



KENYA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2020

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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 2020, final data for the 2019 calendar year must be provided to the Secretariat by 30 June 2020)</p>	<p>YES 30/12/2020</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 2020, preliminary data for the 2019 calendar year was provided to the IOTC Secretariat by 30 June 2020). 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 2020, final data for the 2019 calendar year must be provided to the Secretariat by 30 December 2020).</p>	<p>YES 30/12/2020</p>
<p>If no, please indicate the reason(s) and intended actions:</p>	

Executive Summary

The Kenyan tuna and tuna-like fishing fleets comprise of the artisanal, semi-industrial, industrial and recreational fisheries which have an impact on IOTC’s priority species. The commercial artisanal fishing fleet is composed of a multi-gear and multi-species fleet operating in the territorial waters. The artisanal boats are broadly categorized as outrigger boats or dhows which come with variants depending on the construction designs. It is estimated that 414 artisanal vessels are engaged in the fishing for tuna and tuna like species in 2016 within the coastal waters. The main gears used are artisanal long line hooks, gillnets, monofilament nets and artisanal trolling lines. In 2019, three (3) Kenya pelagic longline vessels operated in the IOTC area of competence. The IOTC species landed during the year included swordfish (388 tons), yellowfin tuna (188 tons) Bigeye tuna (51 tons), Blue sharks (66 tons) while other species combined (101 tons). Artisanal fishers landed 668 tons of Kingfish, 201 tons of sailfish, 1,170 tons of tuna and tunalike species and 564 tons of sharks and rays. Catches of scombrids declined compared to 3,476 tons recorded in 2018. The main target species from the recreational fisheries are marlins and sailfish (Istiophiridae), swordfish (Xiiphidae) and tuna (Scombridae). Other species caught include small pelagic species such as barracuda, Spanish mackerel, Wahoo and sharks are landed. The artisanal fisheries and recreational fishing fleets have interactions with sharks where sharks are caught and the carcass is retained and fully utilised in artisanal fisheries and recreational trolling line fisheries have a voluntary shark release policy for sharks.

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 2019 was 25,686 MT consisting of demersal 44%, pelagic 30%, sharks and rays 11% mollusc 8% 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 414 artisanal vessels are engaged in the fishing of tuna and tuna like species in 2019. 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 (45), handlines (75), gillnets (150), trolling lines (106), monofilament nets (15) and other gears (23). Recreational fishing vessels use trolling lines.

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

Year	2015	2016	2017	2018	2019
No. of Vessels	0	1	1	3	3

3. CATCH AND EFFORT (BY SPECIES AND GEAR) [Mandatory]

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 1 summarises artisanal catch data for the year 2016- 2019. In 2019, landings of tunas from artisanal fishers were 2,737 tons which was a decrease compared to 3,476 tons caught in 2018. 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 by artisanal fishers in Kenya

Species	2016	2017	2018	2019
Istiophoridae	371.5	356.1	427.3	200.6
Scombridae	3,430.9	1,931.1	3,476.0	2,737.3
Xiphiidae	199.8	166.0	215.8	205.8
Carcharinidae	411.9	466.0	535.9	563.6
Dasyatidae	596.9	462.5	601.2	232.8
Myliobatidae	112.9	231.8	278.2	-
Sphyrnidae	30.8	20.3	26.4	-
Other Rays	-	12.6	15.2	-

The Kenya flag industrial longline vessels fished within the EEZ and the high seas in the period of 2018- 2019 with the average number of hooks per vessel per day being 1,720 in 2019. The vessel fished for a total of 573 days at sea. The catch and effort data as well as length frequency data was submitted IOTC. A total of 796 tons of fish was landed in 2019 with swordfish (385 tons) and yellowfin (190 kg) reported as the main species caught.

Table 3. Annual catch by Kenyan Longliners

Species	2016	2017	2018	2019
Yellowfin Tuna	50.2	14.4	107.6	190.3
Bigeye tuna	28.1	10.6	27.6	52.5
Swordfish	19.4	2.3	294.0	385.2
Marlins	11.1	2.3	8.8	14.3
Sailfish	-	0.8	1.3	5.0
Sharks	8.8	6.3	55.9	114.6
Others	32.7	10.5	22.6	35.1
Effort Hooks	275,593	259,125	618,385	985,560
Fishing Days	151	85	340	573

4. RECREATIONAL FISHERY

Recreational fishing which mainly encompasses sport or big game fishing in the case of Kenya is undertaken predominantly in five centres along the coast. These include Watamu, Malindi, Kilifi,

Diani, Shimoni and Mombasa 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), species belonging to family Scombridae (yellowfin, skip jack, bigeye tuna etc.), 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 2019/ 2020, many of the boats stopped fishing early as a result of COVID-19 lockdown measures. The virus restrictions also resulted in a reduction in the number of overseas anglers. There is currently limited information documented on the implications of COVID-19 on recreational fisheries. However, since September 2019, a regional research project focusing on billfish (BILLFISH-WIO) that is funded by the Western Indian Ocean Marine Science Association (WIOMSA) has been conducting surveys for recreational fisheries. The survey is part of a larger regional search with the main goal is to examine the catch dynamics, socio-economic importance and interactions of the fishery to contribute to the management of billfish species in the Western Indian Ocean region. Findings by Kadagi *et al* (2020) show competitive interactions between recreational and artisanal fisheries whereby both groups target billfish in the same space and time. Further, results show that billfish are of socio-economic importance to both fisheries and therefore increases the potential for conflicts.

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. The process to develop an NPOA for sharks and seabirds has been initiated. A National sea turtle strategy for Kenya is in place and is in the process of being updated.

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. Kenya’s small scale fishery targeting sharks is made up of artisanal fishers using canoes, outriggers or wooden boats powered either by oars, long sticks, sail or engines (Fulanda, 2011; Samoilys *et al.* 2011; Munga, 2014). Handlines are used offshore in the Kenya North Bank targeting snappers (Lutjanidae), while sharks are caught incidentally (Oddenyo, 2017). Fisher’s operating nearshore in the Malindi-Ungwana Bay utilize various types of gear such as seine nets, monofilament nets and handlines targeting prawns, crabs, catfishes and tilapia but also catch sharks as bycatch (Oddenyo *et al.*, 2016). In Mombasa, the semi-commercial long line fishery targets sharks mostly thresher sharks, *Alopi* sp. and mako sharks, *Isurus* sp. (Kiilu and Ndegwa, 2013). The semi-industrial prawn fishery in Ungwana Bay also catches sharks and rays as bycatch and discards.

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. A roadmap to complete the document has been developed comprising of three steps, namely; i) Development of draft shark assessment baseline report, ii) Stakeholder identification of issues and prioritization, and iii) Drafting of the NPOA- sharks plan.

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).

5.1.3. Blue shark

In 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 will collect 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 4: Total weight and number 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. 2015–2019).

Weight							
Common Name	Scientific Name	2016	2017	2018	2019	2020	Grand Total
Blue Shark	<i>Prionace glauca</i>	0	2,262	28,779	87,395	37,819	156,255
Shortfin mako shark	<i>Isurus oxyrinchus</i>	40	0	7,197	15,266	5,374	27,877
Silky Shark	<i>Carcharinus falciformis</i>	0	0	2,213	7,889	7,233	17,335
Hammerhead sharks		8,773	3,354	0	0	0	12,127
Black Tip shark	<i>Carcharinus limbatus</i>	5,196	644	0	0	0	5,840
Other sharks		572		4,234	863	23	5,692
Tiger sharks	<i>Galeocerdo cuvier</i>	5,334	0	0	0	0	5,334
Grand Total		19,915	6,260	42,423	111,413	50,449	230,460
Number							
Common Name	Scientific Name	2016	2017	2018	2019	2020	Grand Total
Blue Shark	<i>Prionace glauca</i>	0	90	954	2698	1258	5000
Silky Shark	<i>Carcharinus falciformis</i>	0	0	115	425	329	869

Shortfin mako shark	<i>Isurus oxyrinchus</i>	1	0	109	238	66	414
Hammer head shark		243	136	0	0	0	379
Black Tip shark	<i>Carcharinus limbatus</i>	158	58	0	0	0	216
Other sharks		14	0	102	19	1	136
Tiger sharks	<i>Galeocerdo cuvier</i>	121	0	0	0	0	121
Grand Total		537	284	1280	3380	1654	7135

Table 5: 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. 2015–2019). Where available, include life status upon released/discard.

	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- May-October 2020

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

The country is in the process of initiating a NPOA-Seabirds. Under the world bank funded KEMS FED project, a TOR has been developed for a consultancy to address the matter. A gazette notice with the IOTC requirements for mitigations against seabirds was published this year and contains the measures as stipulated in the seabirds requirements. In 2019, no Kenyan flagged vessel operated south of 25°S.

5.3 Marine Turtles

In 2019, 92 sets were observed by observers in which three turtles were recorded, two of which were released alive. One was unfortunately dead by the time of retrieval.

Table 7: Marine turtles caught by the longliners

Year	Fishery			Observed **				
	Lat*	Lon	Total effort	Total effort observed	Species	Captures (number)	Mortalities (number)	Live releases (number)
2019	-2	40	70 sets	70 sets	<i>Dermochelys coriacea</i>	2	0	2
2019	-2	41	22 sets	22 sets	<i>Eretmochelys imbricata</i>	1	1	0
2018	-3	40	25 sets	25 sets	<i>Eretmochelys imbricata</i>	1	1	0
2018	-3	41	18 sets	18 sets	<i>Eretmochelys imbricata</i>	1	1	0
2018	-4	40	56 sets	56 sets	<i>Caretta caretta</i>	1	0	1
2018	-4	40	56 sets	56 sets	<i>Chelonia mydas</i>	1	0	1

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. In 2019 a dolphin whale was caught and released alive.

Table 8. 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. 2015–2019 or to the extent available).

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

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. Currently Kenya has 3 longline flagged vessels that fished in the IOTC area in 2019. The logbooks are verified on routine basis during inspection and annually once the vessels submit the logbook data. The verified logbook data for 2019 will be submitted to IOTC as per the requirements. As a requirement under the Fisheries management and Development Act 2016, simple log sheets have been developed for both semi-industrial mainly (line and small purse seine fishery). The implementation was initiated in certain landing sites along the Kenya coast. There are plans to integrate the logbooks into a mobile application for ease on reporting. A recreational fisheries log sheet was developed in collaboration with IOTC. The form has been incorporated in integrated Fisheries Data and Information Management System (FDIMS) expected to be fully operation once the web based database is launched.

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 observes. The country had at one time 9 trained observers, however due to retirement and duty reallocation we currently have 5 trained observers actively involved in observer work. Last year, the country through IOTC received funding to train observers. Ten (10) participants have partially undertaken the training, however due to the outbreak of Covid – 19, training on embarkation and disembarkation procedures are yet to be done thus they are yet to receive their final grading and consequently registration by IOTC.

6.4. Port sampling

Port sampling of vessels landing at the port of Mombasa has been implemented as part of the port state measures. A fishing port was gazetted in 2018 and that 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.

6.5. Unloading/Transshipment of flag vessels

Transshipment at sea is not permitted by law and can only occur upon an authorization. In 2019, Kenya authorised 2 at sea transshipment for one of the Kenya flagged pelagic longline vessel. The transshipment was monitored by an IOTC regional observer.

Table 9: Transshipments details by Kenyan Vessels

Date	Location	Species			Total Kgs	%Observed
		BET	YFT	SW		

22/06/2019	00° 59'S, 050° 37'E	1,723	3,631	6,714	12,068	100
17/12/2019	05° 00'S, 046° 32'E	6,898	13,129	1,357	21,384	100

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

Monitoring of the billfishes is carried out by observers alongside other species. Biological data on the species has been ongoing since 2016.

6.7. Gillnet observer coverage and monitoring

Kenyan artisanal gillnet fishery operates near the shore with small sized vessels where observer coverage is impossible to undertake.

6.8. Sampling plans for mobulid rays

One-year project has just been funded to study the devil rays and investigate the genetic population structure and life history of devil rays (*Mobula* spp.) within the Indian Ocean (Kenya and Tanzania). 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.

7. NATIONAL RESEARCH PROGRAMS

7.1. National research programs on blue shark

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.

7.3. National research programs on sharks

Kenya has drafted a national Plan of Action for Sharks and rays which has recommendations of constant data collection of all sharks to ascertain their catches, biology, seasonality, gears used to catch them etc. KMFRI is putting in measures to collect the following data that will help us improve data to IOTC on the following areas: -

- The catches and a stock assessment- With the species data coming in from the Observers deployed on vessels and the logbooks submitted after every trip.
- Nominal and standardized CPUE trends statistics
- Average weight in the catch by fisheries
- Areas fished

With the Blue economy initiative in Kenya, Marine Spatial mapping efforts are in place and this will correlate with where the fishing vessels operate in the EEZ. KMFRI will in this respect produce maps of where the fish are caught.

7.4. National research programs on oceanic whitetip sharks

There was no oceanic white tip shark was recorded in 2019.

7.5. National research programs on marine turtles

There are initiatives to implement online Sea turtle monitoring and reporting through a mobile application coordinated by Kenya Wildlife service.

7.6. National research programs on thresher sharks

During 2019, there were no reported catches of thresher sharks.

Table 10. Summary table of national research programs, including dates.

Project title	Period	Countries involved	Budget total	Funding source	Objectives	Short description
Marine Fisheries stock assessment	2020-2022	Kenya		National Government	The objective of the project is to characterize the catches from pelagic offshore fisheries.	The objective of the project is to characterize the catches from pelagic offshore fisheries. The period covered is 2020-2021
Billfish Interactions, Livelihoods, and Linkages for Fisheries sustainability in the Western Indian Ocean (BILLFISH-WIO)	2019-2022	Kenya, Tanzania, Mozambique, South Africa and Madagascar		WIOMSA-MASMA	To assess the catch status, genetic structure, the habitat and distribution, and socio-economics associated with billfish species	Data is collected in about 25 sites in total working directly with artisanal, recreation fishers and looking towards IOTC to get industrial data
Strengthening data collection and capacity building for effective conservation and management of billfish in the Western Indian Ocean region	2020-2023	Somalia, Comoros, Mauritius and Seychelles			To strengthen data collection and capacity building in Somalia, Comoros, Mauritius and Seychelles.	Provide support for data collections and create awareness of billfish species

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

Table 11. Scientific requirements contained in Resolutions of the Commission, adopted between 2012 and 2019.

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	Training of 10 observers with the support of IOTC has already been undertaken
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6-10	Conservation measures gazetted

Res. No.	Resolution	Scientific requirement	CPC progress
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	Already taking place
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 been sent
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 participated in the WPEB and provided 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 researchers have been encouraged to work on the Blue sharks and report to the IOTC for the 2021 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	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	Conservation measures gazetted

9. LITERATURE CITED

- Barrowclift, E. 2020 Devil ray Project: Better the devil you know. <https://saveourseas.com/project-leader/ellen-barrowclift/>
- 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.
- 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>
- 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).
- 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