14th Oct 2025	56	39	17	26	30	Mwanaarafa Hall
		Kwale	21st Oct 2025	54	33	21	34	20	Kenya School of Government
		Tana River	22nd Oct 2025	67	50	17	53	14	Maridhiano Hall, Minjila
		Mombasa	23rd Oct 2025	38	28	10	22	16	Kenya School of Government
2.	NGOs and CSOs		24th Nov 2025	42	26	16	35	7	NCBH
3.	Private sector		25th Nov 2025	43	28	15	38	5	NCBH
4.	County government and County-level GOK reps		26th Nov 2025	61	47	14	21	40	NCBH
5.	VMG		27th Nov 2025	31	24	7	36	5	NCBH

S/N	Category	Date	Participants	Gender		Age		Venue
				M	F	>35	<35	
6.	MDAs and National Gov't Agencies	1st and 2nd Dec 2025	128	84	44	-	-	KARLO
Total Attendance			562	398	164	130	57	

Emerging Issues

The Phase III stakeholder engagements identified a range of cross-cutting issues (detailed in **Annex 4**) with direct implications for the design and implementation of the Marine Spatial Plan (MSP). These issues relate to participation and inclusivity, data gaps, governance and coordination, environmental degradation, climate change resilience, infrastructure pressures, and community trust, and underscore the need for an inclusive, evidence-based, and conflict-sensitive planning approach.

Table **91**: Summary of Issues raised

Issues Raised	Responses / Actions Proposed
Data gaps & accuracy concerns: Stakeholders highlighted data gaps and accuracy concerns in fisheries, biodiversity, energy, transport, and tourism sectors.	• Targeted data collection and ground-truthing will be conducted in collaboration with KMFRI, KWS, BMUs, CFAs, and County teams. • Spatial datasets and maps will be standardized, updated, and verified with clear legends and boundaries. • Indigenous and community knowledge will be integrated into MSP datasets, to strengthen inclusivity and continuous monitoring systems will be established to maintain data reliability.
Conflicts in marine space use: Concerns were raised about conflicts in marine space use, including artisanal vs. industrial fishing, tourism vs. conservation, shipping vs. biodiversity, and mining vs. fisheries	• Marine zoning regulations will be introduced to directly address user conflicts and create clarity for each sector E.g. to separate artisanal and industrial fishing zones. • Compatibility analyses will be developed to balance tourism, conservation, shipping, and fisheries. • Mixed-use zoning will be established where activities can coexist under clear guidelines. • Seasonal closures will be applied (e.g., during turtle migration), and low-noise vessel technology will be promoted to protect the biodiversity.
Weak governance & overlapping mandates: Stakeholders noted weak governance and overlapping mandates among NEMA, KWS, BMUs, CFAs, and county departments.	• Institutional mandates across agencies will be harmonized, and inter-agency coordination will be strengthened through the MSP Implementation Framework. • Institutional roles and responsibilities will be clarified at both National and County levels with dedicated MSP units established within counties to enhance accountability and localized enforcement and measures for capacity building for county MSP units
Environmental degradation & pollution: Concerns were raised about environmental degradation and pollution, including impacts on mangroves, reefs, seagrass, waste management, and dredging.	• Sensitive habitats such as mangroves, reefs, and seagrass will be prioritized for conservation and restoration. • Environmental Impact Assessments (EIAs) and continuous monitoring will be enforced for high-impact activities. • Waste management will be regulated through stringent enforcement and community sensitization awareness, with designated dumping zones being established and monitored to prevent ecological damage.

Issues Raised	Responses / Actions Proposed
Climate change impacts & resilience needs: Stakeholders emphasized climate change impacts and resilience needs, such as coral bleaching, sea-level rise, erosion, and community vulnerability.	• Climate risk mapping will be integrated into MSP zoning and planning. • Nature-based solutions such as mangrove restoration will be promoted for carbon sequestration and coastal protection. • Adaptation strategies will be scaled up to safeguard vulnerable ecosystems and communities, with climate-resilient ecosystems being prioritized in conservation planning.
Infrastructure & resource pressures: (including: poor landing sites, port expansion, unplanned coastal development, mining conflicts)	• All existing infrastructure (ports, landing sites, transport corridors) will be mapped and classified for baseline setting. • Port and transport expansion projects will be aligned with MSP zoning and conservation priorities. • Extractive activities such as sand mining and dredging will be restricted in ecologically sensitive zones. • Investments will be directed toward modern facilities such as cold storage, potable water, and safe landing sites.
Community fears & mistrust: Communities expressed fears and mistrust, including potential loss of fishing grounds, misuse of local knowledge, and lack of transparency in oil/gas exploration.	• Communities were assured that MSP zoning will not displace traditional users. • Local knowledge and maps will be secured under government custody, with consent guiding data-sharing/open access data portals to improve transparency and stakeholder confidence. • Exploration activities will be disclosed transparently to build trust. • Grievance redress mechanisms will be strengthened with clear procedures, timelines, and feedback loops.

Results/ Key Outcomes of the Engagement and How They Informed the Plan

The stakeholder engagements generated a shared understanding of the Marine Spatial Planning (MSP) process and produced practical inputs that directly informed both the SESA and the emerging MSP. Through these engagements, stakeholders validated existing spatial and sectoral information, contributed local, traditional, and technical knowledge, and identified key marine uses, conflict hotspots, and ecologically and culturally sensitive areas. The process also built consensus on the need for clear zoning, better management of competing marine activities, and stronger responses to data gaps, governance overlaps, enforcement challenges, climate risks, and social equity concerns. In addition, it strengthened institutional coordination, stakeholder capacity, and ownership of the planning process by ensuring that national, county, community, civil society, VMG, and private sector perspectives were reflected in the plan. Accordingly, the key outcomes of the engagement, and how they informed the plan, are summarized below:

a. Identification of priority areas for zoning

Stakeholder inputs helped define priority areas for zoning, including sensitive ecosystems, fishing grounds, navigation routes, infrastructure corridors, and community-use areas.

b. Clarification of management and regulatory needs

The engagements helped identify the management and regulatory measures needed to support sustainable use of marine resources and guide decision-making across different marine zones.

c. Identification of overlapping marine activities

Stakeholders highlighted areas where activities such as fishing, shipping, tourism, conservation, and infrastructure development intersect, informing measures for spatial allocation and conflict reduction.

d. Validation of data collected for the MSP process

The consultations provided an opportunity to verify and refine spatial, sectoral, and socio-economic data collected during the MSP process, thereby strengthening the reliability of the evidence base.

e. Strengthening of the evidence-based planning process

By integrating scientific information with local and sector-specific knowledge, the engagements reinforced the MSP as an evidence-based planning process.

f. Identification of pressure points at the land-sea interface

Stakeholders identified major pressures arising from land-based activities, including pollution, sedimentation, shoreline degradation, and unsustainable coastal development, which informed the assessment of risks to marine ecosystems.

g. Identification of pressure points from natural and marine-based activities

The process also highlighted pressures linked to marine use and natural processes, including habitat degradation, erosion, overfishing, and climate-related impacts.

h. Identification of measures to support the sustainability of marine resources

The issues raised during engagement informed measures aimed at improving the sustainability of marine resources, including habitat protection, stronger coordination, improved regulation, and community-based management.

i. Strengthening of inclusion, coordination, and ownership in the plan

Overall, the engagement process improved the inclusiveness, legitimacy, and practical relevance of the MSP by ensuring that diverse stakeholder interests and priorities were integrated into the plan.

6.6 Grievance Redress Mechanism (GRM)

A structured Grievance Redress Mechanism (GRM) will be maintained under the Marine Spatial Planning (MSP) process to address concerns, disputes, and complaints arising from MSP preparation, consultation, zoning decisions, implementation, and monitoring. The GRM is intended to provide a transparent, accessible, inclusive, and non-retaliatory process through which affected stakeholders particularly fishing communities, vulnerable and marginalised groups, women, youth, and other marine resource users (fishers, tourism operators, transport users, mariculture actors, conservation organizations, county governments) can raise concerns and seek redress. For Bank-financed downstream activities, the GRM should be implemented consistently with the applicable World Bank safeguard framework, particularly OP 4.01, OP 4.12, and BP 17.50.

To achieve this, the GRM will operate through a structured and well-documented process that encourages community involvement, strengthens stakeholder relationships, and upholds social and environmental safeguards within the MSP framework.

6.6.1 Purpose, Scope and Guiding Principles of GRM

The GRM shall be guided by the principles of accessibility; transparency; cultural appropriateness; timeliness; impartiality; confidentiality where required; protection against reprisal; use of English, Kiswahili, and locally appropriate languages where necessary; and meaningful participation of affected persons in resolution. The mechanism should remain active during both preparation and implementation and should be supported by an adequate operating budget for staffing, awareness creation, translation, meetings, record management, and referrals.

For purposes of this GRM, specific grievances related to spatial or economic displacement shall include the loss or restriction of physical access to traditional fishing grounds, mariculture sites, landing sites, beaches, and other customary marine-use areas resulting from MSP zoning decisions, industrial encroachment, exclusionary access controls, or related implementation measures. Such complaints shall be recorded under a spatial displacement category and prioritised where they affect vulnerable and marginalised groups, including artisanal fishers, seaweed farmers, and other resource-dependent users.

6.6.2 Access to the GRM and Submission Channels

Stakeholders may submit grievances through multiple entry points to reduce barriers to access. Complaints may be submitted verbally or in writing, individually or collectively, and where necessary anonymously. Illiterate, remote, or vulnerable complainants should be supported through oral recording of complaints, assisted form filling, and translation.

In addition to the channels above, the GRM shall accept verified digital reports submitted through community-trusted platforms and other locally accessible digital interfaces recognised by the MSP Secretariat, provided such reports contain sufficient information for registration and follow-up. The Secretariat shall verify, log, acknowledge, and process such reports in the same manner as complaints received through in-person, telephone, written, or other approved channels.

Table **92**: Access to GRM and submission channels

Channel	Illustrative access point	Who it particularly assists	Notes
In person	MSP Secretariat, county offices, BMUs, public forums/barazas	Community members, fishers, women's groups, VMGs	Allows verbal submission where literacy is a barrier.
Telephone / SMS / hotline	Dedicated GRM number	Remote users, mobile stakeholders	Useful for rapid acknowledgement and follow-up.
Email / website / online form / social media	Official MSP website and approved pages	Urban users, private sector, CSOs	Should include simple forms and privacy notices.
Written letter / postal submission	Secretariat and county offices	Formal complainants and institutions	Useful for detailed supporting documentation.

A grievance filed should, at minimum, identify the MSP process or activity involved, describe the complaint (including date and place where possible), state the relief sought, and provide complainant contact details where follow-up is required. Anonymous grievances may still be received and recorded where sufficient information is available to allow assessment.

6.6.3 Grievance Handling Process and Indicative Timelines

To enhance accessibility and ensure inclusivity, the Grievance Redress Mechanism (GRM) for the MSP process allows stakeholders to submit complaints through multiple entry points. These include Beach Management Units (BMUs), national and county government offices, email, postal mail, telephone hotlines, and online platforms such as the official MSP website. Additionally, community meetings and public forums will serve as avenues for verbal submissions, particularly to accommodate illiterate or marginalized groups that may face barriers to written communication. By providing these diverse and accessible channels, the GRM ensures that all stakeholders regardless of literacy level or location have equitable opportunities to raise concerns and receive timely, transparent responses.

A transparent and structured resolution process will be implemented, ensuring that each grievance is acknowledged, promptly addressed, and the decisions at various stages communicated to the aggrieved party. presents the steps in handling grievances:

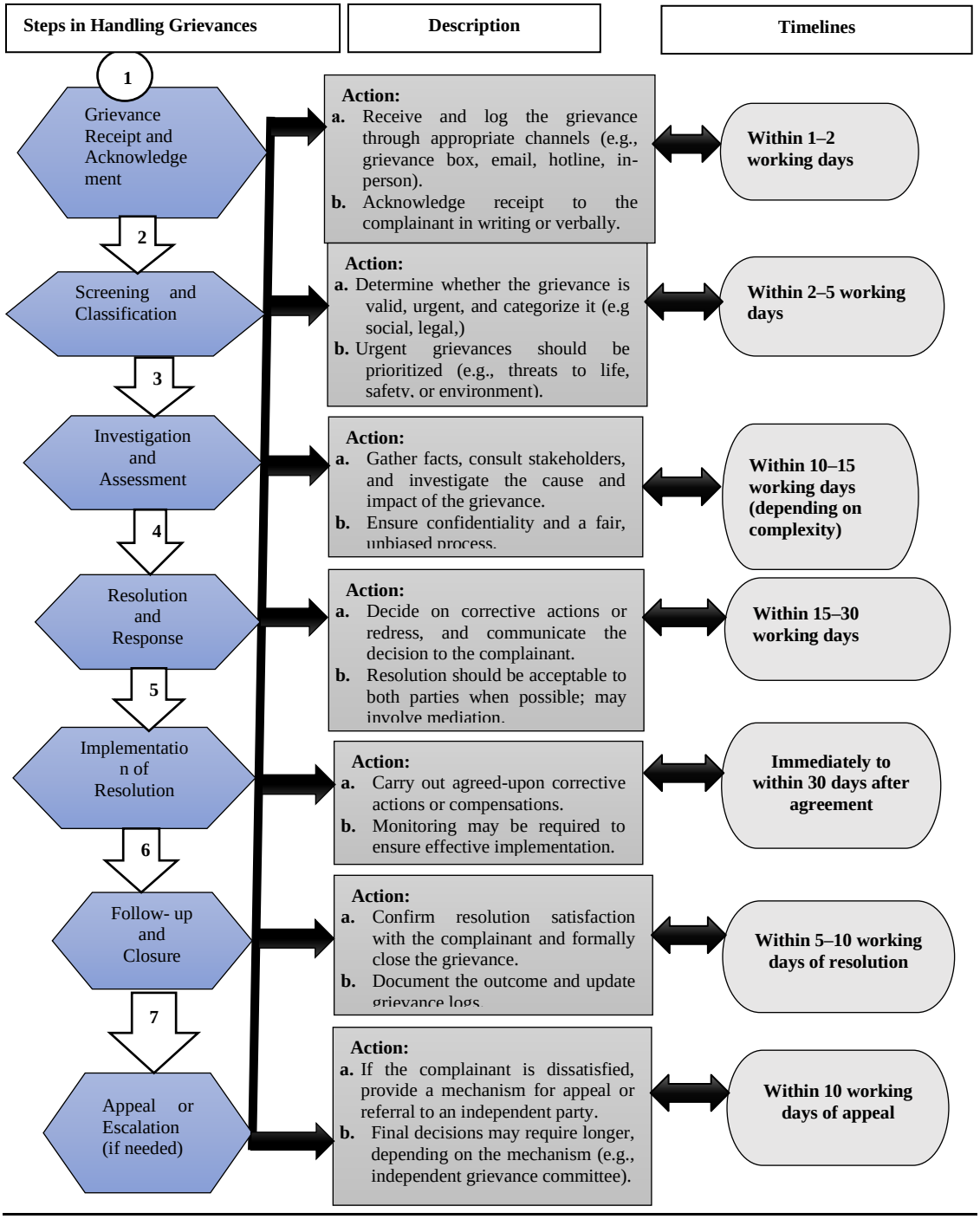

Figure **32**: Steps in handling grievances

Complainants should be informed in writing, or through a documented verbal communication where literacy is a barrier, of the proposed resolution, the basis for the decision, the action to be taken, and the options for appeal. Closure should only occur once the agreed action has been implemented or the complainant has been informed of the final decision, and no further administrative recourse is available.

Where a grievance is confirmed to have caused economic displacement, livelihood disruption, or damage to productive assets, the resolution shall include, where applicable, a Restorative Action Plan (RAP) setting out the remedial measures required to restore affected livelihood capacity to pre-incident levels, the responsible party, the implementation timeline, and the financing source, including, where applicable and

lawfully available, project support arrangements, insurance, performance bonds, or other responsible-party funding mechanisms.

Filing a Grievance

A complaint/grievance may be submitted by individuals or communities affected by the MSP process. A grievance filed should:

- Identify the project involved
- Describe what the complaint is about (including date, place)
- Identify the individual(s) submitting the complaint, including the contact details.

6.6.4 Appeals, Escalation and Sensitive Cases

Complaints not resolved at the first level should move through a documented appeal process as presented in **Figure 33**:

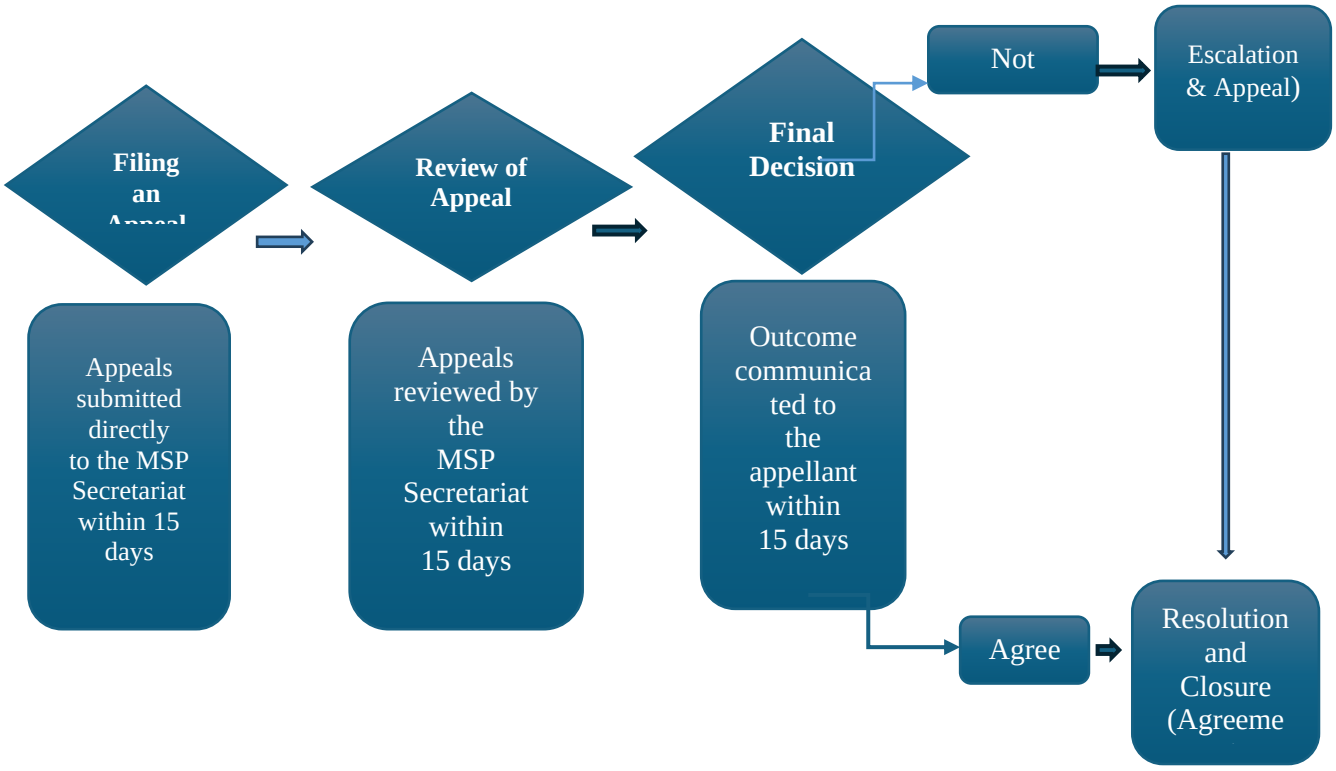

Figure **33**: Grievance redress process
Source: Ministry of Mining, Blue Economy and Maritime Affairs

Appeals should first be reviewed by the MSP Secretariat. Where the matter is cross-sectoral, high-risk, or unresolved, it should be referred to the MASC for inter-agency review. Particularly complex cases may be referred onward to statutory institutions such as the Ombudsman, anti-corruption bodies, or the courts, depending on the nature of the complaint.

Sensitive grievances, including allegations of corruption, intimidation, SEA/SH, or other forms of serious abuse, must not be handled through routine open mediation. Instead, they should be recorded through a restricted-access process, triaged immediately, and referred to the appropriate competent service providers or authorities, while preserving the complainant's confidentiality and safety.

6.6.5 Monitoring, Effectiveness and Learning

The GRM should not function only as complaints register; it should also operate as a management and learning tool for the MSP and SESA as summarised in **Table 93**. Quarterly and annual GRM reports should

therefore disclose not only the number of grievances received but also the types of issues raised, the timeliness of resolution, the proportion closed satisfactorily, and the extent to which grievance patterns have informed changes to the MSP, SESA, or implementation arrangements.

At a minimum, grievances should be categorised under: (i) access restrictions to beaches, landing sites, fishing grounds, mangroves or protected areas; (ii) consultation, information disclosure, and language barriers; (iii) zoning boundaries and user conflicts; (iv) livelihood impacts and compensation/livelihood restoration concerns; (v) contractor or worker conduct during implementation; (vi) SEA/SH and other sensitive cases; and (vii) corruption, favouritism, or abuse of authority. The Secretariat should explicitly record whether a grievance led to a change in zoning, stakeholder engagement practice, mitigation measures, access arrangements, or monitoring commitments.

Table **93** Monitoring effectiveness of GRM

Effectiveness Indicator	Why it matters	Suggested reporting frequency
Number of grievances received by category and county	Shows whether the GRM is being used and where pressure points lie	Quarterly
Percentage acknowledged within 48 hours	Measures accessibility and responsiveness	Quarterly
Percentage resolved within agreed timelines	Measures operational efficiency	Quarterly
Percentage of complainants satisfied with the process/outcome	Assesses fairness and confidence in the mechanism	Quarterly / annually
Number of appeals and repeat grievances	Signals unresolved systemic issues or weak first-level resolution	Quarterly
Number of grievances that resulted in MSP/SESA adjustments	Shows whether the GRM is informing planning and adaptive management	Quarterly / annually
Average time for closure of SEA/SH referrals (non-identifying)	Tracks safe and timely referral performance without disclosing survivor details	Restricted internal reporting

If these indicators show persistent delay, low satisfaction, repeated recurrence of the same issue, or poor access for vulnerable groups, the MSP Secretariat should commission a GRM effectiveness review and adopt corrective actions. Such actions may include refresher training, stronger local-language communication, revised service standards, additional county entry points, digital tracking improvements, or independent oversight for high-risk grievances.

6.6.6 GRM for GBV, SEA and SH

The MSP GRM should include a separate protocol for Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). These grievances differ from general complaints because they require survivor-centred handling, strict confidentiality, safe referral pathways, and limited information management as presented in **Table 94**. GRM personnel should therefore receive specialised training on confidential intake, informed consent, referral, and do-no-harm principles.

Table **94**: GRM for GBV, SEA and SH

Aspect	GBV / SEA / SH grievance	General grievance	Required implication for MSP GRM
Confidentiality	Strict confidentiality; information shared only on a need-to-know basis	Handled through normal GRM records	Use restricted-access records and no public disclosure of survivor details
Approach	Survivor-centred and trauma-informed	Administrative problem-solving approach	Avoid mediation that could expose or pressure the survivor
Response time	Immediate triage and referral	Standard service timelines	Prioritise safety and rapid referral to competent providers
Actors involved	GBV focal point, service providers, legal/medical/psychosocial actors	Secretariat, agencies, community representatives	Use external referral systems rather than internal investigation alone
Outcome	Safety, support, referral, and accountability through competent systems	Corrective action, explanation, compensation, or policy adjustment	Track process without recording unnecessary sensitive details

For GBV/SEA/SH complaints, the role of the GRM is primarily to receive the complaint safely, obtain informed consent where appropriate, and facilitate confidential referral to the relevant service provider or authority. The GRM register should record only the minimum information necessary for follow-up and accountability.

How GRM is Empowered to Resolve GBV/SEA/SH Issues

i. Confidential Reporting Channels: Ensuring survivors can report grievances safely and anonymously.
ii. Survivor-Centred Approach: Prioritising the dignity, safety, and well-being of survivors.
iii. Specialized Training for GRM Staff: Equipping personnel with skills to handle GBV/SEA/SH cases sensitively.
iv. Referral Systems: Connecting survivors with GBV service providers for medical, psychological, and legal support.
v. Accountability Framework: Implementing Codes of Conduct and disciplinary measures for perpetrators.
vi. Community Engagement: Raising awareness and encouraging safe reporting through stakeholder engagement.
vii. Monitoring & Evaluation: Regularly assessing the effectiveness of GRM in addressing GBV/SEA/SH cases.

A well-designed MSP GRM is essential for effective stakeholder engagement, social accountability, and adaptive marine governance. To respond to the issues raised during review, the GRM section should therefore go beyond generic process description and clearly show how the mechanism will be operationalised, budgeted, monitored for effectiveness, and kept active throughout implementation. It should also show how grievances and not only consultations can influence the MSP and SESA by improving zoning, mitigation, disclosure, and conflict management over time. Additionally, periodic reviews should be conducted to ensure the effectiveness of the GRM.

CHAPTER 7: EVALUATION OF ALTERNATIVE PLANNING OPTIONS

7.1 Overview

The evaluation of alternative planning scenarios is a central requirement of the Strategic Environmental and Social Assessment (SESA) for Kenya's Marine Spatial Planning (MSP) process. MSP is designed to resolve the complex and competing demands placed on Kenya's marine space, including biodiversity conservation, fisheries production, maritime transport, tourism, offshore energy, cultural uses, and climate resilience. Evaluation alternative planning pathways enables the MSP process to explicitly examine how different choices will shape environmental sustainability, social equity, economic development, and governance outcomes over the long term.

The evaluation of alternative planning scenarios ensured that environmental and social considerations were integrated into MSP at the earliest stage so that planning decisions do not inadvertently cause long-term ecological degradation or social harm. It further evaluates the trade-offs between competing objectives, such as rapid economic expansion versus biodiversity protection, allowing policymakers to select the most feasible and balanced approach for Kenya's marine and coastal space.

Given Kenya's rapidly expanding Blue Economy sectors, growing coastal populations, and intensifying pressures on marine ecosystems, the review of alternatives was essential for identifying a planning pathway that secures both development aspirations and environmental resilience. MSP must therefore consider reasonable and realistic alternatives, based on current trends, ecological thresholds, socio-economic needs, and long-term sustainability considerations.

7.2 Planning Alternatives Assessed

The SESA considered four strategic planning alternatives as presented in the marine spatial plan. Each represents a distinct development philosophy and management approach for Kenya's marine space. These alternatives were selected because they reflect the full spectrum of plausible pathways available.

i. **Scenario 0: Managed Continuation (Business-as-Usual (BAU)) Scenario**

It represents the continuation of existing sectoral management arrangements and development trends in the absence of an integrated MSP framework, characterised by fragmented decision-making and limited coordination across sectors and levels of government.

ii. Scenario 1: Nature Recovery and Protection (Conservation-Led Zoning)

This scenario reflects a biodiversity-led approach where ecosystem health and ecological thresholds guide all planning decisions. Marine uses are permitted only if they comply with conservation objectives, with expanded protection of critical habitats such as coral reefs, mangroves, turtle nesting beaches, seagrass beds, estuaries, migratory corridors, and offshore biodiversity hotspots. It is evaluated to understand the benefits and implications of prioritizing ecosystem integrity.

iii. Scenario 2: Accelerated Blue Growth

This scenario prioritizes economic expansion, industrial growth, and infrastructure development. MSP serves primarily as a tool to facilitate sectoral investments such as ports, aquaculture, fisheries enhancement, tourism, offshore energy, and marine transport. It is important to assess how accelerated blue economy development affects ecosystems, livelihoods, and cumulative impacts, and whether governance systems can accommodate rapid expansion.

iv. **Scenario 3: Balanced Multi-Use and Coexistence**

This scenario seeks to balance development and conservation through ecosystem-based management, spatial efficiency, and conflict reduction. It aligns marine uses with ecological carrying capacity and governance capabilities while supporting sustainable economic growth. This pathway is assessed as it reflects international MSP best practice and Kenya's policy intent to achieve both conservation and development outcomes in a coordinated manner.

7.2.1 Development of Scenarios

The alternative marine spatial planning scenarios were developed through an integrated and systematic methodology designed to ensure consistency, transparency, and comparability across all options. The process began with the compilation, review, and analysis of relevant spatial data and sector-specific evidence to establish baseline environmental, social, economic, and infrastructural conditions within the planning area. This evidence base informed the suitability analysis and priority-area mapping, which identified areas that were more or less appropriate for protection, community use, transport, restoration, blue economy development, and mixed-use zoning under each scenario.

Subsequently, legal and policy layers were applied to ensure that the scenarios reflected statutory requirements, tenure and access considerations, conservation obligations, existing regulatory constraints, and national as well as county development priorities. In parallel, stakeholder input and participatory mapping were incorporated throughout the process to validate spatial assumptions, capture local and sectoral knowledge, identify areas of potential conflict, and reflect community and stakeholder priorities.

To maintain methodological consistency, a common set of assumptions was applied across all scenarios, including assumptions related to development demand, ecological precaution, community use, regulatory capacity, and future sector growth. This ensured that differences among scenarios arose from planning choices rather than inconsistencies in the analytical process.

Finally, all scenarios were assessed using the same evaluation framework, covering social, economic, environmental, and cost-benefit criteria. This enabled a transparent, objective, and evidence-based comparison of alternatives and supported the identification of the most balanced, feasible, and sustainable marine spatial development option.

7.2.2 Scenario Assumptions

The scenarios were developed on the basis of clearly defined assumptions regarding future development pathways and management priorities.

The Business-as-Usual Scenario assumes that, in the absence of intervention through the Marine Spatial Plan, sectors will continue to grow in accordance with past trends and future projections. Under this scenario, existing patterns of use remain largely unchanged, and conflicts are expected to intensify in the busiest and most congested areas.

The Nature Recovery and Protection Scenario assumes that environmental protection is the primary planning priority. Under this scenario, ecologically and biologically important areas are effectively protected, the most impactful activities are reduced to the maximum extent practicable, and any new development is guided primarily by ecological sustainability considerations.

The Accelerated Blue Growth Scenario assumes that economic development is the dominant priority. Under this scenario, marine-based development is promoted to maximize economic opportunities, while comparatively less emphasis is placed on conservation and environmental protection measures.

The Balanced Multi-Use and Coexistence Scenario assumes a more integrated approach in which ecological, economic, and social objectives are considered together. This scenario seeks to promote sustainability by balancing development needs, environmental protection, and social interests, while encouraging compatible and co-existing uses of marine space.

These scenarios do not represent final zoning decisions. Rather, they constitute alternative planning options developed to support analysis, consultation, and comparison before the selection of a preferred scenario for incorporation into the final Marine Spatial Plan.

7.3 Methodology

The evaluation of alternatives used a combination of **qualitative and quantitative assessment methods**. The analysis applied environmental, social, economic, governance, and climate resilience criteria to assess the performance of each scenario, including:

- **Environmental parameters:** habitat condition, biodiversity value, sensitivity, ecosystem services, cumulative impacts.
- **Social parameters:** livelihoods, equity, cultural values, access rights, community well-being.

- **Economic parameters:** blue economy potential, long-term viability, employment opportunities, infrastructure needs, efficiency of resource use.
- **Governance parameters:** institutional feasibility, regulatory effectiveness, enforcement requirements, cross-sector coordination.
- **Climate resilience parameters:** vulnerability to climate risks, adaptive capacity, long-term ecological stability.

Data were drawn from sector studies, spatial analyses, cost–benefit assessments, stakeholder consultations, and expert input. This ensured that the scenario evaluation incorporated both scientific evidence and socio-economic considerations relevant to Kenya's coastal and marine context. The assessment focused on long-term, cumulative, indirect, and transboundary impacts, recognizing that marine activities interact over time and across ecosystems, and that impacts may extend beyond national boundaries within the Western Indian Ocean region.

7.3.1 Evaluation of the Performance of Each Scenario

i. Scoring framework and criteria

Scenario alternatives were evaluated using a transparent multi-criteria approach that separates (i) the criteria used, (ii) the scoring scale, and (iii) the weighting and aggregation method. Scores were assigned for Environmental (E), Social (S) and Economic (Ec) dimensions within each sector theme.

For each sector and each dimension, reviewers assigned a Pros score (E+, S+, Ec+) and a Cons score (E−, S−, Ec−). Net score was calculated as Pros − Cons. In completing the scoring matrices, each distinct positive impact statement was scored as +1 and each distinct negative impact statement as −1; where impacts were presented as bullet paragraphs rather than numbered items, each paragraph was treated as one scoring item. The following decision rules were applied:

- Evidence-led scoring: where quantitative estimates existed in the scenario narrative (e.g., habitat extent, projected recovery/decline, cost or benefit values), those were used to justify higher or lower scores.
- Cumulative and long-term lens: scores reflect cumulative impacts to 2045, including indirect and transboundary effects.
- Precautionary treatment of high-consequence risks (e.g., oil spill risk, habitat conversion): low probability but high impact risks were reflected in Cons scores.
- Distributional effects: social scoring explicitly considered impacts on artisanal fishers, women, youth and vulnerable groups, including access restrictions and conflict risk.

ii. Weighting and aggregation

Dimension weights were applied to reflect the SESA sustainability lens: Environmental 40%, Social 30%, and Economic 30%. A slightly higher environmental weight was used because the blue economy depends on functioning ecosystems and because environmental degradation can create irreversible losses and long-term costs that undermine social and economic objectives. Social and economic weights were kept equal to maintain a balance between livelihoods and growth. Weighted Net scores were computed as 0.4(E Net) + 0.3(S Net) + 0.3(Ec Net).

The dimension weights of Environmental = 0.40, Social = 0.30, and Economic = 0.30 were selected to reflect the sustainability perspective adopted in the Strategic Environmental and Social Assessment (SESA) and the principles of marine spatial planning. A slightly higher weight was assigned to the environmental dimension because the long-term viability of the blue economy is fundamentally dependent on healthy and functioning ecosystems. Marine habitats such as coral reefs, mangroves, seagrass beds, estuaries, and spawning grounds provide essential ecological functions, including biodiversity support, coastal protection, fisheries productivity, and climate regulation. Damage to these systems may be irreversible or only recoverable over very long timeframes, and such losses can generate substantial long-term social and economic costs.

The higher environmental weighting also reflects the precautionary principle, which is particularly relevant in marine planning where ecological thresholds may be crossed before damage becomes fully visible or economically measurable. In this context, giving greater emphasis to environmental performance helps

ensure that development choices do not undermine the ecological foundation upon which livelihoods, food security, tourism, fisheries, and other blue economy sectors depend.

The social and economic dimensions were each assigned a weight of 0.30 to maintain a balanced consideration of human well-being and development objectives. The social dimension captures issues such as livelihoods, equity, access to resources, cultural values, and community well-being, while the economic dimension reflects growth potential, investment efficiency, employment creation, and sector productivity. Assigning equal weights to these two dimensions recognizes that sustainable marine planning must support both inclusive social outcomes and economic development, without allowing either objective to dominate the other

7.4 Description and Evaluation of Each Option

7.4.1 Managed Continuation (Business-as-Usual (BAU)) (“No MSP” Option)

The Business-as-Usual (BAU) Scenario (**Figure 34**) is intended to represent the continuation of current marine and coastal use patterns, governance arrangements, and sectoral decision-making processes without the introduction of a strongly interventionist spatial planning framework. Under this scenario, existing activities and approvals largely continue as they are, with marine space remaining open to multiple uses under prevailing management conditions. The scenario, therefore, serves as a reference condition against which more directive planning options can be assessed, particularly in relation to how far current trajectories are able to sustain ecological integrity, reduce spatial conflict, and support long-term economic and social outcomes.

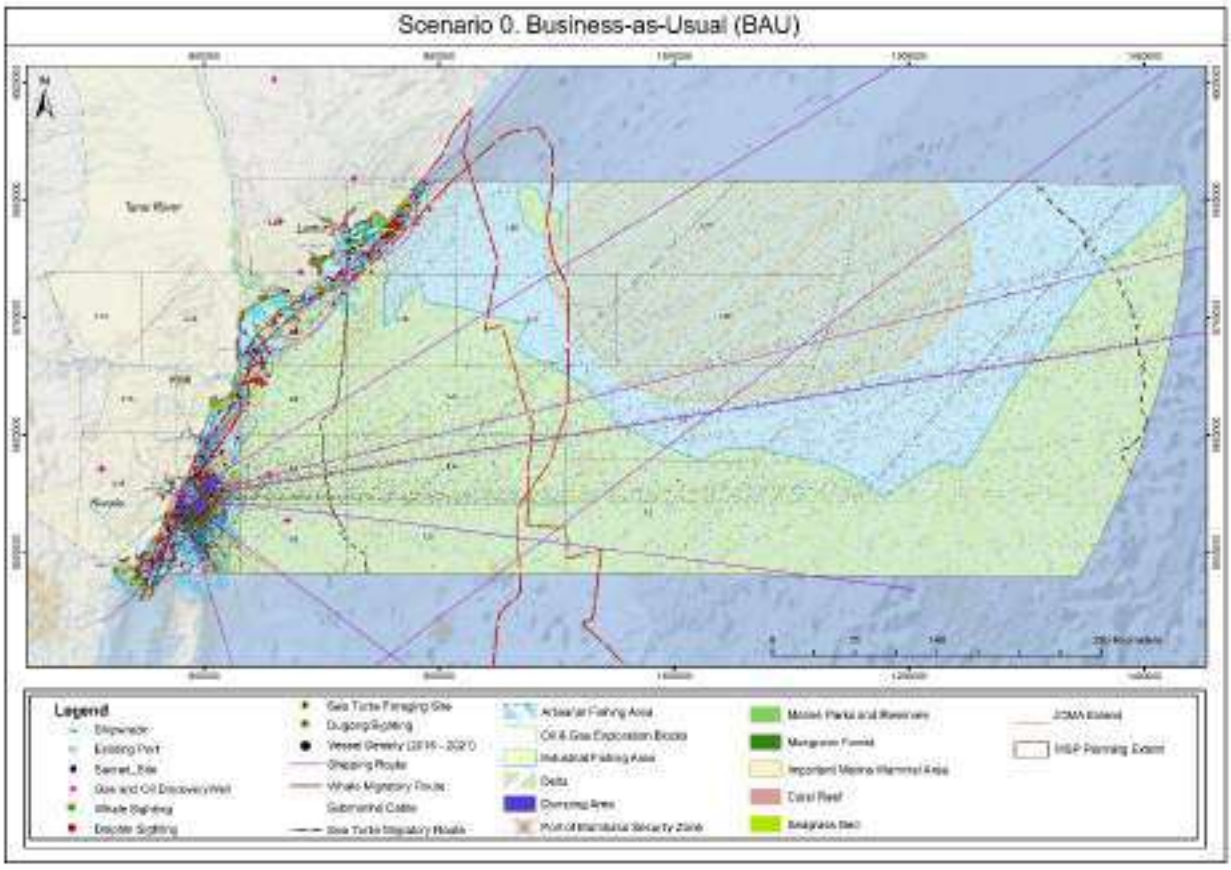

Figure **34**: Business-as-Usual Scenario

This scenario is plausible in the Kenya marine context because many marine and coastal sectors already operate through fragmented regulatory structures, project-level approvals, and overlapping use patterns rather than through fully integrated spatial allocation. Tourism, fisheries, ports, aquaculture, shipping, offshore interests, and coastal settlements continue to expand or compete within the same seascape, while cumulative environmental pressures on coral reefs, seagrass meadows, mangroves, estuaries, deltas, turtle

nesting beaches, and offshore habitats remain significant. As such, BAU reflects a credible baseline planning condition in which existing economic uses persist, but ecological degradation, user conflict, and uneven distribution of benefits are not systematically resolved through coordinated marine spatial planning.

Summary of Impacts under the Business-as-Usual Scenario

The Business-as-Usual scenario sustains prevailing patterns of coastal and marine resource use, enabling existing economic activities and operational systems to continue with minimal spatial restructuring. While this approach supports short-term continuity and stability, it also perpetuates cumulative environmental pressures that gradually erode ecosystem health, reduce long-term productivity, and weaken the resilience of nature-dependent livelihoods and industries. Detailed sectoral impacts by zone are provided in **Annex 7**, with key summaries outlined as follows:.

Areas and Activities Most Positively Affected

The sectors and users that will continue to benefit from current use patterns, despite the gradual weakening of long-term sustainability:

i. Tourism and marine recreation operators, because existing destinations and coastal use areas continue to generate revenue and employment.
ii. Artisanal and industrial fisheries in the short term, because fishing grounds remain open under current patterns of use.
iii. Ports, shipping, and marine transport services, as trade corridors and operational nodes continue without major spatial restructuring.
iv. Aquaculture and marine service nodes, because existing activities continue to support production, income, and market supply.
v. Subsea communications infrastructure and offshore resource interests, since existing approvals and project-level decision-making continue.

Areas and Activities Most Negatively Affected

The ecological systems, resource-dependent users, and nature-based values that continue to absorb cumulative pressure in the absence of integrated spatial management includes:

i. Coral reefs, seagrass meadows, mangroves, estuaries, deltas, turtle nesting beaches, and offshore habitats, because degradation continues under cumulative and largely unmanaged pressure.
ii. Marine megafauna and other sensitive fauna, including turtles, dolphins, dugongs, sharks, and rays, as bycatch, ship-strike risk, underwater noise, and direct disturbance remain ongoing pressures.
iii. Nature-based tourism quality, because habitat decline progressively reduces destination appeal and long-term tourism value.
iv. Fisheries productivity, since declining habitat quality lowers catch efficiency and weakens nursery and breeding functions.
v. Small-scale fishers and coastal communities, because livelihood insecurity, congestion, unequal benefit distribution, and conflict remain high in contested use areas.

Table **95**: Results of the weighted index under BAU Scenario

Dimension	Total pros	Total cons	Net score	Weight	Weighted contrib.
Environment	52	125	-73	0.40	-29.2
Economic	56	68	-12	0.30	-3.6
Social	41	80	-39	0.30	-11.7
Overall index					-44.5

The BAU score is strongly negative across all three dimensions, indicating that residual short-term benefits are outweighed by cumulative environmental degradation, rising economic inefficiency, and persistent social conflict.

Cumulative Net Impacts

The BAU scenario records negative cumulative net impacts throughout the projection period, worsening from KES 181 billion in Year 1 to KES 1,034 billion in Year 20 as presented in **Table 96**. This confirms that, under uncoordinated marine use, cumulative costs consistently exceed cumulative benefits, making the BAU pathway economically unsustainable.

Table **96**: Economic performance of BAU Scenario

Indicator	Value	Interpretation
Net Present Value (NPV) - KES Billion	-99	Negative NPV indicates that total discounted costs exceed benefits
Benefit-Cost Ratio (BCR)	0.20	Every KES 1 invested yields only KES 0.20 in benefits
Internal Rate of Return (IRR)	13.8%	Below the economically desirable threshold relative to risk and opportunity cost

Source: Adapted from the Draft Cost-Benefit Analysis Report for the MSP[183]

The BAU scenario is economically inefficient, with a negative NPV (-KES 99 billion) and a BCR of 0.20, indicating that benefits are substantially lower than costs over the 20-year horizon. Although the IRR is estimated at 13.8%, the overall performance indicates a structurally inefficient pathway driven by rising environmental and governance costs, confirming that BAU is not a viable long-term strategy for Kenya's marine economy.

7.4.2 Nature Recovery and Protection (Conservation-Led Zoning)

The Conservation-Led Scenario, as presented in **Figure 35**, is intended to achieve long-term protection of ecosystem integrity, biodiversity recovery, and ecological resilience by ensuring that marine spatial decisions are guided primarily by ecological thresholds and habitat sensitivity. This scenario is plausible in the Kenyan marine context because Kenya's coastal and offshore waters contain nationally important and globally significant ecosystems, including coral reefs, seagrass meadows, mangroves, turtle nesting beaches, estuaries, deltas, and marine mammal habitats that are increasingly exposed to cumulative development pressure and climate-related stress. As such, it represents a credible spatial planning option for safeguarding the ecological assets that sustain fisheries, tourism, coastal protection, blue-carbon functions, and community resilience. Of the three core planning objectives, this scenario gives the greatest weight to environmental protection, while accepting that this emphasis entails economic and social trade-offs through stricter limits on extractive activities, infrastructure expansion, and access to sensitive marine and coastal areas.

[183] The Cost_benefit Analysis Report for the Kenay MSP is being prepared alongside the SESA and the MSP as described in the Terms of Reference provided as Annex 1.

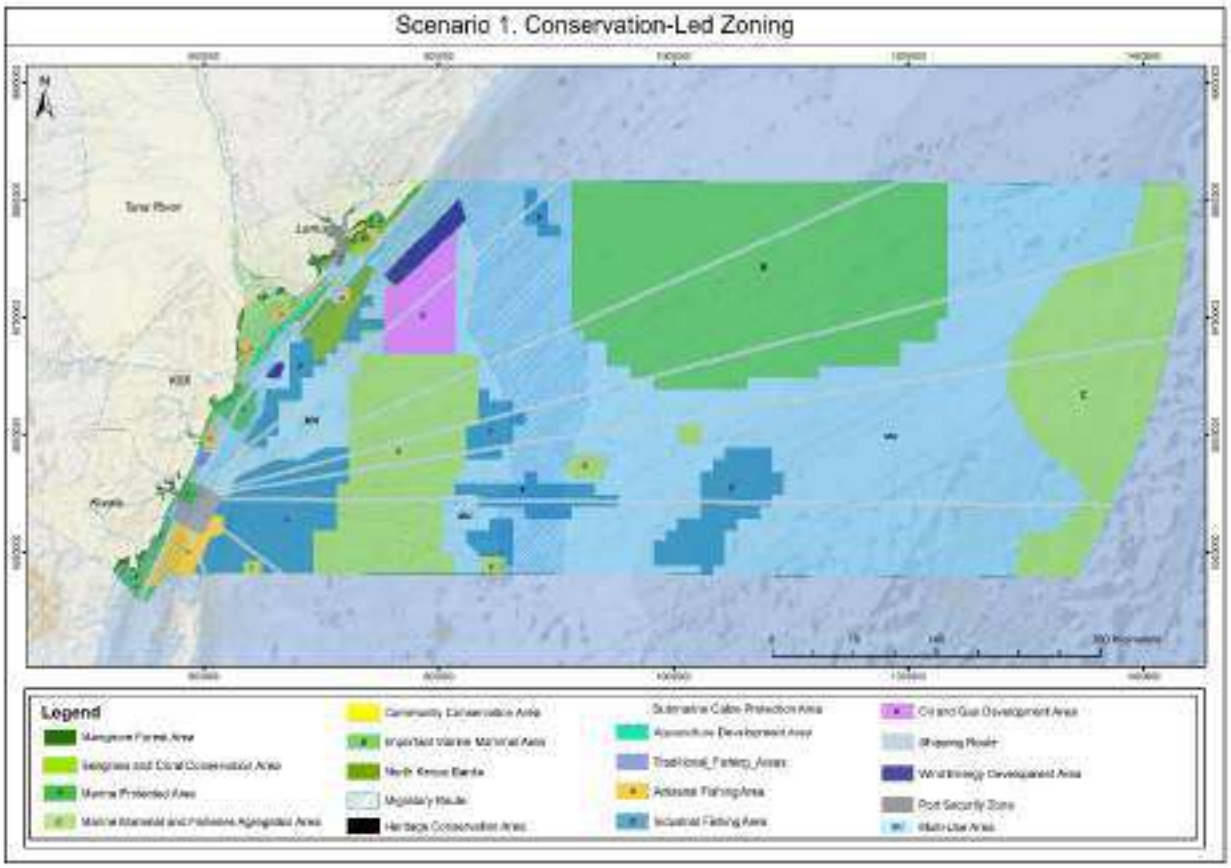

Figure 35: Conservation-Led Zoning

Implications of the scenario

Under the Conservation Approach, ecological protection, habitat recovery, and the long-term preservation of natural capital are prioritized. This pathway strengthens activities, ecosystems, and community functions that depend on healthy and resilient coastal and marine environments. At the same time, uses that exert pressure on sensitive habitats or require access to ecologically important areas face stricter controls and reduced spatial flexibility.

Areas and Activities Most Positively Affected

Sectors that are likely to benefit most from stronger ecological protection, habitat restoration, and long-term ecosystem retention include:

i. Biodiversity and sensitive habitats, including coral reefs, mangroves, seagrass, turtle nesting areas, estuaries, deltas, marine mammal habitats, and aggregation areas.
ii. Eco-tourism and biodiversity-based enterprises, as ecological quality, scenic value, and wildlife value are enhanced.
iii. Blue-carbon, restoration, research, and conservation services, because the approach places strong emphasis on habitat recovery, ecological monitoring, and environmental management.
iv. Long-term artisanal fisheries productivity and ecosystem services, due to stronger retention of nursery habitats, shoreline protection, and broader ecological support functions.
v. Community stewardship and co-management functions, where conservation, restoration, education, and regulated local participation are reinforced.

Sectors Negatively Affected

Sectors likely to be affected by restrictions, exclusions, or trade-offs to secure sensitive habitats and ecological corridors include:

i. Oil and gas exploration and development, which faces the greatest level of constraint, with restrictions recurring across IMMA, seagrass, coral, and North Kenya Banks areas, creating a combined trade-off area of at least 59,847.42 km².
ii. Industrial fishing, which is also substantially constrained, as industrial pelagic longlining, bottom trawling, and other industrial fishing activities are restricted across at least 31,734.39 km², excluding additional unquantified limitations.
iii. Artisanal fisheries in restricted areas, where beach seining, gill-net use, fishing access, and some community fishing grounds are reduced across at least 228.45 km².
iv. Subsea cables, as conservation zoning reduces siting flexibility and may require rerouting, longer alignments, and higher installation and protection costs.
v. Salt mining, because mangrove protection and aggregation-area controls limit salt works in sensitive coastal zones.
vi. Wind and current energy development, particularly in sensitive marine areas such as Lamu, where the space available for future renewable-energy siting is reduced.
vii. Aquaculture in sensitive reef-linked areas, as coral conservation controls limit expansion around locations such as Shimoni and Malindi.
viii. Sport fishing, because coral conservation areas reduce access to some reef zones used for recreational fishing.

Table **97**: Results of the weighted index for conservation-Led Zoning

Dimension	Total pros	Total cons	Net score	Weight	Weighted contrib.
Environment	43	40	3	0.40	1.2
Economic	43	85	-42	0.30	-12.6
Social	42	38	4	0.30	1.2
Overall index					-10.2

The Conservation Scenario records a strongly improved environmental and social profile relative to BAU, but its overall score remains negative because the cumulative economic trade-offs attached to restrictions on high-footprint development are substantial.

Cumulative Net Impacts

The net impacts of the Conservation Scenario are derived from the difference between total benefits and total costs over the 20-year analysis period. Net benefits increase from KES 126.1 billion in Year 1 to approximately KES 823.3 billion in Year 20, indicating a strong upward trajectory as presented in .

Table **98**: Economic performance of the Conservation-Led Scenario

Indicator	Value
Benefit-Cost Ratio (BCR)	1.97
Net Present Value (NPV) (KES Billion)	292.97
Internal Rate of Return (IRR)	18%

The Conservation Scenario demonstrates strong economic performance across all indicators. The BCR of 1.97 shows high efficiency, generating nearly double the value of costs. A positive NPV of KES 292.97 billion confirms substantial net economic gains over time, while an IRR of 18%, well above the 9.25% discount rate, indicates strong financial viability. Figure 24 illustrates the cumulative impacts of the Conservation Scenario, showing trends in total benefits, costs, and net impacts over the 20 years.

7.4.3 The Accelerated Blue Growth Scenario

The Accelerated Blue Growth Scenario, as presented in **Figure 35**, intended to enable rapid economic expansion by applying an economy-led marine use allocation model in which marine space is preferentially assigned to uses that maximize aggregate economic value, infrastructure development, and strategic national return. Under this scenario, priority is given to port development and operations, aquaculture development areas, renewable energy development areas, infrastructure corridors, and other high-value ocean sectors capable of generating immediate output, investment, and growth. The scenario, therefore, represents a development-forward planning pathway in which spatial efficiency and investment attraction are treated as central planning outcomes.

This scenario is plausible in the Kenya marine context because the marine spatial planning framework already promotes equitable economic growth through a sustainable Blue Economy and includes explicit ambitions for offshore fisheries development in the EEZ, mariculture expansion, tourism value optimization, efficient port and maritime transport operations, marine biotechnology, offshore petroleum handling, and submarine cable infrastructure. Kenya's broader policy direction has also emphasized the strategic role of ocean-based sectors in employment creation, trade facilitation, infrastructure development, and national economic transformation. As such, this scenario reflects a credible planning option where marine space is deliberately structured to accelerate sectoral expansion and attract large-scale investment.

Of the three core planning objectives, this scenario gives the greatest weight to economic growth and sectoral expansion through spatial clarity and transparent management of trade-offs. Conflict reduction is treated primarily as an enabling condition for growth, while environmental protection is recognized mainly to the extent necessary to manage risk, maintain functionality, or avoid unacceptable constraints on development. As a result, the scenario offers strong potential for short- to medium-term economic gains, but it also entails substantial ecological and social trade-offs where rapid expansion overlaps with sensitive habitats, lower-impact uses, and community-based livelihoods.

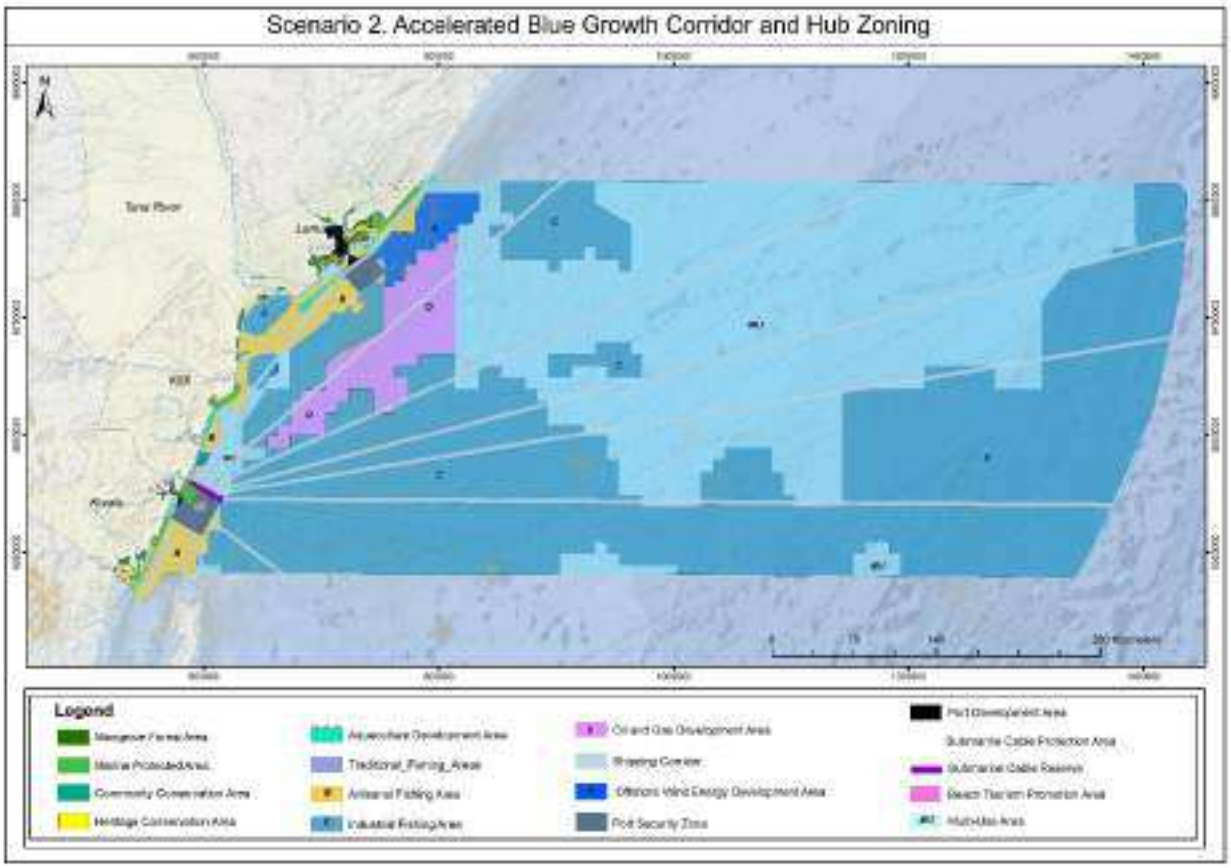

Figure **36**: Blue Economy Development Scenario

Implications of the Scenario

This option will have the following implications in the sectors:
Under the Accelerated Blue Growth scenario, rapid economic expansion, large-scale infrastructure development, and intensified sectoral growth are projected to deliver substantial gains for investment-driven and high-output industries. However, this trajectory is also expected to heighten pressures on ecologically sensitive systems, diminish the viability of lower-impact resource uses, and challenge local livelihoods that rely on environmental quality, spatial access, and ecosystem stability.

Areas and Activities Most Positively Affected

The following are the areas and activities expected to experience the strongest positive effects:

i. Ports, shipping, and logistics, as rapid expansion is expected to increase throughput, transport value, corridor efficiency, and infrastructure-led growth.
ii. Tourism, marine services, and coastal development nodes, because accelerated investment is likely to expand facilities, visitor services, and associated commercial activity.
iii. Aquaculture, as the scenario directly links sectoral expansion with GDP growth, increased production, and improved livelihood opportunities in selected areas.
iv. Industrial fisheries, because the scenario favours higher-output offshore and industrial production, notwithstanding significant spatial overlap costs.
v. Oil and gas and other offshore investment interests, as the scenario prioritizes rapid economic expansion, licensing value, and supporting infrastructure growth.
vi. Renewable energy investment interests, because the scenario supports expansion-oriented blue economy development, even where spatial conflicts may emerge over time.

Areas and Activities Most Negatively Affected

The following are the areas and activities expected to experience the strongest negative effects:

i. Coral reefs, mangroves, seagrass meadows, turtle nesting areas, estuaries, and marine mammal habitats, because rapid growth is likely to intensify dredging, construction, boating, shipping, anchoring, pollution, and habitat conversion.
ii. Marine megafauna and other sensitive species, such as bycatch, underwater noise, vessel movement, and habitat fragmentation, are expected to increase as multiple sectors expand concurrently.
iii. Artisanal fisheries and coastal communities, because access to fishing grounds, landing sites, beaches, and customary use areas is likely to decline, while conflict and livelihood insecurity increase.
iv. Nature-based tourism is dependent on ecological quality, including whale watching, dolphin sighting, sport fishing, and reef-based tourism, because habitat degradation is expected to reduce destination quality and wildlife value

Table **99**: Results of the weighted index for Accelerated Blue Growth Scenario

Dimension	Total pros	Total cons	Net score	Weight	Weighted contribution
Environment	68	99	-31	0.40	-12.4
Economic	82	90	-8	0.30	-2.4
Social	93	89	4	0.30	1.2
Overall index					-13.6

The Accelerated Blue Growth Scenario improves economic dynamism and some social opportunity pathways, but its overall score remains negative because cumulative environmental losses and associated trade-offs offset those gains.

Cumulative Net Impacts

The net impacts of the Accelerated Blue Growth Scenario are derived from the discounted comparison of cumulative benefits and costs over the 20-year analysis period, using a social discount rate of 9.25%, consistent with the Central Bank of Kenya benchmark rate. The analysis integrates the sectoral benefit and cost streams into a unified cash flow model to assess overall economic viability, as shown in **Table 100**.

Table **100**: Economic performance of Accelerated Blue Growth Scenario

Indicator	Result	Interpretation
Net Present Value (NPV) - (KES billion)	912.3	Strong positive net economic gain; benefits significantly exceed costs
Cost-Benefit Ratio (BCR)	1.60	Every KES 1 invested yields KES 1.60 in return
Internal Rate of Return (IRR)	107%	Very high return driven by front-loaded benefits

Source: Adopted from the Draft Cost-Benefit Analysis Report for the MSP

The Accelerated Blue Growth Scenario demonstrates strong economic viability, with a Net Present Value (NPV) of KES 912.3 billion, indicating that the discounted benefits substantially outweigh the associated costs over the 20 years. The positive NPV reflects the scale of economic gains generated by ports, maritime trade, offshore energy, tourism, and Aquaculture, particularly in the early and medium-term phases of implementation. The Cost-Benefit Ratio (BCR) of 1.60 further confirms the investment's efficiency, indicating that each unit of investment generates 60% additional economic value. This suggests that, from a purely financial perspective, the Accelerated Blue Growth Scenario represents a highly attractive pathway for maximising economic returns within Kenya's marine space. The Internal Rate of Return (IRR) of approximately 107% indicates an exceptionally high rate of return, largely driven by the front-loaded nature of benefits associated with infrastructure expansion, increased trade throughput, and rapid sectoral growth. This high IRR reflects strong revenue generation relative to initial investment costs, particularly in capital-intensive sectors.

7.4.4 Balanced Multi-Use and Coexistence Scenario

The Balanced Multi-Use Scenario, as demonstrated in **Figure 37**, is intended to achieve a managed coexistence among ecological protection, economic development, and social use by allocating marine space in a way that reduces avoidable conflict while maintaining the natural capital on which long-term marine productivity depends. This scenario applies a balanced planning approach in which sensitive habitats and high-value ecological systems are protected, while compatible development and livelihood activities are retained within clearly defined spatial and management limits. Its purpose is therefore to provide a practical middle pathway between strict conservation and rapid expansion by improving predictability, compatibility, and transparency in marine space allocation.

This scenario is plausible in the Kenya marine context because Kenya's marine area supports multiple legitimate and interdependent uses, including tourism, artisanal and industrial fisheries, ports and shipping, renewable energy, digital infrastructure, aquaculture, conservation, and community-based coastal livelihoods. At the same time, these uses interact within an ecologically sensitive seascape that contains coral reefs, mangroves, seagrass meadows, marine mammal habitats, estuaries, deltas, and other areas of high biodiversity and ecosystem-service value. A balanced scenario is therefore credible because it reflects the practical need for marine spatial planning in Kenya to accommodate development objectives while also addressing cumulative ecological pressure, reducing unmanaged overlap, and protecting the ecosystem functions that support both local livelihoods and national economic priorities.

Of the three core planning objectives, this scenario gives the strongest combined emphasis to conflict reduction and sustainable multi-sector coexistence, while still maintaining substantial attention to ecological protection and managed economic growth. Unlike the conservation-led option, it does not rely primarily on exclusion, and unlike the accelerated growth option, it does not prioritize expansion at the expense of ecological thresholds. Instead, it seeks to manage trade-offs more selectively by directing stricter controls to higher-sensitivity areas while retaining development and access opportunities where compatibility can be

achieved. In this sense, the Integrated Option represents the most explicitly reconciliatory planning pathway, aiming to balance protection, productivity, and social stability within a single marine spatial framework.

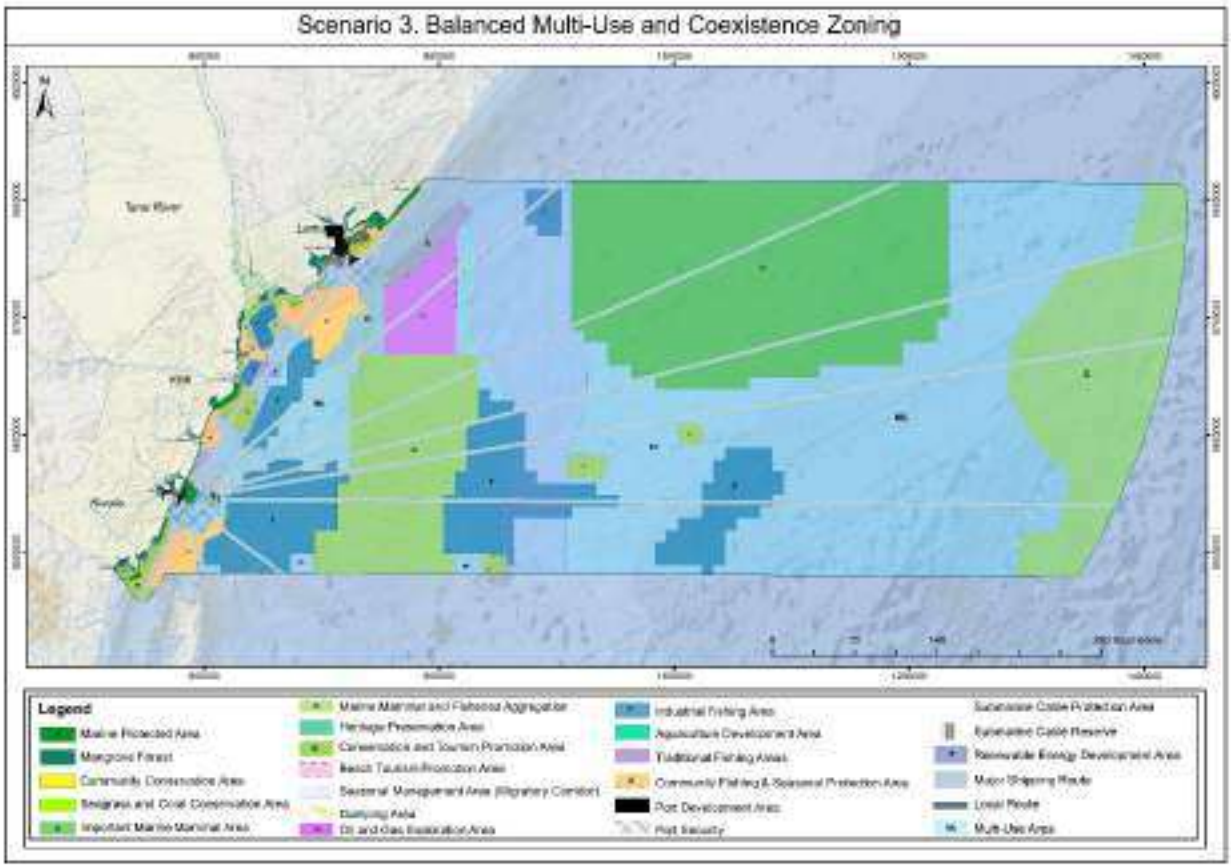

Figure **37**: Balanced Multi-Use and Coexistence Zoning

Implications

Under the Balanced Multi-Use Scenario, the spatial planning framework is designed to promote coexistence among marine and coastal uses by combining ecological protection with managed development space. This approach is expected to improve predictability, reduce unmanaged spatial conflict, and strengthen the long-term contribution of natural capital, while still allowing compatible economic activities to continue within clearly defined limits.

Areas and Activities Most Positively Affected

The following are the areas and activities expected to experience the strongest positive effects:

i. Eco-tourism, regulated fisheries, and other compatible marine uses, because the scenario protects sensitive habitats while allowing managed use in lower-conflict areas.
ii. Ports, shipping, digital connectivity, renewable energy, research, and other compatible development sectors, as the scenario improves predictability and reduces unmanaged spatial overlap.
iii. Natural capital and ecosystem-service functions, because habitat recovery, ecological connectivity, shoreline protection, nursery support, and blue-carbon retention are strengthened in priority areas.
iv. Co-management, restoration, conservation awareness, and community resilience, because the scenario supports coexistence and reduces exposure to unmanaged ecological decline.
v. Longer-term food security and livelihood stability, because ecological limits are recognized while compatible access is retained.

Areas and Activities Most Negatively Affected

The following are the areas and activities expected to experience the strongest negative effects:

i. Oil and gas exploration in higher-sensitivity areas, because balanced protection of marine mammal areas and sensitive habitats still creates substantial trade-offs, including about 780 km² in Watamu IMMA, about 828.66 km² in Vanga IMMA, and about 56,078.79 km² in Offshore IMMA.
ii. Industrial fishing, because aggregation-area protection continues to constrain industrial fishing over about 3,311.57 km² in shark and ray aggregation areas, about 115.1 km² in Aggregation Area 3, and about 26,740.3 km² in Aggregation Area 4.
iii. Dredging and port expansion in higher-sensitivity areas, because seagrass, mangrove, and other habitat protection measures constrain dredging activities and reduce expansion flexibility around ecologically sensitive port locations.
iv. Subsea cables and corridor infrastructure, because the protection of marine mammal areas and undersea cable routing controls reduces siting flexibility and may increase protection, maintenance, and repair costs.
v. Shipping flexibility in sensitive corridors, because route management creates trade-offs with mariculture, certain fishing opportunities, wildlife tourism, and renewable energy infrastructure space.
vi. Artisanal fishing in localized sensitive areas, because some seagrass-sensitive, port-sensitive, and protected areas continue to reduce access and displace local use.
vii. Salt works, charcoal production, land conversion, and other incompatible mangrove-area use, because mangrove protection remains a firm constraint even under the balanced option.

Table **101**: Results of the weighted index for Balanced Multi-Use Scenario

Dimension	Total pros	Total cons	Net score	Weight	Weighted contrib.
Environment	101	79	22	0.40	8.8
Economic	104	107	-3	0.30	-0.9
Social	97	78	19	0.30	5.7
Overall index					13.6

The Balanced Multi-Use Scenario produces the highest overall weighted index, indicating the strongest combined performance across environmental protection, social stability, and managed economic use.

Cumulative Net Impacts

The Integrated (Balanced) Scenario yields strong positive net impacts over the full 20-year planning period. Cumulative net benefits increase from KES 623.9 billion in Year 1 to KES 3,656.0 billion in Year 20, demonstrating that the scenario remains economically beneficial throughout, as illustrated in **Table 102**. The positive trajectory reflects the combined effect of sustained sectoral benefits, ecosystem service recovery, and improved governance, which together outweigh the moderate but necessary implementation and management costs.

Table **102**: Economic performance of Balanced Multi-Use Scenario

Indicator	Value
Net Present Value (NPV)	KES 1.50 trillion
Benefit-Cost Ratio (BCR)	2.20
Internal Rate of Return (IRR)	50%
Overall Economic Performance	Highly Positive

The Integrated (Balanced) Scenario demonstrates strong economic performance and long-term financial viability. With a Net Present Value (NPV) of approximately KES 1.50 trillion, the scenario generates substantial net benefits after accounting for all discounted costs. The Benefit-Cost Ratio (BCR) of 2.20 indicates that investments in integrated marine spatial planning yield more than double their cost in economic

returns, reflecting high efficiency in resource allocation. Furthermore, the Internal Rate of Return (IRR) of about 50%, which is significantly above the 9.25% discount rate, confirms that the scenario is highly profitable and resilient to potential economic risks. Overall, these indicators demonstrate that the Integrated (Balanced) Scenario provides a balanced, low-risk, and economically superior pathway, outperforming Business-as-Usual while avoiding the volatility associated with more extreme development or conservation approaches. Figure 33 illustrates the performance of the integrated (balanced) scenario.

7.5 Comparative Analysis of the Scenarios

A comparative analysis was undertaken using the completed weighted scoring matrices for all four scenarios. The analysis compares the net outcomes for the Environmental, Social and Economic dimensions and then aggregates them using the SESA weights of 0.40, 0.30 and 0.30, respectively as presented in **Table 103**. This provides a transparent weighted multi-criteria matrix, a clear ranking of scenarios, and a defensible basis for selection of the preferred option.

Table **103**: Comparative weighted matrix and ranking of scenarios

Scenario	E Net	S Net	Ec Net	Overall weighted index	Rank
Balanced Multi-Use and Coexistence Scenario	22	19	-3	13.6	1
Nature Recovery and Protection Scenario	3	4	-42	-10.2	2
Accelerated Blue Growth Scenario	-31	4	-8	-13.6	3
Business-as-Usual (BAU) Scenario	-73	-39	-12	-44.5	4

The weighted index gives the following ranking: Balanced Multi-Use > Nature Recovery and Protection > Accelerated Blue Growth > Business-as-Usual.

7.6 Sensitivity Analysis

A sensitivity analysis was undertaken to test whether the ranking of the scenarios remains stable under different weighting assumptions for the environmental, social and economic criteria. This step is important because weighting in multi-criteria analysis involves professional judgement, and different decision-makers may reasonably place greater emphasis on ecological integrity, social inclusion or economic growth.

The results show that the Accelerated Blue Growth Scenario remains the highest-ranked option under all tested weighting combinations, while the Business-as-Usual scenario remains last in every case as presented in **Table 104**. The relative positions of the Conservation-Led Zoning and Accelerated Blue Growth scenarios change under some weight sets, indicating that those two options are more sensitive to policy preference. The implication is that selection of the Integrated Scenario is robust, defensible and not dependent on a single weighting assumption

Table **104**: Sensitivity analysis of the scenarios

Weights (E/S/Ec)	Balanced Muti-Use	Conservation	Blue Growth	BAU	Rank
0.40/0.30/0.30	13.6	-10.2	-13.6	-44.5	Balanced Multi-Use > Conservation-Led > Accelerated Blue Growth > Business as Usual

Weights (E/S/Ec)	Balanced Muti-Use	Conservation	Blue Growth	BAU	Rank
0.60/0.20/0.20	16.4	-5.8	-19.4	-54.0	Balanced Multi-Use> Conservation-Led> Accelerated Blue Growth > Business as Usual
0.33/0.33/0.34	12.5	-12.0	-11.6	-41.0	Balanced Multi-Use > Accelerated Blue Growth > Conservation-Led > Business as Usual
0.25/0.25/0.50	8.8	-19.3	-10.8	-34.0	Balanced Multi-Use > Accelerated Blue growth > Conservation-Led > Business as Usual
1.00/0.00/0.00	22.0	3.0	-31.0	-73.0	Balanced Multi-Use> Conservation> Accelerated Blue Growth > Business as Usual

7.7 Findings

The completed weighted analysis establishes a clear ranking of the alternatives: Balanced Multi-Use first (13.6), Conservation-Led Zoning second (-10.2), Accelerated Blue Growth third (-13.6), and Business-as-Usual last (-44.5). This demonstrates that the Balanced Multi-Use Scenario is the only option that delivers a positive overall outcome when environmental, social and economic considerations are assessed together.

The Balanced Multi-Use Scenario is therefore identified as the preferred option because it combines the strongest environmental performance (22) with a strong positive social outcome (19) and only a limited economic trade-off (-3). In summary, it provides the most proportionate and implementable balance between ecosystem protection, livelihood security and sustainable blue economy development, consistent with internationally accepted marine spatial planning and SESA principles.

The Conservation-Led Scenario was not selected as the preferred option because, although it performs relatively well on environmental and social criteria, its economic penalty (-42) is too large to support a realistic and balanced national planning pathway. The Accelerated Blue Growth Scenario was also not selected because its short-term development opportunities are outweighed by substantial environmental losses (-31) and a negative overall score, indicating that its economic benefits would come at an unacceptably high ecological and social risk.

The Business-as-Usual scenario was not selected because it performs worst across the assessment, particularly in relation to environmental degradation and social conflict. In summary, it would perpetuate fragmented management, cumulative ecosystem decline, inefficient spatial use and unresolved competition among sectors. The sensitivity analysis further confirms that the preferred option is robust, as no alternative scenario displaces the Integrated Scenario from first place under any of the tested weighting sets.

7.8 Recommendations

Adopt the Balanced Multi-Use Scenario as the preferred MSP option. It offers the strongest combined environmental, social and economic performance, remains first under all tested sensitivity cases, and provides the most credible basis for a sustainable, implementable and internationally defensible marine spatial plan.

Do not adopt the Business-as-Usual or Accelerated Blue Growth scenarios as the preferred option. Business-as-Usual should be rejected because it allows current patterns of cumulative degradation, governance fragmentation and user conflict to continue. Accelerated Blue Growth should also not be selected because, despite its investment and expansion potential, its environmental and associated social costs are too significant to justify approval as the primary planning pathway.

Do not adopt the Conservation-Led Scenario as the sole preferred option. Instead, its strongest elements should be incorporated into the final MSP through strict protection of critical habitats, ecological buffers, restoration priorities, precautionary safeguards and stronger controls in highly sensitive areas.

The final MSP should therefore be based on the Balanced Multi-Use Scenario, strengthened by targeted conservation measures and supported by clear implementation arrangements for monitoring, enforcement, adaptive management and conflict resolution. Particular attention should be given to managing the localized trade-offs associated with oil and gas activities, industrial fishing, dredging, routing flexibility and some artisanal access so that the selected option remains environmentally credible, socially responsible and economically feasible.

CHAPTER 8: IMPACT ANALYSIS OF THE ZONING PLAN

8.1 Overview

Marine Spatial Planning (MSP) adopted the Balanced Approach as the preferred scenario because it seeks to harmonise ecological sustainability, socio-economic development, and the protection of cultural heritage within the planning area. However, even under this optimal scenario, both positive and negative impacts are anticipated. The impact assessment was therefore undertaken to ensure that the MSP promotes ecological sustainability, safeguards socio-economic livelihoods, and protects cultural heritage, while systematically identifying, evaluating, and managing potential risks so that development and conservation objectives are achieved in a balanced, equitable, and sustainable manner

8.2 Impact Identification and Analysis Process

The impacts were identified through a combination of stakeholder consultation, participatory mapping, and literature review, complemented by technical methods such as professional judgment, GIS spatial analysis, risk assessment, and compliance checks against legislative frameworks.

8.3 Anticipated Positive Impacts

The anticipated positive impacts arising from the implementation of the MSP are closely linked to the zoned sectors established under the balanced approach scenario. By designating specific areas for conservation, fisheries, tourism, shipping, and cultural heritage, the plan is expected to generate multiple benefits across environmental, social, and economic dimensions.

i). Marine Conservation Zone

The Marine Conservation Zone delivers positive environmental outcomes by safeguarding critical habitats, protecting biodiversity hotspots, and maintaining ecological connectivity. **Table 105** summarises the anticipated positive impacts for each sub-zone within this category.

Table **105**: The anticipated positive impacts from Marine Conservation Zone

Sub-Zone	Positive Impacts
Marine Protected Areas (MPAs)	• Consolidates strict no-take reference areas around the established KWS marine parks (Mombasa, Malindi, Watamu and Kisite-Mpunguti), improving boundary clarity for users and enforcement. • Creates biodiversity refugia that can demonstrate recovery benchmarks (coral condition, fish size/biomass) and support spill-over into surrounding regulated-use areas. • Supports high-value, non-extractive tourism (diving, snorkelling, glass-bottom boats) under clear carrying-capacity and compliance rules.
Marine Reserves	• Provides buffer zones around parks and sensitive habitats where artisanal fishing can continue under gear restrictions, reducing destructive practices while maintaining livelihood access. • Improves predictability and reduces conflict through clear rules on compatible gears, spatial access and enforcement responsibilities. • Maintains biodiversity and fisheries functions that support mixed livelihoods (regulated fishing + ecotourism) in adjacent coastal communities.
Mangrove Conservation	• Secures priority mangrove blocks in Lamu Archipelago, Tana Delta, Mida Creek, Gazi Bay and Vanga–Funzi by preventing incompatible conversion and enabling restoration where degraded. • Maintains nursery and feeding habitat for nearshore fisheries (crabs, prawns and finfish) that underpin artisanal fishing and local seafood supply chains at adjacent landing sites. • Protects and expands blue-carbon opportunities (e.g., community carbon projects in Gazi Bay) and strengthens benefit-sharing incentives for stewardship. • Reduces sediment and nutrient loading to adjacent seagrass and coral systems by maintaining mangrove filtration and creek-edge stability in estuary/creek settings.

Sub-Zone	Positive Impacts
Locally managed marine areas (LMMAs)	• Formalises and strengthens community closures and restoration initiatives (e.g., Kuruwitu-type models), enabling measurable local fish biomass recovery and improved compliance through co-management. • Improves social legitimacy of zoning by anchoring rules in local institutions (BMUs, CIGs/CBOs) and reducing reliance on costly external enforcement. • Creates diversified income pathways (guided snorkelling, community conservation fees, restoration jobs) where ecological condition improves and visitation is managed.
Marine mammal and wildlife management zone	• Protects identified Kenya IMMAs (Watamu–Malindi, Kisite–Shimoni and Lamu Offshore) by prioritising measures that reduce disturbance and mortality risks in known cetacean and dugong use areas. • Supports regulated dolphin/whale watching (codes of conduct, vessel approach distances and speed management) that improves tourist experience and reduces harassment impacts. • Improves monitoring and reporting of strandings/bycatch and supports Kenya's regional collaboration on migratory species in the Western Indian Ocean. • Safeguards multi-species hotspots (sharks, rays, turtles and marine mammals) where bycatch controls and habitat protection are prioritised, supporting ecosystem stability. • Strengthens fisheries sustainability through reduced bycatch mortality and better compatibility rules in sensitive habitats, improving the basis for responsible-seafood market access. • Supports niche nature-based tourism (e.g., megafauna viewing) where conducted under clear wildlife-interaction standards. • Maintains seamount-driven productivity and 'aggregation' functions that concentrate pelagic species (including tunas, billfish and associated predators), supporting more predictable, efficiently managed pelagic fisheries while reducing dispersal of effort into sensitive coastal habitats. • Improves scientific certainty and adaptive management by establishing fixed offshore reference areas for baseline surveys (e.g., ROV/drop-camera, eDNA, acoustic), enabling trend detection on climate signals (temperature/oxygen) and informing future deep-sea biodiversity obligations. • Reduces cumulative risk from unplanned offshore infrastructure siting by providing a clear offshore constraint layer for routing of cables/pipelines and siting of energy/mineral activities, lowering the likelihood of later project redesign, conflict and compliance costs.
Seasonal marine mammal and wildlife corridor	• Maintains functional connectivity between coastal critical habitats (mangroves, seagrass and coral systems) and offshore feeding/migration areas by reducing fragmentation from incompatible uses along key corridors; this supports larval dispersal, recruitment and genetic exchange that underpin long-term fisheries productivity. • Strengthens protection of migratory species by safeguarding pathways used by marine mammals and turtles (e.g., movement between nearshore feeding areas and offshore/transboundary routes), reducing disturbance and mortality risks where traffic and other pressures can be concentrated and managed. • Provides a defensible spatial basis for cross-sector compatibility measures (speed/route management, seasonal advisories, bycatch-risk controls) to be targeted where they deliver the highest ecological return, improving cost-effectiveness of compliance and enforcement.

ii). Fisheries Management Zone (FMZ)

The Fisheries Management Zone improves fisheries sustainability, reduces user conflicts, and secures predictable access for artisanal, commercial, and recreational fishers. **Table 106** summarises the anticipated positive impacts for each fisheries-related zone.

Table **106**: Anticipated positive impacts from the fisheries protection zone

Sub-Zone	Positive Impacts
Traditional fishing zone	• Secures predictable access for artisanal fishers to customary nearshore grounds by clarifying spatial rules and reducing displacement by incompatible uses. • Improves compliance legitimacy where zoning is implemented through BMUs and county fisheries structures, strengthening co-management and peer accountability.
Artisanal fishing zone	• Creates predictable investment space for low-impact livelihoods (seaweed lines, bivalve racks, small-scale cages/rafts) that are compatible with community-based enterprises and women/youth participation in coastal value chains. • Promotes better farm siting (avoiding dense seagrass and coral patches) and standardised farm layouts, reducing habitat abrasion from poorly positioned lines and anchors. • Provides a nature-based water-quality co-benefit where shellfish filtration can help reduce turbidity locally (when farms are appropriately stocked and not placed in polluted effluent plumes).
Industrial - Prawn fishing zone	• Reduces spatial conflict between industrial trawling and artisanal fleets by clarifying access corridors, temporal controls and compliance requirements in a historically contested area. • Improves benthic habitat recovery and prawn recruitment where effort controls and bycatch-reduction requirements are enforced alongside protected nursery areas. • Strengthens seafood safety and market confidence where pollution controls and landing-site hygiene measures reduce contamination risks in prawn value chains.
Industrial - Deep water crab fishing zone	• Improves sustainability of the crab value chain by setting effort controls and reducing ghost-fishing through gear marking and retrieval rules. • Reduces conflict with artisanal fishers by clarifying spatial access and compatible gears and by protecting nearshore nursery areas from industrial gear concentrations.
Industrial - Pelagic fishing zone	• Supports stable pelagic yields through improved catch reporting and strengthened monitoring, control and surveillance aligned to RFMO requirements. • Reduces bycatch and discard rates through gear standards and operational controls, improving sustainability credentials and market access.
Industrial - ECS Pelagic fisheries zone	• Supports stable pelagic yields through improved catch reporting and strengthened monitoring, control and surveillance aligned to RFMO requirements. • Reduces bycatch and discard rates through gear standards and operational controls, improving sustainability credentials and market access for ECS fisheries.

iii). Navigation, Port Access and Security Zone (NPAZ)

The Navigation, Port Access and Security Zone enhances maritime safety, operational efficiency, and the protection of critical port infrastructure while reducing spatial overlap with sensitive habitats and fishing grounds. **Table 107** summarises the anticipated positive impacts for port and shipping route zones within the NPAZ.

Table **107**: Anticipated positive impacts from the NPAZ

Zone	Positive Impacts
Major shipping corridors	• Reduces spatial overlap between high-traffic navigation corridors and sensitive habitats/tourism sites by defining predictable routing and buffers in Kenya's marine space. • Improves maritime safety and operational reliability by clarifying separation from small-craft corridors and fishing concentration areas near port approaches. • Enables targeted compliance and emergency preparedness because high-risk corridors are mapped and monitored.
Local shipping route	• Protects small-craft navigation essential for coastal livelihoods, fisheries value chains, and inter-community connectivity.

Zone	Positive Impacts
	• Ensures traditional routes and landing sites remain accessible, with vessel speed limits applied near sensitive habitats and landing sites.
Port development zones	• Improves planning certainty for port expansion and associated infrastructure by concentrating development within defined envelopes and enabling cumulative-impact management planning. • Supports coastal employment and service-sector benefits linked to port activity, while reducing conflict with adjacent uses through clearer spatial rules and safety zones. • Enables integrated mitigation (water quality, dredging controls, waste reception facilities) because operational footprints are fixed and performance monitoring can be focused.
Port security zones	• Protects critical port assets and ensures maritime security in accordance with the International Ship and Port Facility Security (ISPS) Code and SOLAS Chapter XI-2. • Establishes defined security perimeters around major ports, with controlled access, continuous surveillance, and the authority to impose dynamic restrictions in response to security threats.
Dredged material disposal zones	• Reduces uncontrolled dumping by directing disposal to defined sites with agreed operating conditions and monitoring requirements. • Supports maintenance of navigational depth and safe port operations while reducing the footprint of disposal impacts through focused compliance oversight. • Improves transparency and accountability by linking disposal activities to permits, tracking, and periodic environmental monitoring.
Ferry operation zone	• Improves safety and predictability for high-volume passenger and vehicle ferry transits by separating ferry lanes from anchorage areas and small-craft fishing zones. • Reduces collision risk and service disruption where ferry routes are integrated with vessel traffic management protocols. • Supports reliable urban and inter-county connectivity, particularly for communities dependent on ferry access across creeks and harbour channels.

iv). Marine Infrastructure Protection Zone (MIPZ)

The Marine Infrastructure Protection Zone safeguards strategic subsea cables, reducing outage risk from anchors, trawls, and construction activities, while providing a predictable spatial framework for cable installation and maintenance. **Table 108** summarises the anticipated positive impacts for marine infrastructure zones within the MIPZ.

Table **108**: Anticipated positive impacts from the MIPZ

Sub-Zone	Positive Impacts
Existing submarine cable buffer zones	• Protects strategic subsea telecommunications corridors and cable landing approaches (international fibre routes serving the coast), reducing outage risk from anchors, trawls, and construction activities. • Establishes clear no-anchoring and no-trawling restrictions to protect cable integrity, reducing the likelihood of costly cable damage and service disruption. • Improves transparency for other marine users by mapping cable protection areas, enabling better compliance and reducing accidental damage.
Submarine cable reserve zone	• Concentrates future cable routes within designated reserves, reducing cumulative seabed disturbance compared to unplanned, scattered cable laying. • Provides a predictable spatial framework for cable installation, inspection, and maintenance, reducing project delays and approval uncertainty. • Enables coordinated routing with other linear infrastructure (e.g., pipelines, power

Sub-Zone	Positive Impacts
	cables) where feasible, minimising habitat fragmentation and reducing cumulative environmental impacts.

v). Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)

The Marine Tourism, Recreation and Cultural Heritage Zone concentrates visitor activities in designated areas, protects sensitive coastal and underwater cultural assets, and supports high-value, nature-based tourism. **Table 109** summarise the anticipated positive impacts for tourism and cultural heritage zones respectively.

Table **109**: Anticipated positive impacts from MTCZ

Sub-Zone	Positive Impacts
Beach tourism promotion zone	• Concentrates visitor facilities and high-use recreation into designated beach stretches, protecting sensitive dune systems, turtle nesting beaches and erosion-prone shorelines from unmanaged expansion. • Reduces conflict between visitors, fishers and coastal residents by clarifying access points, beach use times, and safety zones for swimming/boating, supporting orderly local enterprise development.
Archeological sites	• Secures vulnerable submerged or buried archaeological deposits by establishing early screening and protective buffers that prevent irreversible loss during coastal works. • Reduces project stoppages and redesign costs by requiring early heritage due-diligence (chance-find procedures, surveys) before trenching, dredging or shoreline modification. • Strengthens Kenya's coastal heritage tourism circuits by safeguarding the historic seafront setting of nationally significant heritage centres (e.g., Lamu Old Town and Mombasa historic coastline context).
Shipwrecks	• Protects mapped wreck assets by preventing anchor drag/prop-wash damage and unmanaged artefact removal, preserving the integrity and safety of dive sites. • Enables structured underwater-heritage tourism products (licensed dive access, heritage trails, interpretation) in established coastal tourism hubs, strengthening heritage-tourism value (baseline: heritage-related tourism estimated at ~KES 300 million/year). • Improves maritime safety through systematic charting/marking of wreck hazards and clearer rules for vessel behaviour near wreck sites. • Supports research and education partnerships (e.g., National Museums of Kenya and coastal institutions) through monitored access and documentation.
Sacred Sites	• Recognises customary cultural and spiritual use rights in zoning decisions, reducing conflict and increasing legitimacy and compliance with MSP. • Protects culturally important seascapes from incompatible development pressures, supporting community-led cultural tourism and inter-generational heritage transmission. • Clarifies agreed access protocols (timing/activities/visitor conduct) that enable respectful coexistence between local use, tourism and conservation rules.

vi). Aquaculture Development Zone (ADZ)

The Aquaculture Development Zone creates predictable investment space for low-impact mariculture, promotes better farm siting to avoid sensitive habitats, and supports community-based enterprises, particularly for women and youth. summarises the anticipated positive impacts for the Aquaculture Development Zone.

Table **110**: Anticipated positive impacts from the Aquaculture Development Zone

Zone	Positive Impacts
Aquaculture Development Zone (ADZ)	• Creates predictable investment space for low-impact livelihoods (seaweed lines, bivalve racks, small-scale cages/rafts) that are compatible with community-based enterprises and women/youth participation in coastal value chains. • Promotes better farm siting (avoiding dense seagrass and coral patches) and standardised farm layouts, reducing habitat abrasion from poorly positioned lines and anchors. • Provides a nature-based water-quality co-benefit where shellfish filtration can help reduce turbidity locally (when farms are appropriately stocked and not placed in polluted effluent plumes).

vii). Offshore Renewable Energy Development Zone (ORED)

The Offshore Renewable Energy Development Zone concentrates wind and current energy sites in pre-identified areas, improves investment certainty, and supports Kenya's renewable energy pipeline while reducing cumulative environmental footprints. **Table 111** summarises the anticipated positive impacts for renewable energy development zones within the ORED.

Table **111**: Anticipated positive impacts form the ORED

Sub-Zone	Positive Impacts
Wind energy harnessing zones	• Concentrates offshore wind sites in pre-identified areas to avoid repeated redesigns where proposals overlap Marine Parks, Coral Conservation Areas, Turtle Nesting Areas and main shipping approaches. • Improves investment certainty and consenting efficiency by signalling upfront spatial compatibility requirements (navigation buffers, construction windows, monitoring). • Supports Kenya's renewable-energy pipeline by unlocking offshore wind resource potential (baseline estimate: ~78,840 GWh/year technical potential), with coastal port-side supply and service opportunities (e.g., Mombasa and Lamu logistics bases). • Enables planned navigation safety marking and route predictability, reducing collision/incident risk and operational downtime. • Co-location zoning allows shared access routes, safety marking and monitoring platforms where feasible, reducing cumulative seabed footprint compared to scattered single-use siting. • Provides a single coordinated permitting and cumulative-effects monitoring envelope, reducing transaction costs and approval uncertainty. • Enables negotiated co-existence protocols for fisheries/tourism transits (time-bound exclusion during installation, re-entry rules), reducing displacement disputes.
Current energy harnessing zones	• Directs current-energy development to defined areas so installations do not expand opportunistically into nearshore reef/seagrass complexes and priority artisanal fishing grounds. • Creates a predictable framework for time-bound construction exclusion zones and post-installation access arrangements, reducing user conflicts and enforcement burden. • Diversifies low-carbon generation options that can complement offshore wind/wave resources in Kenya's blue-economy corridor.

viii). Offshore Oil and Gas Exploration and Production Zone (OGEP)

The Offshore Oil and Gas Exploration and Production Zone provides spatial clarity for hydrocarbon activities, reduces conflict with other marine uses, and enables integrated environmental management through defined operating envelopes. Table 108 summarises the anticipated positive impacts for this zone.

Table **112**: Anticpated positive impacts form the OGEP

ZOne	Positive Impacts
Offshore Oil and Gas Exploration and Production Zone (OGEP**)**	• Provides spatial clarity for hydrocarbon activities by defining operating envelopes, reducing ad hoc siting decisions and cumulative conflict with other marine uses (fisheries, shipping, conservation). • Improves investment certainty for oil and gas exploration by signalling upfront spatial compatibility requirements, including exclusion zones around sensitive habitats (coral reefs, seagrass, marine mammal areas, MPAs). • Enables integrated environmental management through defined operating envelopes, including mandatory Environmental Impact Assessments (EIAs), Strategic Environmental Assessments (SEAs), and approved oil spill contingency plans. • Supports transitional energy activities aligned with national energy security and climate transition policies, contributing to Kenya's energy mix during the transition to lower-carbon sources. • Strengthens emergency preparedness and response by requiring approved oil spill contingency plans within defined operational areas, reducing transboundary spill risks and improving regional cooperation. • Facilitates cumulative impact management by concentrating hydrocarbon activities within a defined zone, enabling focused monitoring, compliance oversight, and coordinated decommissioning planning.

ix). Multiple Use Zone (MUZ)

The Multiple Use Zone provides a defined multi-use envelope where compatible activities can coexist under clear rules, reducing ad hoc siting decisions and cumulative sectoral conflicts. **Table 113** summarises the anticipated positive impacts for the Multiple Use Zone.

Table **113**: Anticipated positive impacts from the Multiple Use Zone (MUZ)

Sub-Zone	Positive Impacts
Multiple Use Zone - Territorial Waters	• Provides a defined multi-use envelope within nearshore waters where compatible activities (artisanal fisheries, tourism, small-scale infrastructure, conservation) can coexist under clear compatibility rules. • Supports equitable benefit-sharing by making permitted activities transparent to county governments and coastal communities, strengthening local ownership and compliance. • Reduces ad hoc siting decisions and cumulative conflict between sectors by establishing agreed spatial allocations for multiple uses within the same area. • Enables integrated management of land-sea interface activities, ensuring coherence between coastal land-use planning and marine spatial allocation.
Multiple Use Zone - Exclusive Economic Zone	• Provides a defined multi-use envelope within offshore waters where compatible activities (industrial fisheries, shipping, offshore energy, research) can coexist under clear compatibility rules and regulatory oversight. • Reduces unmanaged spatial overlap between high-value offshore sectors (pelagic fisheries, shipping corridors, renewable energy, cable routes) by establishing agreed spatial allocations. • Supports investment certainty for offshore industries by signalling upfront compatibility requirements and reducing the risk of future use conflicts. • Enables cumulative impact management by concentrating multiple uses within a defined zone, allowing focused monitoring, compliance oversight, and adaptive management.
Multiple Use Zone - Extended Continental Shelf	• Provides a defined multi-use envelope within Kenya's Extended Continental Shelf where compatible activities (deep-sea fisheries, seabed research, cable routes, future mineral exploration) can coexist under clear compatibility rules. • Supports Kenya's sovereign rights and jurisdiction over the Extended Continental Shelf by establishing a spatial framework for resource management and

Sub-Zone	Positive Impacts
	conservation. • Enables precautionary management of deep-sea ecosystems by defining clear operating envelopes for any future activities, ensuring environmental safeguards are applied before development proceeds. • Facilitates international cooperation on transboundary resources and deep-sea biodiversity conservation, strengthening Kenya's position in regional and global ocean governance forums.

8.4 Anticipated Negative Impacts

The anticipated negative impacts arising from the implementation of the MSP are also closely linked to the zoned sectors established under the balanced approach scenario. While zoning provides structure and safeguards, it inevitably introduces trade-offs that may affect certain users and ecosystems.

i). Marine Conservation Zone

The Marine Conservation Zone safeguards critical habitats and biodiversity but necessarily restricts or displaces certain extractive and development activities, generating opportunity costs and residual pressures where enforcement capacity is limited or where external stressors (such as land-based pollution) persist as presented in **Table 114**.

Table **114**: Anticipated negative impacts from Marine Conservation Zone (MCZ)

Sub-Zone	Anticipated Negative Impacts
Marine Protected Areas (MPAs)	• Displacement of traditional fishers and other users from customary fishing grounds, with potential for conflict if benefit-sharing or alternative livelihood mechanisms are inadequate. • Loss of short-term economic opportunities from restricted fishing and extractive activities.
Marine Reserves	• Continued habitat damage and bycatch where weak enforcement allows illegal or destructive fishing gears. • Livelihood transition pressures and economic losses for users reliant on prohibited gears or extractive uses.
Mangrove Conservation	• Restrictions on expansion of salt production, port development and other incompatible activities, with additional regulatory burdens on small-scale operators. • Reduced income and livelihood challenges for communities dependent on mangrove wood for construction or fuel. • Ongoing vulnerability to land-based pollution and altered hydrology, leading to reduced mangrove health, dieback, diminished nursery function for fisheries and weakened shoreline protection.
Locally Managed Marine Areas (LMMAs)	• Limits on infrastructure development and artisanal fishing that create foregone opportunities and may constrain short-term investment and income options. • Risk of persistent illegal activity during the transition to formal co-management.
Marine Mammal and Wildlife Management Zone	• Underwater noise and vibration from vessels and construction, resulting in displacement of marine mammals from key feeding, breeding and resting areas, disruption of behaviour and interference with acoustic communication. • Increased risk of vessel strikes and entanglement in fishing gear. • Residual bycatch and trophic impacts where regulated fishing continues.
Seasonal Marine Mammal and Wildlife Corridor	• Residual fishing impacts (bycatch and trophic effects) in areas where fishing remains permitted. • Opportunity costs arising from restrictions on shark finning, CITES-listed species and nursery-area fishing.

ii). Fisheries Management Zone (FMZ)

The Fisheries Management Zone seeks to improve sustainability and reduce conflict, yet zoning boundaries, gear restrictions and effort controls can generate short-term displacement, enforcement challenges and residual ecological pressures as presented in **Table 115**.

Table **115**: Anticipated negative impacts from Fisheries Management Zone

Sub-Zone	Anticipated Negative Impacts
Traditional Fishing Zone	• Exclusion of some artisanal and seasonal/migrant fishers due to zoning boundaries, increasing equity concerns and local conflict. • Concentration of fishing effort in permitted areas, raising risk of localised overfishing and reduced catch per unit effort (CPUE).
Artisanal Fishing Zone	• Similar risks of effort concentration, gear conflicts and enforcement challenges as in traditional zones.
Industrial – Prawn Fishing Zone	• High bycatch levels (historically approximately 84 % of catch, with significant discard rates). • Historical and potential illegal encroachment into nearshore zones, damaging artisanal gear and reducing artisanal catch rates. • Capture of juveniles of commercial species.
Industrial – Deep Water Crab Fishing Zone	• Resource depletion risk and shifts in crab size/age structure from intensive potting. • Ghost fishing from lost pots. • Habitat disturbance on sensitive bottoms. • Increased risk of IUU fishing due to regulatory gaps.
Industrial – Pelagic Fishing Zone	• Unsustainable harvesting pressure on key pelagic species, declining catches and high bycatch of turtles, sharks and other non-target species. • Habitat damage from destructive techniques. • Revenue losses from IUU fishing by foreign vessels.
Industrial – ECS Pelagic Fisheries Zone	• Similar pressures as in the Pelagic Fishing Zone, with additional risks from high-seas operations and limited enforcement capacity.
Aquaculture Development Zone (ADZ)	• Effluent discharge leading to reduced dissolved oxygen, altered water and sediment quality and bioaccumulation of contaminants. • Displacement of existing users and reduced competitiveness for some operators.

iii). Navigation, Port Access and Security Zone (NPAZ)

The Navigation, Port Access and Security Zone enhances maritime safety and operational efficiency but introduces localised physical and pollution pressures as well as spatial constraints on other users as summarised in **Table 116**.

Table **116**: Anticipated negative impacts form NPAZ

Sub-zone / Feature	Anticipated Negative Impacts
Major Shipping Corridors	• Dredging and channel maintenance that alter seabed topography and sediment distribution. • Air emissions (SO_2, NO_x, particulates and CO_2) contributing to poor air quality, acid rain and climate change. • Risk of accidental oil/chemical spills. • Underwater noise and vibration disturbing marine fauna. • Displacement of fishers and small operators, increasing user conflict.
Local Shipping Route	• Similar pressures to major corridors but concentrated on small-craft and coastal routes.

Sub-zone / Feature	Anticipated Negative Impacts
Port Development Zones	• Sediment plumes and disposal impacts from dredging. • Pollution and spill risks. • Noise and vibration in port approaches. • Access restrictions creating pressure and conflict in alternative areas. • Higher planning, coordination and transition costs.
Port Security Zones	• Expanded exclusion zones reducing artisanal access and traditional routes.
Dredged Material Disposal Zones	• Seabed disturbance and altered sediment dispersion patterns. • Temporary or permanent exclusion of fishing, tourism and anchoring. • Additional compliance and monitoring costs.
Ferry Operation Zone	• Wake wash, propeller scour and shoreline erosion. • Local air and water pollution from emissions and fuel leaks. • Route constraints increasing congestion and accident risk for small craft.

iv). Marine Infrastructure Protection Zone (MIPZ)

The Marine Infrastructure Protection Zone safeguards critical subsea infrastructure but introduces restrictions on fishing, anchoring, and other marine activities that can displace users and create compliance costs. **Table 117** summarises the anticipated negative impacts for marine infrastructure zones within the MIPZ.

Table **117**: Anticipated negative impacts from MIPZ

Sub-Zone	Negative Impacts
Existing submarine cable buffer zones	• No-anchoring and no-trawling restrictions to protect cables can reduce fishing/anchoring options and constrain dredging or coastal works, increasing project costs and approval timelines. • Cable laying/burial and periodic repairs disturb benthic habitats; accidental route overlap with reefs/seagrass can cause direct physical damage. • Security controls and compliance monitoring increase transaction costs and may heighten user conflict where traditional routes cross cable corridors.
Submarine cable reserve zone	• Same negative impacts as Existing submarine cable buffer zones, with additional potential for pre-emptive reservation of areas that could otherwise be used for fishing or other activities. • Long-term exclusion of certain activities (anchoring, trawling) within reserve areas, creating opportunity costs for displaced users.

v). Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)

The Marine Tourism, Recreation and Cultural Heritage Zone supports tourism and cultural preservation but introduces pressures from visitor concentration, infrastructure development, and access restrictions that can affect local communities and sensitive habitats. **Table 118** summarise the anticipated negative impacts for tourism and cultural heritage zones respectively.

Table **118**: Anticipated negative impacts from MTCZ

Sub-Zone	Negative Impacts
Beach tourism promotion zone	• Coastal development and beach grooming can remove dunes/vegetation and compact sand, increasing erosion and reducing turtle nesting success. • Increased wastewater, litter and stormwater runoff raise nutrient/pathogen loads, degrading coral/seagrass condition and public health (bathing water

Sub-Zone	Negative Impacts
	quality). • Higher land values and privatisation of access can displace local residents and restrict fish landing/processing sites; benefits may be seasonal and uneven.
Archeological sites	• Protective buffers force rerouting of cables, jetties or shoreline works, increasing project costs and approval timelines. • Irreversible loss: trenching, dredging or sand mining destroys submerged or buried archaeological deposits permanently.
Shipwrecks	• High vessel traffic near port approaches (Mombasa, Lamu) increases the risk of anchor drag and propeller wash damaging exposed wreck structures. • Uncontrolled access leads to artefact loss, reducing dive tourism appeal.
Sacred Sites	• Cultural exclusion zones restrict tourism facilities, landing improvements and night activities near sacred coastal/marine sites. • Potential for conflict between customary use and tourism development if access protocols are not clearly defined and respected.

vi). Aquaculture Development Zone (ADZ)

The Aquaculture Development Zone creates opportunities for mariculture development but introduces environmental pressures from farm effluents and potential conflicts with other marine users. **Table 119** summarises the anticipated negative impacts for the Aquaculture Development Zone.

Table **119**: Anticipated negative impacts from ADZ

Sub-Zone	Negative Impacts
Aquaculture Development Zone (ADZ)	• Effluents/waste → reduced dissolved oxygen. • Altered water/sediment quality. • Bioaccumulation of contaminants in organisms. • Dislocation where operators/users are displaced by zoning decisions. • Reduced competitiveness (relocation/scale limits). • Financial hardship (disrupted market relationships).

vii). Offshore Renewable Energy Development Zone (ORED)

The Offshore Renewable Energy Development Zone supports renewable energy development but introduces environmental and social pressures during construction and operation, including habitat disturbance, user conflicts, and displacement of fishing activities. **Table 120** summarises the anticipated negative impacts for renewable energy development zones within the ORED.

Table **120**: Anticipated negative impacts from ORED

Sub-Zone	Negative Impacts
Wind energy harnessing zones	• Wave/current seabed alteration during construction. • Noise/vibration disturbance to marine fauna. • Collision risk (low/rare but recognised). • Short-term disruption/displacement of fishing/tourism if not compatibly planned. • Reduced total wind output where high-yield sites excluded. • Residual disturbance risks (noise/traffic during construction; ecosystem disturbance). • Constant coordination requirements can create friction. • Coordination reduces efficiency and can delay sector operations.
Current energy harnessing zones	• Disturbance pathways linked to construction/operations (seabed and ecosystem disturbance risk where works occur).

Sub-Zone	Negative Impacts
	• Short-term interaction with fishing/tourism uses if not coordinated. • Potential delay/cost from restrictions and monitoring requirements.

viii). Offshore Oil and Gas Exploration and Production Zone (OGEP)

The Offshore Oil and Gas Exploration and Production Zone provides spatial clarity for hydrocarbon activities but introduces significant environmental risks, including oil spills, seismic disturbance, and habitat fragmentation, as well as social impacts from displacement of fishing communities. **Table 121** summarises the anticipated negative impacts for this zone.

Table **121**: Anticipated impacts from OGEP

Sub-Zone	Negative Impacts
Offshore Oil and Gas Exploration and Production Zone (OGEP)	• Oil spill risk: toxic contamination, altered organism development, intoxication, altered water and sediment quality, and bioaccumulation of contaminants. • Seismic surveys: underwater noise disturbance to marine mammals, fish, and invertebrates; potential displacement from feeding/breeding areas. • Habitat fragmentation from pipelines, platforms, and associated infrastructure. • Displacement of fishing activities from exploration and production areas. • Long-term liability and decommissioning costs. • Transboundary spill risks requiring regional cooperation and contingency planning.

ix). Multiple Use Zone (MUZ)

The Multiple Use Zone allows coexistence of multiple activities but introduces risks of cumulative impacts, marginalisation of small-scale users, and governance challenges. **Table 122** summarises the anticipated negative impacts for the Multiple Use Zone.

Table **122**: Anticipated negative impacts from the Multiple Use Zone

Sub-Zone	Negative Impacts
Multiple Use Zone - Territorial Waters	• Multi-use permissions can increase cumulative impacts (noise, pollution, habitat loss) if compatibility rules and thresholds are not enforced consistently. • Competition for space may marginalise small-scale users when licensing and investment requirements favour capital-intensive sectors; inequitable benefit-sharing. • Higher monitoring, coordination and dispute-resolution costs; delays and uncertainty for investors and communities where governance is complex. • Activities displaced from stricter zones can intensify in sustainable use areas, increasing local ecological pressure and conflict hotspots.
Multiple Use Zone - Exclusive Economic Zone	• Same negative impacts as Territorial Waters, with additional risks from industrial-scale activities (shipping, industrial fisheries, offshore energy) concentrating cumulative pressures in the EEZ. • Transboundary management challenges where activities interact with neighbouring countries' EEZs.
Multiple Use Zone - Extended Continental Shelf	• Same negative impacts as EEZ, with additional risks associated with deep-sea ecosystems that are poorly understood and highly sensitive to disturbance. • Limited baseline data increases uncertainty in impact prediction and management effectiveness.

Sub-Zone	Negative Impacts
	• Potential for international disputes over resource access and management in the ECS area.

8.5 Transboundary Impacts

Kenya's marine space is ecologically and oceanographically interconnected with the wider Western Indian Ocean region. Migratory species such as tuna, billfish, marine mammals, and sea turtles traverse national boundaries, while ocean currents and seasonal monsoons transport sediments, nutrients, pollutants, and marine debris across jurisdictional lines. The spatial decisions made under the Marine Spatial Plan (MSP) therefore carry transboundary implications, influencing ecological integrity, resource availability, and socio-economic conditions in adjacent waters. Under the Balanced Multi-Use and Coexistence Scenario, the MSP is expected to generate both positive and negative transboundary effects.

8.5.1 Positive Impacts

The MSP generates positive transboundary effects where it reinforces regional cooperation, aligns with international conservation commitments, and contributes to the sustainable management of shared resources. Kenya's engagement with neighbouring countries and regional bodies strengthens the collective capacity to manage transboundary ecosystems, migratory species, and shared fisheries stocks. The following positive transboundary impacts are anticipated under the Balanced Multi-Use and Coexistence Scenario.

i). **Promotion of Regional Cooperation:** MSP in Kenya is part of a broader regional strategy involving multiple countries in the Western Indian Ocean. This cooperation aims to manage marine resources sustainably and protect biodiversity.

ii). **Strengthened Transboundary Conservation Areas:** Kenya collaborates with neighbouring countries such as Tanzania to establish Transboundary Conservation Areas (TCAs). These areas are crucial for protecting ecosystems that span national borders.

iii). **Enhanced Marine Resource Management:** Effective MSP can improve marine resource management, enhance biodiversity conservation, and sustain coastal communities' development across the region.

8.5.2 Negative Impacts

The MSP also carries potential negative transboundary effects, particularly where zoning restrictions displace fishing effort into neighbouring waters, where pollution pathways carry contaminants across borders, or where legal and institutional mismatches create uneven enforcement outcomes. These effects may undermine regional conservation gains, create resource conflicts, and impose uneven socio-economic burdens on adjacent communities. The following negative transboundary impacts are anticipated.

i). **Cross-border Conservation Zoning (Kenya–Tanzania Seascape):** Small-scale fishers may experience reduced access to traditional fishing grounds where conservation zones overlap with community-use areas. If zoning restrictions differ across the border, displaced fishing pressure could intensify in adjacent waters, creating uneven impacts and potential conflicts between Kenyan and Tanzanian fishing communities.

ii). **Fisheries Zoning and Shared Stock Allocation:** Kenyan restrictions may displace fishing effort toward border areas, leading to effort concentration and potential overfishing in Tanzanian waters. If protective measures are not harmonised across jurisdictions, vulnerable species, including sea turtles, sharks, rays, and dolphins, may continue to face significant bycatch risks in neighbouring waters, undermining conservation gains and creating uneven ecological outcomes.

iii). **Marine Pollution and Cumulative Effects:** Oil spills, debris, ballast water, and chronic pollution drift across the Kenya–Tanzania boundary, contributing to declining water quality and habitat degradation that affect shared fishing grounds and livelihoods.

iv). **Legal and Institutional Mismatch:** Poor protection of shared ecosystems may result if zoning rules and enforcement standards differ across the Kenya–Tanzania border. Compliance disputes and uneven restrictions are likely for fishers and tourism operators where legal frameworks are misaligned.

v). **Maritime Border Disputes**: Overlapping maritime claims between Kenya and Somalia can cause disputes regarding the management of resources such as oil, gas, and fisheries in boundary regions.

vi). **Displaced Fishing Pressure:** Ocean currents may shift displaced fishing pressure into sensitive habitats across borders, intensifying transboundary resource conflicts.

8.6 Climate Change Considerations for Kenya's Marine Space and Implications for MSP

Climate change is already influencing both the nearshore strip (reefs, seagrass, mangroves and beaches) and the offshore domain (EEZ pelagic fisheries and maritime corridors) through sea-level rise, marine heatwaves and ocean warming, ocean acidification, and more intense rainfall and flood-driven runoff from catchments, particularly the Tana and Sabaki river systems. These stressors operate mainly by amplifying baseline pressures, reducing recovery capacity after disturbance, and shifting the timing and location of sensitive habitats and species. Consequently, impacts already assessed in the impact matrix, especially pollution/runoff, dredging and sediment plumes, anchoring damage, overfishing/bycatch, and spill/exposure pathways, may intensify in magnitude and persist for longer under climate stress. The anticipated climate-related impacts are presented **Table 123.**

Table **123**: Climate Drivers and their Implications

Climate Driver	Key MSP Zones Affected	Implications
Sea-level rise	Mangrove Conservation Areas, Turtle Nesting Beaches, Port Operation Zones	Coastal squeeze, nest inundation, flooding risk, shoreline scouring
Marine heatwaves & warming	Coral Conservation Areas, Seagrass Meadows, Nursery Grounds	Coral bleaching, seagrass mortality, and reduced larval survival
Ocean acidification	Coral Reefs, Seagrass, Pelagic Fisheries	Reduced calcification, slower recovery, altered ecosystem interactions
Extreme rainfall & runoff	Tana & Sabaki catchments, Malindi–Ungwana Bay, Port Approaches	Sediment plumes, nutrient loading, sewage exposure, and benthic degradation
Storm intensity & sea state	Navigation Corridors, Port Zones, Offshore Energy Areas	Reduced safe navigation, wider dredging plumes, and infrastructure stress
Species redistribution	Pelagic Fishing Areas, IMMAs, High Biodiversity Areas	Altered bycatch risk, concentrated fishing pressure, and shifting overlap with vessels

8.7 Impact Analysis

Following the identification of potential environmental, social, and economic impacts associated with the implementation of the Marine Spatial Plan (MSP), a structured impact evaluation was undertaken to determine the significance, scale, and implications of each identified impact. This evaluation provides the analytical basis for decision-making, prioritisation of mitigation measures, and integration of safeguards into MSP implementation arrangements. The assessment distinguished between positive and negative impacts and further classified impacts as direct or indirect, short-term or long-term, and temporary or permanent, in accordance with the SESA methodology.

8.7.1 Impact Categorisation and Evaluation

Following the identification of potential environmental, social and economic impacts associated with the implementation of the Marine Spatial Plan (MSP), a structured impact evaluation was undertaken to determine the significance, scale and implications of each identified impact. This evaluation provides the analytical basis for decision-making, prioritisation of mitigation measures, and integration of safeguards into MSP implementation arrangements.

Each impact statement was assessed using a systematic scoring matrix, applying agreed significance parameters of severity, spatial scope, duration and likelihood of occurrence. Consequence scores were derived by aggregating severity, spatial scope and duration, and subsequently combined with likelihood ratings to generate an overall impact significance score (**Table 124** and **Table 125**) Each impact was scored using the agreed-upon criteria and formulas in the matrix. For each statement, a Consequence score was computed as (Severity + Spatial Extent + Duration) and multiplied by Likelihood/Frequency to yield a Significance Score. Scores were then classified into Low, Medium, High or Very High categories based on the matrix thresholds. The assessment distinguished between positive and negative impacts, and further classified impacts as direct or indirect, short-term or long-term, and temporary or permanent, in accordance with the SESA methodology.

Table **124**: Criteria for assessing significance

Severity of Impact	**Rating**	
Insignificant / non-harmful /non-beneficial	-1/ +1	**CONSEQUENCE**
Small/ Potentially harmful / Potentially beneficial	-2/ +2	
Significant / slightly harmful / Significantly beneficial	-3/ +3	
Great/harmful/beneficial	-4/ +4	
Disastrous/ extremely harmful / extremely beneficial	-5/+5	
SPATIAL SCOPE OF IMPACT	RATING	
Activity specific	-1/ +1	
Planning area	-2/ +2	
Local area	-3/ +3	
Regional	-4/ +4	
National	-5/+5	
DURATION OF IMPACT	RATING	
One day to one month	-1/ +1	
One month to one year	-2/ +2	
One year to ten years	-3/ +3	
Life of operation	-4/ +4	
Post closure	-5/+5	
FREQUENCY OF IMPACT	RATING	**LIKELIHOOD**
Rarely/ almost impossible	-1/ +1	
Very seldom / highly unlikely	-2/ +2	
Infrequent/unlikely/seldom	-3/ +3	
Often / regularly/ likely/ possible	-4/ +4	
Daily / highly likely/ definitely	**-5/+5**	

Table **125**: Significance rating matrix

Consequence (Severity+ Spatial Scope + Duration)															
LIKELIHOOD (Frequency of activity + Frequency of impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	**15**
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	**30**
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	**45**
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	**60**
	5	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**

The impact was translated into a Likert scale of 1 to 5, as shown in **Table 126**. This was to ensure consistency, comparability, and clarity in the evaluation process, allowing complex judgments on severity, scope, and duration to be expressed in a simple, intuitive format. This facilitates prioritization of mitigation measures, enhances transparency in decision-making, and provides a common language

for communicating impact significance to both technical and non-technical stakeholders, thereby strengthening the integration of safeguards into Marine Spatial Plan implementation.

Table **126**: Likert scale for significance

0-15	**16-30**	**31-45**	**46-60**	**61-75**
1	2	3	4	5
Insignificant	Minor	Moderate	Major	Severe
Consequence or severity of the impacts	Description			
Severe	A Severe impact has two or more of the following characteristics: Widespread - Impact occurs at the national, international, or global scale; High Intensity - Impact irreversibly compromises the integrity of environmental values and Permanent - environmental values will not recover on human time scales.			
Major	A Major impact has two or more of the following characteristics: Region - Impact extends to the region, Moderate - Integrity of environmental values altered, but the Impact can practicably be reversed or Long-term – Impact that is measurable post-Project.			
oderate	A Moderate impact has two or more of the following characteristics: Localized - Impact is confined to the Site and areas directly adjacent to the Development, Low - Impact alters the quality, abundance, or distribution of environmental values without compromising their integrity and can be easily and cheaply reversed and Medium-term - Impact that is felt up to the completion of operations.			
Minor	A Minor impact has two or more of the following characteristics: Limited - Impact limited to the Site; Very Low - Impact does not significantly alter the quality, distribution, or abundance of environmental values; and Short-term - Impact that is felt up to the completion of the planning process			
Insignificant	No noticeable/ measurable impact on values.			

The impact was further subjected to the risk assessment matrix using the criteria presented in **Table 127**. This provided a structured framework for evaluating potential impacts by combining the severity of consequences with the likelihood of occurrence. This approach ensures that risks arising from marine spatial planning are systematically categorized, allowing planners to prioritise mitigation measures and allocate resources effectively. Consequences range from insignificant to severe, while likelihood spans from rare to almost certain, creating a clear scale for decision-making. By anchoring the evaluation on sector-specific issues within the marine spatial plan, the matrix helps identify which risks demand immediate attention and which can be managed through routine monitoring. This structured assessment supports transparent, evidence-based planning and strengthens stakeholder confidence in the management process.

Table **127**: Risk assessment matrix

			Consequence				
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Severe
Likelihood	5	Almost Certain	Medium	Medium	High	Very High	Very High
	4	Likely	Medium	Medium	High	Very High	Very High
	3	Possible	Low	Medium	Medium	High	Very High
	2	Unlikely	Low	Low	Medium	Medium	High
	1	Low	Low	Low	Low	Medium	High

The above framework for impact evaluation was anchored on the issues arising from the key sectors of interest in the marine spatial plan. The resultant weighting of the significance of each impact on different MSP zones is based on significance, depending on their nature, consequence, and likelihood, with weighting refined through severity, spatial scope, duration, and frequency. presented in **Annex 5**.

8.7.2 Cumulative Impact Assessment

Cumulative impact screening was undertaken using the normalized receptor-sensitive SESA matrix derived from the cumulative risk assessment workbook, as presented in **Annex 7**. Each pressure–receptor interaction was scored for severity, spatial scope, duration, likelihood and receptor sensitivity, and the cumulative score was calculated as ((Severity + Spatial Scope + Duration) × Likelihood × Sensitivity) / 5. Row scores were then aggregated by hotspot/zone cluster, habitat/resource and pressure type to derive total cumulative burden, average normalised score and cumulative class as presented in **Table 128**. This screening was used to identify where overlapping pressures are most concentrated within the proposed zoning plan and where stronger mitigation, monitoring and compliance controls are required.

Table **128**: Summary of cumulative impact screening results

Biodiversity Resources	Score	Class
Sea turtle nesting areas	40.0	Moderate
Seagrass and reef-associated conservation zones	37.6	Moderate
Mangrove and coastal protection zones	35.2	Moderate
Seamounts and offshore fishing grounds	30.9	Moderate
Fisheries resources	29.3 (avg.)	Minor

The cumulative impact results show that pressure is concentrated in Kenya's sensitive nearshore ecological systems and in the port–fisheries interface. The highest average normalized hotspot scores were recorded in Sea turtle nesting areas, Seagrass and reef-associated conservation zones Mangrove and coastal protection zones, and Sea mounts and offshore fishing grounds. Fishing production zones and Marine reserves and parks also remain important management priorities because of repeated pressure pathways and receptor sensitivity.

Across priority biodiversity and resource receptors, the screening confirms Seagrass and coral reef habitats as the leading ecological receptor group in the cumulative assessment. Fisheries resources, Mangroves, Marine mammals and Sea turtle nesting beaches are also priority receptors requiring sustained safeguards. In addition, Benthic and portside habitats and Nursery grounds register elevated cumulative burden because they sit at the interface of shipping, ports, dredging, disposal and fisheries activity.

At the pressure level, Dredging, altered hydrological regime, Coastal development/encroachment, Habitat conversion for development, and recurrent Noise/disturbance are dominant cumulative drivers. Other important cumulative drivers are trawling activity, light disturbance, organic toxins, plastic litter, artisanal fishing activity, habitat disturbance linked to port development, and tourism pressure. These

results indicate that cumulative risk in the proposed MSP is driven by the combined effect of coastal development, habitat modification, fisheries pressure, shipping-related disturbance and water-quality stress, rather than by any single sector acting alone.

The cumulative impact assessment as per the above results indicates that, relative to BAU, the MSP reduces unmanaged cumulative pressure overall; however, residual cumulative effects remain in ecologically sensitive and highly contested zones, particularly seagrass and coral systems, mangrove areas, marine mammal corridors, fishing grounds, and nearshore multi-use areas.

8.7.3 Impact Evaluation (Positive and Negative Impacts) and Implications for Decision

The evaluation of mean significance scores across zones **Table 129** highlights clear priorities for action.

Table **129**: Results of impact analysis

Zone	+Ve Score	Significance Of The Positive Impacts		-Ve Score	Significance Of The Negative Impacts	
Mangrove Conservation Areas	32	3	Moderate	29	2	Minor
Seagrass Conservation Areas (Sgca)	37.75	3	Moderate	33	3	Moderate
Coral Conservation Areas	41.3	3	Moderate	33	3	Moderate
Turtle Nesting Areas	33	3	Moderate	26	2	Minor
Marine Parks (Mpa1–Mpa4)	41	3	Moderate	29	2	Minor
Marine Reserves	40	3	Moderate	37	3	Moderate
Community Conservation Areas	37	3	Moderate	29	2	Minor
Important Marine Mammal Areas (IMMA) (Hbmma1–Hbmma3)	40	3	Moderate	30	3	Moderate
Mammals And Fisheries Aggregation Zone	41	3	Moderate	37	3	Moderate
Sea Mount	44	3	Moderate	33	3	Moderate
Fixed Bridges Zone	36	3	Moderate	24	2	Minor
Cable Reserves And Protected Areas	36	3	Moderate	30	2	Minor
Power Transmission Wayleaves	36	3	Moderate	27	2	Minor
Shipping Routes (Local Routes And Transhipment Routes	35	3	Moderate	28	2	Minor
Port Operations Zones	39	3	Moderate	29	2	Minor
Designated Dredged Material Dumping Areas	35	3	Moderate	26	2	Minor
Ferry Operation Zone	40	3	Moderate	27	2	Minor
Prawn Fishing Zone	37	3	Moderate	30	2	Minor
Deep Sea Crab Fishing Zone	36	3	Moderate	29	2	Minor
Priority Pelagic Fishing Zone	42	3	Moderate	32	3	Moderate
Aquaculture Promotion Zone	36	3	Moderate	30	2	Minor
Beach Tourism Promotion Zone	38	3	Moderate	33	3	Moderate

Zone	+Ve Score	Significance Of The Positive Impacts		-Ve Score	Significance Of The Negative Impacts	
Sport Fishing Zone	40	3	Moderate	33	3	Moderate
Rewd – Wind Energy Development Zone	37	3	Moderate	25	2	Minor
Wind Energy Development Zone2	33	3	Moderate	26	2	Minor
Reca – Current Energy Development Zone	24	2	Minor	28	2	Minor
Shipwreck Preservation Zones	37	3	Moderate	29	2	Minor
Sacred Marine Sites	34	3	Moderate	30	2	Minor
Archaeological Site Zone Archaeology., Lamu Old Town Seafront; Malindi And Mombasa Historic Coastlines)	38	3	Moderate	33	3	Moderate

Overall, positive impacts are predominantly rated Moderate, reflecting consistent ecological and socio-economic gains from improved spatial order, reduced ad hoc development, and strengthened resource stewardship. In parallel, negative impacts range from Minor to Moderate, indicating that while zoning reduces many unmanaged pressures, it also introduces access restrictions, displacement effects, and residual environmental risks that require active management.

Decision note (priority setting): The significance scores should not be interpreted as implying that biodiversity and conservation zones can be deprioritised because some show “minor” negative impacts. Biodiversity zones mangroves, seagrass, coral reefs, turtle nesting areas, marine parks/reserves, IMMA and other critical habitats must be treated as priority zones because they underpin the ecosystem services that sustain the wider MSP area, including fish nursery and spawning functions, shoreline protection, water quality regulation, carbon storage (blue carbon), tourism value, and long-term fisheries productivity. Even where negative impacts are rated minor, these zones warrant higher precaution, stronger compliance and earlier investment in monitoring and enforcement, because degradation can produce disproportionate, irreversible, and system-wide losses that undermine outcomes across all other zones and sectors.

Zones with Moderate negative significance, including Seagrass and Coral Conservation Areas, Marine Reserves, IMMA, Mammals and Fisheries Aggregation Zones, Sea Mounts, Priority Pelagic Fishing, Beach Tourism Promotion, Sport Fishing, and Archaeological Site Zones, represent the most sensitive trade-offs. In these areas, restrictions and intensified use controls are necessary to secure biodiversity and long-term productivity, but they can also drive short-term opportunity costs (e.g., reduced fishing access, higher compliance costs, displacement to adjacent zones) and persistent ecological pressures (e.g., anchoring damage, bycatch, disturbance, cumulative impacts). These zones should therefore be prioritised for targeted mitigation, compliance enforcement, and effects monitoring to prevent cumulative degradation and manage user conflict.

Zones with Minor negative significance such as Mangrove Conservation Areas, Turtle Nesting Areas, Marine Parks, Community Conservation Areas, fixed bridges, cable reserves, power transmission wayleaves, shipping routes, port operation zones, dumping areas, ferry operations, prawn fishing, deep sea crab fishing, aquaculture promotion, wind energy zones, shipwreck preservation zones, and sacred marine sites still require precautionary controls, but their adverse impacts are generally more manageable where mitigation measures are applied. For these zones, the emphasis should be on

maintaining compliance, preventing localized hotspots (pollution, illegal gear use, unregulated access), and ensuring that benefit-sharing and access arrangements reduce social tension.

CHAPTER 9: MITIGATION MEASURES AND MONITORING PLAN

9.1 Overview

This chapter focuses on mitigation measures and monitoring plans for addressing the environmental, social, and economic impacts associated with marine spatial planning (MSP).

The strategies to minimize negative effects across various sectors are outlined, including energy, navigation, tourism, fisheries, and mining, while promoting sustainability. Detailed mitigation plans address challenges like pollution, habitat destruction, and social displacement, emphasizing stakeholder engagement, regulatory frameworks, and innovative technologies.

The monitoring plan establishes frameworks for tracking progress through specific indicators related to marine ecosystems, biodiversity, socio-cultural impacts, and economic activities. It integrates measurable criteria, stakeholder feedback, and periodic reporting to ensure adaptive, transparent, and effective MSP implementation.

9.2 Mitigation Measures

The MSP will likely result in environmental, social, and economic impacts. These effects can be both positive and negative. To address the negative impacts, several mitigation measures have been proposed below. Combined with existing plan provisions, these measures will minimise adverse impacts during the implementation of the plan and maximize the positive impacts. The climate change mitigation measures are mainstreamed in various sectors.

9.2.1 Marine Conservation Zone (MCZ)

The Marine Conservation Zone delivers critical biodiversity benefits but introduces trade-offs through access restrictions, displacement of traditional users, and residual environmental pressures. Mitigation measures for this zone focus on strengthening co-management, enforcing compliance, and ensuring equitable benefit-sharing to balance conservation outcomes with community livelihoods. **Table 130** presents the mitigation measures for each sub-zone within the Marine Conservation Zone.

Table **130**: Mitigation measures for the anticipated negative impact on the Maritime Conservation Zone

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Marine Protected Areas (MPAs)	• External pressures (water quality decline from pollution; sediment plumes from dredging outside boundaries). • Displacement of traditional users, where fishers and local communities lose access to customary fishing grounds, leading to conflict if benefit-sharing mechanisms are weak. • Loss of economic opportunities due to loss of fishing and other activities.	• Prohibit dumping and discharge (waste or ballast water) within parks and apply ballast water compliance controls. • Strengthen park management by enforcing permanent no-take zones through approved management plans, while managing tourism use zoning and visitor carrying-capacity limits. • Protect park integrity by requiring EIA/ESIA for all developments outside park boundaries.	**Lead:** KWS **Support:** NEMA (EIA/compliance), KMA (navigation/ballast), KCGS (enforcement), TRA (tourism controls)
Marine Reserves	• Continued habitat damage and bycatch where weak enforcement results in the use of illegal and destructive fishing gears. • Livelihood transition pressures and economic losses for users dependent on prohibited gears.	• Strengthen enforcement of bans and reduce fishing pressure by applying gear restrictions (mesh-size limits, fishing methods), effort controls, and seasonal or spatial closures. • Minimise bycatch and habitat damage by promoting selective	**Lead:** KWS (reserve management) + KeFS (fisheries controls) **Support:** BMUs (community compliance), KCGS (enforcement), NEMA (EIA for adjacent developments)

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
		fishing gears, using bycatch reduction devices, and implementing regular monitoring.	
Mangrove Conservation	• Protecting mangroves limits expansion of activities such as salt production and port development. • Communities dependent on mangrove wood for building materials or household fuel may experience reduced income. • Mangroves remain highly vulnerable to land-based pollution: pollution and altered hydrology reduce mangrove health; degraded mangroves provide poorer nursery habitat; reduced mangrove condition weakens shoreline protection.	• Implement Participatory Forest Management Plans (PFMPs) through KFS and CFAs; carry out EIAs for salt works and all developments within or near mangroves. • Control mangrove harvesting through permits and quotas; require salt and calcium mining companies to maintain at least 30% mangrove woodlot cover as a condition for lease renewal. • Apply county benefit-sharing frameworks for blue carbon to allocate 30–40% of revenues to community development projects. • Strengthen waste reduction, collection, and community clean-up initiatives.	**Lead:** KFS / CFAs **Support:** NEMA (EIA/compliance), County Governments (pollution), KCGS (pollution enforcement), BMUs/KeFS (fisheries linkages)
Locally managed marine areas (LMMAs)	• Persistent illegal activity during transitions undermines gains. • Limits on infrastructure development and restrictions on artisanal fishing create foregone opportunities and may constrain short-term investment and income options.	• Implement monitoring, compliance patrols, and socio-economic assessment as set out in the zoning plan. • Maintain temporal closures. • Undertake environmental screening/EIA for small-scale projects. • Conduct stakeholder engagement and participatory planning to manage conflict; designate zones for traditional activities to continue.	**Lead:** BMUs + County Governments (CEC—Fisheries/Blue Economy) **Support:** KeFS (technical), KWS/KMFRI (biodiversity linkages), KCGS (enforcement)
Marine mammal and wildlife management zone	• Underwater noise and vibration from vessels and construction disturb marine mammals by displacing them from key habitat areas, disrupting behaviour, and interfering with acoustic communication. • Potential vessel-strike risk. • Entanglement risk (particularly with drift nets and other high-risk gears). • Residual fishing impacts (bycatch; trophic impacts). • Spatial closures around seamounts can displace deep-water fishing and	• Ensure EIA studies are carried out for offshore developments including oil exploration and other construction works. • Enforce seasonal restrictions on use of seismic and high-noise activities during peak breeding/migration periods. • Enforce mandatory vessel speed limits within these zones. • Prohibit shark finning: all sharks must be landed with fins naturally attached. • Mandatory bycatch mitigation: circle hooks,	**Lead:** KWS (species/protected area interface) + KeFS (fisheries management) **Support:** KMA (vessel speed compliance), NEMA (EIA licensing), KCGS (enforcement), KMFRI (science/monitoring)

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
	increase trip distance, fuel costs, and safety risks.	live-release protocols, Turtle Excluder Devices (TEDs). • Apply zoned seamount management plan: core no-take area + controlled buffer allowing only low-impact gears. • Require VMS/AIS, logbooks, and observer/e-monitoring for industrial vessels.	
Seasonal marine mammal and wildlife corridor	• Seasonal restrictions on activities (e.g., shipping, fishing, seismic surveys) during peak migration and breeding periods can create economic and operational constraints. • Enforcement challenges where corridor boundaries intersect with high-traffic areas.	• Implement seasonal advisories and mandatory route adjustments during critical migration periods. • Strengthen AIS monitoring and compliance patrols during peak seasons. • Conduct stakeholder awareness campaigns to explain the ecological rationale for seasonal restrictions.	**Lead:** KWS + KMA **Support:** KeFS (fisheries), KCGS (enforcement), County Governments (community engagement)

9.2.2 Fisheries Management Zone (FMZ)

The Fisheries Management Zone improves fisheries sustainability but introduces restrictions that can displace fishing effort, create compliance burdens, and generate conflicts between artisanal and industrial users. Mitigation measures for this zone, as presented in **Table 131**, emphasise spatial and temporal controls, bycatch reduction, strengthened monitoring and surveillance, and co-management arrangements that secure access for artisanal fishers while ensuring resource sustainability.

Table **131**: Mitigation measures for anticipated negative impacts on FMZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Traditional fishing zone	• Zoning boundaries and access/gear rules can exclude some artisanal users (including seasonal/migrant fishers). • Concentration of effort in permitted areas can raise local overfishing risk. • Where enforcement is weak, continued use of illegal/destructive gears can persist.	• Strengthen co-management: update BMU by-laws and co-management plans to reflect zoning boundaries, seasonal access rules, and transparent licensing of seasonal fishers. • Prevent effort displacement: apply community-agreed effort/gear limits, nursery buffers, and seasonal closures; use CPUE trends as adaptive triggers. • Reduce destructive gears through targeted gear-swap programmes and incentives for selective gears.	Lead: KeFS + County Governments Support: BMUs (implementation), KMFRI (science), KCGS (enforcement)
Artisanal fishing zone	• Concentration of fishing effort in designated zones may lead to localised resource depletion. • Potential displacement of fishers from traditional grounds outside designated zones.	• Implement community-agreed effort limits and gear restrictions. • Establish monitoring systems to track CPUE and fish size trends. • Develop livelihood diversification programmes for displaced fishers.	Lead: KeFS + County Governments Support: BMUs, KMFRI

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Industrial - Prawn fishing zone	• Continued high bycatch levels (approx. 84% of total catch consists of non-target species). • Illegal encroachment into restricted zones. • Significant catches of non-commercial fish and juveniles.	• Define trawl corridors and exclusion buffers away from river mouths, seagrass, reefs, and juvenile hotspots. • Require bycatch reduction devices (BRDs) and Turtle Excluder Devices (TEDs). • Enforce seasonal closures during peak spawning periods. • Strengthen the 5-nautical-mile no-trawl zone through real-time VMS enforcement. • Apply harvest control rules with science-based total allowable catches.	Lead: KeFS (industrial licensing/controls) Support: KMFRI (research), County Governments, BMUs, KCGS (enforcement)
Industrial - Deep water crab fishing zone	• Resource depletion risk from industrial-scale pot effort. • Ghost fishing from lost pots. • Inadequate regulatory frameworks increase IUU risk. • Habitat impacts from intensive potting.	• Set effort caps (number of pots per vessel/area) and minimum size limits. • Require escape gaps and biodegradable panels to prevent ghost fishing. • Enforce minimum size limits to prevent harvesting of juveniles. • Control number of licensed vessels and gear types. • Improve catch reporting, landing records, and export monitoring.	Lead: KeFS (licensing, effort/size rules) Support: BMUs, County Governments, KCGS (enforcement)
Industrial - Pelagic fishing zone	• Intense fishing pressure on pelagic species leading to declining catches. • Foreign vessels engaging in IUU fishing (estimated loss over KES 2.9 billion annually). • Significant bycatch of non-target species including turtles and sharks. • Destructive techniques damaging marine habitats.	• Enforce selective gear regulations (e.g., minimum mesh sizes) to limit bycatch. • Apply bycatch-reduction measures such as shorter longline soaking times. • Strengthen Monitoring, Control, and Surveillance (MCS) through VMS and stricter penalties. • Apply adaptive management: tighten limits when CPUE declines.	Lead: KeFS + KMFRI Support: KCGS (enforcement), County Governments, IOTC (regional coordination)
Industrial - ECS Pelagic fisheries zone	• Similar negative impacts as Industrial - Pelagic fishing zone, with additional risks associated with deeper-water operations. • Transboundary management challenges.	• Same mitigation measures as Industrial - Pelagic fishing zone. • Enhance regional cooperation with neighbouring countries for shared stock management. • Strengthen data collection for ECS-specific fisheries.	Lead: KeFS + KMFRI Support: KCGS, Ministry of Foreign Affairs (regional cooperation)

9.2.3 Navigation, Port Access and Security Zone (NPAZ)

The Navigation, Port Access and Security Zone enhances maritime safety and operational efficiency but introduces environmental pressures from shipping and port operations, as well as social impacts from access restrictions and displacement of fishing activities. Mitigation measures for this zone focus on navigation risk management, pollution prevention, spill response preparedness, and stakeholder engagement to minimise displacement conflicts as presented in **Table 132**.

Table **132**: Mitigation measures for anticipated negative impacts on NPAZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Major shipping corridors	• Dredging alters seabed topography and sediment distribution. • Ship emissions (SO_2, NO_x, CO_2) contribute to air pollution and global warming. • Ballast-water discharge introduces non-native species. • Accidental oil/chemical spills. • Underwater noise/vibration disturbs marine fauna. • Spatial restrictions can displace fishers.	• Apply corridor "no-obstruction" principle; keep corridors free of fixed or floating impediments. • Require Navigation Risk Assessment (NRA) for intersecting infrastructure. • Implement AIS monitoring and safety patrols. • Enforce low-sulphur fuels and operational efficiency measures. • Require ballast-water monitoring/reporting consistent with IMO Ballast Water Management Convention. • Implement National Marine Spills Response Contingency Plan. • Implement noise-reduction technologies (quieter engines/propellers) where required.	Lead: KMA (navigation rules/route controls) + KCGS (maritime law enforcement) Support: KPA (port interface), NEMA (EIA), vessel operators (implementation)
Local shipping route	• Increased vessel traffic may create safety risks for small-craft users. • Wake wash impacts on sensitive nearshore habitats and shoreline stability.	• Enforce speed limits near sensitive habitats and landing sites. • Establish clear separation between local shipping routes and small-craft fishing zones. • Conduct awareness campaigns for safe navigation practices.	Lead: KMA + County Governments Support: KCGS (enforcement), BMUs (community interface)
Port development zones	• Dredging-related sediment plumes and disposal impacts. • Oil/chemical spill risks. • Noise/vibration disturbance in high-traffic port approaches. • Access restrictions reduce artisanal access.	• Require Navigation Risk Assessment (NRA) for works affecting channels. • Implement Marine Traffic Management Plans for dredging/construction. • Apply IALA-compliant marking and safety zones around works. • Implement cable–dredging coordination protocols. • Define anchorage allocation and capacity limits. • Apply spill-prevention protocols and National Marine Spills Response Contingency Plan.	Lead: KPA (port operations) + KMA (maritime safety oversight) Support: NEMA (EIA/compliance), KCGS (enforcement), port operators/contractors (implementation)
Port security zones	• Restricted access to traditional fishing grounds and navigation routes within security perimeters. • Increased compliance	• Establish clear security perimeters with controlled access. • Develop protocols for temporary access adjustments during non-security periods.	Lead: KPA + Kenya Coast Guard Service Support: County Governments, BMUs

	and monitoring requirements.	• Conduct stakeholder engagement to explain security requirements and alternative access arrangements.	
Dredged material disposal zones	• Disposal activities affect seabed condition and sediment dispersion. • Excludes other uses within disposal areas during operations. • Foregone use within disposal footprint.	• Enforce mandatory environmental approval and material testing before disposal. • Implement approved dumping plans (location, volume, timing, method). • Establish temporary navigation warnings and safety zones during disposal operations. • Monitor sediment dispersion and seabed condition; complete post-dumping verification.	Lead: NEMA (environmental approvals) + KPA (where port dredging applies) Support: KMA (navigation oversight), KCGS (enforcement), dredging contractor (implementation)
Ferry operation zone	• Wake wash and propeller scour accelerate shoreline erosion. • Air emissions, noise, and fuel/oil leaks degrade local air and water quality. • Route corridors constrain fishing/landing and increase congestion.	• Enforce defined ferry lanes and time-based controls. • Implement speed limits near sensitive habitats and landing sites. • Integrate ferry operations with Vessel Traffic Services (VTS). • Conduct regular maintenance of ferry terminals to minimise pollution. • Establish safety protocols for channel crossings.	Lead: KPA + County Governments Support: KMA (navigation safety), KCGS (enforcement)

9.2.4 Marine Infrastructure Protection Zone (MIPZ)

The Marine Infrastructure Protection Zone safeguards strategic subsea cables and associated infrastructure but introduces restrictions on fishing, anchoring, and other marine activities that can displace users and create compliance costs. Mitigation measures for this zone emphasise alternative anchorage provision, transparent compensation mechanisms, and coordinated routing to minimise habitat disturbance and user conflict as summarised in **Table 133**.

Table **133**: Mitigation measures for anticipated negative impacts on MIPZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Existing submarine cable buffer zones	• No-anchoring and no-trawling restrictions reduce fishing/anchoring options. • Cable laying/burial disturbs benthic habitats. • Security controls increase transaction costs and user conflict.	• Provide designated alternative anchorage/mooring areas outside buffers. • Conduct installation surveys; prohibit routing through reefs/seagrass unless no alternative and strict mitigation applied. • Establish rapid repair protocols with sediment/noise controls. • Apply transparent gear-loss compensation and dispute-resolution mechanisms. • Conduct periodic compliance	Lead: Communication Authority of Kenya (CA) + cable owners (implementation) Support: NEMA (EIA), KMA (charting/safety), KCGS (enforcement), County/BMUs (community interface)

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
		patrols and update corridor data.	
Submarine cable reserve zone	• Same negative impacts as Existing submarine cable buffer zones. • Pre-emptive reservation of areas reduces availability for other uses.	• Same mitigation measures as Existing submarine cable buffer zones. • Conduct stakeholder engagement to explain reservation rationale and alternative area availability.	Lead: CA + cable owners Support: NEMA, KMA, KCGS

9.2.5 Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)

The Marine Tourism, Recreation and Cultural Heritage Zone supports tourism and cultural preservation but introduces pressures from visitor concentration, infrastructure development, and access restrictions that can affect local communities and sensitive habitats. Mitigation measures for this zone focus on carrying capacity management, wastewater treatment, heritage site protection protocols, and community benefit-sharing arrangements as demonstrated in **Table 134**.

Table **134**: Anticipated negative impacts on MTCZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Beach tourism promotion zone	• Coastal development and beach grooming remove dunes/vegetation and compact sand. • Increased wastewater, litter, and stormwater runoff degrade water quality. • Higher land values and privatisation of access can displace residents.	• Undertake EIAs for new coastal projects as per EMCA, 1999. • Enforce coastal setback rules under PLUPA, 2019. • Protect turtle nesting beaches through gazettement under Wildlife Conservation and Management Act, 2013. • Improve wastewater treatment in line with Water Act, 2016 and Waste Management Regulations, 2006.	Lead: County Governments + NEMA Support: KWS (turtle nesting), TRA (tourism), BMUs (community interface)
Archeological sites	• Protective buffers force rerouting of cables, jetties, or shoreline works, increasing project costs. • Trenching, dredging, or sand mining destroys submerged or buried archaeological deposits permanently.	• Establish no-disturbance rule: ban dredging, excavation, and sand mining within mapped site and buffer unless authorised by NMK. • Controlled disclosure: limit circulation of sensitive location data to regulators and authorised operators.	Lead: National Museums of Kenya (NMK) Support: NEMA (EIA), KMA (cable routing), County Governments
Shipwrecks	• High vessel traffic near port approaches increases risk of anchor drag and propeller wash damaging exposed wreck structures. • Uncontrolled access leads to artefact loss.	• Install fixed moorings at mapped wreck sites; prohibit anchoring within defined buffers. • Publish coordinates via Notices to Mariners. • Restrict wreck diving to licensed operators; cap diver numbers. • Enforce no-take/no-touch rules.	Lead: NMK Support: KMA (notices to mariners), KCGS (enforcement), tourism operators (implementation)

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
		• Conduct periodic visual surveys to detect damage.	
Sacred Sites	• Cultural exclusion zones restrict tourism facilities, landing improvements, and night activities near sacred coastal/marine sites.	• Formalise access times, permitted activities, and restrictions through agreements with custodians. • Develop protocols for respectful coexistence between local use, tourism, and conservation rules.	Lead: Custodians + County Governments (Culture) Support: NMK, tourism operators

9.2.6 Aquaculture Development Zone (ADZ)

The Aquaculture Development Zone creates opportunities for mariculture development but introduces environmental pressures from farm effluents, water quality degradation, and potential conflicts with other marine users. Mitigation measures, as presented in **Table 135**, for this zone emphasise carrying capacity assessment, effluent control, biosecurity protocols, and social safeguards to ensure that aquaculture expansion is environmentally sustainable and socially equitable.

Table **135**: Mitigation measures for anticipated negative impacts on ADZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Aquaculture Development Zone (ADZ)	• Effluents and waste reduce dissolved oxygen. • Altered water and sediment quality. • Bioaccumulation of contaminants in organisms. • Dislocation where operators/users are displaced by zoning decisions. • Reduced competitiveness and financial hardship from disrupted market relationships.	• Require EIA/ESIA and carrying-capacity assessment; set stocking density limits. • Implement effluent and sludge controls with regular water-quality monitoring. • Enforce biosecurity, disease surveillance, and escape prevention measures. • Establish habitat buffers and separate intake/outfall structures. • Develop social safeguards including access agreements, grievance mechanisms, and compensation frameworks.	Lead: KeFS + County Governments Support: NEMA (EIA/effluent), KMFRI (science support), KCGS (enforcement)

9.2.7 Offshore Renewable Energy Development Zone (ORED)

The Offshore Renewable Energy Development Zone supports renewable energy generation but introduces environmental and social pressures during construction and operation, including habitat disturbance, noise pollution, user conflicts, and displacement of fishing activities. Mitigation measures for this zone focus on strategic siting, seasonal construction controls, noise minimisation, and co-existence protocols that balance energy development with fisheries and conservation priorities as presented in **Table 136**.

Table **136**: Mitigation measures for anticipated negative impacts on ORED

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Wind energy harnessing zones	• Seabed alteration during construction. • Noise and vibration disturbance. • Collision risk (low/rare but recognised). • Short-term	• Undertake EIA with stakeholder consultations. • Apply seasonal construction controls. • Monitor sediment resuspension during	Lead: EPRA (energy licensing) + NEMA (EIA approvals) Support: KMA (marine safety), KWS/KMFRI (biodiversity monitoring), KCGS (enforcement), project proponent (implementation)

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
	disruption/displacement of fishing/tourism. • Reduced total wind output where high-yield sites are excluded.	works. • Avoid sensitive habitats (coral reefs, seagrass beds). • Apply noise minimisation measures (quieter methods; bubble curtains for piling). • Conduct monitoring and compliance audits.	
Current energy harnessing zones	• Disturbance pathways linked to construction/operations. • Short-term interaction with fishing/tourism uses if not coordinated. • Potential delay/cost from restrictions and monitoring requirements.	• Mandatory EIA with stakeholder consultations. • Apply buffers: 2 km from seabird corridors, 5 km from marine mammal routes, ≥3 km from key fishing areas. • Implement seasonal construction controls. • Conduct continuous environmental monitoring.	Lead: EPRA + NEMA Support: KWS/KMFRI, KeFS/BMUs, KMA, KCGS, project proponent

9.2.8 Offshore Oil and Gas Exploration and Production Zone (OGEP)

The Offshore Oil and Gas Exploration and Production Zone provides spatial clarity for hydrocarbon activities but introduces significant environmental risks, including oil spills, seismic disturbance, habitat fragmentation, and displacement of fishing communities. Mitigation measures for this zone, as presented in **Table 137**, emphasise environmental impact assessment, spill contingency planning, seasonal restrictions on high-noise activities, and strict exclusion from sensitive habitats to minimise ecological and social risks.

Table **137**: Mitigation measures for anticipated negative impacts on OGEP

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Offshore Oil and Gas Exploration and Production Zone (OGEP)	• Oil spill risk: toxic contamination, altered water and sediment quality. • Seismic surveys: underwater noise disturbance. • Habitat fragmentation from pipelines and platforms. • Displacement of fishing activities. • Long-term liability and decommissioning costs. • Transboundary spill risks.	• Require EIA/ESIA and approved oil spill contingency plans. • Apply buffers: 2 km from seabird corridors, 5 km from marine mammal habitats. • Enforce seasonal restrictions on seismic surveys during peak breeding/migration periods. • Exclude activities from MPAs, mangroves, coral reefs, EBSAs, and critical marine mammal corridors. • Implement continuous monitoring and compliance audits. • Require decommissioning bonds and closure plans.	Lead: EPRA (petroleum licensing) + NEMA (EIA) Support: KWS/KMFRI (biodiversity), KeFS (fisheries), KCGS (enforcement), project proponent (implementation)

9.2.9 Multiple Use Zone (MUZ)

The Multiple Use Zone allows coexistence of multiple activities but introduces risks of cumulative impacts, marginalisation of small-scale users, and governance complexity. Mitigation measures for this zone focus on compatibility rules, community access safeguards, benefit-sharing agreements, and transparent licensing to ensure that multi-use outcomes are equitable, sustainable, and effectively managed as presented in **Table 138**.

Table **138**: Mitigation measures for anticipated negative impacts on MUZ

Sub-Zone	Negative Impacts	Mitigation Measures	Responsibility
Multiple Use Zone - Territorial Waters	• Multi-use permissions can increase cumulative impacts if compatibility rules are not enforced. • Competition for space may marginalise small-scale users. • Higher monitoring, coordination, and dispute-resolution costs. • Activities displaced from stricter zones can intensify pressure.	• Require SEA/ESIA for large or high-risk developments. • Reserve community access corridors, landing/processing areas, and nearshore transit routes. • Apply local content and benefit-sharing agreements for licensed projects. • Establish multi-stakeholder MSP coordination forum and grievance mechanism. • Publish licensing decisions and spatial data to reduce disputes.	Lead: State Department for Blue Economy and Fisheries Support: County Governments, KeFS, KMA, NEMA, KCGS
Multiple Use Zone - Exclusive Economic Zone	• Same negative impacts as Territorial Waters. • Additional risks from industrial-scale activities (shipping, industrial fisheries, offshore energy). • Transboundary management challenges.	• Same mitigation measures as Territorial Waters. • Strengthen regional cooperation frameworks for transboundary resource management. • Enhance VMS/AIS monitoring and data sharing with neighbouring countries.	Lead: State Department for Blue Economy and Fisheries Support: KeFS, KMA, NEMA, KCGS, Ministry of Foreign Affairs (regional cooperation)
Multiple Use Zone - Extended Continental Shelf	• Same negative impacts as EEZ. • Additional risks from deep-sea ecosystems with limited baseline data. • Potential for international disputes over resource access.	• Same mitigation measures as EEZ. • Apply precautionary approach to deep-sea activities. • Invest in baseline surveys (ROV, eDNA, acoustic mapping) before development. • Engage in international scientific collaboration for deep-sea biodiversity conservation.	Lead: State Department for Blue Economy and Fisheries Support: KMFRI (science), NEMA, Ministry of Foreign Affairs

9.3 Monitoring Plan

A monitoring plan is required to verify that the mitigation measures and development standards in the Kenya Marine Spatial Plan (MSP) zoning framework are implemented, and to track whether residual negative impacts, identified under the Balanced Multi-Use and Coexistence Scenario, are being prevented, reduced, or managed. The purpose of this monitoring plan is to ensure that mitigation commitments are not only documented but actively enforced, that ecological and social impacts are detected early, and that coexistence between sectors remains balanced and sustainable. In this way, the plan provides a safeguard for adaptive management, allowing corrective action whenever compliance weakens, ecological decline signals emerge, or user conflicts escalate.

The monitoring programme focuses on three dimensions:

i). **Compliance monitoring**: Are restrictions and standards being followed?

ii). **Effects monitoring**: Are the impact pathways reducing or persisting?

iii). **Conflict and coexistence monitoring**: Identify if cross-sector interactions are creating pressure or displacement.

The monitoring costs are indicative annual ranges for implementing and reporting the monitoring actions (staff time, field verification, basic equipment, and laboratory analysis where relevant). Project-specific monitoring required under EIA/ESIA conditions is to be funded by proponents, with government oversight costs shown separately where applicable.

9.3.1 Marine Conservation Zone (MCZ)

The Marine Conservation Zone monitoring framework tracks the effectiveness of mitigation measures for biodiversity and conservation sub-zones, focusing on habitat condition, compliance with protection rules, and socio-economic outcomes for dependent communities. **Table 139** presents the monitoring framework for the Marine Conservation Zone sub-zones.

Table **139**: Monitoring framework for Marine Conservation Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Marine Protected Areas (MPAs)	Enforce permanent no-take and park rules; visitor caps; prohibit dumping/discharge; EIA screening for adjacent developments	• No-take compliance: illegal fishing incidents per quarter • Discharge/dumping incidents and response actions • Visitor cap compliance (% days within cap) • Adjacent development compliance: % EIAs with conditions	• Patrol and incident logs • Visitor registers and operator reporting • NEMA EIA/SEA review records • KWS ecological monitoring surveys (UVC/photo transects)	• Quarterly compliance summary • Bi-annual ecological monitoring survey • Annual management plan performance review	Lead: KWS	KES 12–20 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
		• Ecological condition: fish biomass (kg/ha), coral cover (%) at sentinel sites				
Marine Reserves	Gear and mesh-size restrictions; effort controls; seasonal/spatial closures; bycatch reduction measures	• Illegal gear incidents per quarter; sanctions applied • Closure compliance: incursions; % closure communication actions completed • Selective gear compliance: % inspected vessels compliant • Bycatch reporting: % trips submitting bycatch records	• Landing site inspections and BMU records • Patrol/boarding logs and enforcement outcomes • Licensing/inspection records and bycatch log review	• Quarterly compliance reporting • Bi-annual closure effectiveness review • Annual reserve fisheries performance report	Lead: KeFS	KES 6–14 million/year
Mangrove Conservation	Regulated cutting (permits/quotas); EIA for developments; blue-carbon benefit sharing	• PFMP approved and under implementation (% annual actions completed) • Harvest compliance: permits issued; illegal cutting cases; % cases resolved • Development compliance: % relevant projects with valid EIA licence • Pollution/waste: priority outfalls/runoff hotspots mapped and actioned • Mangrove condition:	• KFS compliance inspections and CFA patrol logs • NEMA licence register and compliance audit reports • Sentinel plot surveys (transects/photo-points) • County waste management/clean-up records	• Quarterly compliance and pollution hotspot review • Bi-annual habitat condition survey • Annual PFMP performance review	Lead: KFS / CFAs	KES 5–10 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
		canopy cover (%), seedling density (/m²)				
Locally managed marine areas (LMMAs)	Community-based compliance patrols; temporal closures; biophysical monitoring; socio-economic review	• Patrol effort: patrol days/quarter; coverage of closure boundary (%) • Illegal activity: incidents and % resolved within 30 days • Biophysical: fish biomass (kg/ha), benthic cover (%) at sentinel sites • Co-existence: grievances logged and % resolved within 30 days	• BMU/community patrol logbooks and GPS tracks • Sentinel biophysical surveys (community + technical support) • Grievance register maintained by County/BMU	• Quarterly compliance and conflict review • Bi-annual biophysical surveys • Annual socio-economic/conflict summary	Lead: County Governments + BMUs	KES 4–12 million/year
Marine mammal and wildlife management zone	Seasonal restrictions on high-noise activities; vessel speed limits; EIA conditions (MMO presence, shutdown); gear controls	• AIS speed compliance: % AIS positions within speed limit; exceedance events • Activity compliance: approved high-noise activities with seasonal windows • Incidents: strandings/vessel strikes/entanglements reported and verified • Gear compliance: drift-net/high-risk gear incidents	• AIS analytics and quarterly compliance reports • NEMA compliance audits; proponent monitoring reports (MMO/shutdown logs) • Incident database compiled by KWS and partners	• Quarterly compliance analytics • Bi-annual review of seasonal restrictions • Annual status report	Lead: KWS	KES 5–12 million/year
Seasonal marine mammal and	Seasonal advisories; route adjustments; AIS	• Seasonal advisory compliance: % vessels adhering to advisories	• AIS analytics • Patrol and incident logs	• Quarterly during peak seasons	Lead: KWS + KMA	KES 3–8 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
wildlife corridor	monitoring during peak seasons	• Incursion events during peak migration periods • Stranding/incident rates during peak seasons	• Stakeholder engagement records	• Annual corridor performance review		

9.3.2 Fisheries Management Zone (FMZ)

The Fisheries Management Zone monitoring framework tracks fisheries sustainability, compliance with spatial and gear restrictions, and the effectiveness of bycatch reduction measures across artisanal and industrial fisheries as demonstrated in **Table 140**.

Table **140**: Monitoring framework for the Fisheries Management Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Traditional fishing zone	Co-management plans; effort/gear limits; seasonal closures; gear-swap programmes	• BMU by-law updates completed; % of BMUs with approved co-management plans • Illegal gear incidents per quarter; % resolved • CPUE trends for key species • Compliance with seasonal closures • Grievances logged and % resolved within 30 days	• BMU records and county fisheries reports • Landing site inspections and patrol logs • Catch assessment surveys • Grievance register maintained by County/BMU	• Quarterly compliance review • Bi-annual catch assessment • Annual by-law and co-management review	Lead: KeFS + County Governments	KES 5–12 million/year
Artisanal fishing zone	Effort limits; gear restrictions; CPUE monitoring; livelihood diversification	• Effort levels vs agreed limits • Gear compliance rates • CPUE trends for key species • Fish size distribution trends • Participation in alternative livelihood programmes	• Landing site inspections • Catch assessment surveys • BMU records • Livelihood programme enrolment data	• Quarterly compliance review • Bi-annual catch assessment • Annual livelihood impact review	Lead: KeFS + County Governments	KES 4–10 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Industrial - Prawn fishing zone	Trawl corridors; BRD/TED compliance; seasonal closures; VMS enforcement; harvest control rules	• Encroachment rate into 3 nm zone (VMS track violations per month) • Bycatch ratio (% by weight of non-target catch) • TED/BRD compliance (% trips inspected with compliant devices) • Artisanal gear conflict cases logged	• VMS and track analysis • At-sea observer records and landing-site sampling • Port/landing inspections • BMU grievance/incident registers	• VMS review: weekly • Observer/EM review: quarterly • Landing inspections: per landing event	Lead: KeFS	KES 8–15 million/year
Industrial - Deep water crab fishing zone	Pot limits; pot marking; soak-time controls; lost-gear retrieval; catch reporting	• CPUE trend (kg/pot/day) and size structure • Lost pot rate and number retrieved • Pot marking compliance (% inspected pots compliant) • Reporting completeness (% trips with logbooks)	• Onboard/landing sampling (length-weight; maturity) • Patrol/inspection records • Retrieval campaign logs • Licensing and catch reporting database	• Sampling: quarterly • Inspections: monthly • Ghost-gear retrieval: biannual • Reporting audit: quarterly	Lead: KeFS	KES 5–10 million/year
Industrial - Pelagic fishing zone	Licensing/effort controls; RFMO-aligned catch limits; MCS; bycatch risk controls	• Active vessel-days and effort vs licensed limits • IUU indicators: unauthorised vessels detected; compliance findings • Catch reporting timeliness/completeness • Stock status indicators (CPUE indices; size trends)	• VMS/AIS monitoring and patrol reports • Port State Measures inspections • Logbooks/e-logbooks, observer/EM summaries • KMFRI/IOTC-aligned assessment reports	• Port inspections: each port call • Reporting audit: monthly • Stock assessment: annual	Lead: KeFS + KMFRI	KES 10–18 million/year
Industrial - ECS Pelagic fisheries zone	Same as Industrial - Pelagic fishing zone, with additional transboundary coordination	• Same indicators as above • Transboundary cooperation meetings held; agreements implemented	• Same methods as above • Regional cooperation records	• Same frequency as above • Annual transboundary review	Lead: KeFS + KMFRI	KES 8–15 million/year

9.3.3 Navigation, Port Access and Security Zone (NPAZ)

The Navigation, Port Access and Security Zone monitoring framework tracks maritime safety, pollution prevention, spill response readiness, and the effectiveness of measures to minimise displacement of fishing and other coastal activities as presented in **Table 141**.

Table **141**: Monitoring framework for the Navigation, Port Access and Security Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Major shipping corridors	No-obstruction principle; NRA for intersecting activities; AIS monitoring; low-sulphur fuels; ballast-water controls; spill response	• AIS corridor compliance: % tracks within route/corridor • NRA compliance: % intersecting projects with approved NRA • Ballast compliance: % eligible vessels submitting ballast reports • Spill readiness: drills conducted; mobilisation time • Port State Control checks: inspections covering fuel/operational compliance	• AIS data analytics • NRA submission/approval register • Port State Control inspection records • Spill drill records and incident response reports	• Quarterly compliance analytics • Bi-annual spill preparedness drill • Annual consolidated safety and environmental report	Lead: KMA	KES 6–15 million/year
Local shipping route	Speed limits near sensitive habitats; separation from small-craft zones	• Speed compliance: % vessels exceeding speed limits • Incident reports: collisions, wake wash complaints • Stakeholder satisfaction surveys	• AIS analytics (where available) • Incident and complaint registers • Community feedback mechanisms	• Quarterly compliance review • Annual stakeholder survey	Lead: KMA + County Governments	KES 3–8 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Port development zones	NRA and Marine Traffic Management Plans; IALA-compliant marking; anchorage controls; cable-dredging coordination; spill protocols	• Traffic plan compliance: % compliance observations closed • Dredging plume compliance: turbidity exceedance events • Marking/safety: % inspections compliant with IALA marking • Anchorage management: congestion incidents • Spill readiness: drills and incidents	• Port and contractor operational logs • Navigation aid inspections and notices • NEMA EIA compliance reports • Grievance register	• Quarterly compliance reporting • Bi-annual spill drill review • Annual independent audit	Lead: KPA	KES 10–25 million/year
Port security zones	Security perimeters; controlled access; surveillance	• Security perimeter violations per quarter • Access control compliance • Surveillance system uptime	• Security patrol logs • Access control records • Surveillance system reports	• Monthly security briefings • Quarterly compliance reports	Lead: KPA + KCGS	KES 5–12 million/year
Dredged material disposal zones	Environmental approval; material testing; dumping plan compliance; sediment monitoring; post-dump verification	• Pre-disposal testing: % disposal campaigns with approved lab results • Plan compliance: GPS evidence within approved polygon • Safety: notices to mariners issued; safety non-compliance events • Post-dump verification:	• Approval and laboratory records • Vessel GPS/dump logs • KMA notices to mariners • Post-dump survey reports	• Quarterly (where disposal occurs) • Bi-annual review of monitoring results • Annual cumulative compliance review	Lead: NEMA	KES 6–15 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
		survey completed; findings addressed				
Ferry operation zone	Defined ferry lanes; time-based controls; VTS integration; speed limits	• Ferry lane compliance: % ferry trips within designated lanes • Speed compliance near sensitive habitats • Incident reports: collisions, wake wash complaints • Service disruption events	• VTS/AIS analytics • Ferry operator logs • Incident and complaint registers	• Monthly operational review • Quarterly compliance summary	Lead: KPA + County Governments	KES 4–10 million/year

9.3.4 Marine Infrastructure Protection Zone (MIPZ)

The Marine Infrastructure Protection Zone monitoring framework tracks cable protection compliance, habitat disturbance during installation and repair, and the effectiveness of compensation mechanisms for displaced users as presented in **Table 142**.

Table **142**: Monitoring framework for the Marine Infrastructure Protection

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Existing submarine cable buffer zones	Alternative anchorage provision; routing avoidance; rapid repair protocols; compensation mechanisms	• Corridor awareness: maps published; outreach events completed • Infringements (anchoring/trawling) per quarter; case closure rate • Exposure incidents; % repaired within target timeframe • Gear-loss claims; % resolved within 30 days	• KMA chart/notice records • Patrol logs and inspection records • Integrity surveys (ROV/sonar); repair logs • Compensation/grievance register	• Quarterly compliance and integrity reporting • Bi-annual integrity survey (first year), then annual	Lead: CA + cable owners	KES 4–10 million/year (government oversight)

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Submarine cable reserve zone	Route coordination; cumulative impact management; stakeholder engagement	• Route coordination: % new cables within designated reserve • Cumulative disturbance footprint (km²) • Stakeholder meetings held; grievances resolved	• As-built survey reports • Cumulative impact assessments • Stakeholder engagement records	• Quarterly during installation • Annual cumulative impact review	Lead: CA + cable owners	KES 3–8 million/year (government oversight)

9.3.5 Marine Tourism, Recreation and Cultural Heritage Zone (MTCZ)

The Marine Tourism, Recreation and Cultural Heritage Zone monitoring framework tracks visitor pressure, habitat condition, cultural site integrity, and community access as presented in **Table 143**.

Table **143**: Monitoring framework for the Marine Tourism, Recreation and Cultural Heritage Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Beach tourism promotion zone	Coastal setback enforcement; turtle-friendly lighting; wastewater controls; solid waste management; public access protection	• % new permits meeting setback; stop orders issued • Lighting compliance rate (% properties compliant) • Bathing-water quality: E. coli/enterococci exceedances • Litter density (items/100 m) • Public access points maintained; grievances resolved	• County permit and inspection records • Lighting audits and patrol logs • Lab water-quality results • Litter surveys • Grievance register	• Quarterly inspections • Bathing water: monthly (peak season) • Litter surveys: monthly • Annual report	Lead: County Governments	KES 6–18 million/year
Archeological sites	No-disturbance rule; controlled disclosure	• Incursions into site buffers per quarter • Unauthorised	• NMK site inspection records • Patrol logs	• Quarterly site inspections	Lead: NMK	KES 2–5 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
		excavation/sand mining incidents • Authorised access records	• Permit and authorisation register	• Annual site condition report		
Shipwrecks	Fixed moorings; no-anchor buffers; licensed dive access; diver caps	• Moorings installed; % functional • Anchoring violations per quarter • Licensed operator compliance • Diver numbers vs caps • Artefact loss incidents	• Mooring inspection checklists • Patrol logs • Operator licensing records • Dive operator logs	• Quarterly compliance review • Bi-annual site inspections • Annual dive tourism report	Lead: NMK	KES 3–6 million/year
Sacred Sites	Custodian-led rules; access protocols; cultural tourism management	• Access protocols formalised and implemented • Grievances from custodial communities • Visitor compliance with cultural protocols	• Custodian meeting records • Grievance register • Visitor monitoring records	• Quarterly custodian meetings • Annual cultural site review	Lead: Custodians + County Governments	KES 1–3 million/year

9.3.6 Aquaculture Development Zone (ADZ)

The Aquaculture Development Zone monitoring framework tracks water quality, effluent management, disease surveillance, and social impacts to ensure sustainable mariculture development **Table 144**.

Table **144**: Monitoring framework for the Aquaculture Development Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Aquaculture Development Zone (ADZ)	EIA/ESIA compliance; carrying-capacity assessment; effluent	• % farms with valid EIA licence and annual compliance audit • Water quality: DO, pH,	• Farm self-monitoring logs + independent sampling • Laboratory results	• Water quality: monthly • Inspections/audits: quarterly	Lead: KeFS + County Governments	KES 6–14 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
	controls; biosecurity; social safeguards	temperature, salinity, turbidity, NH_3/NH_4^+, NO_3^-, PO_4^{3-}; exceedances vs thresholds • Sediment: organic matter (%) and sulphide/black sludge observations • Disease outbreaks, mortality rate (%/cycle), escape incidents • Complaints logged; % resolved within 30 days	(nutrients/BOD/COD) • Veterinary/aquatic health reports • County/BMU grievance registers	• Disease/escape: immediate notification; quarterly summary		

9.3.7 Offshore Renewable Energy Development Zone (ORED)

The Offshore Renewable Energy Development Zone monitoring framework tracks environmental compliance during construction and operation, habitat disturbance, and co-existence with fisheries and navigation as demonstrated in **Table 145**.

Table **145**: Monitoring framework for the Offshore Renewable Energy Development Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Wind energy harnessing zones	EIA conditions; habitat avoidance; sediment plume controls; noise mitigation; stakeholder engagement	• EIA compliance: quarterly report submitted and reviewed • Turbidity/sediment: exceedance events vs EIA thresholds • Noise mitigation: evidence of mitigation deployed • Co-existence: grievances logged and % resolved within 30 days	• Proponent environmental monitoring reports • Independent audit reports • NEMA compliance review records	• Quarterly compliance reporting during construction • Bi-annual independent audit • Annual operations compliance review	Lead: EPRA + NEMA	Proponent-funded; government oversight: ≤KES 2 million/year

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Current energy harnessing zones	EIA conditions; buffer compliance; seasonal construction controls	• Spatial compliance: buffer/corridor compliance verified • Seasonal timing: % activities within approved windows • Cumulative monitoring: quarterly report submitted	• GIS compliance checks • Proponent monitoring reports • NEMA compliance review records	• Quarterly compliance reporting • Bi-annual independent audit • Annual cumulative performance review	Lead: EPRA + NEMA	Proponent-funded; government oversight: ≤KES 2 million/year

9.3.8 Offshore Oil and Gas Exploration and Production Zone (OGEP)

The Offshore Oil and Gas Exploration and Production Zone monitoring framework tracks environmental compliance, spill readiness, and the effectiveness of exclusion measures to protect sensitive habitats as presented in **Table 146**.

Table **146**: Monitoring framework for the Offshore Oil and Gas Exploration and Production Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Offshore Oil and Gas Exploration and Production Zone (OGEP)	EIA/ESIA conditions; spill contingency plans; seasonal restrictions; exclusion from sensitive areas	• EIA compliance: quarterly report submitted and reviewed • Spill readiness: drills conducted; mobilisation time; spill incidents • Seasonal restriction compliance: seismic surveys within approved windows • Exclusion zone compliance: incursions into MPAs/critical habitats	• Proponent environmental monitoring reports • Spill drill records and incident reports • NEMA compliance review records • Patrol logs	• Quarterly compliance reporting • Bi-annual spill drill review • Annual environmental performance review	Lead: EPRA + NEMA	Proponent-funded; government oversight: ≤KES 3–5 million/year

9.3.9 Multiple Use Zone (MUZ)

The Multiple Use Zone monitoring framework tracks cumulative impacts, user conflict, and the effectiveness of compatibility rules across multiple sectors as presented in **Table 147**.

Table **147**: Monitoring framework for the Multiple Use Zone

Sub-Zone	Mitigation to Verify	Monitoring Indicators	Method / Source	Frequency / Timing	Responsibility	Indicative Cost (KES/year)
Multiple Use Zone - Territorial Waters	SEA/ESIA for large developments; community access corridors; benefit-sharing agreements; grievance mechanism	• SEA/ESIA compliance: % large projects with approved assessments • Community access: access points maintained; grievances resolved • Benefit-sharing agreements in place; % revenue distributed • Cumulative impact indicators (noise, pollution, habitat loss)	• NEMA EIA/SEA register • Grievance register • Benefit-sharing agreement records • Cumulative impact monitoring reports	• Quarterly compliance review • Bi-annual cumulative impact assessment • Annual benefit-sharing review	Lead: State Department for Blue Economy and Fisheries	KES 8–15 million/year
Multiple Use Zone - Exclusive Economic Zone	Same as Territorial Waters, with additional transboundary coordination	• Same indicators as above • Transboundary cooperation meetings held; agreements implemented	• Same methods as above • Regional cooperation records	• Same frequency as above • Annual transboundary review	Lead: State Department for Blue Economy and Fisheries	KES 6–12 million/year
Multiple Use Zone - Extended Continental Shelf	Same as EEZ, with additional precautionary approach for deep-sea activities	• Same indicators as above • Baseline survey completion; % deep-sea areas characterised • Deep-sea activity permits issued with conditions	• Same methods as above • Baseline survey reports (ROV, eDNA, acoustic) • Permit and authorisation register	• Same frequency as above • Baseline surveys: every 3–5 years • Annual deep-sea activity review	Lead: State Department for Blue Economy and Fisheries	KES 5–10 million/year

The monitoring framework establishes a systematic, evidence-based approach to verifying the implementation of mitigation measures and tracking the environmental, social, and economic performance of the MSP under the Balanced Multi-Use and Coexistence Scenario. By defining clear indicators, assigning institutional responsibilities, and specifying monitoring frequencies, the framework ensures that compliance is enforced, residual impacts are detected early, and cross-sector conflicts are identified before they escalate. The indicative cost ranges reflect a shared responsibility between government oversight and project-specific proponent-funded monitoring, ensuring that resources are allocated efficiently. Ultimately, this monitoring framework is designed to support adaptive management—enabling corrective action, zoning adjustments, and stakeholder re-engagement whenever monitoring signals ecological decline, weak compliance, or emerging user conflicts. In doing so, it provides the essential feedback mechanism for keeping the MSP dynamic, accountable, and responsive to changing conditions over its 20-year planning horizon.

CHAPTER 10: SESA FINDINGS, RECOMMENDATIONS AND CONCLUSION

10.1 SESA Findings

The Strategic Environmental and Social Assessment (SESA) for the Kenya Marine Spatial Plan (MSP) was conducted to evaluate the environmental, social, and economic implications of the Balanced Multi-Use and Coexistence Scenario—the preferred planning pathway for organising Kenya's marine space. The assessment systematically examined the positive and negative outcomes likely to arise from the implementation of the zoning framework, the effectiveness of proposed mitigation measures, and the institutional and capacity requirements necessary for successful implementation.

The findings are structured around five analytical dimensions that together provide a comprehensive basis for decision-making and adaptive management:

10.1.1 Strategic Benefits and Positive Effects

The plan offers several strategic advantages that strengthen ecological integrity, maritime safety, and investment certainty:

- Reduced habitat loss and improved recovery of mangroves, seagrass, and coral through no-take/no-anchor controls and EIA conditions.
- Improved maritime safety and route certainty via designated shipping corridors, navigation risk assessments, and port traffic management.
- Clearer spatial rules reduce ad hoc siting, enhance investment predictability, and support co-existence across tourism, fisheries, ports, and offshore energy.
- Enhanced climate resilience through blue carbon protection and strengthened coastal buffering against erosion and storms.

10.1.2 Significant Adverse Risks and Trade-offs

Despite these benefits, the plan also presents notable risks and trade-offs that must be carefully managed:

- Access restrictions in conservation zones may displace artisanal fishers and beach users, cause short-term income loss and conflict unless mitigated.
- Higher compliance and operating costs for shipping, ports, and industrial fisheries (AIS/VMS, gear requirements, route adjustments) may reduce profitability and increase non-compliance risks.
- Residual pollution risks from ports, dredging, and land-based runoff can degrade nursery habitats and bathing water quality.
- Wildlife disturbance risks (marine mammal noise, vessel strikes, turtle nesting disruption) persist without seasonal controls and enforcement.
- Cultural heritage sites face damage or artefact loss from anchoring and uncontrolled access; protective buffers may increase project costs and timelines.

10.1.3 Cumulative Effects and Priority Hotspots

Beyond individual risks, cumulative pressures emerge in specific hotspots where multiple activities overlap:

- Nearshore multi-use areas around Mombasa, Kilifi, Malindi, and Lamu: cumulative waste, turbidity, and user conflict pressures.
- Ungwana Bay prawn grounds: bycatch, gear conflict, and benthic impacts from weak trawl compliance or displaced effort.
- IMMA corridors and migration/aggregation areas: cumulative underwater noise and strike risks from transhipment and offshore construction.

Compared with Business-as-Usual, the proposed MSP reduces overall cumulative pressure by introducing spatial controls, compatibility rules, and mitigation measures that reduce unmanaged overlap among competing activities. However, cumulative pressure is not eliminated; it remains concentrated in sensitive hotspots, including nearshore multi-use areas around Mombasa, Kilifi, Malindi and Lamu, Malindi–Ungwana Bay, and marine mammal movement corridors, where continued mitigation, monitoring and enforcement are required.

10.1.4 Institutional and Capacity Findings

The effectiveness of the MSP depends heavily on institutional coordination and capacity for monitoring and enforcement:

- Effective implementation requires clear role separation and coordination among State Department for Blue Economy and Fisheries, KeFS, KWS, KMA, KPA, KCGS, NEMA, and County Governments.
- Monitoring, Control and Surveillance (MCS) capacity and data systems (AIS, VMS, observer/e-monitoring, patrol coverage) determine residual risk and credibility.
- Continuous stakeholder engagement and grievance redress mechanisms are essential to manage displacement, enforce co-existence, and reduce conflict.

10.1.5 Priority Conditions for Implementation and Compliance

To ensure sustainability and compliance, several priority measures must be applied consistently:

- Finance monitoring and enforcement: ring-fence resources for MCS and ecological monitoring; require proponent-funded EIA/ESIA monitoring under government oversight.
- Apply equitable transition measures: gear swap incentives, agreed access corridors, and transparent benefit sharing for affected communities.
- Strengthen pollution prevention: port reception facilities, spill readiness, county waste/stormwater controls, and compliance audits.
- Use adaptive management triggers: adjust spatial rules, effort limits, and enforcement focus when CPUE, habitat cover, strandings/bycatch, or conflict cases exceed thresholds.

10.2 Recommendations

Based on SESA findings, the following recommendations guide MSP implementation:

- Each sector should improve sustainability to enhance competitiveness and marine environmental status, with MSP serving as a backdrop to sectoral strategies.
- Strengthen links between MSP and national/international environmental objectives, maritime policies, legal frameworks, conventions, and treaties.
- Prioritise preservation of marine ecological value when planning new activities to ensure long-term sustainability.
- Clarify interdependencies between sectors to promote cooperation and positive development.
- Conduct periodic monitoring to ensure compliance with mitigation measures, prioritising pollution control, ecosystem protection, and sustainable fishing.
- Ensure active community involvement in decision-making, equitable benefit sharing, and training for alternative livelihoods.
- Strengthen regulatory frameworks and promote clean energy projects to mitigate ecological and socio-economic impacts, ensuring resilience and sustainability.

10.3 Conclusion

The SESA demonstrates that coordinated spatial planning under the Balanced Multi-Use and Coexistence Scenario significantly reduces unmanaged conflicts, improves ecological outcomes, and provides investment certainty across marine sectors. Priority zones for ecosystems, biodiversity

hotspots, and conservation areas form the foundation of the planning framework, ensuring that the most sensitive habitats receive the highest levels of protection.

Implementation of the MSP will introduce some negative impacts—particularly access restrictions, compliance costs, and residual pollution risks. The mitigation measures and monitoring framework developed in this SESA provide a structured pathway for managing these trade-offs. Where adverse effects cannot be avoided, the mitigation hierarchy, transitional support mechanisms, and adaptive management triggers offer practical means of reducing harm and ensuring equitable outcomes.

Compared with the Business-as-Usual scenario, the Balanced Multi-Use and Coexistence Scenario delivers superior environmental, social, and economic performance over the 20-year planning horizon. The zoning framework, sectoral impact assessments, mitigation measures, and monitoring framework embedded in the MSP indicate that no significant adverse impacts are anticipated where recommended mitigation measures and monitoring frameworks are consistently applied.

Successful implementation depends on sustained institutional coordination, adequate resourcing of monitoring and enforcement functions, and continued stakeholder engagement. By embedding adaptive management principles and maintaining transparent reporting, the MSP can remain responsive to changing oceanographic conditions, emerging sectoral pressures, and evolving scientific knowledge—securing long-term ecological integrity and socio-economic resilience for Kenya's marine space.

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ANNEXURE

Annex 1 : Terms of Reference

https://drive.google.com/file/d/1f-17RzFGT7Si03rOrjafSSBJBk0_gnyt/view?usp=sharing

Annex 2 : Legal Review Report

https://docs.google.com/document/d/e/2PACX-1vS8BqPcP9PClvjxidXhwOX0psBl_NhcIPSzjaictZf-BVv9BwADfkdN3KWuJTqxUA/pub

Annex 3 : List of Identified Stakeholders

https://docs.google.com/document/d/1MRzbm6XVKVijfRLS5cBZjupCEaTI3vKX/edit?usp=sharing&ouid=103887412153547621259&rtpof=true&sd=true

Annex 4 : Stakeholder Engagement Reports and Attendance Registers

i). Scoping Phase

a) Summary of Emerging Issues

https://docs.google.com/document/d/1Shti7S9HaHCOLLRjOvVBcusrcYQbFOB3/edit?usp=sharing&ouid=105847573907373834727&rtpof=true&sd=true

b) Reports

1. **CSOs and NGO**

https://drive.google.com/file/d/1h4HqdEFH4eslqWuClb96F0xMMA_6TWOh/view?usp=sharing

2. **Research and Academia**

https://drive.google.com/file/d/1bQ16YHz-aBqy2FOWz2O2kNAty-AELlq4/view?usp=sharing

3. **Public sectors**

https://drive.google.com/file/d/1XAUIp1tvsxGx6Xrf5UFURn9VV60ozVBH/view?usp=sharing

4. **Private sectors**

https://drive.google.com/file/d/1YOV98ouVIDkfFyl14Te_zkm2tIXWPChN/view?usp=sharing

5. **County Directors**

https://drive.google.com/file/d/1rGCL5HgPbXBBfSGkthGL5WKw5-djaqD-/view?usp=sharing

c) Attendance register

https://docs.google.com/document/d/e/2PACX-1vTGj7Aczky4mXl5tpfesHkch2PKQmLcRjT6_OzhhYjCg9kb7gEUSRAta7xfjQcfZA/pub

ii). Draft SESA Phase

a) Reports

1. **CSOs and NGO**

https://docs.google.com/document/d/1czg6IGsA150-Xo6TV72nH5_JlsjAKN8e/edit?usp=sharing&ouid=105847573907373834727&rtpof=true&sd=true

2. **Vulnerable and marginalised groups**

https://docs.google.com/document/d/19vqDd4W6fJ2Ahyui0Xcv1FE4sR28vafG/edit?usp=sharing&ouid=105847573907373834727&rtpof=true&sd=true

3. **Public Sectors**

https://docs.google.com/document/d/1KO7z1oXCC5eSeno7afBNHFN_cYCjSKWA/edit?usp=sharing&ouid=105847573907373834727&rtpof=true&sd=true

4. **Private Sectors**
5. **County Directors**

https://docs.google.com/document/d/1FXE3CcrcRQZQyM6nJAH1rNXiXn6YvbgI/edit?usp=sharing&ouid=116312366427582048613&rtpof=true&sd=true

6. **communities**

https://drive.google.com/file/d/1hJtAKh7rSM1THgr6_1xIK7-KmLijr2DQ/view?usp=sharing

b) Attendance Register

https://docs.google.com/document/d/e/2PACX-1vTrmZU42dG4Ym3Xp6tzpbWLHY-xAE57skjQowtOWkOa8dwWqAUrz25qNZclNobY-g/pub

c) Summary of Emerging Issues

https://docs.google.com/document/d/1FOqT59RvRaob5BVC_5Ux--w0P2s96_gQ/edit?usp=sharing&ouid=105847573907373834727&rtpof=true&sd=true

Annex 5 : Impact Evaluation/Scoring Matrix

https://drive.google.com/drive/folders/1nDaX72G_ZEIbfWrFv8J3u5u85uTff4hO?usp=sharing

Annex 6 : Technical Reports

https://drive.google.com/file/d/1QIn2GeRYFiYLVuuGuGV4kuWf7Ub2gJ80/view?usp=drive_link

Annex 7 : Cumulative Impact Assessment Matrix

https://docs.google.com/spreadsheets/d/14HSplHUsfTPiT2mOYVzc5phk35dWriz6/edit?usp=sharing&ouid=108947611550250727602&rtpof=true&sd=true