CONSERVATION STRATEGY FOR KEY THREATENED SHARKS AND RAYS IN KENYA

November 2025

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Caroline Lees, Lucy Kemp, Lauren Waller

Benedict Kiilu (facilitation in Kiswahili)

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ACRONYMS AND ABBREVIATIONS

ARK	A Rocha Kenya
BHC	Bahari Hai Conservation
BMU	Beach Management Unit
BRUVs	Baited Remote Underwater Videos
CANCO	Community Action for Nature Conservation
CBD	Convention of Biological Diversity
CGK	County Government of Kilifi
CGT	County Government of Tana River
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COMRED	Coastal and Marine Resources Development
CORDIO	Coastal Oceans Research and Development in the Indian Ocean
CPSG	Conservation Planning Specialist Group
EADF	East Africa Deep Sea Fishing Limited
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ETPs	Endangered, Threatened, and Protected Species
FAO	Food and Agriculture Organization of the United Nations
FMDA	Fisheries Management and Development Act
GROOTS Kenya	Grassroots Organizations Operating Together in Sisterhood Kenya
IOTC	Indian Ocean Tuna Commission
IOWB- BMU Network	Indian Ocean Water Body – Beach Management Unit Network
ISRAs	Important Shark and Ray Areas
IUCN	International Union for the Conservation of Nature
IUU	Illegal, Unreported, and Unregulated
JCMAs	Joint Co-management Areas
KCGS	Kenya Coast Guard Service
KeFS	Kenya Fisheries Service

KFS	Kenya Forest Service
KMFRI	Kenya Marine and Fisheries Research Institute
KPA	Kenya Ports Authority
KTSL	Kenya Tropical Sealife
KWS	Kenya Wildlife Service
LEK	Local Ecological Knowledge
LMMAs	Locally Managed Marine Areas
M&E	Monitoring and Evaluation
MCS	Monitoring, Control and Surveillance
MOU	Memorandum of Understanding
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NDFs	Non-Detriment Findings
NEM	North East Moonsoon
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NLC	National Land Commission
NOAA	National Oceanic and Atmospheric Administration
NPOA-sharks	National Plan of Action for the conservation and management of sharks
OECMs	Other Effective Area-based Conservation Measures
SEM	South East Moonsoon
SSC	Species Survival Commission
SSFC	Small - Scale Fisheries
ST	Shark Trust
TEDs	Turtle Excluder Devices
TNC	The Nature Conservancy Society
TOR	Terms of Reference
TOTs	Trainers of Trainers
TUM	Technical University of Mombasa
TWG	Technical Working Group

WCS	Wildlife Conservation Society
WMA	Watamu Marine Association
WMCA	Wildlife (Conservation and Management) Act
WRTI	Wildlife Research Training Institute
ZSL	Zoological Society of London

FOREWORD

Sharks and rays are a fundamental component of Kenya's marine ecosystems providing key ecological roles as top predators. They are also some of the most threatened species in our country. The mandate of the Kenyan Wildlife Research and Training Institute (WRTI) is to coordinate and undertake wildlife research and training and to drive cutting-edge research, promote capacity-building and influence conservation policy at national and regional levels. In this context WRTI has been closely involved in the development of this Conservation Strategy for Key Threatened Sharks and Rays in Kenya.

This document "Conservation Strategy for Key Threatened Sharks and Rays in Kenya" represents the culmination of a productive and consensus-building workshop with multiple stakeholders in Mombasa, led by the IUCN Species Conservation Planning Specialist Group. The result is a detailed action plan with agreed targets and activities and key actors indicated. The process exemplifies WRTI's priorities of broad engagement with stakeholders, prioritising research on critical wildlife for decision making and thereby providing the best advice for policy makers. We congratulate all participants in the workshop for producing a comprehensive conservation strategy for sharks and rays and look forward to engaging in its implementation.

Yours sincerely

Dr. Mohamed Omar

Senior Principal Scientist

Co-Chair IUCN Kenya Species Specialist Group

Coastal and Marine Research and Training Centre

Wildlife Research and Training Institute

Kenya

EXECUTIVE SUMMARY

BACKGROUND

Sharks and rays (elasmobranchs) are among the most threatened groups of marine species globally, with over one-third of species assessed by the IUCN Red List categorized as threatened with extinction. These species play vital ecological roles in maintaining the health and balance of marine ecosystems, yet they are particularly vulnerable to overfishing due to their life -history traits. In the Western Indian Ocean, and specifically along Kenya's coastline, elasmobranch populations have declined significantly in recent decades, primarily due to fishing.

Kenya's coastal communities have long depended on marine resources for livelihoods and food security, with sharks and rays forming part of local fisheries. However, the demand for elasmobranch products both locally and internationally, coupled with weak regulatory frameworks and limited enforcement capacity, has led to unsustainable exploitation. Recent studies and catch data suggest that several species, including globally threatened hammerheads, wedgefish, and guitarfish, are being caught along the Kenyan coastline, many of them as juveniles. Moreover, critical knowledge gaps persist regarding species distribution, population trends, ecological roles, and socio-economic drivers of exploitation in Kenya's waters. These deficiencies hinder effective policy-making and management action.

In response to these growing concerns, Kenya's Fisheries Service developed a National Plan of Action (NPOA) for sharks and rays in 2023 providing a strategic framework for guiding research, governance, monitoring, and public awareness to ensure the long-term sustainability of elasmobranchs. However, successful implementation of the NPOA requires coordinated action across sectors and scales, including government agencies, local communities, civil society, researchers, and the private sector who all have critical roles to play in the sustainable management and conservation of stocks.

To catalyse this participatory approach, CORDIO and a group of partners conceived a multi-stakeholder workshop to be essential to build consensus, promote ownership and enhance collaboration among actors to conserve sharks and rays in Kenya.

THE WORKSHOP

This multi-stakeholder workshop was held in Mombasa, Kenya, from April 1-3, 2025. Participants included government officials from fisheries and wildlife services, fishers, traders, NGOs, the tourism sector, researchers, and university representatives. The purpose of the workshop was to sensitize and build (develop) consensus on a conservation strategy for sharks and rays in Kenya, designed to support the implementation of Kenya's NPOA, and focusing on a group of species that are globally threatened with extinction. The workshop was organised by CORDIO, in partnership with KeFS, WRTI, TNC, Ngomeni Beach Management Unit, Technical University of Kenya, University of Eldoret, and WCS. Workshop design and facilitation was provided by the IUCN SSC Conservation Planning Specialist Group (CPSG).

Over the three days that followed, participants alternated between focused working group discussions, plenary reporting and feedback sessions. The workshop concluded with working groups presenting an overview of the goals and actions agreed to and a discussion was held on the way forward. Further detail is provided in the 'Strategy' section below.

THE STRATEGY

The strategy and associated text provided in this document is intended to be an accurate reflection of what was agreed by participants through consensus during the workshop, with no additions or omissions.

This Kenyan shark and ray species conservation strategy is designed to pull together key stakeholders to produce a document that identifies goals and actions that will address the issues around restoring and maintaining healthy populations of threatened species.

Participants were asked to develop a vision, or desired state for sharks and rays. Participants then went through an interactive process to develop their understanding of the system. Once this process was concluded, participants identified emerging themes and working groups were created according to these themes. All threats/issues identified were assigned to the relevant theme. Participants then went through a discussion process where they fleshed out these issue statements. This involved identifying the impact of these issues/threats; their causes and identifying what is known or assumed about these issues/threats and what the knowledge gaps are. Based on this information, goals were identified to address these issues/threats. Subsequent to a prioritisation process, the relevant prioritised goals were then worked on by each working group where actions were identified for each goal. These actions were the necessary steps needed to ensure that the goal was reached.

The resulting conservation strategy framework includes:

- A 25-year VISION for conservation of sharks and rays in Kenyan waters;
- A highlight and discussion of 18 ISSUES relevant to their conservation;
- 19 GOALS for the next 5-10 years focused on addressing those issues;
- 79 ACTIONS recommending what should be done, when and by whom, to achieve the goals set.

Table 1: Highest priority goals recommended by workshop participants (those ranked between 1-6 in terms of achievability and impact are included here)*. See Appendix I for more details:

		RANK	
Goal #	**GOAL**	**Achievable**	**Impactful**
14	Strengthened BMU structures for improved fisheries governance.	1	4
3	Develop and implement compatible alternative livelihood activities to reduce pressure on sharks and rays, by 2030. Activities must be: culturally acceptable; have environmental benefits; align with available opportunities; incentivise conservation of sharks and rays.	2	7
13	Enhance community and other stakeholders' consultation in shark and ray conservation and decision making to ensure inclusivity and transparency.	3	6
12	Enhanced inter-agency cooperation to reduce jurisdictional conflicts and improve resource management.	3	8
8	Ensure strong compliance with laws and regulations relating to fishing gear use and enforcement effectiveness by government through Monitoring Control Surveillance (MCS).	4	4
7	Ensure marine spatial planning is aligned with critical sharks and rays habitat to prevent negative impact from coastal development e.g. ensure all critical habitats has been nominated as ISRAs.	7	6
6	Increase in areas covered by MPAs and LMMAs to include Important shark and ray areas (ISRAs) so that critical habitats such as nursery, feeding, and pupping grounds are safeguarded.	4	6

17	Conduct regular studies on abundance, distribution, diversity and ecology.	5	3
5	Enhance participatory research, knowledge sharing and feedback to communities, to build capacity and awareness about sharks and rays.	6	
10	Strengthened laws and regulation that reverse the decline of shark and ray populations.	10	2
2	Reduce the impact of fishing on sharks and rays breeding grounds by 2030 through restriction or exchange of gears into sustainable ones through: mesh size limits; seasonal closures; no take zones; gear restricted areas/zones.	9	1
1	Reduce bycatch of sharks and rays by 2030 in order to maintain healthy populations.	11	5

*Goal 15 is not included in the priority tables (Appendix 1 and Table 1) as this Goal was added after the entire group of participants had presented, synthesized and prioritised all goals. It was recognized that mapping critical habitat was an important first step, and that this should fall into the 'Science and Knowledge' Group (see pages 39 and 60).

STRATEGY IMPLEMENTATION

Implementing the strategy laid out in these pages will require significant resources and close collaboration across the agencies and disciplines represented at the 2025 workshop. It was acknowledged that a body to drive, coordinate and communicate progress will be critical to success. It was agreed that this body should be large enough to represent the main themes of the actions prescribed, but small enough to remain nimble and effective. The formation of a core team was agreed, along with an initial list of the organisations to be represented, as follows:

- CORDIO (Melita Samoilys)
- KeFS (Kelvin Wachira)
- WRTI (Mohamed Omar)
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The above core team will strive to establish a formal working and implementation framework with the NPOA Sharks Implementation Committee.

It is hoped by all participants that the various stakeholder organisations who have created this Shark Conservation Strategy will now commit to fund raising and implementation of the actions outlined for the next five years towards achieving the 25 year Vision of the Strategy.

BACKGROUND

INTRODUCTION TO KEY THREATENED SHARKS AND RAYS IN KENYA

Clare Thouless (CORDIO / University of Exeter)

Sharks and rays are highly vulnerable to overfishing because they have slow growth rates, late maturity and are long lived. Additionally, they have small litters or egg clutch sizes.

Globally it is estimated that there has been a 90% decline in shark numbers, with one-third of all Chondrichthyes (sharks, rays, and chimeras) threatened with extinction (Dulvy et al., 2021). Overfishing is the main threat facing sharks and rays. Their populations are also threatened by habitat degradation, pollution and the impacts of climate change. In addition, sharks and rays in tropical habitats, such as those in Kenya are more threatened than in other regions (Dulvey et al., 2021).

In the Western Indian Ocean (WIO), there has been a severe decline in reef shark populations, with some populations now termed "functionally extinct" (McNeil et al., 2020). The global FinPrint baited remote underwater video system (BRUVS) survey of reef sharks found Kenya to be one of 10 countries with the least number of reef sharks globally (McNeil et al., 2020). Subsequent BRUVS surveys also detected no reef sharks in Kenya (WCS, CORDIO) though some guitarfish and other rays have been detected using BRUVS.

Kenya's small-scale fishery (also called artisanal) uses mixed fishing gear methods which capture a variety of sharks and ray species (Wambiji et al., 2023, Osuka et al., 2025), the majority of which are listed as threatened on the IUCN RedList (Osuka et al., 2025). These include Critically Endangered species, such as the scalloped hammerhead shark (*Sphyrna lewini*) and giant guitarfish (*Rhynchobatus djiddensis*). Additionally, 90% of the sharks landed in the artisanal fishery are below the size of maturity (Osuka et al., 2025) including the scalloped hammerhead and the giant guitarfish. In summary, current fishing practises in Kenya take threatened species of sharks and rays and capture high numbers of juveniles.

Kenya also has a prawn bottom trawl fleet in Ungwana Bay operated by the private sector. Sharks and rays are caught in significant numbers as by-catch (discards) by the prawn trawlers (Kiilu et al., 2019). Additionally, they are also taken in the aquarium trade and industrial long-line fishing.

The focal species for this strategy (See Table 1) are all species that are often landed in Kenya's artisanal fisheries and are listed as threatened on the IUCN RedList. All the shark species, the guitarfish and wedgefish are listed on Appendix II by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) list. Some of the species, *Carcharhinus falciformis (2015)*, *Sphyrna lewini (2014)* and *Rhynchobatus australiae* (2018), are also listed on Appendix II of the Convention on Migratory Species (CMS) underscoring the need for their conservation.

Overall, ecological and species-specific fisheries catch data are inadequate to fully understand the population status of sharks and rays in Kenya or their distribution, movements and use of critical habitats. The IUCN shark specialist group (SSG) has designated important shark and ray areas (ISRAs) in Kenya, but these will require management and enforcement strategies. Currently, shark fishing in Kenya contravenes our country's commitments to the CBD, CMS, CITES and the FAO code of conduct for responsible fisheries. A National Plan of Action (NPOA) for sharks and rays spearheaded by the Kenya Fisheries Service has now been developed in recognition of these issues. We need to conserve sharks and rays on a precautionary basis and take steps now to prevent the extinction of sharks and rays in Kenya.

Table 1: Focal species for this strategy that are often landed in Kenya's artisanal fisheries and are listed as threatened on the IUCN RedList

Species English name	**Species name Latin**	**IUCN status**	**CITES listing**	**CMS listing**	**Local Name**
Blacktip reef shark	*Carcharhinus melanopterus*	VU	Appendix II	Not Evaluated	Pezi weusi
Grey reef Shark	*Carcharhinus amblyrhynchos*	EN	Appendix II	Not Evaluated	Jori jori
Silky shark	*Carcharhinus falciformis*	VU	Appendix II	Appendix II. Sharks MOU	Papa
Bull shark	*Carcharhinus leucas*	VU	Appendix II	Not Evaluated	Papa sumbwe
Whitetip reef shark	*Triaenodon obesus*	VU	Appendix II	Not Evaluated	Papa siruanzi
Scalloped hammerhead shark	*Sphyrna lewini*	CR	Appendix II	Appendix II	Papa mbingusi
Giant guitarfish	*Rhynchobatus djiddensis*	CR	Appendix II	Annex 1 Sharks MOU of CMS	Papa fuanda/ charawanza
Bowmouth guitarfish	*Rhina ancylostomus*	CR	Appendix II	Not Evaluated	Papa usingizi/ kiharere/ wame
Whitespotted / bottlenose wedgefish	*Rhynchobatus australiae*	CR	Appendix II	Appendix II. Sharks MOU	
Halavi guitarfish	*Glaucostegus halavi*	CR	Appendix II	Not Evaluated	
Ocellated eagle ray/spotted eagle ray	*Aetobatus ocellatus*	EN	Not evaluated	Not Evaluated	Kipungu/Shetezi

THE WORKSHOP

Figure 1: Participants and the Kenya Shark and Ray Strategy Workshop in Mombasa (1-3 April 2025) (Photo credit: Timothy Allela).

This multi-stakeholder workshop was held in Mombasa, Kenya, from April 1-3, 2025. Participants included government officials from fisheries and wildlife services, fishers, traders, NGOs, the tourism sector, researchers, and university representatives. The purpose of the workshop was to sensitize and build (develop) consensus on a conservation strategy for sharks and rays in Kenya, designed to support the implementation of Kenya's NPOA, and focusing on a group of species that are globally threatened with extinction. The workshop was organised by CORDIO, in partnership with KeFS, WRTI, TNC, Ngomeni Beach Management Unit, Technical University of Kenya, University of Eldoret, and WCS. Workshop design and facilitation was provided by the IUCN SSC Conservation Planning Specialist Group (CPSG).

Dr. Melita Samoilys, Director of CORDIO, welcomed the 43 participants (Figure 1) to the workshop and gave a brief address describing the crisis for sharks and rays in Kenya and the vital role the workshop will play in supporting implementation of the KeFS NPOA-sharks. Tsiganyiu Dadley from the Kenya Wildlife Service (KWS) gave opening remarks emphasising the KWS commitment to effective regulation of trade in sharks and rays and stressing the need for cooperation among stakeholders. Finally, the workshop was declared open by Dr Mohamed Omar of the Wildlife Research and Training Institute (WRTI), who noted the importance of changing public perceptions of sharks and of maintaining Kenya's critical leadership role in CITES.

Caroline Lees (IUCN SSC CPSG) gave a brief presentation on the workshop process and program and Clare Thouless (CORDIO) set the scene for workshop discussions with a presentation on the biology and ecology of sharks and rays, their global and national conservation status and trends, summarising recent studies in Kenyan waters. A summary of Clare's presentation is provided in the Background section of this document. A video providing an overview of sharks in Kenya was shown to participants, and this can be accessed using the QR code (Figure 2).

Figure 2: QR Code - A Shark Conservation Strategy for Kenya - Short Documentary.

Over the three days that followed, participants alternated between focused working group discussions (Figure 3), plenary reporting and feedback sessions (Figure 4). Participants began by identifying and discussing issues that challenge effective conservation of sharks and rays in Kenya. Increasing pressure from fisheries, gaps in governance, legislation and regulation, habitat destruction and degradation, and knowledge gaps emerged as dominant themes and working groups were formed for each of these topics (see Sections 1-4). Following thorough consideration of each issue, participants discussed and prioritised potential solutions and recommended actions to implement them. Discussions proceeded by consensus. The workshop concluded with working groups presenting an overview of the goals and actions agreed to and a discussion was held on the way forward. Further detail is provided in the 'Strategy' section below.

Figure 3: Participants in their working groups discussing their Issues / Goals / Actions (Photo credit: Lucy Kemp).

Figure 4: Working groups feeding back on their discussions in plenary (Photo credit: Lucy Kemp)

VISION

At the start of the workshop all participants took part in a collaborative exercise to decide on a shared vision for the future of sharks and rays in Kenyan waters. The initial material developed was refined iteratively by a small, representative team to create the version below, which was approved by the entire group (Figure 5).

Figure 5: Participants working on the Vision (Photo credit: Lucy Kemp).

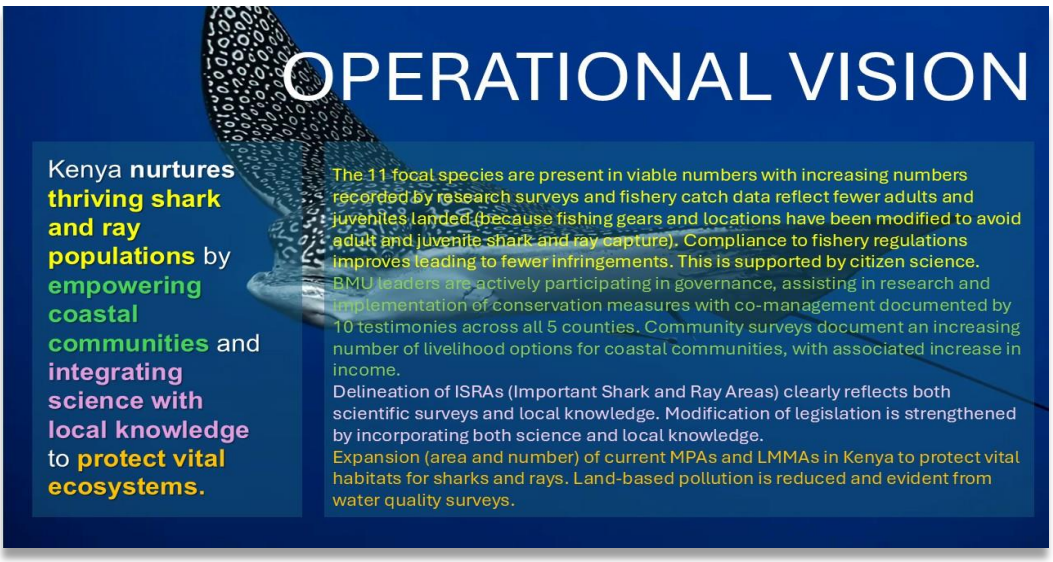
By 2050:

Kenya has nurtured thriving shark and ray populations by empowering coastal communities and integrating science with local knowledge to protect vital ecosystems.

Kenya imekuza idadi kubwa ya papa na taa wanaostawi kupitia uwezeshaji wa jamii za pwani na kwa kujumuisha sayansi na maarifa ya jadi ili kulinda maeneo muhimu ya kiekolojia.

OPERATIONAL DEFINITIONS

To track progress towards the shared vision, the aspirational text was broken down into its component themes, an operational definition for each was developed, along with an appropriate indicator measure and 2025 baseline. These were discussed and agreed by the wider group.



Definitions:

The 11 focal species are present in viable numbers with increasing numbers recorded by research surveys and fishery catch data reflect fewer adults and juveniles landed (because fishing gears and

locations have been modified to avoid adult and juvenile shark and ray capture). Compliance to fishery regulations improves leading to fewer infringements. This is supported by citizen science.

BMU leaders are actively participating in governance, assisting in research and implementation of conservation measures with co-management documented by 10 testimonies across all 5 counties. Community surveys document an increasing number of livelihood options for coastal communities, with associated increase in income.

Delineation of ISRAs (Important Shark and Ray Areas) clearly reflects both scientific surveys and local knowledge. Modification of legislation is strengthened by incorporating both science and local knowledge.

Expansion (area and number) of current MPAs and LMMAs in Kenya to protect vital habitats for sharks and rays. Land-based pollution is reduced and evident from water quality surveys.

THE STRATEGY

The strategy and associated text provided in this document is intended to be an accurate reflection of what was agreed by participants through consensus during the workshop, with no additions or omissions.

This Kenyan shark and ray species conservation strategy is designed to pull together key stakeholders to produce a document that identifies goals and actions that will address the issues around restoring and maintaining healthy populations of threatened species.

The process to develop the strategy was as follows. Participants were asked to develop a vision, or desired state for sharks and rays. This was done through a collaborative exercise, the details of which are in the 'Vision' section. Participants then went through an interactive process to develop their understanding of the system. This involved discussing the threats/issues and how they impacted sharks and rays in Kenya. Once this process was concluded, participants identified emerging themes and working groups were created according to these themes.

All threats/issues identified were assigned to the relevant theme. Participants then went through a discussion process where they fleshed out these issue statements. This involved identifying the impact of these issues/threats; their causes and identifying what is known or assumed about these issues/threats and what the knowledge gaps are. The section on 'Working Group Summaries' provides the outputs from each group on their discussion of the issues assigned to them.

Based on this information, goals were identified to address these issues/threats. Here a goal is defined as what was needed to be achieved over the next 25 years to address the issues/threats. The goals of each group were then presented to all participants for input and discussion and the participants went through a process where they prioritised the goals through a voting process. The relevant prioritised goals were then worked on by each working group where actions were identified for each goal. These actions were the necessary steps needed to ensure that the goal was reached. The actions identified included a description of the action, the indicator of success, who the lead organisations would be and collaborators and then a time frame for implementation.

The resulting conservation strategy framework includes:

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- A highlight and discussion of 18 ISSUES relevant to their conservation;
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		RANK	
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14	Strengthened BMU structure for improved fisheries governance.	1	4
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10	Strengthened laws and regulation that reverse the decline of shark and ray populations.	10	2
2	Reduce the impact of fishing on sharks and rays breeding grounds by 2030 through restriction or exchange of gears into sustainable ones through: mesh size limits; seasonal closures; no take zones; gear restricted areas/zones.	9	1
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WORKING GROUP SUMMARIES

GROUP 1. FISHERIES OPERATIONS

Group members: Evelyne Ndiritu (facilitator), Maryline Achieng, Yahya Mohammed, Kahindi Changawa (presenter), Collins Katana, Omar Abdalla, Said Adnan, Halifa Omar, David Mwandikwa (scribe).

Issues discussed: Fishing gears; Bycatch; Targeted fishing; Fishing pressure; Conservation resistance.

ISSUE 1: BYCATCH FROM INDUSTRIAL AND SEMI-INDUSTRIAL FISHING VESSELS

Description: Bycatch from trawlers and longliners.

Impact:

- High catches of juveniles and pregnant females leading to low population growth rates, limiting chances of population recovery;
- Death leading to decrease in population and loss of sharks and rays species diversity;
- Injury of individuals leading to low post-release survival rate.
- Reduced species diversity;
- Possible local extinctions;
- Habitat destruction.

Causes:

- Spatial overlap between fishing grounds and critical habitats including foraging, nursery and breeding grounds for sharks;
- Fishing during breeding seasons for sharks;
- Bait and lights used in longliners.

What do we know or assume about it?

What we know:

- The industrial fishing vessels are not allowed to land certain shark and ray species e.g. thresher sharks, oceanic white tip, manta rays;
- There are bycatch data from fisheries and also from various published research from trawlers and longline fishing vessels (e.g. Kiilu et al., 2024);
- Sharks are caught as bycatch in longlines and trawlers;
- There are observers on board trawlers and longline fishing vessels;
- Despite the presence of observers, the data is deficient e.g. due to lack of training, equipment. Some fishers commented there were not always observers present, hence inaccurate data. There are cameras in these fishing vessels but some switch them off;
- There exists regulations (e.g. nylon branch lines instead of a wire, circle hooks, bycatch repelling devices, turtle excluders devices (TEDs) to reduce bycatch but there is weak enforcement and compliance of these regulations in industrial and semi industrial fishing vessels;
- According to commercial fishers, there is no bycatch nowadays as everything is consumed and marketable. They do not release the sharks and rays when they catch them whether juvenile or endangered species, they retain them;
- There is a familiarity in the operations where the data collected and submitted is not carefully checked by compliance. The operators need to be sensitised on the value of accurate data capture and reporting.

- Participants of this working group estimated that in prawn trawls, this is more than the targeted catch (anecdotal - approximately 80% of the catch weight the bycatch and 20 % is prawns);
- Potential alternatives to unsustainable fishing gears exist. For example, in the longlining fishery, the wires (which sharks cannot cut and get away from) can be removed and replaced with nylon line which sharks and rays can bite through and survive.

Knowledge gaps:

- Public, fishers and communities do not have access to these bycatch data from fisheries and research publications;
- Data from these trawlers and long liners are not accurate as sharks are processed while at sea and data is collected later at the dock, and some fishers reported sharks can be entirely discarded;
- The protected sharks' data is not recorded hence it is difficult to monitor or assess the reduction of bycatch;
- There is limited data of the bycatch in trawls and long liners for sharks and rays species, their sizes and whether they were pregnant or not;
- Limited to no data on discards;
- Stock assessments to know or estimate the populations of sharks and rays;
- The percentage of bycatch of sharks and rays in trawlers and long lines catches is unknown.

GOAL 1: Reduce bycatch of sharks and rays by 2030[1] to maintain their healthy populations.

ISSUE 2: TARGETED FISHING IN ARTISANAL FISHERIES

Description: Targeted fishing in artisanal fisheries (use of large mesh sized gillnets and fishing in known fishing grounds and seasons for sharks).

Impact:

- High catch of juveniles and pregnant females;
- Decrease in populations;
- Size structure disruption where the smaller sharks and rays remain, affecting maturity and reproduction rates.

Causes:

- Fishing during breeding season and in areas that are hotspots for juveniles;
- Market pressure and preference and demand;
- High income from shark and ray products.

What do we know or assume about it?

What we know:

- There is local knowledge of the breeding seasons and hotspot fishing grounds of sharks and rays e.g. for hammerhead sharks;
- Large mesh gill nets catch sharks and rays (e.g. Osuka et al., 2021).

[1] Kenya Vision 2030 (Swahili: Ruwaza ya Kenya 2030) is a Kenyan development program, aiming to raise the average standard of living in Kenya to middle income by 2030. It was launched on 10 June 2008 by President Mwai Kibaki.

Knowledge gaps:

- Documenting local knowledge on the fishing ground hotspots, seasons;
- Getting sufficient and accurate data from artisanal fishers is hard as they process (cut, fin and dry) the sharks and rays while still at sea;
- No species specific information/data;
- Most of the sharks caught are juveniles so species identification becomes a problem;
- No feedback or reporting from the Kenya Fisheries Service fish catch surveys;
- There are data on various fisheries aspects from NGOs and government institutions but accessing these data is the key issue.

GOAL 2: Reduce the impact of fishing on sharks and rays breeding grounds by 2030 through restriction or exchange of gears into sustainable ones through: mesh size limits; seasonal closures; no take zones; gear restricted areas/zones.

ISSUE 3: FISHING PRESSURE

Description: High fishing pressure on marine fish leading to overfishing.

Impact:

- Overfishing which leads to reduced populations;
- Disturbance and destruction of habitats

Causes:

- Increasing human population;
- Poverty;
- Limited alternative livelihoods for fishers;
- Culture and traditions - shark oil for their boats, men's vitality when they eat juvenile sharks and rays;
- Increase in the number of fishers leading to high fishing pressure on sharks.

What do we know or assume about it?

What we know:

- The number of fishers (>14, 000) and fishing vessels have increased as indicated by data from BMUs and the fisheries department (registration and licensing);
- Many fishers with different fishing gear can target sharks and rays increasing the fishing pressure on their populations (all artisanal fishers can be shark fishers, either targeted or non-target. All incidental catches of sharks are landed and sold for their meat and products);
- Reduction in fish populations leads to reduced catch landings which eventually leads to reduced income and fishers start migrating to new fishing areas;
- Household surveys in fishing communities have shown that many live below the poverty line – data from social services portal, Kenya National Bureau of Statistics (KNBS), NGOs. Most of the fishers are poor and fish all their lives even in their old ages due to little profits;
- There is limited alternative livelihoods for coastal communities hence their heavy reliance on fishing as the main source of income;
- Giving fishermen alternative livelihoods e.g. bee keeping, livestock keeping will be very difficult as fishing is their tradition;

- The idea of alternative livelihoods is hard to sell to the fishers as e.g. if it is farming or livestock rearing, time and space are required to get results (and unreliable rain may lead to loses) and the fishers will therefore still go back fishing;
- A common belief amongst fishers related to alternative livelihoods is that the communities themselves should ideally be the ones to propose these alternative livelihoods. Fishers love fishing and many of them say they can't stop fishing because they love it, they get daily bread and it gives them time to do other activities after fishing. The alternatives need to be more profitable than fishing and also take less time to earn income (compared to farming for example). Fishing guarantees food and an income even though some youths have gone to boda boda riding business as alternative;
- Alternative livelihoods should align to local environment, culture and traditions and community skills and needs (potential options include the adoption of crab fishing, mariculture, aquaculture);
- The conservation of sharks and rays should be incentivised;
- The catch data reported is less than the actual catches that are caught and traded because dried sharks are not recorded in the catches.

Knowledge gaps:

- Documentation of culture and traditions on the use of sharks and rays products e.g. fishers say eating juvenile sharks increases virility in men;
- Data on various forms of incentives to fisheries conservation by the fisher communities;
- Availability and demand for other complementary fish species to reduce market demand on sharks hence reducing fishing pressure on sharks.

GOAL 3: Develop and implement feasible alternative livelihood activities to reduce pressure on sharks and rays, by 2030. Activities must be: culturally acceptable; have environmental benefits; align with available opportunities; incentivise conservation of sharks and rays.

ISSUE 4: CONSERVATION RESISTANCE

Description: Resistance to behaviour change and adoption of conservation measures by fishermen.

Impact:

- Sharks and rays are reduced to extinction due to overfishing;
- Destruction of habitats that are key sharks and rays hotspot areas.

Causes:

- Ignorance;
- Limited awareness;
- Most fishers have a mindset that they are poor and must always fish, and so are resistant to conservation measures like MPAs;
- There is a lack of incentives to motivate conservation actions. These can be monetary, equipment and skills to boost morale in conservation efforts;
- Lack of livelihood alternatives limit buy-in and trust among community members causing resistance to conservation;
- Culture and traditions;
- Lack of coordination and synergy among stakeholders involved in conservation efforts has limited the overall impact and sustainability of these interventions;
- Non-inclusion of communities in conservation decisions;

- Perceptions, poor communication channels and fisher behaviour influence buy-in of conservation efforts.

What do we know or assume about it?

What we know:

- The fishermen are reluctant to adopt conservation measures like MPAs since they feel they are not directly benefiting from them and when they are engaged in similar workshops their thinking is already biased as they say the managers want to "sell their ocean" and restrict them from fishing;
- There is misconception among fishers on various issues e.g. they feel the scientists know very little and it is them, the fishers, who know about their fishery leading them to ignoring important communications and conservation efforts;
- These misconceptions are brought about by poor communication and limited integration of local knowledge;
- Elders had their own traditional ways of conservation e.g. fishing in some reefs or fishing grounds in certain seasons; fished during the north-eastern monsoon (NEM) season and rested during the south-eastern monsoon (SEM);
- The sharks and rays have many products e.g. meat, fins, shark oil (sifa), teeth, hence fishers resistance to conserve;
- The fishers are reluctant to attend Beach Management Unit (BMU) assembly and other meetings;
- Review of by-laws is a long process which will involve public participation;
- It is not always clear which skills and equipment are needed to capacity build the BMUs;
- The BMUs do their patrols every day since fishermen go fishing every day. They can therefore monitor fishing activities within their fishing grounds;
- In BMUs, there is a category of "others" in the leadership roles, which is not clear who constitutes this category;
- The BMU chair has to have a form four certificate as a mandatory requirement, but fishers end up nominating and electing unqualified BMU chairpersons;
- Implementation of management measures on breeding grounds will mainly target big sharks like hammerheads and bull sharks.

Knowledge gaps:

- Integration of local and traditional/cultural conservation knowledge and methods with scientific methods, regulatory frameworks and conservation initiatives of sharks and rays;
- There is inadequate and limited sharing of data. This is important so that data can be analysed, harmonised and integrated for ease of interpretation;
- There is no feedback or dissemination of the data and research findings so that management decisions can be made;
- The communities do not get any feedback from researchers or scientists who engage the communities during surveys or data collection; they do not come back to share the results and reports. The feedback should be timely after carrying out the research or surveys. This will help increase buy-in by communities and their embracing of conservation initiatives. In addition the scientists do not acknowledge communities during reports and publications;
- More dialogue is needed around industrial fishing and how it is managed including on data sharing and how different stakeholders are brought together in industrial fishing;
- Data on various forms of incentives;

- The BMU leaders do not have authority and mandates from their by-laws to apprehend the fishers with illegal gears and methods hence it becomes difficult to govern and manage their resources;
- There is need to review and strengthen these BMU regulations and by-laws;
- The BMUs need sensitization on the main sharks and rays species that need protection, which will aid in designing by-laws targeting conservation of sharks and rays integrating both scientific and local knowledge with support from government and NGOs;
- The fishermen's trust in BMUs, NGOs and government institutions needs to be promoted so that they can feel part of the conservation, governance and management of marine resources;
- The local and political leaders e.g. chiefs, local administrators, Members of County Assemblies (MCAs), Members of Parliament (MPs) are not included during the making of regulations. They should be included so that they can be at the forefront in enforcing conservation regulations without biasness or corruption;
- If fishers agree to conservation of sharks and rays, what will Kenya Fisheries Service do to compensate communities?
- In Lamu, the Lamu court used to compensate fishers for the damage of their nets whenever they interacted with marine turtles. Is that a possibility for sharks?

GOAL 4: Strengthen governance and management capacity of BMUs to effectively conserve sharks and rays.

GOAL 5: Enhance participatory research, knowledge sharing and feedback to communities to build capacity and awareness about sharks and rays.

GROUP 2. HABITAT DESTRUCTION AND DEGRADATION

Group members: Remy Oddenyo (Presenter), Melita Samoilys, Nana Omar (Facilitator), Saidi Mote, Mwakira Mohammed, Joshua Rambahiarson (Presenter), Sarah Tyrell, Gurveena Ghataure, Diana Karan (Scribe).

Issues discussed: Pollution; Destructive gears; Insufficient protected areas; Coastal development.

ISSUE 1: INSUFFICIENT MPA/LMMA COVERAGE

Description: Government managed marine parks do not all include critical habitat for sharks and rays e.g nursery and pupping grounds (Blacktip sharks need seagrass areas for breeding; rays need mangroves). There are not enough protected areas to allow sharks and rays to breed undisturbed, and the current marine protected areas (National Parks) are too small. The Marine Reserves do not provide enough protection from fishing and there are too few LMMAs that are also too small and generally have weak governance.

Impact:

- Low survival of juveniles and adults;
- Ongoing habitat degradation.

Causes:

- Lack of awareness on the importance of MPAs and LMMAs;
- Lack of community willingness (communities still fish despite knowing importance of MPA focussing on short term gain over long term benefit);
- Lack of political will.

What do we know or assume about it?

What we know:

- Parks, Reserves, and LMMAs are mapped so area data is available (government and CORDIO dataset);
- Nursery grounds are known by some Beach Management Units (BMUs), Kenya Fisheries Service (KeFS) & NGOs for Blacktip Reef Sharks, Bull Sharks and Eagle rays;
- Most Reserves are not functional (Samoilys et al., 2017), though protection is intended to promote sustainable fishing;
- Lack of awareness/ ignorance – fishing communities are always raising this as an issue
- Lack of willingness (community and political) – verbal communication from fishers;
- Habitat degradation- use of destructive fishing gear in non-protected areas causes habitat destruction- fishers observation;
- ISRAs cover only 7%, and tend to be on coral reef areas;
- Breeding grounds known from data catch landings;
- NGOs get timely information as they have liaisons/ data collectors to help collect information while the Government largely depends on BMUs;
- Rays and sharks – known to breed at Ungwana and Malindi bays (Sabaki and Tana river mouths), breeding is usually in seasons of April;
- Coral fragments from breakage are also observed at sea due to trawling activities where chains are dragged with force – fisher observations;
- Co-Management has been attempted but due to political interference it is not always successful;

- Habitat degradation is known in areas of critical habitats where there is no protection e.g. when trawlers use destructive gears, seagrass floats as it has been pulled out with the roots;
- Dredging for port development has an immediate effect and is different from long-term impact.

What we assume:

- Habitat degradation in the mangrove areas outside protected areas
- Offshore MPAs do offer some protection but how much is unknown.

GOAL 6: Increase in areas covered by MPAs and LMMAs to include Important shark and ray areas (ISRAs) so that critical habitats such as nursery, feeding, and pupping grounds are safeguarded. (While 30% by 2030 is a government goal under ratified conventions, more might be required to capture critical habitats).

GOAL : Stronger inclusivity of communities in governance of critical habitats for sharks and rays for better stewardship in both setting of goals and implementation. This Goal was identified as cross-cutting throughout all the working groups. It was thus not fleshed out into actions in this group and included in the action tables, but rather each working group ensured actions that referenced stronger inclusivity of communities.

ISSUE 2: COASTLINE DEVELOPMENT

Description: Dredging and dumping offshore for port development leads to destruction of critical habitats and coastal transformation from building ports, roads, sea walls, hotels too close to the beach leads to loose substratum and ultimately sedimentation.

Impact:

Habitat loss for:

- All life stages for guitarfish & rays (Ocellated eagle ray);
- Juveniles for big and reef sharks;
- Sedimentation of general coastal habitat with greater ecosystem harm.

Causes:

- Economic growth;
- Population growth;
- Tourism;
- Sea level rise from climate change;
- Shipping.

What do we know or assume about it?

What we know:

- Loss of habitats leads to decline of catches, low livelihoods - (socio-economic and cultural aspects);
- Coastal transformation - Lamu port construction damaged habitats around it. Road construction in Takaungu causing sedimentation (EIA reports);
- Sedimentation on the corals lead to death on seagrass and corals bleaching, replication of effects. Sediment fills all crevices and thus reduces habitat complexity - based on local knowledge;
- Economic growth.
- It is possible for road development that considers ecosystem benefits e.g. Dongo-kundu bypass road blends in with mangrove areas.

What we assume:

- Is there evidence that where there is coastal development there is a link to habitat loss for sharks;
- Does tourism have an impact e.g. sea walls creating habitat loss, sedimentation – at Hemingways in Watamu and Billionaires club hotel in Malindi.

Knowledge gaps:

- Understanding of how coastal development leads to habitat degradation;
- Which areas currently open for coastal development would impact critical habitats for sharks and rays;
- Understanding interaction between sea level rise, climate change and construction effects.

GOAL 7: Ensure marine spatial planning is aligned with critical sharks and rays habitat to prevent negative impact from coastal development e.g. ensure all critical habitats has been nominated as ISRAs.

GOAL: Strong integration of socio-economic, traditional knowledge and impacts in action around habitat degradation. Integration of communities and traditional knowledge was incorporated into Goal 6.

ISSUE 3: DESTRUCTIVE GEARS E.G DYNAMITE, BEACH SEINE, RINGNETS

Description: Destructive gears; Damage to shark and ray habitat and includes prawn trawlers, beach seines and ringnets.

Causes:

- Policies and enforceable management measures;
- Use the gaps listed to guide goal setting;
- No ringnetting in shallow waters;
- Enforcement of illegal gears is in place;
- Confiscation of illegal gears;
- Extend gear exchange programme to other coastal areas (as done in Lamu for beach seines);
- Explore alternative livelihood options;
- Fishing gear to be only used where they are not destructive
    - e.g. Ringnets (deeper than 30 m) and beach seine nets are being used in shallow waters and lagoons and prawn trawls offshore are likely to impact sponges.

Impact:

- Destruction of coral and seagrass habitats e.g. by ring nets in shallow water and when bags of sand are dropped onto coral;
- Destroys prey base e.g. by ring nets;
- Destroys refuge for shark juveniles and all life stages for rays;
- Beach seine inside the creeks take rays.

What do we know or assume about it?

What we know:

- Destroys corals;
- Some bycatch in beach seines;
- Beach seine is destructive – was made illegal based on data

- Ringnet – its activities have been documented and a management plan developed based on data - regulations stipulate only to be used in deep water > 30m to capture pelagic species and to avoid bottom damage;
- Prawn trawl fisheries – have high by-catch (KeFS reports and KMFRI publications);
- Limited enforcement - documented by fishers although the data has not been captured scientifically. But this gap has been documented from fishers dialogues (e.g. CORDIO enforcement workshop report of 2025: SSF – CORDIO website);
- Market demand (for prawns) – documented by KeFS;
- Money and greed;
- BMU income driving the ringnet fisheries - e.g. Kipini areas and Ngomeni, but the BMUs know the effects of the ringnet and some are against its use;
- Corruption among the leaders in the South of Kenya BMUs and local government to allow some destructive fishing – e.g. use of reef seines;
- Different types of beach seines and reef seines should have individual management plans - the transfer of knowledge about their use is part of traditional fishing.

What we assume:

- Destroy fish prey-base;
- Market demand.

Knowledge gaps:

- Is there sufficient data on the impact of prawn trawling?
- There is contradictory evidence about beach seines: some fishers argue that seining over seagrass acts as pruning and lead to new growth and if you stop beach seines fish will disappear vs. beach seine destroys habitat and doesn't lead to new recruitment of seagrass;
- Is abuse of power an issue?
- Why is there insufficient enforcement?
- Illegal use of ringnets is poorly understood by communities;
- How to address corruption.

GOAL 8: Ensure strong compliance with laws and regulations relating to fishing gear use and enforcement effectiveness by government through Monitoring Control Surveillance (MCS).

ISSUE 4: POLLUTION

Description: Pollution of shark and ray habitats includes untreated sewage, harmful agro-chemicals, saltwater from industries, land-based- river-borne waste e.g. plastic, maritime transport oil, ballast water, oil and gas exploration.

Impact:

- Eutrophication

Eutrophication causes coastal and estuarine habitats such as seagrass beds and coral reefs to become smothered by excessive algal growth or to die off due to reduced light penetration. This process threatens vital habitats that serve as key nurseries and feeding grounds, particularly for juvenile sharks and rays, disrupting the ecological balance and reducing biodiversity.

- Anoxic conditions leading to stress /death of marine life

When algal blooms die and decompose, they consume large amounts of dissolved oxygen, creating "dead zones" where oxygen levels are too low to support most marine life. Sharks and rays, require oxygen-rich water to survive, and in anoxic zones, they may face suffocation. Prolonged anoxic conditions lead to collapse of not only key shark and ray populations but also lead to disruption and collapse of foodwebs.

- Habitat degradation

Untreated sewage, agrochemicals, and industrial runoff pollute marine ecosystems, affecting sensitive habitats such as coral reefs, mangroves, and seagrass beds. Plastics and solid waste physically damage or alter these habitats, whereas oil spills and ship discharges coat the seafloor and beaches, making them unsuitable for breeding or feeding. Sharks and rays that use these habitats as nurseries lose food and shelter, resulting in population decreases exacerbated by displacement to less favourable areas.

- Bioaccumulation of pollutants

Pollution produces hazardous elements into marine environments, including heavy metals, herbicides, and industrial chemicals. These toxins are ingested by small organisms and accumulate throughout the food chain, a process known as bioaccumulation. Sharks and rays, as top predators, build up high toxin levels process known as biomagnification, where they unavoidably ingest pollutants within their contaminated prey, affecting their immune, reproductive, and nervous systems. In addition, toxins in pregnant females can pass to embryos, reducing juvenile survival and contributing to population decline.

- Micro-plastics that affect filter-feeders

Microplastics (plastic particles < 5 mm), which are small plastic particles derived from degraded garbage, are abundant in polluted marine habitats. Filter-feeding rays, such as manta and devil rays, are especially vulnerable because they consume massive volumes of water to graze on plankton, often ingesting microplastics unknowingly. These plastics can build up in their digestive tracts and result in internal injuries or blockages. Microplastics may also include hazardous compounds, which can disrupt the ray's health by impairing growth, reproduction, and immunity. Over time, this can result in decreased fitness and population decreases in shark and rays populations.

- Reduced fecundity

Sharks and rays absorb toxic chemicals and pollutants found in ocean waters, and because they have long lifespans, these compounds accumulate in their fatty tissues, making it harder for these animals to digest. These toxins frequently target organs such as the gonads, disrupting natural hormones and causing injury to their reproductive systems, lowering their chances of survival. Furthermore, microplastics with hormone-altering effects may interfere with reproductive success, decreasing shark fecundity and contributing to shark population decline.

- Oil spill in open water

Toxic compounds such as Polycyclic aromatic hydrocarbons (PAHs) found in oil can accumulate in sharks and rays causing mortality. Oil residues in sediments prolong exposure, affecting species with slow developing egg cases on the seafloor as their embryos are exposed to these toxins increasing the risk of developmental damage and mortality. Filter feeding sharks such as Whale sharks also risk breathing problems from clogged gills. Oil spills also threaten juvenile survival of sharks and rays leading to population declines.

Causes:

- Improper land-use practices;
- Inadequate waste management systems (sewerage and solid waste);
- Inadequate enforcement of maritime environmental and pollution control and mitigation regulations; inadequacy of vessel inspection and licensing by the Kenya Maritime Authority contributes to some vessels operating without full compliance to environmental regulations. This situation increases the risk of marine pollution from oil spills and harmful discharges.
- Poor vessel maintenance;

- Inadequate enforcement of water quality regulations: Kenya Fisheries Service (KeFS) officers test water and take swabs from fish samples to check for pollutants, but fishermen do not receive feedback on the results. This lack of communication limits awareness of water quality issues and poses risks to human health, as contaminated fish may be consumed unknowingly. Inadequate enforcement and follow-up on water quality regulations reduce the effectiveness of pollution control and fish safety measures.

  Specific examples:

  - Seasonal flooding from rivers can often lead to downstream pollution. A case example is the River Uma from Tanzania flowing through Kenya villages at the border of Kenya-Tanzania.

What do we know or assume about it?

What we know:

- Causes/ sources of pollution are untreated sewage, harmful agro-chemicals, saltwater from industries, land-based-river-borne waste e.g. plastic;
- Pollution leads to loss of livelihood and local economies do suffer;
- Shark and ray habitat is degraded due to pollution from plastic:
  Specific examples:
  - Pollution is an issue in Kilifi County, especially the salt pans where chemicals are deposited in the creeks leading to fish kills and mangrove destruction (Saidi Mote pers comm);
  - Other impacted areas include Gongoni;
  - Mombasa creeks and Fort Jesus face direct raw sewerage accumulation.

What we assume:

- Bioaccumulation - Without testing bioaccumulation locally, it is impossible to accurately assess the extent to which harmful chemicals are building up in aquatic organisms in specific water bodies or coastal areas.

GOAL 9: Functioning sewage treatment systems are in place for all Kenyan coastal waterways and estuaries.

GROUP 3. GOVERNANCE, LEGISLATION AND REGULATION

Group members: Siso Job, Kelvin Wachira, Mwangi Gachuru, Benedict Kiilu, Ritah Abong'o, Maryam Mbui, Abigail Kidd (presenter), Samuel Murithi, Somo Somo, Pauline Safari (scribe).

ISSUE 1: INSUFFICIENCY IN POLICY AND REGULATIONS

Description:

The current policies and regulations in Kenya do not adequately address the declining stocks of sharks and rays.

Impact:

- Continued decline of shark and ray stocks, which will lead to local extinction;
- Declining income and food insecurity, and loss of social and cultural values;
- Distortion of the ecosystem balance or even collapse of ecosystem.

Causes:

- Limited skills and capacity to develop sufficient regulations and policies ;
- Inadequate/limited data for evidence-based regulatory making;
- Inadequate recognition of sharks and rays as a priority for conservation e.g. some 4 species of sharks and rays are listed in the Wildlife Management and Conservation Act Cap. 376 as vulnerable but they are not protected as they are still being caught and consumed by artisanal fishers;
- Non-ratification of international or regional laws;
- Lack of an MSP (but it is acknowledged that it is currently being developed).

What do we know or assume about it?

What we know:

- Sharks and rays are listed and not protected in national law (FMDA & WMCA acts);
- There are gaps and loopholes in international protection laws CMS and CITES;
- There are species specific data gaps.

What we assume:

- Limited skills and capacity to develop sufficient regulations and policies.

Knowledge gaps:

- Socio economic value chain of sharks and rays;
- Economic value of living sharks;
- Species specific data for all shark species;
- Mapping of key areas (nursery grounds).

GOAL 10: Strengthened laws and regulations that reverse the decline of sharks and ray stocks.

ISSUE 2: ILLEGAL, UNREPORTED AND UNREGULATED (IUU) FISHING

Description:

IUU enables unsustainable and indiscriminate fishing of sharks and rays, distorts markets and local economies and causes unfair competition with legal fishers.

Impact:

- Unsustainable and indiscriminate fishing reduces populations and thus continued decline of shark and ray stocks, which will lead to local extinctions;
- Distortion of markets and local economy;
- Distortion of the ecosystem balance due to high bycatch of sharks and rays;
- Loss of data on sharks and rays;
- Degradation of marine habitats (reefs, sea beds).

Causes:

- Weak enforcement and low compliance to regulations;
- Poor traceability mechanism in the local fish value chain;
- Weak regulations;
- Poor national and regional collaboration;
- Poor species identification skills amongst managers and resource users;
- Abuse of influence;
- Political influence.

What do we know or assume about it?

What we know:

- IUU fishing depletes fish stocks;
- Economic loss (Kenya losses approximately Kehs 10,000,000,000 annually due to IUU fishing);
- Weak enforcement and low compliance to regulations;
- Poor traceability mechanism in the local fish value chain.

Knowledge gaps:

- Low capacity for community to collect and report data;
- Lack of transparency;
- Inadequate data to inform mapping, quota and conservation measures;
- No data available to inform the stock levels of sharks and rays.

GOAL 11: Ensure effective enforcement and compliance mechanisms that promote sustainable fishing and enhance livelihoods.

ISSUE 3: OVERLAPPING MANDATES

Description: This occurs within multiple government agencies as a result of legal gaps and silo mentality.

Impact:

- Poor service delivery to the community;

- Critical habitats and ecosystem deteriorate;
- Exploitation of fishing communities;
- Enforcement and compliance weaknesses;
- Wastage of resources.

Causes:

- Interagency conflicts;
- "Big Brother" syndrome amongst enforcement interagency partners (Some enforcement agencies carry more weight and have greater influence);
- Lack of coordination;
- Lack of transparency and accountability (trade, corruption);
- Poor service delivery to the community;
- Critical habitats and ecosystem deteriorate;
- Exploitation of fishing communities;
- Enforcement and compliance weaknesses;
- Wastage of resources.

What do we know or assume about it?

What we know:

- Fragmented and overlapping legal framework e.g. a case where KeFS issues the licence while the KWS issues permits for trading of some sharks and their products;
- Jurisdictional ambiguity;
- Unclear roles in the different government agencies;
- Power imbalance e.g.KCGS is armed; they may feel like they are more superior to other maritime agencies.

Knowledge gap:

- Identification of the mandate overlaps and ambiguity.

GOAL 12: Enhanced inter-agency cooperation to reduce jurisdictional conflicts and improved synergies and collaborations within institutions.

ISSUE 4: INADEQUATE CONSULTATION PROCESSES AND INCLUSIVITY IN THE REGULATORY MAKING PROCESS

Description: Consultation and involvement of all relevant stakeholders and communities is not adequate during development of regulatory processes.

Impact:

- Ineffective regulations;
- Suspension of the law;
- Resistance from the fisher community (lack of ownership);
- Increase in low compliance.

Causes:

- Limited resources;
- Limited access to information;
- Power imbalances within the community and government;
- Low awareness and understanding (secure rights).

What do we know or assume about it?

What we know:

- Limited resources;
- Power imbalances within the community and Government.

What we assume:

- Limited access to information;
- Low awareness and understanding (secure rights).

Knowledge gaps:

- Consultation is not done to the grassroot level hence under-representation;
- Input, knowledge and experience are missing from policy;
- Language barrier – most drafts presented in the community are in English creating inadequacy in legal information;
- Legal rights and processes to challenge;
- Dispute management is not formal.

GOAL 13: Enhance community and other stakeholders' consultation in shark and ray conservation and decision making to ensure inclusivity and transparency.

ISSUE 5: WEAK GOVERNANCE STRUCTURE AT THE COMMUNITY LEVEL

Description: The BMUs are unable to meet their mandates as stipulated in the By-laws.

Impact:

- Open access;
- Decline in fisheries resources;
- Loss of livelihoods and economic decline;
- Weak enforcement;
- Marginalization of a section of the fisher community (fewer woman in fishing community compared to men);
- Illegal trade of sharks and rays.

Causes:

- Political interference;
- Insufficient capacity to manage and enforce by-laws;
- Low compliance.

What do we know or assume about it?

What we know:

- Political interference.

What we assume:

- Insufficient capacity to manage and enforce by-laws;
- Low compliance by communities.

Knowledge gaps:

- Lack of information on the level of impact of low compliance;
- Level of impact on the livelihoods due to weak governance;
- The level of marginalization.

GOAL 14: Strengthen BMU structures for improved fisheries Governance.

GROUP 4. SCIENCE AND KNOWLEDGE

Group members: Dr.Omar, Saeed Mwaguni, Lyn Njuguna, Wendy Itenya (Presenter), Thomas Mkare, Clare Thouless, Gorret Mwang (Presenter)i, Thalia Roveira (Facilitator), Philip Otieno, Linet Nasambu (Scribe).

ISSUE 1: HABITAT

Description: Inadequate knowledge on critical habitats including nursery, breeding and fishing grounds.

Impact: Lack of knowledge to protect species (juveniles).

Causes: Lack of resources, funding, capacity and technology.

What do we know or assume about it?

What we know:

- There are important shark and ray areas (ISRAs) designated by the IUCN-SSG- Watamu and Vanga, Lamu archipelago, Ungwana bay;
- In Kenya neonates and juveniles are caught by fishermen;
- Current data is based on catch only;
- Sharks are known globally to use shallow estuaries.

What we assume:

- Fishing is happening in critical nursery grounds;
- Critical habitats are degraded;
- Area based conservation will lead to increased shark and ray populations;
- With sufficient funding, resources and capacity we could locate critical habitats.

Knowledge gaps:

- We need to map critical habitats;
- We must know what conservation management actions are possible and beneficial in each area;
- Evaluating ecological status and future climate scenarios of the critical habitats i.e. what environmental factors affect sharks and rays;
- How communities utilize critical habitats and how they can be involved in identifying, planning and managing these areas.

GOAL 15: Identify and map all critical habitats in Kenyan waters.

ISSUE 2: FISHING

Description: Inadequate knowledge of fishing pressure and effects on species.

Impact: Leads to overfishing.

Causes:

- Lack of resources, funding, capacity, technology and knowledge;
- Lack of enforcement.

What do we know or assume about it?

What we know:

- Sharks and rays are caught as target species or by-catch – published and well documented;
- There is inadequate monitoring and evaluation of fishing – published and well documented;
- Lack of knowledge and training on species ID among fisheries observers – (Anecdotal information and catch statistics);
- Poor regulations and enforcement especially in illegal gear;
- There is illegal, unregulated and unreported fishing (IUU) – documented;
- Fishing is having an impact on sharks and ray population - well documented.

What we assume:

- Government, authorities and fishers assume that shark and ray populations are healthy based on catch statistics (a flawed circular assumption).

Knowledge gaps:

- The effects of fishing pressure on species;
- The species being caught and the numbers;
- The gears used to catch different species;
- We need to know the genetic make-up of shark and rays species caught;
- The extent of IUU fishing.

GOAL 16: Understand fishing pressure and its effect on sharks.

ISSUE 3: HABITAT AND ECOLOGY

Description: Inadequate knowledge of abundance, distribution, diversity and ecology.

Impact: Lack of knowledge to manage fisheries.

Causes: Lack of long-term monitoring and regional status.

What do we know or assume about it?

What we know::

- Species present are known – documented and published;
- There is a sharp decline in species populations – documented, local ecological knowledge (LEK);
- There's inadequate species-specific catch data.

What we assume:

- We assume that our catch data represents the overall abundance and diversity;
- We assume we know all the shark and ray species present.

Knowledge gaps:

- We need to have accurate species-specific data;
- We need fisheries independent ecological data;
- We need to know the shark distribution, migration and breeding pattern;
- We need to know population connectivity;
- Regional status of species;
- Resources available to conduct ecological studies.

GOAL 17: Conduct regular studies on abundance, distribution, diversity and ecology.

ISSUE 4: COMMUNITY OUTREACH

Description: Lack of fluid knowledge and data exchange between communities, managers and researchers.

Impact: Lack of community buy-in and compliance within communities.

Causes: Lack of coordination between stakeholders.

What do we know or assume about it?

What we know:

- Uncoordinated dissemination of conservation information to the communities leading to repetition, fatigue, and unmet expectations by the community;
- There's local ecological knowledge (LEK) that is not utilized;
- Research efforts are uncoordinated;
- No centralised data repository;
- Indigenous knowledge is not being passed down;
- The communities are involved first hand in fisheries.

What we assume:

- There is specialisation in research institutions;
- That fisheries and managers understand published reports and papers;
- That conservation outputs are being utilised by relevant authorities.

Knowledge gaps:

- Socio economic impact of sharks and rays to communities;
- Awareness on the negative health impacts on consumption of sharks and rays;
- Need to disseminate information communities and managers including importance of sharks;
- Need to know the socio-cultural values of sharks and rays.

GOAL 18: Enhance the flow of information between communities, researchers and managers.

ISSUE 5: MANAGEMENT

Description: Lack of effective management measures.

Impact: Overfishing.

Causes:

- Limited resources, lack of prioritization, conflicting policies and legal mandates;
- Political issues.

What do we know or assume about it?

What we know:

- LMMAs and MPAs are too small, reserves aren't effective and are not enough;
- Political unwillingness to enforce and protect areas.

What we assume:

- MPAs and LLMAs will benefit shark populations;
- LMMAs are being effectively implemented and enforced.

Knowledge gaps:

- To increase awareness in communities on the benefit of protected areas;
- Build capacity within communities to establish and maintain LMMAs;
- Streamline and harmonise policies based on scientific findings;
- Define OECMs.

GOAL 19: Put in place effective adaptive management measures.

The 19 Goals listed above in these four sections were then revisited and ordered through an exercise in plenary. Participants were invited to prioritise all the goals based on a) which they thought would have the highest impact on shark conservation, and b) which would be most achievable, over the next 5-10 years. This exercise was used to inform the priority actions for achieving the goals. Participants voted as individuals, using sticky dots, six each, three to indicate expected impact, three to indicate achievability. The results of the session are shown in Appendix I.

GOALS AND ACTIONS IN DETAIL

1) FISHERIES OPERATIONS

GOAL 1: REDUCE BYCATCH OF SHARKS AND RAYS BY 2030 TO MAINTAIN THEIR HEALTHY POPULATIONS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
1.1.1	Enhance enforcement of regulations on industrial and semi-industrial fishing vessels through capacity building of relevant agencies including fisheries officers and on board observers.	Catch landings and trade data; frequency of MCS patrols.	Kenya fisheries – licensing and exports/ imports Kenya Revenue Authority and Kenya Wildlife Service – export/ import. Kenya Coast Guard Service – enforcement and patrol Societe Generale de Surveillance (SGS) – quality control of fish before exports NOAA FAO					X	
1.1.2	Enhance compliance in industrial and semi-industrial fishing vessels through: • adoption of electronic monitoring systems; • observers onboard fishing vessels; • provision of catch data reports to fisheries.	Vessel catch data and observer reports.	Industrial and semi-industrial fishing companies.		X				
1.1.3	Ensure all the catch data is easily accessible to the public.	A free accessible public portal with all the data.	Kenya Fisheries Service.		X				

GOAL 2: REDUCE THE IMPACT OF FISHING ON SHARKS AND RAYS BREEDING GROUNDS BY 2030 THROUGH RESTRICTION OR EXCHANGE OF GEARS INTO SUSTAINABLE ONES THROUGH: MESH SIZE LIMITS; SEASONAL CLOSURES; NO TAKE ZONES; GEAR RESTRICTED AREAS/ZONES.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
1.2.1	Implement management measures on breeding grounds (and areas important for juveniles) e.g. seasonal closures, gear restrictions, size limit regulations, no take zones and gear restricted areas.	Management plans and by laws recognizing the management measures. Patrol records.	BMU – Lead JCMA committees? KEFS, County – support and funding NGOs – funding KCGS - enforcement					X*	
1.2.2	Pilot sustainable modified gears to reduce capture of sharks and rays in artisanal fisheries.	Adoption rates of sustainable gears. Number of fishers participating in the interventions. Reports on effectiveness of modified gears on reducing capture of sharks and rays.	Fishers - lead BMU, Kenya fisheries and county. NGOs – CORDIO, WCS, TNC					X*	

*The timeframe of these goals is a key factor as fishermen need awareness, public participation, and an implementation plan, and researchers need time to map breeding grounds & fishing grounds, hence these actions are to be completed within 5 years.

GOAL 3: DEVELOP AND IMPLEMENT FEASIBLE ALTERNATIVE LIVELIHOOD ACTIVITIES TO REDUCE PRESSURE ON SHARKS AND RAYS, BY 2030. ACTIVITIES MUST BE: CULTURALLY ACCEPTABLE; HAVE ENVIRONMENTAL BENEFITS; ALIGN WITH AVAILABLE OPPORTUNITIES; INCENTIVISE CONSERVATION OF SHARKS AND RAYS.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
1.3.1	Identify alternative livelihoods for sharks and rays fishers that are environmentally friendly and meet the interests of the communities.	Needs assessment surveys. Number of identified alternative livelihoods.	Communities through BMUs – lead NGOs – survey and funding, GoK, County Governments	X					
1.3.2	Pilot alternative livelihoods with fishers.	Number of fishers piloting alternative livelihoods.	Fishers, BMU, NGOs, government					X	

GOAL 4: STRENGTHEN GOVERNANCE AND MANAGEMENT CAPACITY OF BMUS TO EFFECTIVELY CONSERVE SHARKS AND RAYS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
1.4.1	Review the BMU by-laws to include conservation of sharks and rays.	Reviewed by-laws BMU assembly minutes.	BMU assembly – lead Kenya Fisheries Service and county fisheries – support Research institutions NGOs - funding		X				
1.4.2	Create awareness to local administrations (Chiefs. Ward Administrators, Members of County Assemblies…) on BMU by-laws and other fisheries regulations to promote political goodwill.	Support from these leaders.	BMU executive committee Kenya Fisheries and county		X				

1.4.3	Conduct trainings on management activities and provide equipment to support implementation of management measures on sharks and rays: • Enforcement patrols, finance, leadership and governance; • equipment (boats, petrol, life-saving.	Trainings conducted. Equipment procured.	NGOs, Kenya Fisheries Service and County Fisheries departments					X	

GOAL 5: ENHANCE PARTICIPATORY RESEARCH, KNOWLEDGE SHARING AND FEEDBACK TO COMMUNITIES TO BUILD CAPACITY AND AWARENESS ON SHARKS AND RAYS.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
1.5.1	Actively engage fishing communities in shark and ray research activities.	Number of community members involved in research – reports, publications, participatory data collected.	Research organizations – KMFRI, CORDIO, WCS, COMRED	X Within one year but is continuous does not abide to a certain time frame	X	X	X	X	X
1.5.2	Provide timely feedback to communities on research findings.	Feedback reports. Number of community members attendance.		Within 6 months after research					
1.5.3	Adopt TOTs approach to conduct awareness and trainings on conservation of sharks and rays.	Training reports Number of TOTs trained.	NGOs – implementing capacity building initiatives	Within 1 year but continuous	X	X	X	X	X

2) HABITAT DESTRUCTION AND DEGRADATION

GOAL 6: INCREASE IN AREAS COVERED BY MPAS AND LMMAS TO INCLUDE IMPORTANT SHARK AND RAY AREAS (ISRAS) SO THAT CRITICAL HABITATS SUCH AS NURSERY, FEEDING, AND PUPPING GROUNDS ARE SAFEGUARDED.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
2.6.1	Dialogue with Kenya Wildlife Service, KeFS and County Fisheries departments on the LMMAs around MPAs , - *Government need to have discussion and be consulted first* - *Government MPAs and LMMA established by communities have different implementation* - *Extend Marine Parks into Reserve areas. KWS should allow LMMAs to be put into the reserve network, fish replacement zones e.g as the case for Kisite Marine Park and Reserve* - *The Intergovernmental Working Group should always involve counties in every activity, including research, to ensure proper involvement*.	Number of meetings held.	Lead – KWS, Community, KeFS, County NGOs-CORDIO,WCS,TNC(*back the Government agencies*) Collaborators- ZSL,COMRED, Blue ventures,	X					
2.6.2	Map critical areas: - *Map LMMA network. We need to know the boundaries of existing LLMAs before increasing the sizes or*	Areas identified. Maps.	Lead-CORDIO, Universities, WRTI, KMFRI, Communities, WCS	X Priority areas, continue to the rest of					

	combining them.For example, Vanga and Jimbo BMUs LMMA are close together so instead of increasing, they could be combined. - *Mapping will come out of the initial discussion.n* - *Mapping of critical habitats to be done in Watamu, Kipini, Ngomeni.* - *Mapping targets all priority of sharks generally for Goal 1 – is for all priority sharks & rays.* - *Mangrove are key habitats as well as other habitats for mapping.*			the coastline consecutively until Y3					
2.6.3	Planning and awareness raising with local communities, BMUs, ensure there is learning exchange between them. Community rays and shark ambassadors to be trained/recruited?	Committee established. Community rays and shark ambassadors Number of people attending.	Lead - BMU leaders and executives(*Once there is a plan in place with the government, community leaders and BMUs can take the lead*) Collaborators –NGOs, County Governments	X	X				
2.6.4	MSP committee dialogues held – new MPAs embed in MSP process (MSP process intervention should be leveraged to have the actions on making MPA integrated instead of it being independent interventions): - *Have a higher level dialogue, then followed by MSP (MSP process plan is already done and stakeholders already have been identified;*	Meeting held.	MSP committee, KMFRI, CORDIO,TNC,WCS	X					

	- *MSP process has been gazetted and gone through public participation;* - *Mapping to be led by scientists* - *TNC has good presence in Lamu with LMMA network.*								
2.6.5	Identification of new LMMAs/MPAs that include ISRAs for review and consultations *- ISRAs in Kenya identified – can download shapefile for use, publicly available – lead by KMFRI* *- Hasn't been done to species level specific, it has been mapped broadly* *- The breeding grounds information of Ungwana Bay and Sabaki River have been included in the JCMAs of their respective BMUs.* - *The decision to establish a shark committee should take a cross-cutting approach, addressing more than just habitat protection.*	Meetings Plans with maps Review and consultations . Knowledge before and after – (KPIs) can be done. (Review and consultations on LMMA implementation should involve all BMUs in the area). [2]	Lead- CORDIO,TNC,WCS, KEFS,KWS Collaborators- BMU executives, BMU network		Y1-Y2--some discussions, shark committees established and ambassadors identified	Y3 to Y4	Y4-finalizing		

[2] *Case examples of Consultations outcome 1.Ngomeni BMU-JCMA was formed top-down, with community consultation after decisions. This led to resistance from the BMU and failure to implement due to lack of ownership. 2.Shimoni-Vanga-Bottom-up approach: BMU consulted first, co-developed rules, engaged stakeholders and NGOs. Draft JCMA gained support. However, Govt didn't approve as LMMAs were initially excluded. After revision to include LMMAs, the process gained traction.*

GOAL 7: ENSURE MARINE SPATIAL PLANNING IS ALIGNED WITH CRITICAL SHARKS AND RAYS HABITAT TO PREVENT NEGATIVE IMPACT FROM COASTAL DEVELOPMENT E.G. ENSURE ALL CRITICAL HABITATS HAS BEEN NOMINATED AS ISRAs.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
2.7.1	Engagement with Marine spatial planning to discuss critical habitats areas.	Meetings held.	Lead-KEFS,KMFRI,KWS & MSP committees Collaborators- NGOs	X	X				
2.7.2	Awareness raising to NEMA, National Land Committee(NLC)(of negative impacts of coastal development to critical habitat for sharks and rays).	Meetings KPI on awareness raised between specific groups.	Lead – KEFS,KWS,KMFRI(Do water quality assessments),NEMA,NLC,SSC(KEFS,KWS & NEMA need to collaboratively work together) Collaborators-NGOs	X	X				
2.7.3	MSP has recognized the MPAs and LMMAs.	ISRAs identified MPA and LMMAS identified and submitted maps(*MSP timeline to completion is unknown*) *ISRAs need to be identified by Y4.*	Lead-SSC,MSP committee, CORDIO,KWS,KEFS Collaborators- KMFRI,NGOs				X	Y5- after dialogues and meetings	

GOAL 8: ENSURE STRONG COMPLIANCE WITH LAWS AND REGULATIONS RELATING TO FISHING GEAR USE AND ENFORCEMENT EFFECTIVENESS BY GOVERNMENT THROUGH MONITORING CONTROL SURVEILLANCE (MCS).

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
2.8.1	Awareness of the law (*to both community and government*)and how it impacts habitat - *IUU versus destructive gears (Legal vs habitat issue)- both are same* Awareness of destructive gears that are legal and destructive– gillnets,ISRAs - *IUU-Unreported–result of bad monitoring by government, illegal –use gear, unregulated –not enough regulations* - *IUU was meant for industrial fishing* -	Number of meetings. Number of attendees.	Lead- KEFS, NGOs. Collaborators-(Including those who learn) County, KWS, BMU, Judiciary, KCGS, politicians.	X	X				
2.8.2	Enforcement Improved through interagency coordination - *IUU in small-scale fisheries* • *Compliance and regulations* • *Interagency patrol maybe needed* • *Policy brief on Small Scale Fisheries (SSF) in Kenya & Tanzania fishers highlights factors inhibiting SSF– lack of awareness, social ties and corruption*	MCS report: • Numbers of arrests, • Numbers of patrols • Number of penalties or convictions	Government led- KEFS Lead- Joint enforcement, patrol, KEFS, KWS, KCGS	X	X	X	X	X	X

	• *Lack of cooperation-KWS, Kenya Coast Guard- better on resources, share boat and people* • *Social ties is common in Lamu as well*								
2.8.3	Compliance (laws, buying in after awareness) - *Gill nets with a 2-inch mesh size are illegal in the lake (inland waters).However, in the sea no mesh size restrictions for gill nets,* • *Enforcement – done by Government, compliance is working with fishers led by communities* - *Gear exchange works only when there is huge awareness raising* • *Donor preference to south coast of Kenya* • *Gillnet fishing dependent on seasons, type of fish harvested* - *Compliance* • *JCMAs – communities have identified places for specific gears use* • *The Kenya Coast Guard Service (KCGS) is the most neutral and objective entity, with no agenda on fisheries, making it ideal to take the lead.*	MCS report	Lead – Joint enforcement by KEFS,KCGS,KWS, Collaborators- County,NGOs	X	X	X	X	X	X

2.8.4	Bring advocacy and media to the team - *Need to raise awareness on corruption, laws and report unethical practices*[3] - *Focus on awareness raising and policy change* • *Make people understand rights and corruption* • *Meant to championed*	Number of campaigns Number of press release Number of planned meetings	Lead-CANCO. Collaborators- Media, Judiciary	X	X	X	X	X	X

GOAL 9: FUNCTIONING SEWAGE TREATMENT SYSTEMS ARE IN PLACE FOR ALL KENYAN COASTAL WATERWAYS AND ESTUARIES.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
2.9.1	Map out key pollution/sewage entry points into the waterways. - *Pollution from onshore sources moves inward, affecting adults of guitarfish, rays, reef sharks, and juveniles of large sharks.* - *Mapping is a continuous process – the more you map, the more you engage.*	Number of key entry points identified.	Lead-KMFRI, KEFS, County	X	X	X	X	X	

[3] *Refer to CORDIO Policy brief 2024/; Enforcement and compliance in SSFs*

2.9.2	Awareness raising for the water bodies, water and sewage management authorities and County officials. - *Due to ignorance, there is increased dumping of waste into water bodies.*	Number of attendees. Number of meetings.	Lead -KEFS,KWS,KCGS,KPA, Collaborators-NEMA, Public health, NGOs	X	X	X	X	X	
2.9.3	Develop target actions to address these entry points. - *Water resource management plans revised to check on Water, Sanitation, and Hygiene (WASH) issues i.e. sewerage*	Number of completed action plans. Number of strategic meetings. Number of implemented action plans.	Lead-KEFS, county Collaborators- Communities, NEMA		X	X	X	X	
2.9.4	Operationalize existing sewerage treatment points. - *NEMA could take the lead, as it has the mandate in its Environmental Management and Coordination Act (EMCA)*	Number of revived treatment plants.	Lead-County, NEMA Collaborators- Water management authority agencies				X	X	

GOVERNANCE, LEGISLATION AND REGULATION

GOAL 10: STRENGTHEN LAWS AND REGULATIONS THAT REVERSE THE DECLINE OF SHARKS AND RAY STOCKS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
3.10.1	Review existing laws and regulations to identify gaps, overlaps and opportunities to improve conservation of sharks and rays (bycatch) and to strengthen laws and regulations.	Gaps and overlaps opportunities report.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X				
3.10.2	Undertake power-mapping to understand political influence.	Power mapping report.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X					
3.10.3	Review BMU bylaws and JCMA plans to include shark and ray conservation.	Reviewed BMU bylaws.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee		X	X			

GOAL 11: ENSURE EFFECTIVE ENFORCEMENT AND COMPLIANCE MECHANISMS THAT PROMOTE SUSTAINABLE FISHING AND ENHANCE LIVELIHOODS.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
3.11.1	Sensitization and awareness creation.	No. of communities /BMU members reached.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X	X	X	X	

		Sensitization and awareness reports.							
3.11.2	Conduct joint interagency patrols (Regional, national, county, and BMUs level).	No. of joint interagency patrols conducted. Patrol reports. No. of agencies participating in the patrol .	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), Shark Conservation Committee			X	X	X	
3.11.3	Community engagement and co-management.	Engagement reports. No. of joint activities done.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X	X	X	X	X
3.11.4	Encourage voluntary compliance through capacity building and incentivization.	Capacity building reports. No of fishers voluntarily adopting sustainable fishing practices.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X	X			
3.11.5	Training (joint) frontline officers to improve enforcement capacity.	Training reports. No of officers trained.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), Shark Conservation Committee	X	X				
3.11.6	Invest in technology for enhanced compliance.	No. and types of technology adopted Training reports.	WRTI, KMFRI, KeFS, KWS, KCGS, KFS, ,, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee			X	X		
3.11.7	Conduct preparatory meetings prior to international (e.g, CMS) and regional meetings (e.g., IOTC) to develop robust sharks and rays conservation proposals.	No. of proposals developed. Meeting minute and report.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee.	X	X	X	X	X	X
3.11.8	Conduct cross-border patrols & meetings to address transboundary issues affecting sharks and rays.	No of cross-border meetings conducted. No of cross border patrol conducted. Patrol reports. Meeting reports.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), Shark Conservation Committee	X		X		X	
3.11.9	Develop robust Non-detriment findings (NDFs) on sharks and rays.	Developed NDFs .	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks),		X				

			NGOs, Universities, Other stakeholders, Shark Conservation Committee						

GOAL 12: ENHANCE INTERAGENCY COOPERATION TO REDUCE JURISDICTIONAL CONFLICTS AND IMPROVE SYNERGIES AND COLLABORATIONS WITHIN INSTITUTIONS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
3.12.1	Establish an interagency Technical working group (TWG).	Established TWG..	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X				
3.12.2	TWG establish their Terms of References.	TORs developed	TWG, Shark Conservation Committee	X	X				
3.12.3	Define and clarify roles and responsibilities for the agencies.	A report with clear roles and responsibilities.	TWG, Shark Conservation Committee		X				
3.12.4	Establish clear communication channels and conflict mechanisms.	Developed protocols on communication and conflict mechanisms. Conflict resolution reports. Minutes reports.	TWG, Shark Conservation Committee		X	X	X		
3.12.5	Conduct a capacity needs assessment and have joint trainings and capacity building	Capacity needs assessment report. Meetings reports No. of people reached in training.	TWG, Shark Conservation Committee		X	X			
3.12.6	Establish a unified permitting system	Developed online system .	TWG, Shark Conservation Committee				X	X	

GOAL 13: ENHANCE COMMUNITY AND OTHER STAKEHOLDERS' CONSULTATION IN SHARK AND RAY CONSERVATION AND DECISION MAKING TO ENSURE INCLUSIVITY AND TRANSPARENCY.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
3.13.1	Identify the relevant stakeholders (stakeholder mapping) and adopt an appropriate consultation method.	Stakeholder mapping list. Adopted consultation methods. Reports for the minutes and meetings.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X					
3.13.2	Establish a clear decision-making approach that promotes inclusivity and participation and document process for transparency.	A documented decision-making approach.	KeFS, KWS, KFS, KCGS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee.	X					
3.13.3	Conduct biennial Shark and Ray workshops.	Workshop reports.	KeFS, KWS, KFS, KCGS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee.			X		X	X
3.13.4	Implement resource sharing strategies between communities, government and other stakeholders to promote effective public participation.	Stakeholder engagement reports.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee		X	X	X	X	X

GOAL 14: STRENGTHEN BMU STRUCTURES TO IMPROVE FISHERIES GOVERNANCE

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
3.14.1	Conduct regular sensitization and awareness to BMUs, communities and local leaders.	Sensitization and awareness reports. Number of sensitization and awareness meetings.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X	X	X	X	X	X
3.14.2	Conduct a training and needs assessment.	Needs assessment report.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee	X					
3.14.3	Conduct training and capacity building.	Training reports No. of trainings conducted.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee		X	X	X	X	X
3.14.4	Conduct training on MCS, data collection, species identification etc.	Training reports No. of trainings conducted.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee		X	X	X	X	X
3.14.5	Establish monitoring and evaluation systems.	Developed M &E systems. M & E reports Feedback meetings reports.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Universities, Other stakeholders, Shark Conservation Committee			X	X	X	
3.14.6	Advocate livelihood diversification.	Advocacy reports No. of sensitization meetings conducted.	KeFS, KWS, KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, Other stakeholders, Shark Conservation Committee			X	X	X	
3.14.7	Address external influences and conflicts.	Meeting reports Proposal for funding.	KeFS, KWS,KCGS, KFS, WRTI, KMFRI, County Governments, BMU (Networks), NGOs, NGAOs Other stakeholders, Shark Conservation Committee			X	X		

SCIENCE AND KNOWLEDGE

GOAL 15: IDENTIFY AND MAP CRITICAL HABITATS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
4.15.1	Integrate LEK and ecological studies to locate critical habitats.	Critical habitat map with species indicated along the whole coastline (including life stages).	WRTI – Lead, NGOs, KMFRI, Community members			X			
4.15.2	Expand the current and initiate new research.	Study on pelagic habitats, continued acoustic tagging.	WRTI - Lead, NGOs, Universities	X					
4.15.3	Mapping/zoning of critical habitats.	Critical habitats map with species indicated along the whole coastline.	WRTI - Lead, Universities, NGOs			X			
4.15.4	Profile species distributions along the Kenyan coast.	Critical habitats map with species indicated along the whole coastline.	KMFRI – Lead, WRTI, NGOs, Universities			X			
4.15.5	Determine the level of degradation in critical habitats.		KMFRI -Lead, WRTI, Universities	Ongoing					

GOAL 16: UNDERSTAND FISHING PRESSURE AND ITS EFFECT ON SHARKS

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
4.16.1	Increasing capacity among catch data collectors to share species level.	Catch landings recorded to species level by BMUs and fisheries officers.	KEMFRI – Lead, NGOs, KeFS, WRTI Community/BMU members		X				
4.16.2	Enforce strategies to track IUU fishing through capacity building and fundraising.	Presence of surveillance systems on commercial fishing vessels. Increased satellite monitoring on offshore fisheries. Increased awareness and engagement levels amongst stakeholders. Consistent training programs for communities and stakeholders.	KeFS – Lead, Coast Guard, Kenya Navy			X			
4.16.3	Genetic testing of meat and fins for species ID.	10% of shark fins in containers be forensically tested.	KWS- Lead, WRTI, KMFRI					X	
4.16.4	Characterize socio economic activities along the Kenyan coast.	Document on socio economic activities produced.	KMFRI leads in collaboration with NGOs		X				

GOAL 17: CONDUCT REGULAR STUDIES ON ABUNDANCE, DISTRIBUTION, DIVERSITY AND ECOLOGY.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
4.17.1	Conduct eDNA studies within Kenya.	Genetic database and published data.	KMFRI – Lead, WRTI, Universities			X			

		Population size studies.							
4.17.2	Enhance long term monitoring- BRUVs, manta tows, aerial/drone surveys, Citizen science(platform), tagging and tracking, by catch analysis, population stock analysis.	Set up a reporting platform. Monitoring protocol Publications on shark ecology.	WRTI- Lead aerial surveys in collaboration with NGOs WRTI Lead in securing long term funding in collaboration with NGOs, KMFRI and universities	Ongoing					
4.17.3	Establish partnerships i.e., academic collaborations and secure long-term funding.	MOUs?	WRTI lead, NGOs, Universities						

GOAL 18: ENHANCE THE FLOW OF INFORMATION BETWEEN COMMUNITIES, RESEARCHERS AND MANAGERS.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
4.18.1	Form a specialised group for sharks.	Online member group of specialists.	WRTI lead in collaboration with NGOs	X					
4.18.2	Strengthen clear communication channels between community, managers and researchers- data interpretation, dissemination, LEK studies carried out and used.	Having facilitators in community. Posters and brochures. Training workshops on interpretation in the community.	KMFRI Lead in collaboration with county government, ministry of interior, KeFS and universities		X				
4.18.3	Establish a centralized database.	Records submitted to the database.	WRTI, KMFRI	Ongoing					
4.18.4	Collate existing data.	Data sharing protocol.	WRTI, NGOs	Ongoing					
4.18.5	Coastal and countrywide awareness campaign on status, importance and negative health impacts of sharks and rays.	Awareness is run and a study done on the impact.	NGOs	X					

GOAL 19: PUT IN PLACE EFFECTIVE ADAPTIVE MANAGEMENT MEASURES.

Action	Details	Success Indicators	Lead (Collaborators)	Year 1	Year 2	Year 3	Year 4	Year 5	> Year 5
4.19.1	Collate and utilize data.	Database, reports and publications.	KWS,WRTI	Ongoing					
4.19.2	Automation of data collection at landing sites to be fast and transparent.	Landing site equipped with tools to identify species and upload information.	KeFS	Ongoing					
4.19.3	Establish monitoring system for fishing, trading and research permits.	Records of trade and research activities and fishing.	KeFS, KWS, WRTI	Ongoing					
4.19.4	Initiate controlled fisheries strategies i.e. closed season, area closures, quotas, specified gears – Adaptive monitoring over 2 years.	Strategies implemented and enforced.	KeFS, KWS	Ongoing	X				

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APPENDIX I. PRIORITISED GOALS

On day 2 of the workshop participants were invited to prioritise all the goals based on a) which they thought would have the highest impact on shark conservation, and b) which would be most achievable, over the next 5-10 years. This exercise was used to inform the priority actions for achieving the goals. Participants voted as individuals, using sticky dots, six each, three dots to indicate expected impact, three dots to indicate achievability. The results of the session are shown below. Shaded couplets indicate similar goals developed independently by different working groups, that were merged for the purpose of voting:

		SCORE		RANK	
	GOAL	**Achievable**	**Impactful**	**Achievable**	**Impactful**
14	Strengthened BMU structure for improved fisheries governance	21	10	1	4
4	Strengthen governance and management capacity of BMUs to effectively conserve sharks and rays				
3	Develop and implement feasible alternative livelihood activities to reduce pressure on sharks and rays, by 2030. Activities must be: culturally acceptable; have environmental benefits; align with available opportunities; incentivise conservation of sharks and rays.	15	2	2	7
13	Enhance community and other stakeholders' consultation in shark and ray conservation and decision making to ensure inclusivity and transparency.	14	4	3	6
	Stronger inclusivity of communities in the governance of critical habitat for sharks and rays for better stewardship.				
12	Enhanced inter-agency cooperation to reduce jurisdictional conflicts and improve resource management.	14	1	3	8
9	Functioning sewage treatment systems in place for coastal waterways and estuaries	0	1	11	8
8	Ensure strong compliance with laws and regulations relating to fishing gear use and enforcement effectiveness by government through Monitoring Control Surveillance (MCS).	13	10	4	4
11	Ensure effective enforcement and compliance mechanisms that promote sustainable fishing and enhanced livelihoods.				
7	Ensure marine spatial planning is aligned with critical sharks and rays habitat to prevent negative impact from coastal development e.g. ensure all critical habitats has been nominated as ISRAs.	6	4	7	6
6	Increase in areas covered by MPAs and LMMAs to include Important shark and ray areas (ISRAs) so that critical habitats such as nursery, feeding, and pupping grounds are safeguarded.	13	4	4	6

		SCORE		RANK	
	GOAL	**Achievable**	**Impactful**	**Achievable**	**Impactful**
16	Understand fishing pressure and its effects on sharks.	0	0	10	9
17	Conduct regular studies on abundance, distribution, diversity and ecology.	9	13	5	3
5	Enhance participatory research, knowledge sharing and feedback to communities, to build capacity and awareness about sharks and rays.	7	0	6	
18	Enhance the flow of information between communities, researchers and managers.				
19	Put in place effective adaptive management measures put in place.	4	1	8	8
10	Strengthened laws and regulation that reverse the decline of shark and ray populations.	1	19	10	2
2	Reduce the impact of fishing on shark and ray breeding grounds by 2030, through: mesh size limit; area closures (seasonal); no-take zones; minimum catch-size limits (difficult); fishing gears restriction zones.	2	25	9	1
1	Reduce bycatch of sharks and rays by 2030 in order to maintain healthy populations.	0	6	11	5

GOAL 15: Identify and map all critical habitats in Kenyan waters[4]

[4] Goal 15 is not included in the priority tables (Appendix 1 and Table 1) as this Goal was added after the entire group of participants had presented, synthesized and prioritised all goals. It was recognized that mapping critical habitat was an important first step, and that this should fall into the 'Science and Knowledge' Group (see pages 39 and 60).

APPENDIX II. WORKSHOP PARTICIPANTS

Participants Name	**Organisation**
Dr. Mohamed Omar	Wildlife Research and Training Institute (WRTI)
Lyn Njeri Njuguna	Wildlife Research and Training Institute (WRTI)
Kelvin Wachira	KeFS - Mombasa
Ritah Abong'o	KeFS- Tana River
Maryan Mbui (Lamu East)	KeFS- Lamu
Job Siso	County Director of Fisheries- Tana River
John M Gachuru	County Director of Fisheries - Kilifi
Nana Omar	KCGS
Samuel Muriithi	Kenya Wildlife Service (KWS)
Tsiganyiu Dadley	Kenya Wildlife Service (KWS)
Dr.Thomas Mkare	KMFRI
Said Mote	Ngomeni BMU - Fisherman
Omar Ahmad Abdalla	Kipini BMU - Tana River - Fisherman
Said Abubakar Adnan	Kiwayu BMU - Fisherman
Yahya Idarus	Shela BMU- Lamu
Halifa Omar Parago	Shimoni BMU (Chair)
Mwakiraa Mohamed	Vanga BMU - Fisherman
Collins Katana	Kanamai BMU -Fisherman
Somo Ebwana Somo	IOWB- BMU Network
Pauline Safari	Technical University Mombasa (TUM)
Sweed Mangini	Technical University Mombasa (TUM)
George Waweru	The Nature Conservancy (TNC)
Remy Oddenyo	Wildlife Conservancy Society (WCS)
Gurveena Ghataure	Zoological Society of London Zoological Society (ZSL)
Philip Otieno	A Rocha Kenya
Thalia Roveira	Watamu Marine Association (WMA)
Kahindi Changawa	Bahari Hai Conservation
Abigael Kidd	Shark Trust
Wendy Itenya	GROOTS Kenya
Sarah Tyrell	3 Degrees Kilifi
Gorret Mwangi	Kenya Tropical Sealife
Maryline Achieng	East Africa Deep Sea Fishing (EADF)
Lucy Kemp	IUCN SSC CPSG-SEA
Caroline Lees	IUCN SSC CPSG
Melita Samoilys	CORDIO
Benedict Kiilu	CORDIO
Clare Thouless	CORDIO
Joshua Rambahiniarison	CORDIO

Evelyne Ndiritu	CORDIO
Diana Karan	CORDIO
Jason Mwamidi	CORDIO
Kennedy Oalo	CORDIO
Timothy Allela	CORDIO
Linet Nasambu, scribe	CORDIO
David Mwandikwa, scribe	CORDIO

APPENDIX III. WORKSHOP PROGRAM

Multi-Stakeholder Workshop to develop a Conservation Strategy for Key Threatened Sharks and Rays in Kenya

1 - 3 April 2025

Tuesday 1st April 2025

8:00 – 9:00	Registration	
9:00 – 9:30	Welcome and opening	Dr Melita Samoilys (CORDIO Director) Ms Elizabeth Mueni (KeFS) Dr Mohamed Omar (WRTI)
9:30 – 9:45	Video: Setting the scene of sharks in Kenya	Timothy Allela (CORDIO)
9:45 – 10:45	Overview of: the process; workshop objectives; agenda; and participant introductions	CPSG
10:45 – 11:15	Overview of status of Sharks in Kenya	Clare Thouless
11:15 – 11:30	Population Viability Analysis	CPSG
11:30 – 12:00	**TEA BREAK**	
12:00 – 13:30	Defining success: Drafting a 25 Year Vision for Sharks in Kenya	CPSG
13:30 – 14:30	**LUNCH**	
14:30 – 16:00	Understanding the system (Part 1): Developing our understanding of the threats / issues for sharks in Kenya, their drivers and impacts	CPSG
16:00 – 16:30	**TEA BREAK**	
16:30 – 17:00	Identify and forming Thematic Working Groups	CPSG with participants
17:00 – 18:00	Understanding the system (Part 2): Working in groups to develop Issue Statements	Working Groups
18:00 - 18:30	Close with +/Δ Plan for day 2	CPSG
	Evening Work: - Volunteers to work on Vision - Organising Team to debrief and plan for Day 2 - Scribes meet CL with notes	

Wednesday 2nd April 2025

7:30 – 8:00	Registration	
8:00 – 8:15	Recap of Day 1	CPSG
8:15 – 10:00	Issue Statements	Working Groups
10:00 – 10:30	**TEA BREAK**	
10:30 – 11:30	Information assembly - what are the facts, assumptions and data gaps relevant to each issue?	
11:30 – 13:00	Feedback on Vision and Issues - group to critically test assumptions	Plenary
13:00 – 14:00	**LUNCH**	
14:00 – 16:00	Introduce Goals task in plenary - participants identify goals for each priority issue	Working Groups
16:00 – 16:30	**TEA BREAK**	
16:30 – 18:00	Plenary: feedback on Goals and prioritization	
18:00 – 18:20	Close and +/Δ Introduce tasks for next day	
Evening work	- Finalise Vision – Volunteer Group - Ensure all Group Work is typed up - Organising Team planning for Day 3	

Thursday 3rd April 2025

8:00 – 8:15	Finalise Vision	Vision Group
8:15 – 11:00	Introduce Actions - development of actions	Plenary and Working Groups
11:00 – 11:30	**TEA BREAK**	
11:30 – 12:30	Rapid feedback on actions: scribes take notes	Plenary
12.30 – 13:30	Finalise Actions	Working Groups
13:30 – 14:30	**LUNCH**	
14:30 – 15:30	Finalise working group reports & presentations	Working Groups
15:30 – 17.00	FINAL PRESENTATIONS	
17:00 – 17:30	Next steps, wrap up and Close	Closing remarks

On the final afternoon there will be a 10 minute break at 15.30 followed by a working tea break from 15:40-16.00.

APPENDIX IV BRIEFING DOCUMENT

The briefing document was supplied to all participants prior to and during the workshop.

CORDIO

BRIEFING DOCUMENT

MULTI-STAKEHOLDERS' WORKSHOP TO DEVELOP A SHARK CONSERVATION STRATEGY FOR KENYA

APRIL 2025

By: Evelyne Ndiritu, Benedict Kiilu, Joshua Rambahiniarison, Clare Thouless, Melita Samoilys

Importance Of Sharks And Rays

Ecosystem function

Sharks and rays (also called elasmobranchs) are cartilaginous fish that play a key role in maintaining ecosystem health, diversity and stability. Many sharks are apex predators and consequently have a key function in maintaining a balance in the food web.

Fisheries and food

Sharks and rays have formed part of Kenya's fish landings for at least 40 years with records dating back to the 1980s, while oral records suggest sharks have provided important food and oil for hundreds of years.

- Sharks and rays are a valuable resource as food and income for coastal communities. They are intentionally targeted for their meat and fins and incidentally caught during fishing operations targeting other species [1, 2] . Shark meat is consumed in all Ken-yan coastal communities.
- The total economic value of Kenya's shark fisheries is estimated at US$1.34 million annually [3].

Social, cultural and economic value

- Within some parts of Kenya, sharks play a cultural role, such as the sawfish being an omen of good fortune and eating juvenile sharks is a cultural practice. Parts of sharks may also be used in tradition-al medicine.
- Sharks play a role in ecotourism and recreation. Divers and mega-fauna lovers seek locations where they can easily interact with sharks, such as whale sharks, reef sharks, and hammerhead sharks, as well as large rays like mobula rays and manta rays.

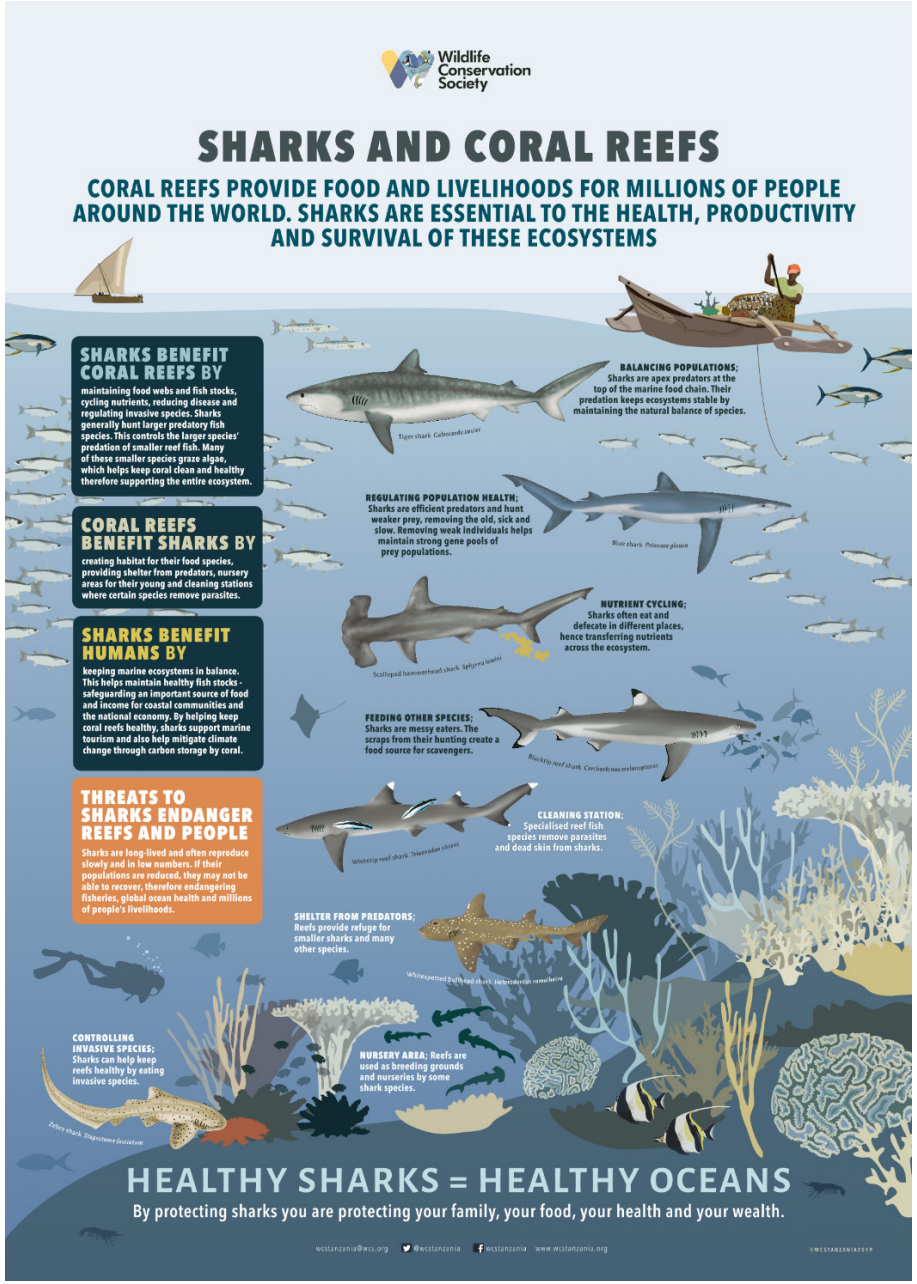

Figure 1: Illustration showing the ecosystem benefits of sharks to coral reefs (Source: WCS).

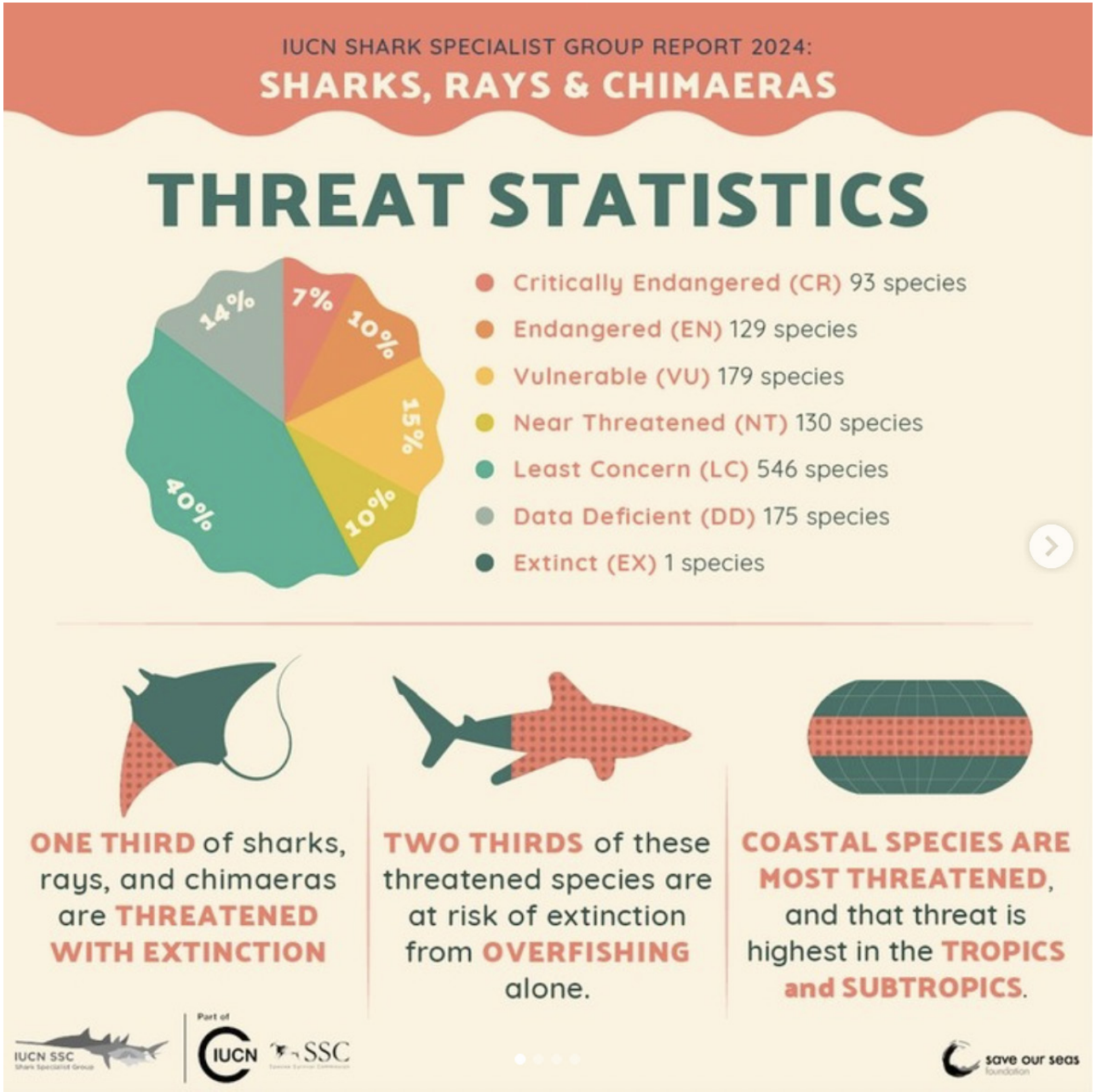

Figure 2: Illustration showing the status of sharks and rays listed in the IUCN Red List of Threatened Species.

97%

of sharks and

46%

of rays and guitar fish are landed as juveniles in the artisanal fishery.

Current status of sharks and rays in Kenya

- Sharks and rays catches in Kenya have declined over the years (Figure 3).
- The artisanal fisheries in Kenya capture a large proportion of juvenile sharks and rays. For example, it is reported 97%of sharks and 46% of rays and guitarfish are landed as juveniles in the artisanal fishery. The same study also reports that the most captured species are the Critically Endangered scalloped hammerhead and Giant Guitarfish, and the Vulnerable silky shark and Whitespotted Eagle Ray [Figure 4].

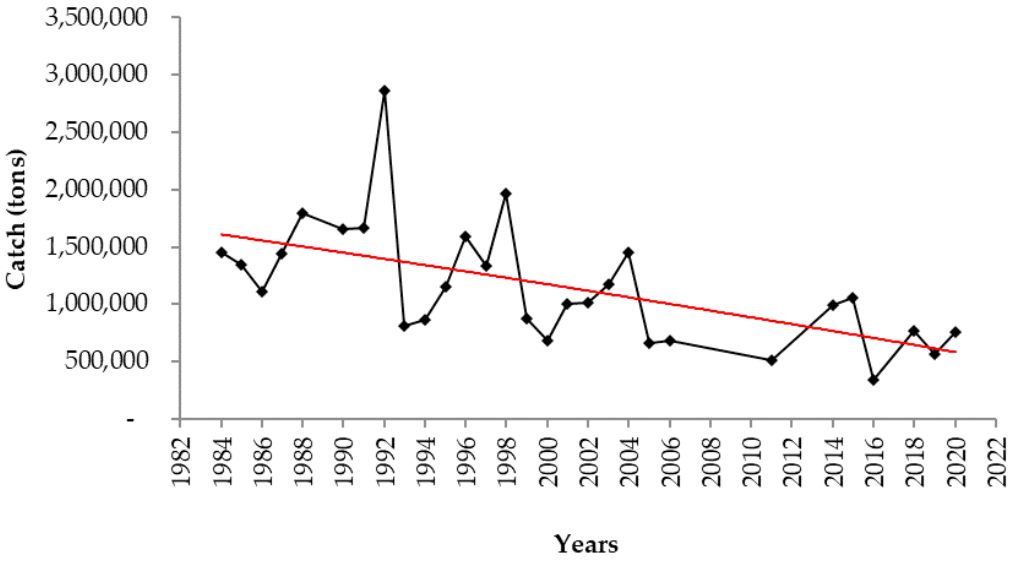

Figure 3: Historical nominal catches of sharks and rays from the artisanal fishery in coastal Kenya from 1984 to 2021 (data source: KeFS data and Annual Statistical Bulletins).

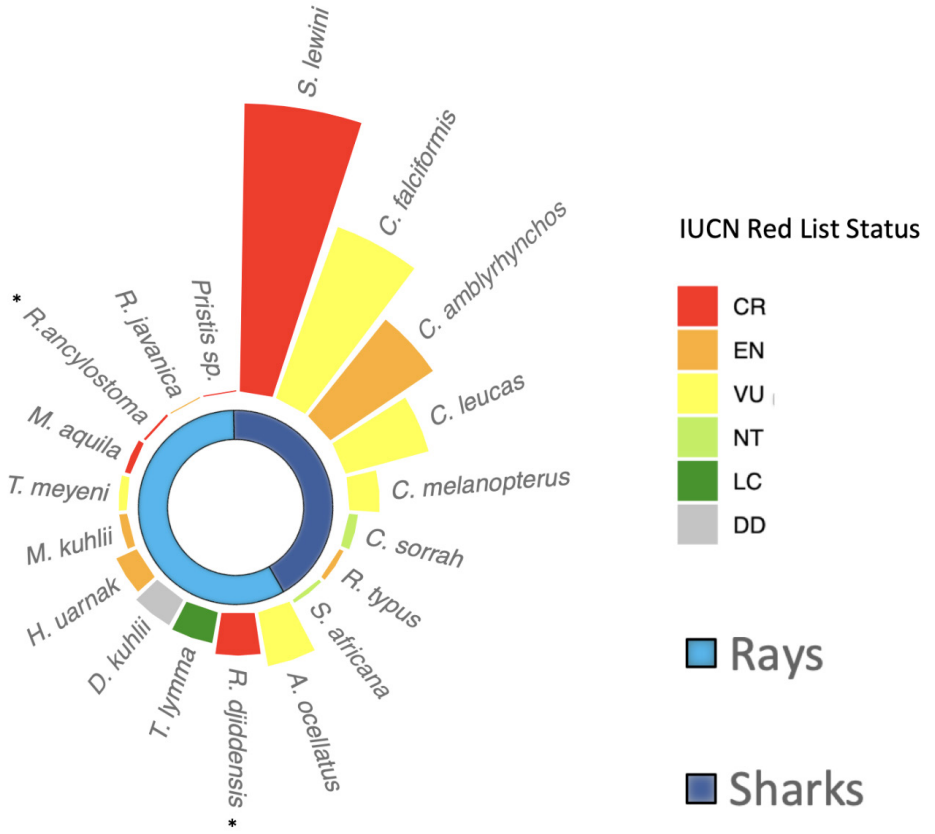

*Figure 4: Circular plot showing the relative abundance (length of bars) and IUCN Red List status of the 19 elasmobranch species captured in Kenya's artisanal fishery. * = Rhinobatidae (guitarfish).*

Why conserve sharks and rays?

- Sharks and rays possess unique life history characteristics, specifically their reproductive and growth strategies. They grow slowly, take years to reach sexual maturity and be able to reproduce, they have a low fecundity, meaning that they have only a few babies compared to other fish. Many reef sharks are also ovoviviparous, meaning they give birth to live young. Therefore, even though many species have long lifespans, their rates of population increase are slow, meaning that when their numbers drop due to overfishing, it takes a long time for these populations to recover. For example, the oceanic manta ray *Mobula birostris*, can live for 40-50 years. A female will only start reproducing after 12 years, producing a single pup every 2-4 years after about a year of gestation (pregnancy). This female will only have a maximum of 15 pups in its lifetime. It would take around 80 years for its population to double in natural condition.

- Many reef shark populations, particularly in East Africa, are now so depleted that they are considered 'functionally extinct', meaning they can no longer play their role in the ecosystem [4] (MacNeil et al., 2020). They will be unable to withstand any further fishing pressure, and may disappear completely, referred to as a local extinction.

- By 2021, almost all known shark and ray species (around 1,250) have been assessed by experts.One-third are estimated to be threatened and nearly one in five is already at risk of extinction, meaning that the majority of these species are in need of conservation action (Figure 3). These categories, following criteria of the IUCN Red List of Threatened Species, are based on the estimated decline of the respective species populations and their risk to go extinct in the wild if no conservation action is taken.

Challenges to the conservation of sharks and rays in Kenya

- Targeted fishing for their meat and fins.
- Unintentional capture during fishing using non-selective artisanal fishing gears (e.g. gillnets and in the prawn trawl fishery).
- Inadequate regulations for protecting sharks and rays.
- A lack of non detriment findings (NDFs) for threatened sharks and poor enforcement of CITES guidelines
- Frequent under-reporting of fishery catches of sharks and rays. This is due to lack of species-specific information, which complicates accurate assessments of species stock status and hinders the implementation of effective conservation measures.
- Limited biological knowledge of critical sharks and rays such as location of nursery grounds and breeding times and locations.
- Growing global demand for shark and ray meat and fins, as well as other products such as mobulid gill plates and shark liver oil.
- Limited knowledge on the trade routes for shark and ray products.
- People often perceive sharks as dangerous predators, leading to widespread fear, particularly among coastal communities. This hinders collaborative conservation efforts.

National legislative and policy instruments relevant for the management and conservation of sharks

The following key pieces of legislation in Kenya affect the management and conservation of sharks and rays (Ministry in Parentheses):

1. **The Constitution of Kenya 2010:** Part 2 - Land and Environment, Article 69 (Ministry of Interior and National Administration).
2. **The Kenya Fisheries Policy, 2023:** The overall goal of the Kenya Fisheries Policy (2023) is to guide the sector to achieve sustainable management and development of fisheries and aquaculture (Ministry of Mining,Blue Economy and Maritime affairs).
3. **The Fisheries Management and Development Act (FMDA) Cap. 378 (2016):** Establishes KeFS with the responsibility for "the conservation, management and development of Kenya's fisheries resources in accordance with the Act" (Ministry of Mining, Blue Economy and Maritime affairs).
4. **Wildlife Conservation and Management Act Cap. 376 (2013):** Provides for CITES listed and protected species and is implemented by the Kenya Wildlife Service (KWS) in collaboration with relevant agencies (Ministry of Wildlife & Tourism).
5. **The Environmental Management and Coordination Act (EMCA) Cap. 387 (1999 Rev. 2012):** Section 55 of EMCA provides for an inventory of areas within the coastal zone of special value (Ministry of Environment & Forestry).

There are several International and regional frameworks and commitments that influence the management and conservation of sharks and rays in Kenya, including: the 1982 United Nations Convention on the Law of the Sea; The 1975 Convention on International Trade in Endangered Species of Wild Fauna and Flora; The 1979 Convention on Migratory Species (CMS); The 1992 Convention on Biological Diversity; The 1995 FAO Code of Conduct for Responsible Fisheries (an FAO voluntary Code), The 2015 UN Sustainable Development Goals, The Nairobi Convention.

In Kenya several institutions can play a role or mandate in the management, research and conservation of sharks and rays:

Kenya Fisheries Service (KeFS); Kenya Marine and Fisheries Research Institute (KMFRI); Kenya Wildlife Service (KWS); Wildlife

Research and Training Institute (WRTI); Kenya Coast Guard Service; National Environmental Management Authority (NEMA);

Universities; County Governments; Beach Management Units (BMUs); Community Based Organizations (CBOs); Non-Governmental Organizations (NGOs); Industrial Fishing Industry; Hotels and Dive clubs.

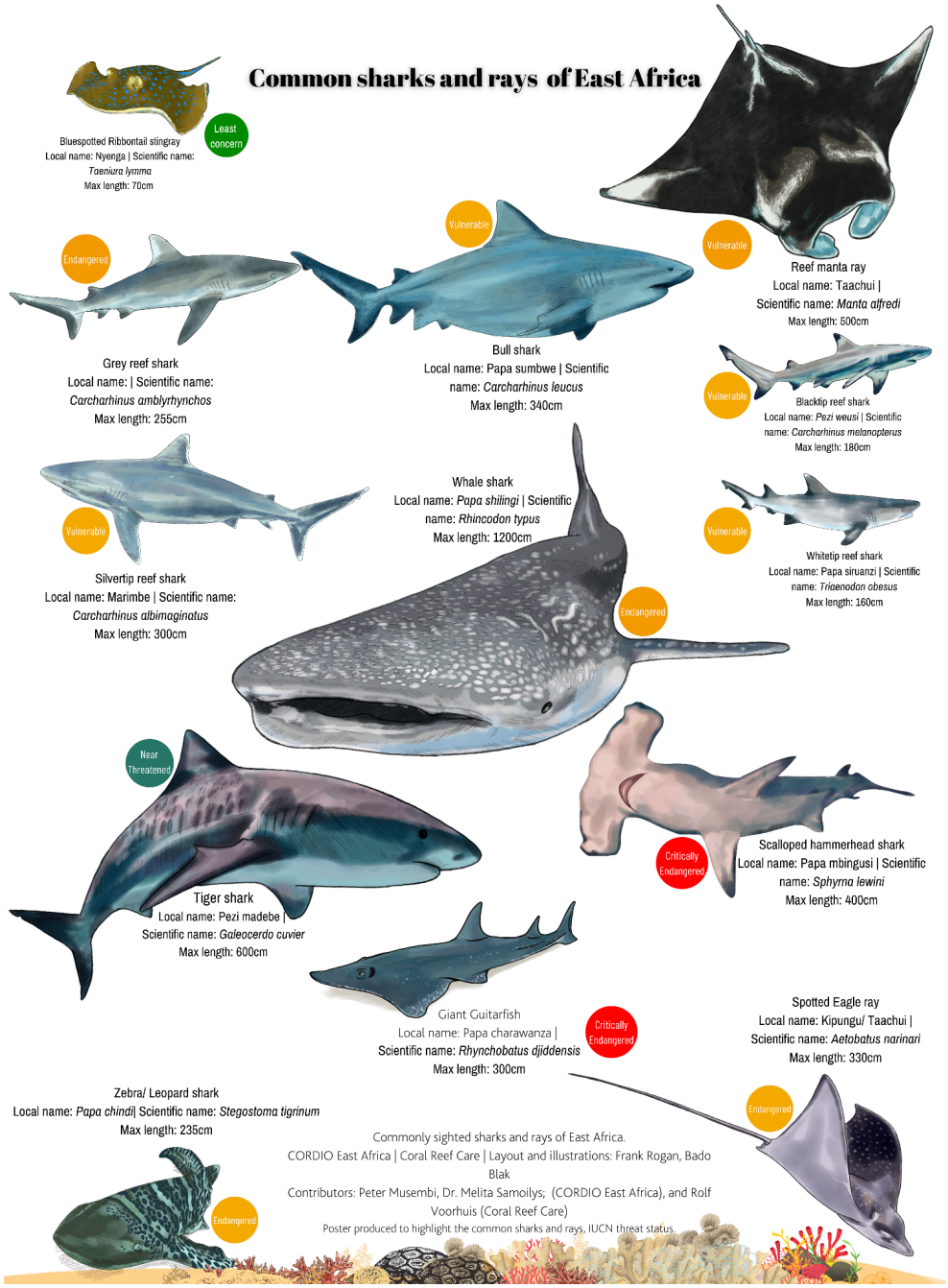

Figure 5: IUCN status of common shark and rays species in Kenya (Source: CORDIO).

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