
GUIDELINES FOR THE PREPARATION OF NATIONAL REPORTS TO THE IOTC SCIENTIFIC COMMITTEE IN 2022

The National Report is due to be submitted no later than 15 days prior to the start of the annual regular session of the Scientific Committee.

DEADLINE: 20 NOVEMBER 2022

Purpose: To provide relevant information to the Scientific Committee on fishing activities of Contracting Parties and Cooperating Non-Contracting Parties operating in the IOTC area of competence. The report should include all fishing activities for species under the IOTC mandate as well as sharks and other byproduct/ bycatch species as required by the IOTC Agreement and decisions by the Commission.

NOTE: The submission of a National Report is **Mandatory**, irrespective if a CPC intends on attending the annual meeting of the Scientific Committee.

Explanatory note

This report is intended to provide a summary of the main features of the tuna and billfish fisheries for Contracting Parties and Cooperating Non-Contracting Parties. As such, it does not replace the need for submission of data according to Resolution 15/02 *Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)*

Mandatory versus Desirable information

National Reports must include all headings as noted in the template below as [Mandatory]. Where data/information is not available for a given [Mandatory] heading, the reason why it is not available should be clearly stated. These mandatory fields for the *National Reports* were agreed to by the Scientific Committee in 2010.

Where available, CPCs are encouraged to provide additional information under the headings shown as [Desirable].

For clarification on minimum reporting requirements for the National Report, please contact the IOTC Secretariat (IOTC-Secretariat@fao.org).

NOTE

Please use the template below when preparing your National Report. Simply delete this explanatory page and add your own cover page/preliminaries if needed.

Please also delete any text shown in **red** below before submitting your National Report.

Kenya National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2022

Authors (Stephen Ndegwa¹, Elizabeth Mueni¹, Benedict Kiilu¹, Collins Ndoro¹, Kennedy Shikami¹, Edward Kimani², Gladys Okemwa², Nina Wambiji², Esther Fondo²)

Author/s affiliation [[Kenya Fisheries Service ¹, Kenya Marine and Fisheries Research Institute ²]

INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

<p>In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, for all fleets other than longline [e.g. for a National Report submitted to the IOTC Secretariat in 2022, final data for the 2021 calendar year must be provided to the Secretariat by 30 June 2022)</p>	<p>YES 30/06/2022</p>
<p>In accordance with IOTC Resolution 15/02, provisional longline data for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2022, preliminary data for the 2021 calendar year was provided to the IOTC Secretariat by 30 June 2022].</p> <p>REMINDER: Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2022, final data for the 2021 calendar year must be provided to the Secretariat by 30 December 2022].</p>	<p>YES 30/06/2022</p>
<p>If no, please indicate the reason(s) and intended actions:</p>	



Executive Summary

The Kenya national scientific report has described the topics provided in the 2022 national report guideline with information provided from 2017 to 2021 and in some cases making reference to the available information. The longline data is provisional until verified from the longline data.

In 2021, the industrial fleet consisted of 4 industrial longline vessels and 6 purse seine vessels. The purse seine vessels did not report any catch. In 2021 four (4) Kenya pelagic longline vessels operated in the IOTC area of competence. The IOTC species landed during the year included swordfish (298 tons), yellowfin tuna (12 tons) Bigeye tuna (17 tons), sharks (97 tons) in the industrial longline .

The artisanal vessels were 455 that caught tuna and tuna like species with a total catch amounted to 1613 tonnes , a decrease from the 2020 records. The main gears used are artisanal long line hooks, gillnets, monofilament nets and artisanal trolling lines.

Monitoring of the artisanal and semi-industrial vessels was also done while the industrial vessels were monitored through logbooks. The Observer Programme resumed in mid 2021 and the coverage was low to abide to the COVID 19 measures and ministry of health protocol for boarding vessels.

1. BACKGROUND/GENERAL FISHERY INFORMATION

Kenya's straight coastline measures 640 km long and 880 Km including bays and inlets. Situated in the Western Indian Ocean, it borders Somalia to the north and Tanzania to the south. The Exclusive Economic Zone (EEZ) extends 200 nautical miles from the Kenya coastal baselines measuring 142,400 Km. The most distinctive feature is its almost continuous fringing coral reef that runs parallel to the coast. The continental shelf is narrow (3-5 km) in most parts except in Ungwana bay, the shelf area measures 6500 km. The coastal and marine environment supports rich inshore fishing grounds located in and around Lamu Archipelago, Ungwana Bay, North Kenya Banks and Malindi Bank. The areas where the two major Kenyan rivers (Tana and Sabaki) empty into the sea are also very productive. The extensive fringing reef system supports vibrant artisanal fisheries for demersal, crustacean and molluscs fisheries vital for the livelihoods of the dependant coastal communities. The annual production from artisanal coastal fisheries in 2021 was 25,380 MT consisting of demersal 48%, pelagic 25%, sharks and rays 11% mollusc 10% and crustaceans 8%. Kenya's entire artisanal fishing fleet consists of 3,500 small scale mostly wooden crafts usually for single day fishing trips. Fishing is heavily influenced by the monsoon season cycles, the most important fishing season is during the calm north east monsoon from September to March. The species under the IOTC mandate that are landed include tuna (yellowfin tuna, skipjack tuna and Kawakawa), but are not always distinguished to species level in catches. Billfish catches in the artisanal fishermen landings are represented mainly by sailfish (Istiophoridae). A recreational trolling line fishery is also important in Kenya's pelagic fisheries. The recreational catch is considered significant especially when compared to the artisanal commercial fisheries and is composed of a total of fifteen pelagic species commonly landed however the mainstay of the fishery is composed of sailfish, marlins, tuna and swordfish.

2. FLEET STRUCTURE

The national tuna fishing fleet structure consists of an artisanal commercial segment and to a lesser extent recreational fleet which all combined target and impact species under the IOTC mandate. An estimate of the total fishing fleet for the entire artisanal sector is obtained from biennial frame surveys conducted regularly for the entire artisanal fishery since 2004. The fishing fleet estimates provided in this report are based on the frame survey estimates of February 2016. The commercial artisanal fishing fleet is composed of a multi-gear and multi- species fleet operating in the territorial waters. The local boats are broadly categorized as outrigger boats or dhows which come with variants depending on the construction designs. It is estimated that 455 artisanal vessels are engaged in the fishing of tuna and tuna like species in 2021. A majority of the vessels are wooden planked propelled by sails and increasingly being motorised. These boats operate day fishing trips within the territorial waters. The mean craft size for tuna fishing vessels based on the frame survey was eight meters. The main gears used are artisanal long lines (55) handlines (85), gillnets (160), trolling lines (110), monofilament nets (20) and other gears (25). Recreational fishing vessels use trolling lines.

Table 1: Number of vessels operating in the IOTC area of competence, by gear type and size

Year	2017	2018	2019	2020	2021
Longliners	1	3	3	4	4
Purse Seiners	0	0	0	6	6

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

Artisanal commercial fishing for tuna and tuna-like species in the territorial waters use artisanal long line hooks, gillnets, monofilament nets and artisanal trolling lines. Generally fishing for tuna species is highly seasonal activity where artisanal vessels in July-November target migratory tuna which occur in the coastal waters. The peak season

for sailfish landings is during the November to March in coastal waters. Species landed are tuna yellowfin tuna, Skipjack tuna, Kawakawa, sailfish and Spanish mackerel. Table 2 summarises artisanal catch data for the year 2016- 2021. Landings of tunas from artisanal fishers were 1,953 tons and 1,613 tons in 2020 and 2021 which a gradual decline as compared to 2,737.3 tons caught in 2019. The spatial representation of the catch by species and the fishing fleet dynamics is not possible primarily because the entire catch is caught by artisanal operators who do not have GPS devices equipped on their vessels. All the fleet operates within the territorial waters and mainly within the 5 nm area.

Table 2. Annual catch and effort by gear and primary species in the IOTC area of competence. Include a 'not elsewhere indicated – NEI' category for all other catches combined.

Species	2016	2017	2018	2019	2020	2021
Istiophoridae	371.5	356.1	427.3	200.6	123	263
Scombridae	3,431	1,931	3,476	2,737	1953	1613
Xiphiidae	199.8	166	215.8	205.8	137	571
Carcharinidae	411.9	466	535.9	563.6	757.7	12
Dasyatidae	596.9	462.5	601.2	232.8	342	-
Myliobatidae	112.9	231.8	278.2	-	109.8	-
Sphyrnidae	30.8	20.3	26.4	-	487	722
Other Rays	-	12.6	15.2	-	0	0

The Kenya flagged industrial longline vessels fished within the EEZ and the high seas in the period of 2017- 2021 with the average number of hooks per vessel per day being 1,720 in 2021. The vessel fished for a total of 830 days at sea. The catch and effort data as well as length frequency data was submitted IOTC. A total of 432.7 tons of fish was landed in 2021 with swordfish (297.7 tons) and sharks (96.5 tons) reported as the main species caught.

Table 3. Annual catch by Kenyan Longliners

Species	2017	2018	2019	2020	2021
Yellowfin Tuna	14.4	107.6	190.3	131.9	12.2
Bigeye tuna	10.6	27.6	52.5	68.7	17.6
Swordfish	2.3	294	385.2	331.9	297.7
Marlins	2.3	8.8	14.3	19.3	4.1
Sailfish	0.8	1.3	5	5	1.1
Sharks	6.3	55.9	114.6	92.8	96.5
Others	10.5	22.6	35.1	19.13	3.4
Effort Hooks	259,125	618,385	985,560	1,252,160	1,406,960
Fishing Days	85	340	573	728	830

Fishing effort by the longliners was mainly concentrated within the Kenyan EEZ with some reported in the high seas as per figure 2.

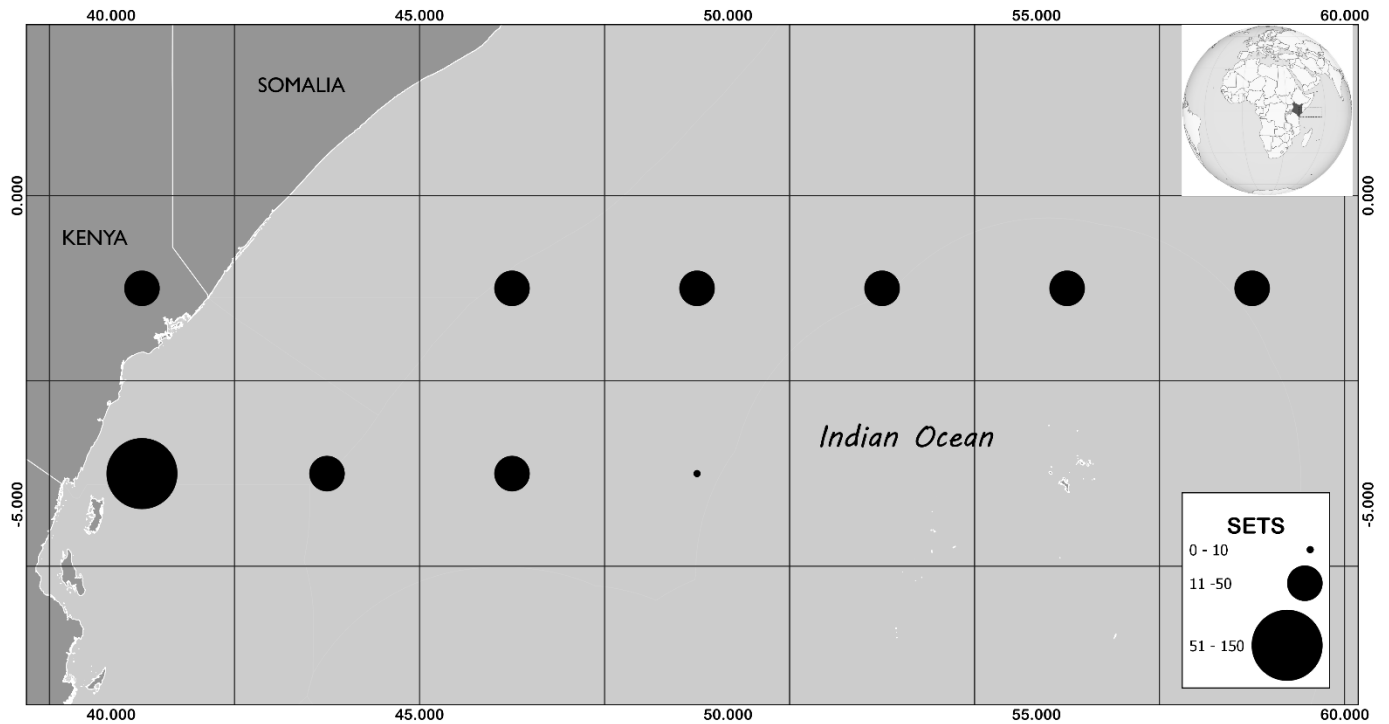


Figure 2. Map of the distribution of fishing effort, by gear type for the national fleet in the IOTC area of competence.

Most of the fish caught by the longliners were swordfish followed by Blue Shark, Yellowfin tuna, Bigeye tuna and Mako sharks (Fig. 3)

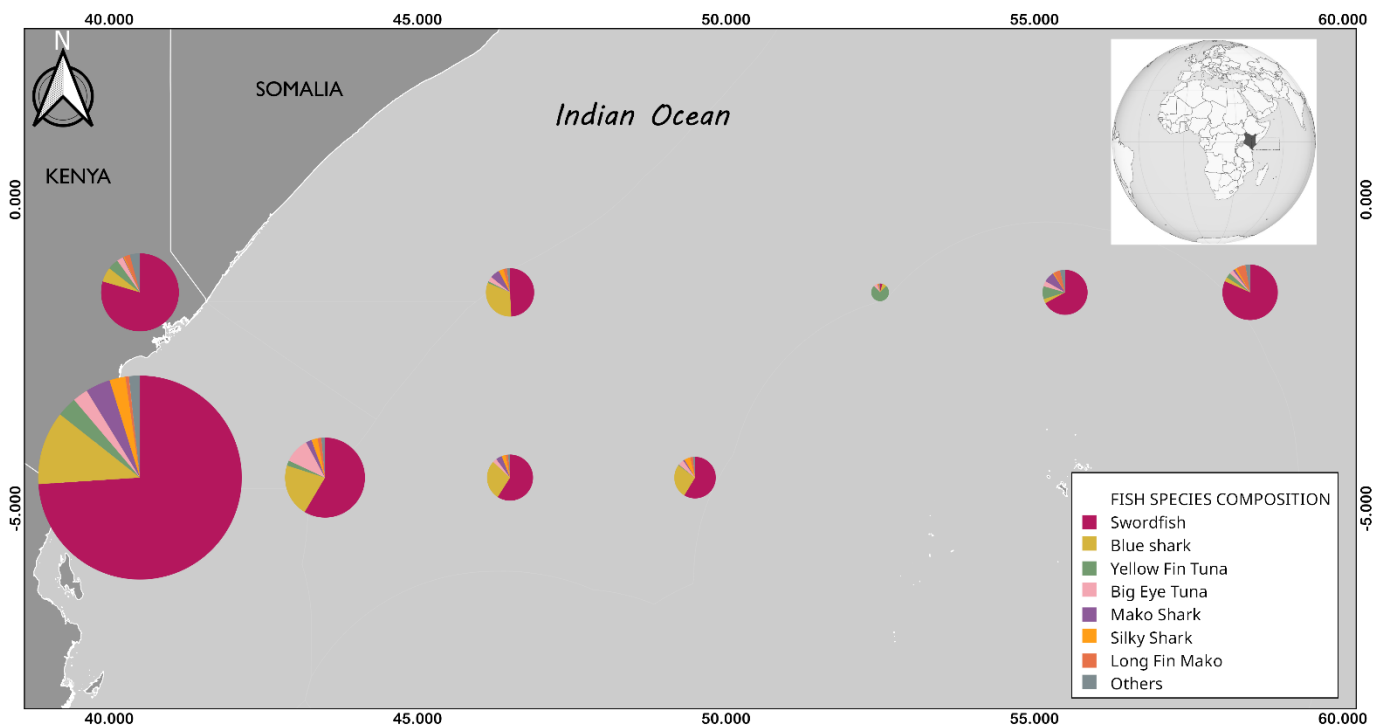


Figure 3. Map of distribution of fishing catch, by species for the national fleet, in the IOTC area of competence.

4. RECREATIONAL FISHERY

Recreational fishery practiced off the coast of Kenya is very important to the country's economy and Billfish are key target species in sport fisheries (Pepperell *et al.*, 2017). Sportfishing for billfish. Major billfish fishing zones include fishing grounds off Lamu and Kiwayuu, Ngomeni and Malindi, Watamu, Kilifi, Mombasa & Shimoni with coordinated annual tournaments and competitions conducted in Malindi, Kilifi, Watamu and Diani (Kadagi *et al.*, 2020). The Kenyan recreational fishery targets billfish (sailfish, marlins and swordfish, yellowfin, skipjack, bigeye tuna, giant trevally, barracuda, spanish mackerel, wahoo, and kingfish among others.

Recreational fishing for billfish is predominantly catch, tag and release which is practiced by charter and private boats that fish during the fishing year or occasionally. Tags are supplied by the African Billfish Foundation, a regional tagging programme based out Kenya which has overseen tagging of billfish in Kenya and other areas for over 30 years). Tagging records indicate that over 600 billfish species were tagged by the sport fishing sector through the African Billfish Foundation (ABF) in the 2019/2020 fishing season. The highest number of tagged billfish between October and December were Sailfish ~400 followed by blue and black marlin ~200.

For the fishing season 2020/ 2021, eight tournaments were planned but due to the Covid-19 pandemic and the travel restrictions, earlier tournaments that started in October 2020, only local anglers participated. There is still limited information documented on the implications of COVID-19 on recreational fisheries.

5. ECOSYSTEM AND BYCATCH ISSUES

The ecosystem and environmental issues in the Kenya tuna fishery include bycatch as well as impacts on protected and endangered species. Bycatch make up 19.6% of the weight of the longline fishery catches dominated by sharks, marlin and sail fish. On the other hand, long line survey data collected in 2020 show that the bycatch form 31.8% of the total catch weight consisting of 38 species. The bycatch species are dominated by *Prionace glauca* (19.3%), *Carcharhinus longimanus* (3.5%), *Isurus oxyrinchus* (2.3%), *Carcharhinus falciformis* (2.0%) and *Sphyrna lewini* (0.8%). Green turtles are occasionally catch caught during the longline survey. A risk assessment has been conducted targeting sharks and rays caught as bycatch in industrial, prawn trawl and artisanal fisheries and management actions proposed. In the Prawn trawl Fishery: a total of 17 species of rays and 24 species of sharks and shark-like rays have been evaluated for vulnerability through assessment of their Vulnerability indices. The use of Turtle Excluder Device (TED) is mandatory in the prawn trawl fisheries as a condition to licensing.

Kenya is finalising the the development of a NPOA for sharks and also actions to manage sea turtles and seabirds . A National sea turtle strategy for Kenya is in place and data collection and reporting protocols have been developed and communities trained for the reporting.

5.1 Sharks

Sharks and rays have formed part of Kenya's coastal and marine landings for a long period with records dating back to the 1980s (Marshall, 1997). The shark fishery in Kenya entails both a targeted fishery as well as incidental catches. KMFRI , KeFS, CORDIO-EA and WCS are collecting data on the sharks being fished in the Kenyan waters so as to inform fisheries management towards minimizing fishing impacts on them since a number are protected under CITES. have collated data from Catch Assessment surveys undertaken on quarterly basis by Kenya Marine and Fisheries Research Institute (KMFRI) and Kenya

Fisheries Service (KeFS). In addition semi-industrial prawn trawl industrial data, longline data is monitored through vessel logbooks. There are 58 species of sharks Kenya and industrial prawn (18 species) fisheries reflects a high diversity of sharks in Kenyan waters. Overall, in 2020, 6 species of sharks were caught by the longliners namely the Blue sharks (*Prionace glauca*) 64 tons, Silky shark (*Carcharhinus falciformis*) 13 tons, Shortfin mako, (*Isurus oxyrinchus*) 11 tons, Longfin Mako Shark, (*Isurus paucus*) 10 tons, Grey shark (*Charcharhinus amblyrhynchos*) 30 kgs and other unidentified sharks weighing 23 kgs.

Sharks species caught in the sampling programm between 2017 and 2021 indicate that sharks from four families namely: - Alopiidae (*Alopias superciliosus*), Carcharhinidae, and Sphyrinidae (*Sphyrna lewini*). Carcharhinidae had the most representation of species comprising of *Carcharhinus leucas*, *Carcharhinus amblyrhynchos*, *Carcharhinus amboinensis*, *Carcharhinus falciformis*, *Carcharhinus leucas*, *Carcharhinus limbatus*, *Carcharhinus longimanus*, *Carcharhinus macloti*, *Carcharhinus melanopterus*, *Carcharhinus plumbeus*, *Carcharhinus sealei*, *Galeocerdo curvier*, *Loxodon macrorhinus*, and *Triaenodon obesus*.

Sharks are also incidentally caught offshore in the Kenya North Bank where the target species are red snappers (Lutjanidae), (Oddenyo, 2017). in 2021, Kenya has introduced monitoring of artisanal longline fisheries through daily reports of the vessel skippers.

5.1.1. NPOA sharks

The process of drafting the National Plan of Action for Sharks and Rays (NPOA-Sharks and rays), an important fishery resource exploited along the Kenya coast, has already been initiated by the Kenya Fisheries Service in collaboration with key stakeholders. An FAO NPOA expert has been engaged to work with the NPOA sharks, sea birds and sea turtle consultant. The plan is expected to be ready by June 2022

5.1.2. Sharks finning regulation

The practice of shark finning has been banned through the new regulations (Gazette notice no. 3409 of 08 May 2020). The ban applies to all licensed industrial vessels fishing within or outside of Kenya's EEZ. Moreover, the trade and sale of fins must be in appropriate proportion to the quantity of carcasses landed (five per cent of dressed carcass weight is usually recommended in the Western Indian Ocean region).

5.1.1. NPOA sharks

Kenya received support from World Bank through the Kenya Marine and Social Economic Project (KEMFSED) to finalise the process of developing a National Plan of Action (NPOA) for Sharks as guided by FAO IPOA guidelines. Kenya has prepared a shark assessment report (basilene)and conducted a risk assessment for sharks species caught by Kenyan fleet for different gears towards preparation for the NPOA Sharks. An FAO NPOA expert has been engaged to work with the NPOA sharks. The plan will be ready by April 2023

5.1.2. Sharks finning regulation

Kenya has banned shark finning through through a gazette notice no. 3409 of 08 May 2020 and also submitted to IOTC secretariat. The ban applies to all licensed industrial vessels fishing within or outside of Kenya's EEZ. Moreover, the trade and sale of fins must be in appropriate proportion to the quantity of carcasses landed (five per cent of dressed carcass weight is usually recommended in the Western Indian Ocean region). Kenya is implementing sampling and monitoring of catch from Industrial long line fisheries at the port during landing by landbased observers.

5.1.3. Blue shark

Since 2019, concrete plans were put in place by the government to enable the Kenya Marine Fisheries Research Institute (KMFRI) to carry out pelagic fisheries research in Kenya's EEZ. This survey collected adequate data on the blue sharks among others for proper reporting. Kenya has also been implementing a scientific observer program on-board industrial fishing vessels since 2016. The data collected included catches and fate of all blue sharks.

Table 3: Total number and weight of sharks, by species, retained by the national fleet in the IOTC area of competence (for the most recent five years at a minimum, e.g. 2017–2021)

Weight							
Common Name	Scientific Name	2017	2018	2019	2020	2021	Grand Total
Blue Shark	<i>Prionace glauca</i>	2,262	28,779	87,395	63,982	63,677	246,095
Shortfin mako shark	<i>Isurus oxyrinchus</i>	0	7,197	15,266	10,783	22,396	55,642
Silky Shark	<i>Carcharinus falciformis</i>	0	2,213	7,889	13,306	10,466	33,874
Hammerhead sharks		3,354	0	0	0	0	3,354
Black Tip shark	<i>Carcharinus limbatus</i>	644	0	0	0	0	644
Other sharks			4,234	863	9,972	0	15,069
Tiger sharks	<i>Galeocerdo cuvier</i>	0	0	0	0	0	0
Grand Total		6,260	42,423	111,413	98,043	96,539	354,678
Number							
Common Name	Scientific Name	2017	2018	2019	2020	2021	Grand Total
Blue Shark	<i>Prionace glauca</i>	90	954	2698	1,950	1,961	7,653
Silky Shark	<i>Carcharinus falciformis</i>	0	115	425	641	584	1,765
Shortfin mako shark	<i>Isurus oxyrinchus</i>	0	109	238	133	329	809
Hammer head shark		136	0	0	0	0	136
Black Tip shark	<i>Carcharinus limbatus</i>	58	0	0	0	0	58
Other sharks		0	102	19	138	0	259
Tiger sharks	<i>Galeocerdo cuvier</i>	0	0	0	0	0	0
Grand Total		284	1280	3380	2,862	2,874	10,680

Table 4: Total number of sharks, by species, released/discarded by the national fleet in the IOTC area of competence (for the most recent five years at a minimum, e.g. 2017–2021). Where available, include life status upon released/discard. *[Note: Multiple tables may be required for this item]*

	Family	Species	DC0	DC2	DC3	DC5	Grand Total
2016					17		17
	Carcharhinidae				17		17
		<i>Carcharhinus longimanus</i>			16		16
		<i>Galeocerdo cuvier</i>			1		1
2019			59	1	127	2	191
	Alopiidae				12	1	13
		<i>Alopias pelagicus</i>			4		4
		<i>Alopias superciliosus</i>			4	1	5
		<i>Alopias vulpinus</i>			4		4
	Carcharhinidae		58	1	78	1	140
		<i>Carcharhinus albimarginatus</i>			1		1
		<i>Carcharhinus falciformis</i>			55	1	56
		<i>Carcharhinus longimanus</i>	58		7		65
		<i>Prionace glauca</i>		1	10		11
	Lamnidae		1		19		20
		<i>Carcharhinus longimanus</i>	1				1
		<i>Isurus oxyrinchus</i>			1		1
		<i>Lamna nasu</i>			18		18
	Sphyrnidae				18		18
		<i>Sphyrna lewini</i>			11		11
		<i>Sphyrna zygaena</i>			7		7
	Grand Total		59	1	144	2	208

Table 6: Sharks released on-board a research experimental fishing vessel. 2020-2021

Row Labels	Species	DC3	DC5	DCO	Grand Total
Alopiidae		12			12
	<i>Alopias superciliosus</i>	12			12
Carcharhinidae	2	81	5	2	90
	<i>Carcharhinus albimarginatus</i>	2			2
	<i>Carcharhinus longimanus</i>	33	2	1	38
	<i>Carcharhinus plumbeus</i>	3			3
	<i>Carcharhinus falciformis</i>	19	3	1	23
	<i>Galeocerdo cuvier</i>	6			6
	<i>Prionace glauca</i>	11			11
Lamnidae		1	1		2
	<i>Isurus oxyrinchus</i>	1	1		2
Sphyrnidae		4			4
	<i>Sphyrna lewini</i>	9			9
	<i>Sphyrna zygaena</i>	1			1
Grand Total		98	6	2	108

5.2 Seabirds

Kenya has initiated the process to develop NPOA for Seabirds, under the world bank funded KEMSFED project. A gazette notice with the IOTC requirements for mitigations against sea turtles was published in a gazette notice 2020 and contains the measures to protect seabirds.

In 2021, no Kenyan flagged vessel operated south of 25°S.

5.3 Marine Turtles

Kenya has initiated the process to develop NPOA for Sea turtles, under the world bank funded KEMSFED project. A gazette notice with the IOTC requirements for mitigations against sea turtles was published in a gazette notice 2020. Kenya has implemented the use of TEDs since 2011 through a management plan for the prawn trawl fishery. Kenya is working in collaboration with NOAA to increase the efficacy of TEDs in the trawl fishery and for certification.

Other measures taken by Kenya related to the conservation of marine turtles have been included in the 'Reporting of progress of implementation of the FAO Guideline to Reduce Sea Turtle Mortality in Fishing Operation and on the implementation of resolution 12/04 on marine turtles' already in April 2022.

There were no turtles recorded in 2021.

5.4 Other ecologically related species (e.g. marine mammals, whale sharks)

Fishing around sea mammals and whale sharks is prohibited by the Kenyan laws.

The Fisheries Management and Development Act no 35 of 2016 makes provision for the protection of marine mammals under Section 46(1) and with subject to section 3) and Section 45 (2,4) with regard to protection of whale sharks. Kenya is currently preparing a national plan of action for sharks and in the process of gazetting measures as stipulated in Res 13/05 (8). No catch of seabirds, marine turtles and marine mammals have been recorded for the national fleet in the IOTC area of competence for the most recent five years.

Table 5. Observed annual catches of species of special interest by species (seabirds, marine turtles and marine mammals) by gear for the national fleet, in the IOTC area of competence (for the most recent five years at a minimum, e.g. 2017–2021 or to the extent available). **[Mandatory]**

Year	lat	long	Gear Type	Total effort	Total effort observed	Species	Captures (Numbers)	Release condition
2019	-3	40	longline	44 sets	44 sets	Dolphin whale (species not indicated)	1	Released alive
2019	-2	41	Longline	13 sets	13 sets	<i>Coryphaena hippurus</i>	1	Released alive
2018	-2	41	Longline	30 sets	30 sets	Dolphin (species not indicated)	1	Released alive
2018	-4	40	longline	56 sets	56 sets	<i>Rhincodon typus</i>	2	Released alive

No species of special interest were caught by the longliners in 2020 and 2021.

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS [Mandatory]

6.1. Logsheet data collection and verification

Logbook data verification was started in 2007 and apply to the authorised long line vessel flying the Kenyan flag. As a licence condition all vessels are required to fill data in the vessel logbook and submit the logbooks for inspection when they call to port. The logbooks are verified on routine basis during inspection and annually once the vessels submit the logbook data. The verified logbook data for 2021 to be submitted to IOTC as per the requirements.

Data reporting is a requirement according to the Fisheries management and Development Act 2016 section 75. Kenya initiated the implementation of artisanal fishers data log sheets since 2020 and monitoring through the Beach management units. In 2021, we developed an application to capture the data and report through the mobile phones. A recreational fisheries log sheet was developed in collaboration with IOTC and introduced to the fishing clubs. The data collection and reporting forms have been published and will be fully integrated into the Fisheries Information Management system (FIMs) currently under development.

6.2. Vessel Monitoring System

Fisheries Management and Development Act No. 35 of 2016 stipulates the need for fishing vessels to have a functional VMS any time the fishing operations are ongoing. The VMS was established at the Mombasa Fisheries Monitoring Centre (FMC) in March 2017. This system has capacity to track vessels using Themis VMS module, AIS, Satellite imagery module and also has capacity to associate oceanographic parameters, including waves and their speed, plankton concentration, temperature etc. to the possibility of where most fishing vessels are likely to be. Oceanographic module helps in prediction of movement of fishing vessels and therefore possible to detect IUU fishers

6.3. Observer scheme

The country's first bunch of five observers was trained in 2010 under the then South West Indian Ocean Fisheries Project (SWIOFP). The country did not have her own fleet of longliners and purse seiners thus the observers were deployed aboard the shallow water prawn trawlers. In 2016, the country registered her own longliner FV Shang Jyi which made three trips and were all covered by observers however data collection was not satisfactory done as some of the trips were covered by untrained observers. In 2017, the vessel Shang Jyi relocated to Mozambique and she came back to Kenya in 2018. During this year one more longliner was registered; FV Seamar II. In 2018 the two vessels made a total of 8 trips which were all covered by both trained and untrained observers. In 2019 a third longliner was registered bringing the number of longliners to three. A total of 13 trips were made by the three longliners in 2019 and 10 trips had observers onboard. Out of the 10 observers, 6 trips were covered by trained observers and 4 trips by untrained observers.

In 2020, the three longliners made a total of 5 trips. Shang Jyi and Seamar II each made a single trip while Newfoundland Alert made 3 trips however due to the covid-19 pandemic only one trip made by Shang Jyi in early 2020 had untrained observer on-board. Deployment of observers was suspended in March 2020 due to outbreak of Covid-19 pandemic.

The observer program resumed in June 2021 after Covid 19 pandemic had been controlled. Three longliners namely Newfoundland Alert, Seamar II and Miss Jane operated in Kenyan waters which made 3, 6 and 2 trips respectively. Out of the 11 trips 7 were covered by observers.

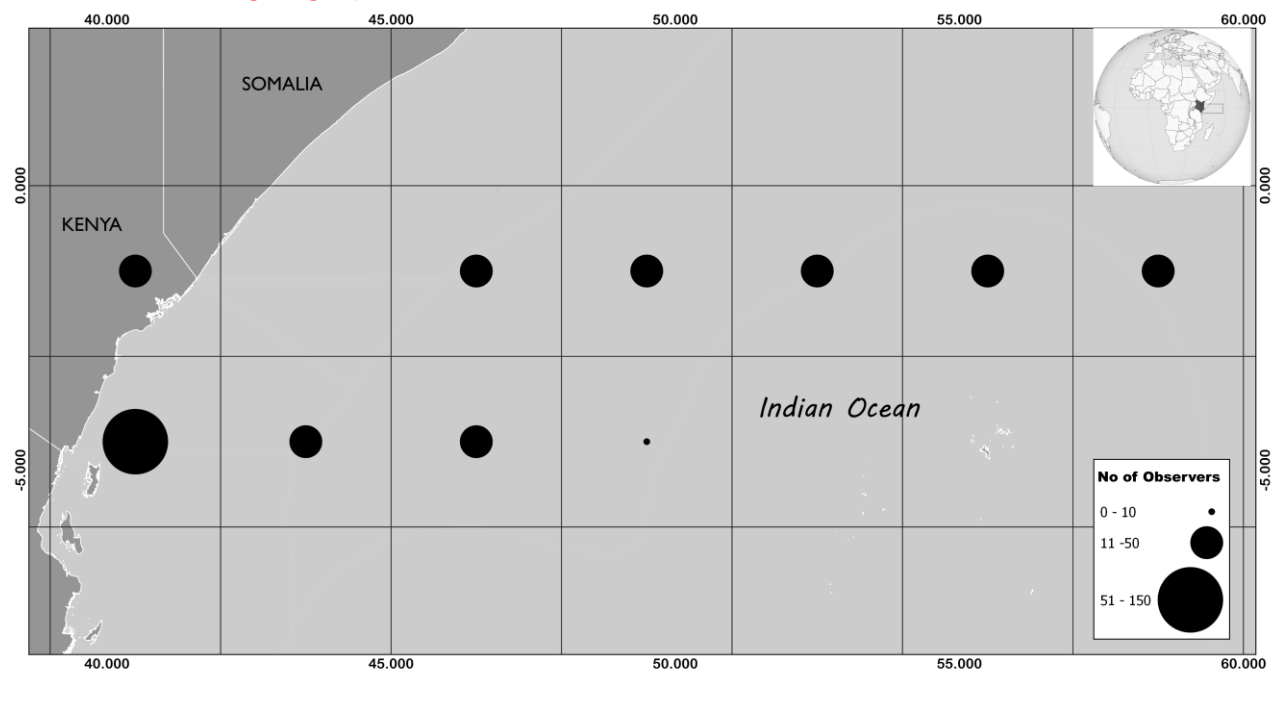
Overtime the staff capacity in the observer program has reduced with only 6 trained observers actively involved fisheries observer work. With funding support from IOTC ROS pilot programme, Kenya has trained more 10 observers with completion delayed due to Covid-19 pandemic. The IOTC contactor is currently completing the remaining training virtually. A number of new officers have been oriented on the National

observer program and data collection to support the observer program capacity as they wait further observer training..

Table 6. Annual observer coverage by operation, e.g. longline hooks, purse seine sets (for the most recent five years at a minimum, e.g. 2017–2021 or to the extent available). **[Mandatory]**

Year	Longline hooks
2017	
2018	
2019	
2020	
2021	

Figure 4. Map showing the spatial distribution of observer coverage. **[Mandatory]** *[Recommended spatial resolution = 1 x 1 degree grid]*



6.4. Port sampling programme *[including date commenced and status of implementation]* **[Mandatory]**

Port sampling of vessels landing at the port of Mombasa has been implemented as part of the port state measures. Kenya has three ports ; Mombasa, Lamu and Shimoni designated as fishing ports according to Fisheries Management and Development Act 2016 second schedule. Mombasa port was gazetted fishing port was gazetted in 2018. This has facilitated port sampling.

Kenya is in the process of building capacity for the fisheries observers who will also take part in the port sampling program. The challenge is that some of the vessel skippers dress the catch hence not able to get length data.

Table 7. Number of vessel trips or vessels active monitored, by species and gear **[Mandatory]**

Table 8. Number of individuals measured, by species and gear] [Mandatory]

6.5. Unloading/Transshipment of flag vessels [including date commenced and status of implementation] [Mandatory]

Fisheries Management and Development Act section 127 prohibits transshipment at sea and therefore at sea transshipment can only occur upon an authorization. In 2021 there was no Kenya flag vessel that authorised to transship at sea.

In 2021, there was no transshipment at a port in the IOTC areas of competence by Kenya flag vessels

6.6. Actions taken to monitor catches & manage fisheries for Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish

Catches of Striped Marlin, Black Marlin and sailfish are reported to the IOTC Secretariat (Resolutions 15/02) and data is captured as provided included in the vessel logbooks and as per the requirements of resolution 15/01. Monitoring of the billfishes catch is done through logbook data and the observer program. Biological data on the billfish species has been ongoing since 2016.

6.7. Gillnet observer coverage and monitoring

There is no gillnet large vessel is registered under Kenyan flag. Kenyan artisanal gillnet fishery operates near the shore with small sized vessels where observer coverage is impossible to undertake. In the artisanal fishery sampling through catch assessment survey is conducted .

The fishery is composed of bottom-set gillnets and small-scale drifting gillnets. Monitoring of the fishery is currently implemented through land-based catch assessment surveys in selected landing sites. The average sizes of the target species varied by gear type with drifting gillnets catching significantly larger sizes compared to the other gears. Small scale drifting gillnets also catch about 70% of Kawakawa catches and about 99% of skipjack catches.

6.8 Sampling plans for mobulid rays [Mandatory]

A study on the devil rays and investigate the genetic population structure and life history of devil rays (Mobula spp.) within the Indian Ocean (Kenya and Tanzania) was conducted . These species are considered of high priority for immediate research and conservation action by the IUCN Shark Specialist Group and Indian Ocean Tuna Commission's (IOTC) Working Party on Ecosystems and Bycatch (WPEB). Given fisheries exploitation of devil ray species and the growing international market for their gill rakers, the project envisions creating international collaborations to generate data necessary to facilitate their sustainable exploitation within the Indian Ocean.

Kenya is implementing a 10 day sampling in 30 landing sites along the Kenyan coast

7. AL RESEARCH PROGRAMS

Kenya has a ongoing research initiatives conducted by KMFRI includes land-based catch sampling of artisanal landings to determine species-specific catch rates by gear type. Biological sampling on length, weight and maturity of has been conducted for skipjack and kawakawa through support of a WIOMSA-MASMA grant. A total of 27 gear-vessel combinations target tuna and tuna-like species but the most common are Mashua-Ringnet, Mashua-drifting gillnet, Dugout canoe-reef seine, Fibre boat-trolling line and Fibre boat-handline. Follow up monitoring is being conducted by KMFRI with support from the world bank funded KEMFSED project. No abundance/biomass surveys have been conducted due to lack of a research vessel with fishing capacity. Project based oceanographic data has been collected under the SOLSTICE project. Based on the catch

surveys conducted, Kawakawa was the most frequently landed species (about 57% of the total weight sampled). A value chain analysis of the coastal tuna species has been conducted and data analysis is ongoing through a PhD student.

7.1. National research programs on blue shark

No research programme is being undertaken on blue shark

Kenya is implementing an observer program on board the industrial longline industrial vessel. The observer coverage monitors blue sharks as one of the catches reported from the longline vessels. Collection of biological data for the species has been ongoing.

7.2. National research programs on Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish

Two projects namely the BILLFISH-WIO (www.billfishwio.com) project funded by The Western Indian Ocean Marine Science Association (WIOMSA) and a Pew grant are studying billfish species. The BILLFISH –WIO project is concentrating on four thematic areas to assess the catch status, genetic structure, the habitat and distribution, and socio-economics in Kenya, Tanzania, Mozambique, South Africa and Madagascar. The Pew grant is looking into strengthening data collection and capacity building in Somalia, Comoros, Mauritius and Seychelles. The BILLFISH_WIO project has collected data on blue marlin, striped marlin, sailfish and black marlin since Jan 2020 to date. The program on Billfish only, to evaluate the historic and current catches of billfish species along the Kenyan coast.

7.3. National research programs on sharks

Kenya has put in place a monitoring program to collect data to improve data to IOTC on the following areas:

- a) The catches and a stock assessment- With the species from the observers program in industrial vessels and the logbooks submitted after every trip.
- b) Nominal and standardized CPUE trends statistics
- c) Average weight in the catch by fisheries
- d) Areas fished

Kenya is also conducting a study with the university focussing on catches, biology, life-history, pupping and nursery areas for sharks caught in the prawn trawl fishery

7.4. National research programs on oceanic whitetip sharks

There is no specific program for the species, but generally for monitoring of sharks fishery is undertaken through studies, undertaken in the prawn trawl fishery

7.5. National research programs on marine turtles

Currently there is no focused research program on mitigation methods for marine turtles; However monitoring of nesting activity and strandings is undertaken through community-based turtle groups in collaboration with the Kenya Wildlife Services . Sea Turtle conservation program undertaken by WWF, KWS, Community and other stakeholders.

The Prawn fishery management plan states the mandatory use of turtle excluding devices to reduce incidences of turtle deaths due to trawling activities in Malindi-Ungwana Bay.

7.6. National research programs on thresher sharks

There is no specific program for the species, but generally for sharks, catch data monitoring through observer and catch assessment survey. During 2021, there were no reported catches of thresher sharks.

Table 8. Summary table of national research programs, including dates.

Project title	Period	Countries involved	Budget total	Funding source	Objectives	Short description
A baseline assessment of Kenya's elasmobranchs: Threats, conservation status and awareness	2019 -2023	Kenya		MASMA-WIOMSA	Observer program: collection of bycatch data	Sharks and Rays bycatch from Malindi-Ungwana Bay prawn trawlers
Strengthening data collection and capacity building for effective conservation and management of billfish fisheries in the Western Indian Ocean region	2020 - 2023	Kenya		Pew Charitable Trusts	Examine the distribution of billfish species Evaluate the genetic stock structure of billfish	Genetic stock structure of billfish using seasonal and spatial distribution data.
Billfish Interactions, Livelihoods and Linkages for Fisheries sustainability in the Western Indian Ocean (BILLFISH-WIO)	2019 - 2022	Kenya		WIOMSA	Assess the historical and present status of billfish species in recreational, artisanal, commercial and IUUs sector Evaluate the socio-economic perspectives and governance strategies of billfish	Review and assess historical and current billfish landings and catch rates
Sea Turtle conservation	Ongoing	Kenya		WWF	harmonization of data collection protocols along the Kenyan coast. conduct intensive awareness creation	harmonization of data collection protocols along the Kenyan coast. conduct intensive awareness creation to bring the community on board; help them to form community-based Turtle Conservation Groups (TCGs) to assist in monitoring.

8. IMPLEMENTATION OF SCIENTIFIC COMMITTEE RECOMMENDATIONS AND RESOLUTIONS OF THE IOTC RELEVANT TO THE SC.

Table 9. Scientific requirements contained in Resolutions of the Commission, adopted between 2012 and 2021.

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	National observer program - 10 observers undergoing training under IOTC ROS pilot
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Conservation measures gazetted
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	Conservation measures gazetted
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	Conservation measures gazetted
13/04	On the conservation of cetaceans	Paragraphs 7– 9	Conservation measures gazetted
13/05	On the conservation of whale sharks (<i>Rhincodon typus</i>)	Paragraphs 7– 9	Conservation measures gazetted
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	Research taking place in the Kenyan EEZ
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	Catch assessment survey to monitor catch and effort in artisanal fishery
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	The longline data collected as per the requirement and submitted to the IOTC by 30th June. The coastal fisheries length frequency data has also been submitted by 30th June. The nominal catch data and effort by gear has also submitted
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	Re. Para. 6: Data on sharks reported according the 15/02 Re. Para. 9: Kenya in the process of development of the NPOA sharks, Kenya participated in the WPEB and presented a report on sharks
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	Paragraphs 2-5	Re. Para. 2 – 4: Data on Blue sharks has been collected and reported to the IOTC according to Res. 15/02. Re. Para. 5: Kenya research institutions have been encouraged to work on the Blue sharks and report to the IOTC for the 2023 assessment of the blue sharks
18/05	On management measures for the conservation of the Billfishes: Striped marlin, black marlin, blue marlin and Indo-Pacific sailfish	Paragraphs 7 – 11	Re. Para. 7 – 10: Data on Billfishes has been collected and reported to the IOTC according to Res. 15/01 and 15/02. Re. Para. 11: Kenya researchers have been encouraged to work on the Billfishes and report to the IOTC
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	Re. Para 1: Kenya reported in the Implementation Report actions taken to implement reporting obligations. Re. Para 4; Catch reported in 30th June using the IOTC template
19/01 (NOW 21/01)	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Paragraph 22	Re. Para 22. Kenyan catches are below the required threshold
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	Paragraph 11	Have developed measures to implement Resolutions 13/05 whale sharks . Awaiting gazette ment

9. LITERATURE CITED

1. Barrowclift, E. 2020 Devil ray Project: Better the devil you know. <https://saveourseas.com/project-leader/ellen-barrowclift/>
2. Fulanda B, Ohtomi J, Mueni E, Kimani E (2011) Fishery trends, resource-use and management system in the Ungwana Bay fishery Kenya. Ocean. Coast. Manag. 54, 401–414.



3. Kadagi, N.I., Wambiji N., and Swisher M.E., 2020. Potential for conflicts in recreational and artisanal billfish fisheries on the coast of Kenya. *Marine Policy*, Volume 117, 103960. <https://doi.org/10.1016/j.marpol.2020.103960>
4. Kadagi, N.I., Wambiji, N., Belhabib, D., Ahrens, R.N.M., (2020). Ocean safaris or food: characterizing competitive interactions between recreational and artisanal fisheries on the coast of Kenya. *Ocean and Coastal Management* (In press).
5. Kiilu, K B, Ndegwa S (2013) Shark by catch – Small scale tuna fishery interactions along the Kenyan coast. IOTC-2013-WPEB09-13.
6. Munga CN, Omukoto JO, Kimani EN, Vanreusel A (2014) Propulsion-gear-based characterisation of artisanal fisheries in the Malindi-Ungwana Bay, Kenya and its use for fisheries management. *Ocean and Coastal Management* 98 (2014) 130—139. Elsevier.
7. Oddenyo, R. M. (2017). Trophic ecology and the exploitation status of sharks (Pisces: Elasmobranchii) in North Coastal of Kenya. MSc thesis, Fisheries and Aquatic Sciences (Aquatic Resources Management), School of Natural Resource Management, University of Eldoret, Kenya.
8. Samoilys, M A and Obura, D O (2011). Marine conservation successes in Eastern Africa. CORDIO Status Report 2011. Obura D O and Samoilys M A (Eds). CORDIO East Africa. www.cordioea.org.
9. Wambiji, N, Omukoto, J.O. Kadagi, N.I, Fondo, E., Mwakisha, S and Thoya, P. Z. 2020. Current status of the sharks and rays along the Kenyan coast. KMFRI Research Report No. OCS/FIS/2019-2020/ C1.2. ii