Indian Ocean Tuna Commission
Commission des Thons de l'Ocean Indien
iotc ctoi

MAURITIUS National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2019

Authors

A. Sheik Mamode[1], C. Lim Shung[2], D. Degambur[3]

Ministry of Blue Economy, Marine Resources, Fisheries and Shipping - Mauritius

1. Scientific Officer, Ministry of Blue Economy, Marine Resources, Fisheries & Shipping
2. Technical Officer, Ministry of Blue Economy, Marine Resources, Fisheries & Shipping
3. Divisional Scientific Officer, Ministry of Blue Economy, Marine Resources, Fisheries & Shipping

INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

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 2019, final data for the 2018calendar year must be provided to the Secretariat by 30 June 2019)	YES 30/06/2019
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 2019, preliminary data for the 2018 calendar year was provided to the IOTC Secretariat by 30 June 2019). **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 2019, final data for the 2018 calendar year must be provided to the Secretariat by 30 December 2019).	YES 30/06/2019
If no, please indicate the reason(s) and intended actions:	

Executive Summary

In 2018, Mauritius had 2 purse seiners, 1 supply vessel and 13 semi-industrial longliners operating in the tuna fishery. The two purse seiners are large freezer vessels having an overall length of 89.4 M each. The longliners are semi-industrial boats less than 24 Metres in length. 8 out of the 13 semi-industrial longliners operated outside the Mauritius EEZ and the remaining 5 longliners operated exclusively inside the EEZ.

The semi-industrial longline fleet operating exclusively inside the EEZ of Mauritius comprised 5 boats which undertook 23 fishing trips for a total of 213 fishing days and a deployment of 296620 hooks. The majority of the catch consisted of yellowfin (35.5%), albacore (28.4%) and swordfish (16%). Their total catch amounted to 130 tonnes. The CPUE was 0.43kg/ hook.

Eight semi-industrial longliners operated outside the EEZ carried out 118 trips for a total of 899 fishing days. They landed 691t of fish with a deployment of 1148857 hooks. The CPUE was 0.6kg/hook. Majority of their catch consisted of swordfish (44%) followed by yellowfin (30%). The area of operation was between latitudes13ºS and 27ºS and longitudes 34ºE and 42ºE.

The Mauritian purse seiners operated between latitudes 13ºN to 15ºS and longitudes 43º to 80ºE. Total catch of the two purse seiners amounted to 22,529t comprising of 50% yellowfin, 41% skipjack and 8% bigeye tuna for 612 positive sets out of a total of 650 sets. Observers were deployed on the two Mauritian purse seiners for a total of 139 days at sea.

Sampling exercises were carried out on local semi-industrial longliners. 783 fish were sampled from the semi-industrial longliners operating outside the EEZ and 1891 fishes were sampled on the semi-industrial longliners operating inside the EEZ. 262 fishes were sampled in the artisanal fishery for length frequency. Sampling exercises were also carried out on the Mauritian purse seiners.

Contents **Page**

1. BACKGROUND/GENERAL FISHERY INFORMATION

Industrial tuna fishing started in Mauritius in the late nineteen seventies. A first Mauritian purse seiner, 'Lady Sushil' was launched in 1979 and eight years later another purse seiner, the 'Lady Sushil II' joined the fleet. A third purse seiner, 'Cirné', started operations in 1991. Until 1997, the three vessels were operating for the local canning factory. However, due to financial problems and change in the administration of the factory, the vessels were sold off and the factory had to rely on import of raw materials to meet its commitments. In 2013, a Mauritius-flagged vessel restarted operating in the purse seine fishery after an absence of 13 years. In 2018 Mauritius had two purse seiners operating in the IOTC area of competence. The two Mauritian purse seiners operated between latitudes 13ºN to 15ºS and longitudes 43º to 80ºE. Total catch of the two purse seiners amounted to 22,529.2t comprising of 50% yellowfin, 41% skipjack and 8% bigeye tuna for 612 positive sets out of a total of 650 sets. Observers were deployed on the two Mauritian purse seiners for a total of 139 days at sea.

The Mauritian longline fishery started in 1970 when a longliner was operated by the local tuna canning factory. Due to various problems, the vessel stopped operation soon after.

The Mauritian surface longline fishery targeting mainly swordfish (*Xiphias gladius*) started in the eighties. During experimental longlining for tuna during 1986-88, a few swordfish were caught in the coastal waters of Mauritius (Roullot et al, 1988).

Commercial longline fishing started in 1999 when a small surface longliner started fishing for swordfish in the Mauritian waters. Since then, the number of vessels has been increasing and the fishery is being developed as promoters are encouraged to exploit the swordfish resource. At present, the Mauritian longline fishing vessels are all semi-industrial vessels less than 24M in length and are operating both inside and outside the Mauritius EEZ. In 2018, there were 13 semi-industrial longliners in operation. The semi-industrial longliners landed a total of 821 tonnes of fish. For the longliners operating inside the EEZ, the majority of the catch consisted of yellowfin (35.5%), followed by albacore (28.4%) and swordfish (16%). For the longliners operating outside the EEZ, the majority of the catch was swordfish (44%), followed by yellowfin (30%).

An artisanal fishery around Anchored Fish Aggregating Devices (AFADS) exists since 1985. A number of FADs are set at distances ranging from 2 to 12nm from the coast. There are approximately 350 fishermen that are registered to fish around the AFADs. In 2018, catch around the AFADs amounted to 252t.

2. FLEET STRUCTURE

In 2018, the Mauritian tuna fleet consisted of two purse seiners, thirteen surface longliners and one supply vessel (Table 1). The purse seiners operated mostly outside the EEZ of Mauritius, in the high seas and the EEZ of other coastal nations under fishing licences. Each has a length of 89.4 Metres and a GT of 2667t. The surface longliners are boats less than 24 Metres in length. Five of them operated inside and the others outside the EEZ. Their sizes range from 16.1 to 23.8 Metres and their gross Tonnage range from 21.2 to 97t. Mauritius also has one supply vessel that services its two purse seiners. The supply vessel is 30M in length and has a GT of 287t. Table 1 shows the number of vessels of the National fleet which operated in the IOTC area of competence by gear type and size from 2012 to 2018.

Table 1: Number of vessels of the Mauritius fleet operating in the IOTC area of competence, by gear type and size (2012 – 2018)

Year	Gear	Number of vessels	Number of fishing days	GT	LOA (m)	Preservation Methods
2012	Surface longline	5	238	38.4-90.4	13.50-22.80	Chilled
2013	Surface longline	3	196	38.4-90.4	13.50-22.80	Chilled
	Purse seine	1	81	2667	90	Frozen
2014	Surface longline	3	131	38.4-90.4	13.50-22.80	Chilled
	Purse seine	7	386	678-2667	49.56-90	Frozen
2015	Surface longline	5	191	32-97.4	13.50-22.80	Chilled
	Purse seine	7	357	678-2667	49.56-90	Frozen
2016	Surface longline	11	649	32-97.4	14.3-23.8	Chilled/Frozen
	Purse seine	2	475	2667	90.0	Frozen
2017	Purse seine	2	511	2667	89.4	Frozen
	Supply vessel	1	191 days at sea	86	30	
2018	Surface longline	13	1112	21.2 – 97	16.1 – 23.8	Chilled/Frozen
	Purse seine	2	511	2667	89.4	Frozen
	Supply vessel	1	183 days at sea	287	30	

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

The semi industrial longliners licensed to operate both within and outside the EEZ undertook 141 fishing trips for a total of 1112 fishing days with a deployment of 1445477 hooks. The total catch of the semi-industrial longline fleet was 821t. These boats target swordfish which are landed gilled and gutted with both the head and tail off.

For the semi-industrial longliners fishing inside the EEZ for 2018, a total catch of 130t of fish was recorded with a deployment of 296620 hooks (Table 2b). The CPUE was 0.43 kg/hook. Yellowfin tuna made up 35.5% of the catch followed by albacore (28.4%). Swordfish made up only 16% of the catch. The percentage of the other species were: bigeye tuna (5.8%), marlins (7.7%), sharks (5%). The remainder of the catch consisted of wahoo, skipjack, oil fish, dolphin fish and other miscellaneous species.

The semi-industrial longliners that operated outside the EEZ of Mauritius carried out 118 fishing trips and landed a total of 691t of fish. 1148857 hooks were deployed (Table 2a). The CPUE was 0.6kg/hook. The majority of the catch composed of swordfish (44.5%), followed by yellowfin tuna (30.8%) and bigeye tuna (11.4%). Marlins made up 5.5% of the catch and sharks 0.5%. Other species included wahoo, oil fish, dolphin fish and miscellaneous species. Two observers were deployed on two Mauritius-flagged longliners operating outside the EEZ of Mauritius. They spent 57 days at sea.

A total of 415 fishing days was recorded for the two super freezer purse seiners and 650 sets with 612 positive sets were deployed (Table 2c). The total catch amounted to 22,529.2 tonnes with a catch composition of 50% of yellowfin tuna, 41% skipjack tuna, 8% bigeye tuna and 0.07% of albacore tuna. The purse seiners operated between latitudes 13°N and 15°S and longitudes 43°E to 80°E (Figure 2b). 73% of the catch (16,471t) was made on log-associated schools whilst 6058t (27%) of the catch was from free school. The majority of the log-associated catch originated from artificial logs (89.5%) and only 10.5% of the log-associated catch was made on natural logs. On free schools, 86% of the catch comprised of yellowfin whilst 8% of the catch comprised of skipjack. On natural logs, skipjack made up 56% of the catch, yellowfin 32% and bigeye 11%. On artificial logs skipjack made up 53.2% of the catch, yellowfin 37.5% and bigeye 8.45%. Two observers were deployed on the Mauritius-flagged purse seiners. They spent 139 days at sea and covered 113 sets.

All the fishing operations of the semi-industrial and industrial tuna fishing vessels under Mauritius flag are monitored regularly by the Vessel Monitoring System (VMS). Moreover, the catch is verified through the fishing logbooks submitted by the vessels' masters. It is mandatory for the vessels to submit logbooks and if a vessel fails to submit its logbook, it is subjected to penalties. The catch of the vessels landing at Port Louis is also monitored during landing at port and this is done by the officers based at the Port State Control Unit.

The tables below 2a, 2b and 2c show the annual catch and effort of the Mauritius flagged longliners fishing inside the EEZ (Table 2a) and outside the EEZ (Table 2b) and of the Mauritius flagged purse seiners (Table 2c) in the IOTC area of competence.

Table 2a. Annual catch and effort of Mauritius flagged longliners (fishing outside the EEZ) in the IOTC area of competence (2016 – 2018)

Species	Catch (kg)		
	2016	**2017**	**2018**
Yellowfin	40235	140068	213025
Bigeye	49763	109313	79209
Albacore	4772	2113	8970
Swordfish	88698	203174	307974
Marlins	23546	24004	22436
Other billfishes	2107	6787	8027
Sharks	825	1195	4029
NEI	4822	26017	47624
Effort (No. of hooks)	322532	701637	1148857

Table 2b. Annual catch and effort of Mauritius flagged longliners (fishing inside the EEZ) in the IOTC area of competence (2011 -2018)

Species	Catch (Kg)							
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Yellowfin	16476	5715	11265	11265	28270	52702	124797	46095
Bigeye	10826	2960	17185	7955	13284	20481	49243	7642
Albacore	8415	5555	6215	6451	12075	28789	34346	36869
Swordfish	43999	17065	28320	14015	42175	64076	115005	20782
Other billfishes	3531	1810	2053	1055	3885	14709	23248	5672
Sharks	740	455	680	90	485	3339	5607	6602
NEI	5407	2561	2255	1789	2695	7956	26174	6101
Effort (No. of hooks)	252480	182300	150560	105120	195850	439046	953344	296620

Table 2c. Annual catch and effort of the Mauritius flagged purse seiners operating in the IOTC area of competence (2013 - 2018)

Species	Catch (tonnes)					
	2013	**2014**	**2015**	**2016**	**2017**	**2018**
Yellowfin	352	4844	5448	7404.1	7681.4	11321.5
Bigeye	27	532	1430	529.7	1353.5	1784.4
Skipjack	476	3131.6	2849	3788.2	8503.3	9283.2
Albacore	-	49	78	55	134	16.1
Total	855	8557	9805	11777	17672	22,405.2
Effort (No. of sets)	53	482	490	463	719	650

The figures 1a and 1b below show the historical annual catch for the Mauritius longline and purse seine fleet respectively. Regarding the longline fleet, there has been an increase in the catch made by all the longliners since 2014. This is mainly due to the development of the fleet from 5 to 13 vessels in 2018 except for the period between 2009 to 2014 where there was a decrease in the number of active vessels in this fishery. It is to be noted that in 2016, 3 longliners started to operate in Mozambique and in 2018, 8 longliners were active in the Mozambican waters.

The catch of the Mauritius purse seine fleet has known a gradual increase from 2013 to 2018 (Figure 1b). In 2013 only one small purse seiner with a G.T of 678t was operational from October to December followed by the coming in operation of 4 additional small purse seiners of the same size and 2 super freezer purse seiners with a GT of 2667t in 2014. The 5 small purse seiners stopped operating in 2016 while the 2 bigger purse seine vessels were still active in 2018. Based on the historical catches, majority of the catch consisted of yellowfin (55%-62%) followed by Skipjack (29%-37%). This was reversed in 2017 with 44% of yellowfin caught and a marked increase in the catch of Skipjack from 32% in 2016 to 48% in 2017 which may be due to log-associated schools. In 2018, the yellowfin catch constituted 50% and skipjack 41% of the total catch.

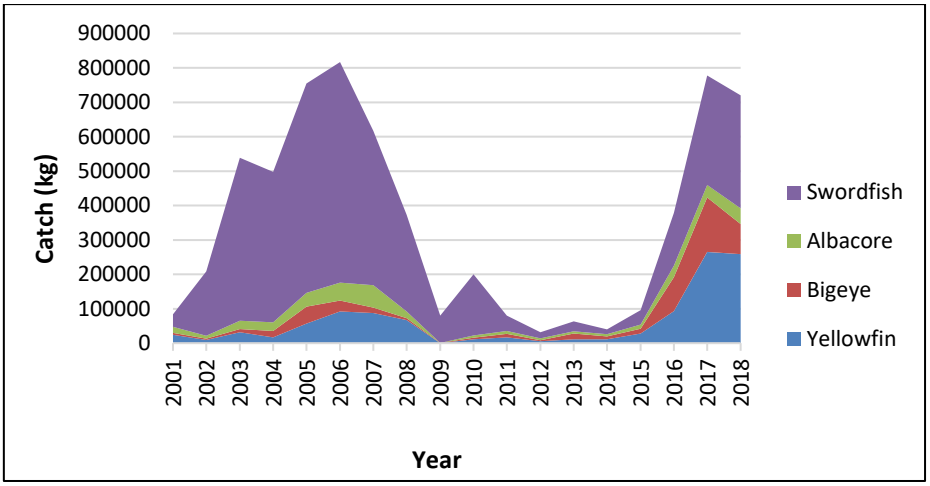

Figure 1a. Historical annual catch for the Mauritius longline fleet in the IOTC area of competence (2001 – 2018)

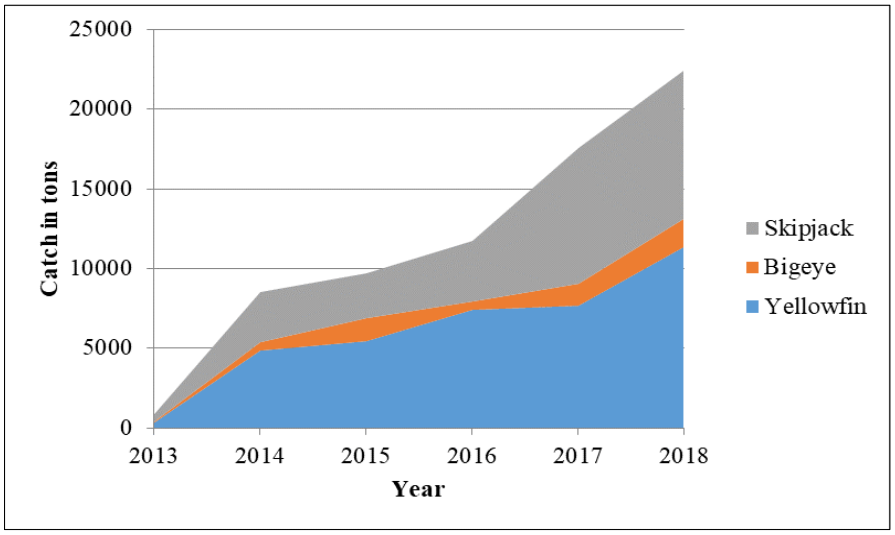

Figure 1b: Historical annual catch for the Mauritius purse seine fleet in the IOTC area of competence (2013-2018)

Figures 2a (i), (ii) and (iii) show the fishing effort of the Mauritius longline fleet both inside and outside the Mauritian EEZ and that of the Mauritius purse seine fleet in 2018. In 2018, a total of 296 620 hooks were used by the Mauritius flagged longliners fishing in the EEZ and the geographical distribution of the fishing effort was concentrated in grid 15° to 20°S and 55° to 60°E. For the national longline fleet operating outside the EEZ, the vessels operated in the EEZ of Mozambique. Regarding the Mauritius flagged purse seiners, fishing effort were deployed mostly in the EEZ of Seychelles and on the high seas in 2018 (Figure 2a iii).

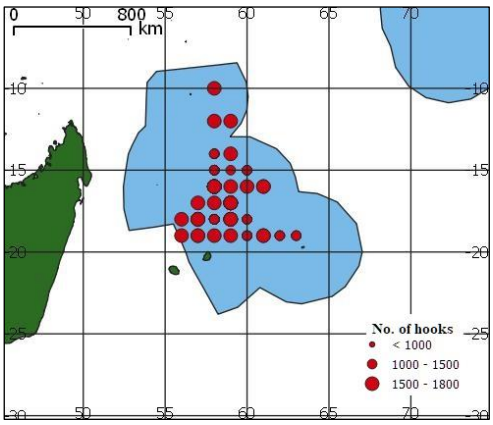

Figure 2a (i): Fishing effort (no. of hooks) -Mauritius-flagged longliners fishing in the EEZ (2018)

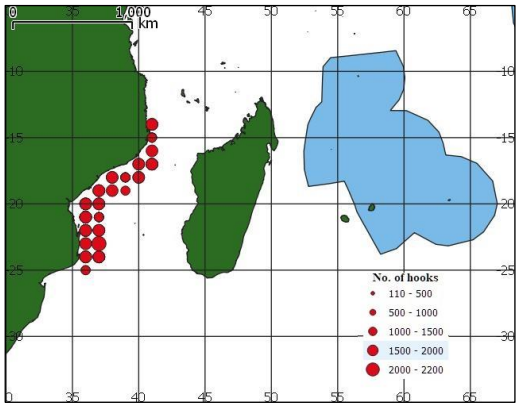

Figure 2a (ii): Fishing effort (no. of hooks) - Mauritius-flagged longliners fishing outside the EEZ (2018)

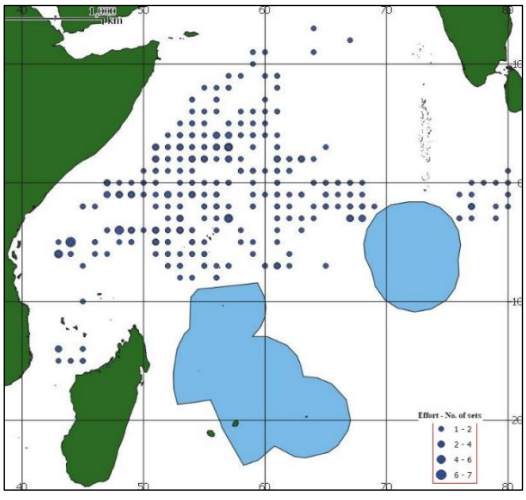

Figure 2a (iii): Fishing effort (no. of sets) - Mauritius-flagged purse seiners (2018)

Figures below 2b (i) to (iii) show the fishing effort of the Mauritius longline fleet both inside and outside the Mauritian EEZ and that of the Mauritius purse seine fleet in from 2014 to 2018. The fishing effort of the national longline fleet operating in the EEZ is concentrated in the same 5^0 grid as in 2018, from 15º to 20 ºS and 55 º to 60 ºE. For the longliners which operated outside the EEZ, the spatial distribution of fishing effort extended from 13°S to 27°S and longitudes 34°E to 42°E mainly in the EEZ of Mozambique. During the last five years, the fishing effort of the Mauritius purse seine fleet comprising two vessels covered an extended area over the high seas and in the EEZ of Seychelles from 10°N to 10°S and 50°E to 60°E and 0°S to 10°S and longitudes 60°E to 70°E (Figure 2biii).

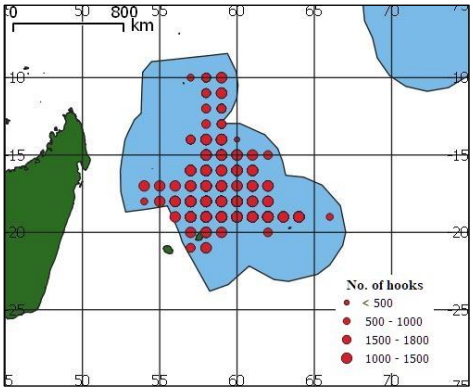

Figure 2b (i): Fishing effort (no. of hooks) -Mauritius-flagged longliners fishing in the EEZ (2014 -2018)

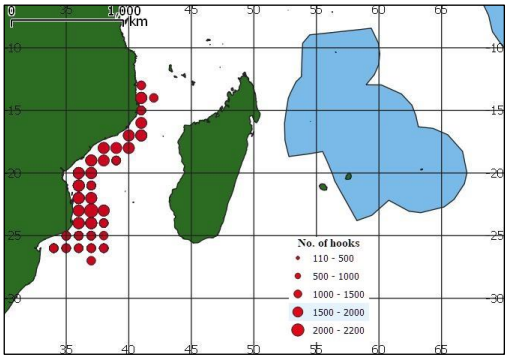

Figure 2b (ii): Fishing effort (no. of hooks) - Mauritius-flagged longliners fishing outside the EEZ (2016 -2018)

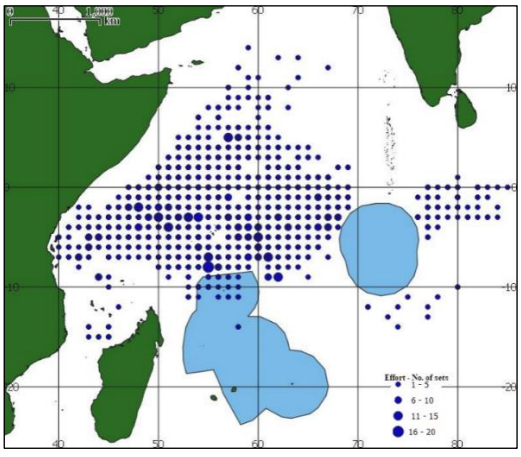

Figure 2b (iii): Fishing effort (no. of sets) - Mauritius-flagged purse seiners (2014 - 2018)

Figures 3a (i) to (vii) show the map of distribution of catch for the longline and purse seine national fleets in 2018. Both swordfish and tuna catches are concentrated between 15º to 20 ºS and 55 º to 60 ºE for those vessels fishing in the EEZ while for those fishing outside the EEZ, catches were mostly concentrated between 20º to 25 ºS and 35 º to 37 ºE. For the national purse seine fleet shown in figures 3a (v) to (vii), catches of the tropical tuna were concentrated between 10°N to 10°S and 50°E to 60°E.

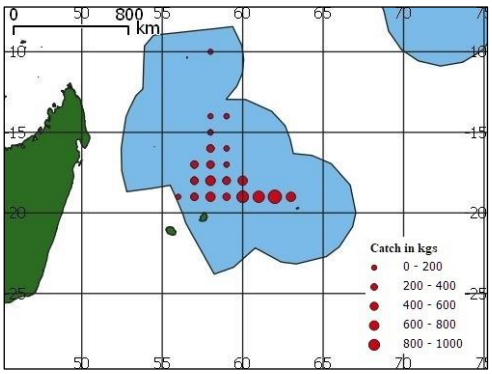

Figure 3a (i): Swordfish catches (tons) in 2018 by Mauritius-flagged longliners fishing inside the EEZ

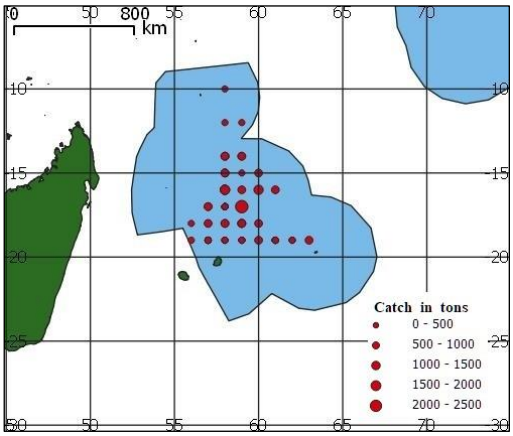

Figure 3a (ii): Tuna catches (tons) in 2018 by Mauritius-flagged longliners fishing inside the EEZ

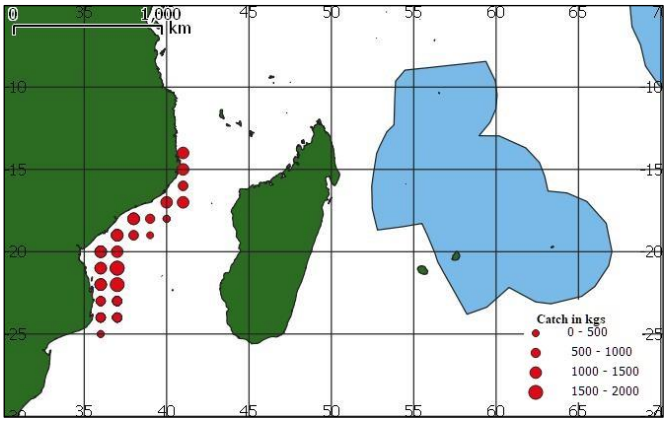

Figure 3a (iii): Swordfish catches (tons) in 2018 by Mauritius-flagged longliners outside in the EEZ

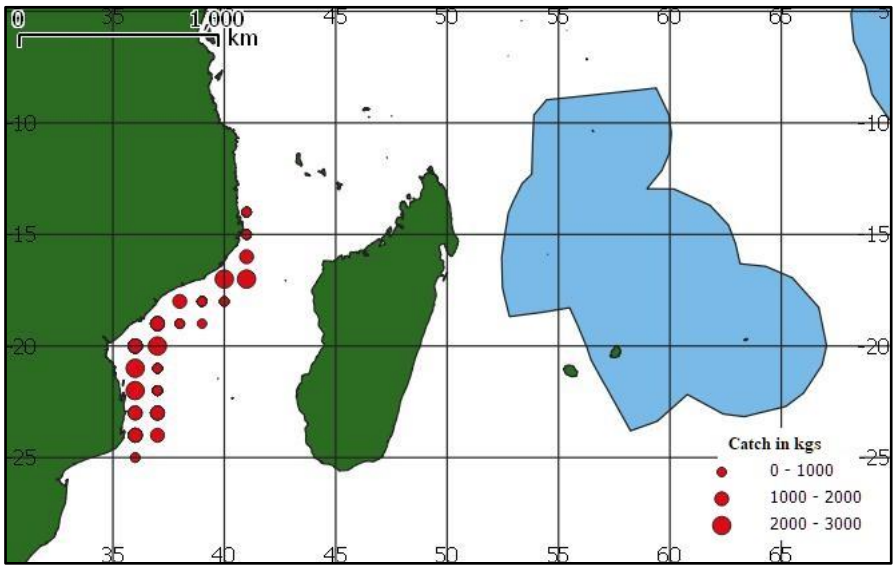

Figure 3a (iv): Tuna catches (tons) in 2018 by Mauritius-flagged longliners fishing outside the EEZ

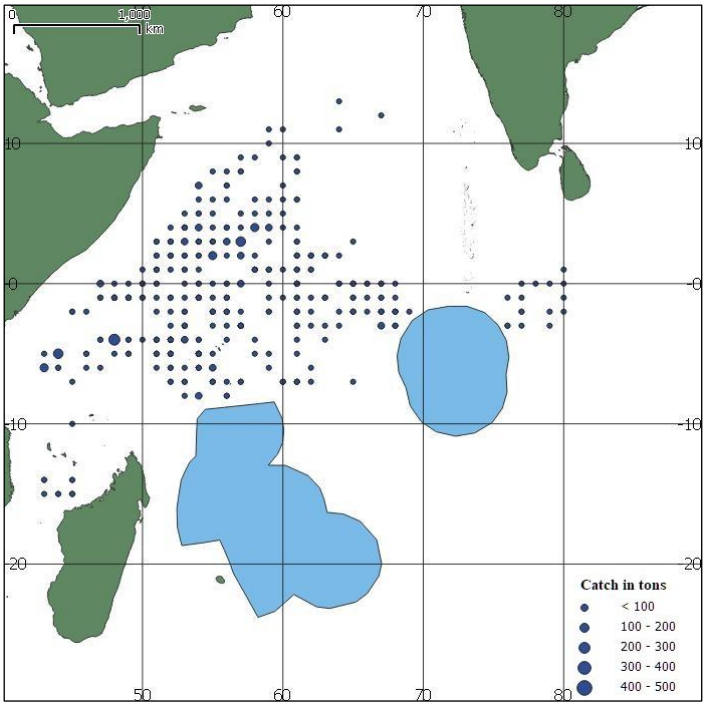

Figure 3a (v): Yellowfin catches (tons) by Mauritius-flagged purse seiners (2018)

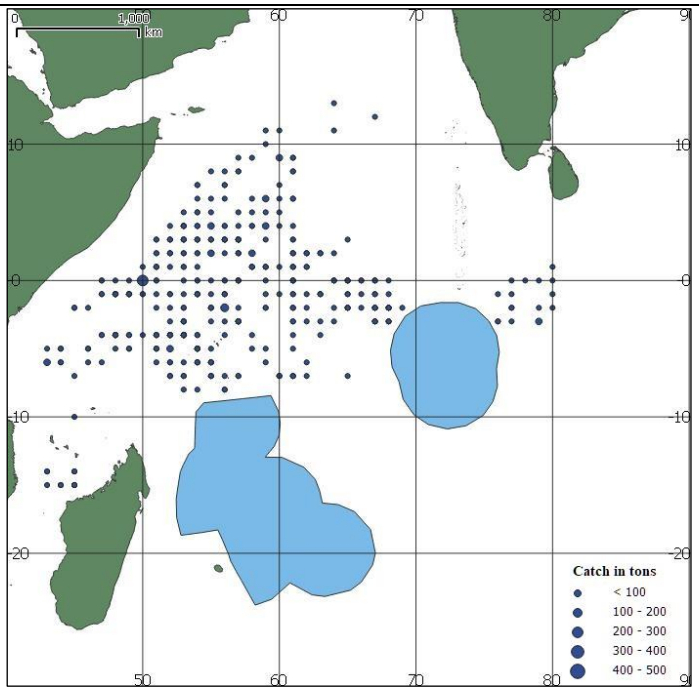

Figure 3a (vi): Skipjack catches (tons) byMauritius-flagged purse seiners (2018)

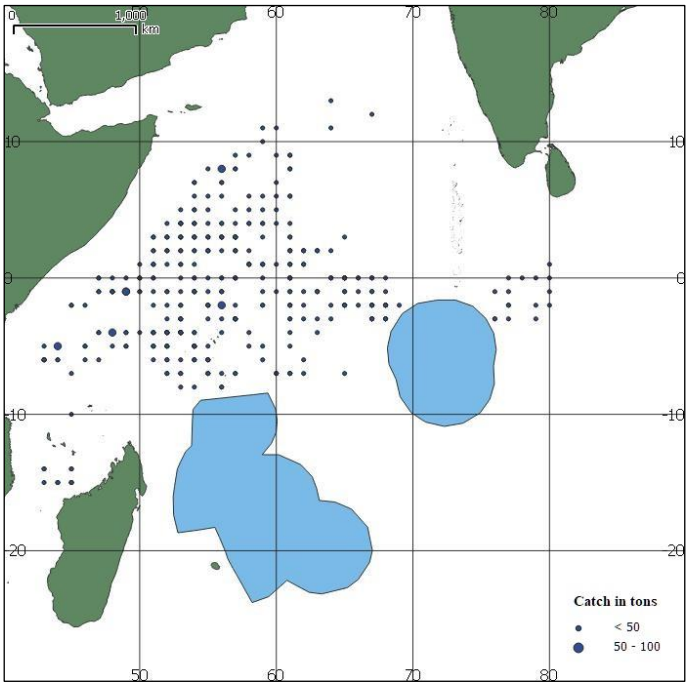

Figure 3a (vii): Bigeye catches (tons) by Mauritius-flagged purse seiners (2018)

In figures 3b (i) to 3b (vii), the catches for the national longline and purse seine fleet have been aggregated for the last five years 2014 to 2018. The same spatial concentration of catches (15º to 20 ºS and 55 º to 60 ºE) can be observed for the national longline fleet operating inside the EEZ in the last five years as in 2018. For those who are active outside the EEZ, the spatial distribution of catches was concentrated between 20º to 25 ºS and 35 º to 38 ºE. Regarding the national purse seine fleet, the spatial distribution from 2016 to 2018 were dispersed over a larger area than in 2018. Catches were concentrated in areas extending from 0°N to 10°N and 50°E to 60°E and 0°S to 10°S and 45°E to 70°E.

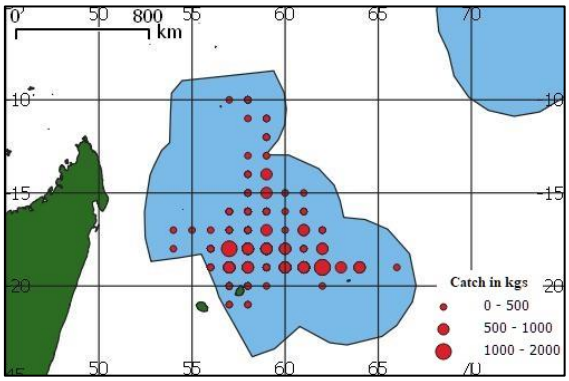

Figure 3b (i): Swordfish catches (tons) by Mauritius-flagged longliners fishing inside the EEZ (2014– 2018)

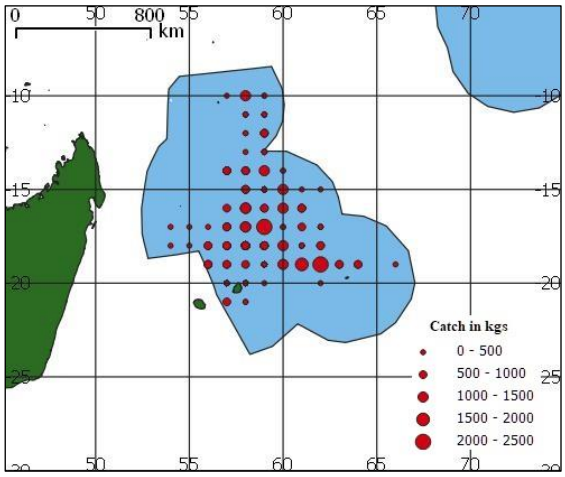

Figure 3b (ii): Tuna catches (tons) Mauritius-flagged longliners fishing inside the EEZ (2014-2018)

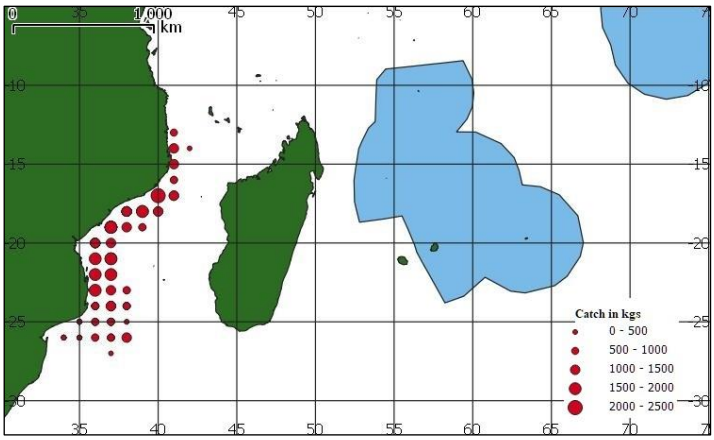

Figure 3b (iii): Swordfish catches (tons) by Mauritius-flagged longliners fishing outside the EEZ (2016-2018)

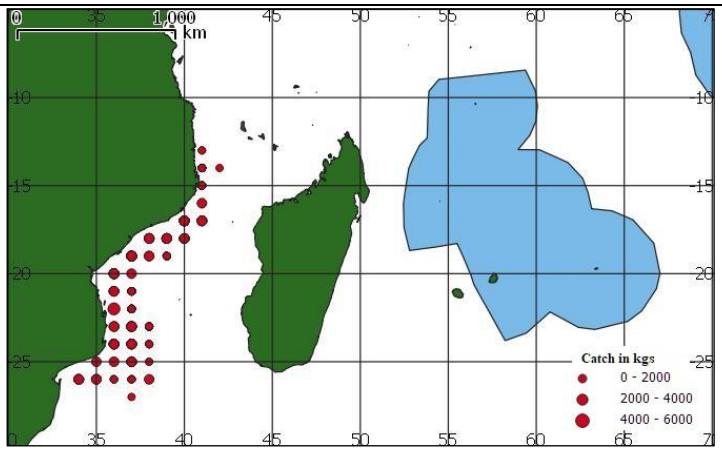

Figure 3b (iv): Tuna catches (tons) by Mauritius-flagged longliners fishing outside the EEZ (2016- 2018)

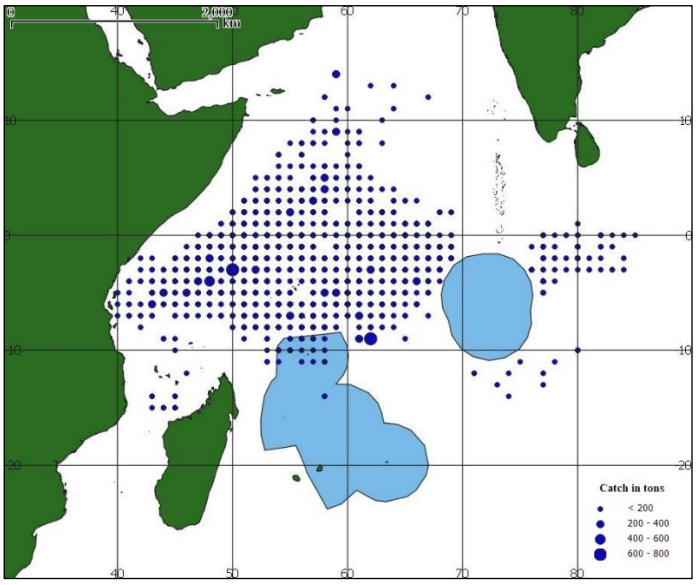

Figure 3b (v): Yellowfin catches (tons) by Mauritius-flagged purse seiners (2014 -2018)

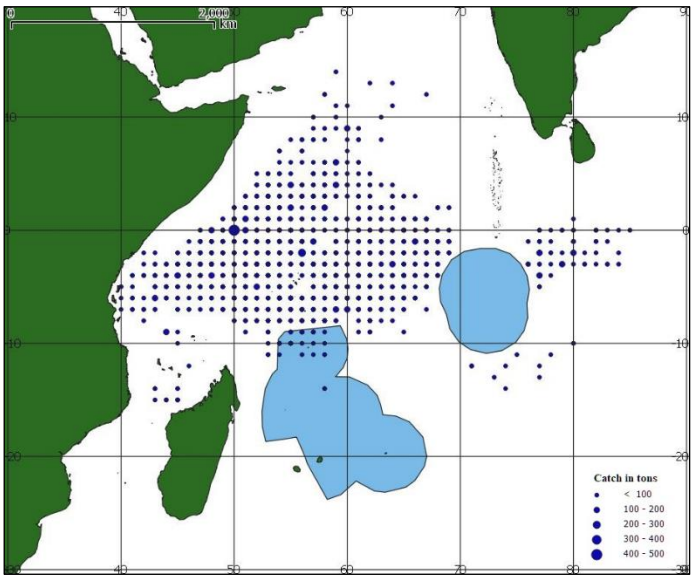

Figure 3b (vi): Skipjack catches (tons) by Mauritius-flagged purse seiners (2014 -2018)

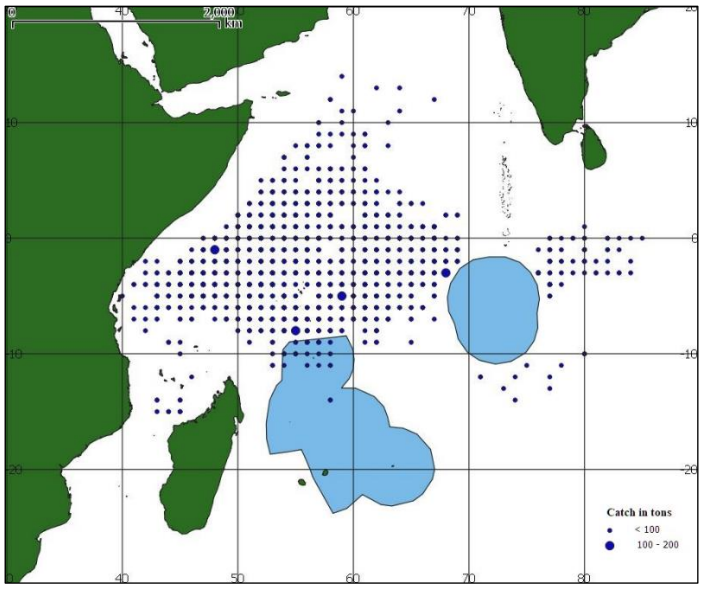

Figure 3b (vii): Bigeye catches (tons) by Mauritius-flagged purse seiners (2014 -2018)

4. RECREATIONAL FISHERY

The sports/recreational fishing is an important activity for the tourism industry and local recreational fishermen. International big game fishing competitions are held annually. Around 60 sports/recreational fishing boats are involved in this fishery. The main fishing gear is trolling and the fishery supplies the local market with an estimated amount of about 350 tonnes. The main species comprises marlins, sailfish, tuna, common dolphinfish and wahoo. The estimated catch in the sports/recreational fishery for pelagic species is estimated at around 350 tonnes of fish.

5. ECOSYSTEM AND BYCATCH ISSUES

Sharks

Skippers, masters and agents of vessels have been sensitised on the conservations and management measures related to sharks; namely Resolutions 12/09, 13/05 and 13/06 17/05 and 18/02. Those resolutions have been included in the licence conditions as mandatory The skippers/masters have also been informed of their obligation to comply to Resolution 19/03 concerning mobulid rays. Furthermore, identification guides on pelagic sharks have been distributed to the masters of the national-flagged vessels. Mauritius has already implemented its NPOA-sharks and has conducted a shark identification workshop in 2014 and is currently planning a second shark identification workshop. As reported in the fishing logbooks, longliners caught shortfin mako (*Isurus oxyrhinchus*) and blue sharks *(Prionace glauca*).

5.1.1 NPOA (Sharks)

Mauritius has a National Plan of Action for the Conservation and Management of Sharks (NPOA- Sharks, Mauritius) since the year 2015. A copy of the NPOA-Sharks, Mauritius was forwarded to the IOTC. In the NPOA, a series of actions have been described to ensure the conservation and management of sharks. These include:

(i) Decrease fishing effort in any fishery where shark catch is unsustainable;
(ii) Improve data collection and monitoring of shark fisheries;
(iii) Train all concerned in identification of shark species;
(iv) Facilitate and encourage research on sharks;
(v) Improve the utilization of sharks caught; and
(vi) Ascertain control over access of fishing vessels exploiting shark stocks

5.1.2 Shark Finning Regulation

Sharks finning is banned in Mauritius. All vessels licensed to fish for tuna and tuna like species are bound by the licence conditions to comply with the different IOTC resolutions, more specifically to Resolution 17/05. The licence conditions are made under Section 37 of the Fisheries and Marine Resources Act 2008 and are thus legally binding.

5.1.3 Blue Shark

Skippers/Masters are bound to report any catch of blue sharks. The skippers/masters have to abide by Resolution 18/02 as Licence conditions are binding as per the Marine Fisheries and resources Act 2008. All blue sharks reported in the logbooks have been transmitted to the IOTC. Monitoring of Blue sharks caught is through logbook information and observer reports. Table 3 shows the total number and weight of sharks, by species, retained by the national fleet in the IOTC area of competence from 2013 to 2018.

Table 3: Total number and weight of sharks, by species, retained by the national fleet in the IOTC area of competence (2013–2018)

Year	No. of sharks	Species	Weight (Kg)
2013	17	*Isurus oxyrhinchus*	680
2014	3	*Isurus oxyrhinchus*	90
2015	12	*Isurus oxyrhinchus*	485
2016	95	*Isurus oxyrhinchus*	3519
	33	*Prionace glauca*	575
	2	*Sphyrnidae*	70
2017	217	*Isurus oxyrhinchus*	6552
	13	*Prionace glauca*	250
2018	138	*Prionace glauca*	3074
	432	*Isurus oxyrhinchus*	6006
	104	*Isurus paucus*	1351
	1	*Carcharinus limbatus*	50
	10	*Carcharinus falciformi*	200
	18	*Sphyrna sp*	600

Table 4: Total number of sharks, by species, released/discarded by the national fleet in the IOTC area of competence (2014–2018)

Year	No. of sharks released	Species
2014	3	*Isurus oxyrhrincus*
2015	12	*Isurus oxyrhrincus*
2016	9	*Prionace glauca*
2017	Nil	Not applicable
2018	1(released alive)	*Rhincodon typhus*

5.2 Seabirds

As reported in the Implementation Report for Mauritius for 2018, there was no incidental bycatch of seabirds by the Mauritian longliners. Nil encounters with seabirds have been reported in all the fishing logbooks received from the foreign-flagged and Mauritius-flagged licensed vessels for 2018. Furthermore, Mauritius-flagged longliners are semi-industrial vessels less than 24 meters that operate mostly in the EEZ and not in the zone of 25 degrees in the South Latitude explaining the nil encounters with seabirds.

All masters and agents of the licensed vessels have been provided with "Seabirds Identification cards for fishing vessels operating in the Indian Ocean" whereby identification techniques and mitigation measures are described.

5.3 Marine Turtles

The protection of marine turtles and eggs of marine turtles is ensured under Sections 16 (1) (c) and 17 (1) (c) of the Fisheries and Marine Resources Act 2007.

Furthermore, vessels' agents and masters have been provided with the 'Marine Turtle Identification Cards – for Indian Ocean Fisheries' depicting different species of turtles, techniques of releasing hooked turtles as well as some literature related to the ecology of marine turtles, threats to marine turtles; amongst others.

Also, the license conditions of Mauritius make provision for compliance to Resolution 12/04.

Other measures taken by Mauritius 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 submitted to the Secretariat on the 10 April 2019. Interaction of the Mauritian purse seiners with Marine turtles has been reported for Resolution 12/04 in April 2019. As shown in table 4a, in 2018, there were 6 interactions with marine turtles and one was released alive. Table 4b gives more details on the geographical position and effort associated with the encounters of marine turtles.

Table 4a: Interactions with marine turtles by the Mauritius-flagged purse seiners in 2018

Species of turtle encountered and discarded	Released Alive	Dead	Month
LKV-Olive ridley turtle	1	1	August
TTH Hawksbill turtle	0	1	April
TTX- Marine turtles nei	0	1	October
TUG Green Turtle	0	1	August
TUG Green Turtle	0	1	January

Table 4b: Details on the effort deployed by geographical position relating to encounters with marine turtles by the Mauritius-flagged purse seiners from 2014 to 2018

Year	Fishery – **Purse Seine**			Observed ** **Observer data**				
	Lat*	Lon	Total effort	Total effort observed	Species	Captures (number)	Mortalities (*Released dead*) (number)	Live releases (number
2018	02N	052E	3	3	LKV-Olive ridley	0	1	1
2018	07S	061E	5	5	TTH-Hawksbill turtle	0	1	0
2018	03N	061E	4	4	TTX- Marine turtles	0	1	0
2018	05N	054E	2	2	TUG-Green Turtle	0	1	0
2018	03S	077E	1	1	TUG-Green Turtle	0	1	0
2017	02N	051E	4	4	LKV-Olive ridley	0	0	1
2017	07S	049E	2	2	TTL-Loggerhead	0	0	1
2017	03S	076E	1	1	TUG-Green turtle	0	0	1
2017	07S	055E	3	3	TUG-Green turtle	0	0	1
2017	04S	060E	4	4	TTH-Hawksbill turtle	0	0	1
2017	00N	048E	6	6	TTH-Hawksbill turtle	0	0	1
2017	02S	080E	4	4	TTX-Marine turtles	0	0	1
2016	-	-	-	-	-	0	0	0
2015	-	-	-	-	-	0	0	0
2014	-	-	-	-	-	0	0	0

NB: Effort units = Number of sets

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

The Fisheries and Marine Resources Act 2007 makes provision for the protection of marine mammals under Section 17 (1) (d) as stipulated: "*no person shall land or cause any person to land, sell or have in his possession in Mauritius or in the maritime zones any marine mammal".*

One encounter was noted by a purse seiner with a whale shark in 2018. As reported in the implementation report, the purse seiner Belle Isle encircled a small whale shark during a fishing operation on FAD. This small whale shark had not been detected before the encirclement and was released safe and alive. Details on the location of the encirclement is as follows: date: 26/01/2018 and position: 03°00S / 076°33E.

The whale shark was tipped over the purse seine by slacking the cork hoist and lowering the float line. The whale shark was released safe and alive. All these elements are recorded in the on-board observer's report.

Table 5 shows that 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 interest (seabirds, marine turtles and marine mammals)

YEAR	Turtles	Seabirds	Marine mammals
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification

Catch data is being collected from the fishing logbooks since 2001. The fishing licence conditions make it mandatory for all the fishing vessels to submit duly filled in logbooks to the Ministry upon arrival at port. All the fishing positions are verified for accuracy against the Vessel Monitoring System (VMS) and landing data from the Port State Control Unit (PSCU), Mauritius Ports Authority and fishing agents. 141 logbooks from longliners and 31 logbooks from purse seiners were processed. Observers were also deployed on two purse seiners and 2 longliners operating outside the EEZ.

6.2. Vessel Monitoring System

The Vessel Monitoring System operates under the Fisheries and Marine Resources (VMS) Regulations Government Notice No. 87 of 2005, which came into operation on 01 June 2005 and is housed at the Fisheries Monitoring Centre (FMC) based at the Albion Fisheries Research Centre (AFRC). The VMS monitors the positions, speed and direction of fishing vessels by means of Inmarsat and Argos satellite-based tracking systems. At a regular interval (two hours for vessel with Inmarsat and one hour for those fitted with Argos transponders), the vessel sends the data reports to the Land Earth Station (LES) via a satellite network which transmit the data to a database of the Server of the FMC.

A Mauritian Fishing Licence is only issued to fishing vessels (local and foreign) equipped with valid and operational satellite-based reporting devices on-board. The VMS assists in the management of licensed vessels in the Exclusive Economic Zone (EEZ) of Mauritius. The reporting and movement of these vessels are monitored at the FMC on a regular basis. Any fishing vessel suspected of illegal fishing activities may be prosecuted and fined accordingly. Any discrepancies in the reporting and any anomalies in the logbook entries checked against the VMS database may result in the forfeit of the logbook deposit fee as well as revocation the Fishing Licence. 239 vessels including foreign licensed vessels were monitored during 2018.

6.3. Observer programme

Deployment of observers on board national purse seiners has been initiated as from February 2015. Observers were deployed on purse seiners in 2016, 2017 and 2018. For purse seiners, Mauritius has been able to maintain an observer coverage of at least 15% throughout the years. Observer coverage on longliners operating outside the EEZ of Mauritius started in 2018. Two observers were deployed on the two Mauritius-flagged longliners operating outside the EEZ of Mauritius and they spent 57 days at sea. On the Mauritius-flagged purse seiners, 113 sets and 139 days at sea were covered by two observers. The annual observer coverage on the Mauritius flagged longliners and purse seiners from 2015 to 2018 is shown in table 6 and the spatial distribution are presented in figures 4a and 4b.

Table 6. Annual observer coverage on the Mauritius longline and purse seine fleets (2015-2018)

Year	Gear	Period	Number of Days
2015	Purse seine	26/02/15 – 03/05/15	69
		06/04/15 – 17/06/15	71
		06/05/15 – 15/07/15	70
2016		23/03/16 – 01/06/16	78
		01/06/16 – 10/08/16	71
		08/09/16 – 17/11/16	71
2017		04/10/17 – 13/12/17	71
2018	Purse seine	02/05/18 – 11/07/18	71
		30/05/18 – 05/08/18	68
	Longline	03/11/18 – 14/11/18	16
		17/11/18 – 28/11/18	12
		03/11/18 – 14/11/18	16
		17/11/18 – 29/11/18	13

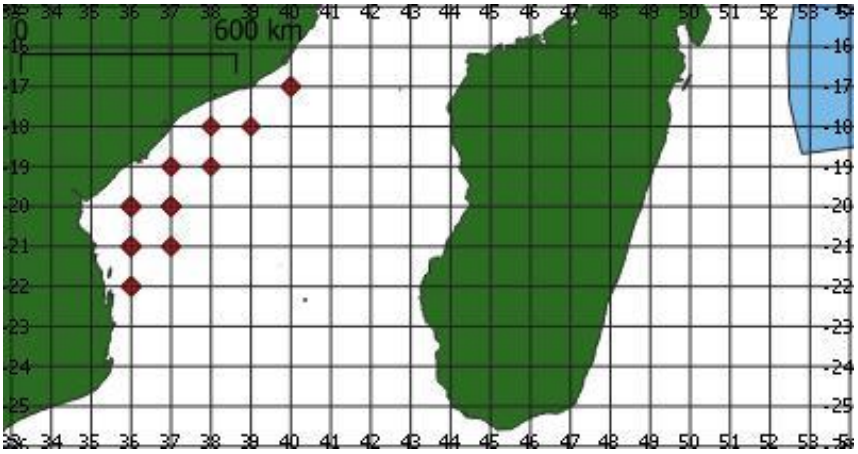

Figure 4a. Map showing the spatial distribution of observer coverage for the Mauritius-flagged longliners fishing outside the EEZ (2018)

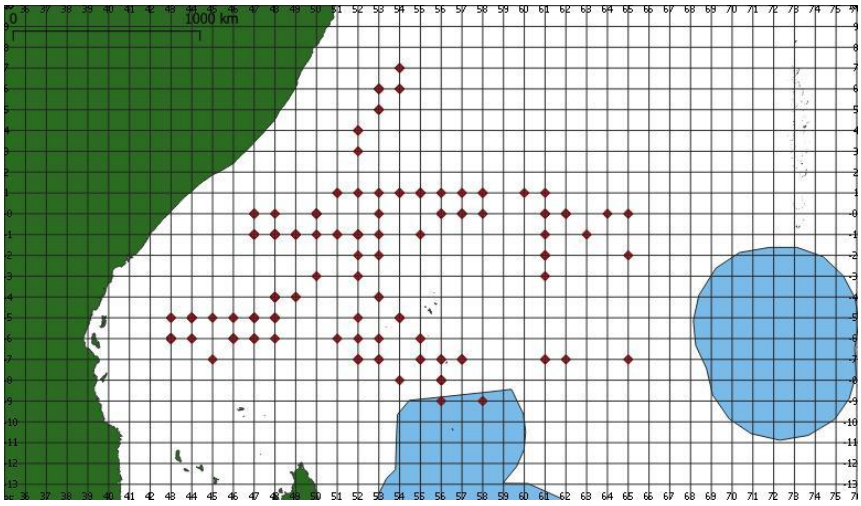

Figure 4b. Map showing the spatial distribution of observer coverage for the Mauritius-flagged purse seiners (2018)

6.4. Port sampling programme

Port sampling program started since the coming into operation of the first Mauritian purse seiners in the 1980's. The sampling programme consists of sampling exercises that are carried out on the catch of tuna unloaded by licensed longliners and purse seiners. Data collection sheets have been designed accordingly to enable the recording of length, weight and species composition data during unloading of catch from both foreign vessels and local boats. The vessel's name and date of unloading is also recorded during sampling. The local longline fishery which targets swordfish also lands a substantial amount of by-catch comprising of tuna with yellowfin tuna being the most predominant species in the group of tuna landed (26%) followed by bigeye tuna (19%) and albacore tuna (15%). Fork length measurements and weight data are recorded for tunas while operculum to keel measurements and weight are recorded for swordfish that are unloaded by local longliners. Table 7 shows the number of active vessels monitored by species and gear in 2018 and table 8 shows the number of individuals measured by species and gear.

Table 7: Number of vessels active monitored, by species and gear

Species	No. of vessels		
	Purse seine	Longline (inside the EEZ)	Longline (outside the EEZ)
Yellowfin	1	5	8
Skipjack	1	Nil	Nil
Bigeye	1	5	8
Albacore	Nil	5	Nil
Black marlin	Nil	2	7
Blue Shark	Nil	2	Nil
Blue Marlin	Nil	4	Nil
Mako shark	Nil	5	6
Striped marlin	Nil	2	5
Sailfish	Nil	4	Nil
Swordfish	Nil	5	8

Table 8: No. of individuals measured by species and gear

Species	No. of individuals measured		
	Purse seine	Longline (inside the EEZ)	Longline (outside the EEZ)
Yellowfin	395	604	341
Skipjack	615	Nil	Nil
Bigeye	68	263	152
Albacore	Nil	278	Nil
Black marlin	Nil	5	5
Blue Shark	Nil	7	Nil
Blue Marlin	Nil	4	Nil
Mako shark	Nil	10	12
Striped marlin	Nil	3	4
Sailfish	Nil	3	Nil
Swordfish	Nil	714	269

6.5. Unloading/Transhipment of flag vessels

Mauritius acquired its purse seine fleet in 2013 and transshipment activities were initially recorded in Victoria, Seychelles in October 2013. In 2018, the two Mauritius-flagged purse seiners transhipped a total of 2932.7 tonnes of tuna in Seychelles out of which a certain quantity was destined for Mauritius and the remaining for tonnes were for various destinations such as Algeria, China, France, Indonesia, Italy, Japan, Korea republic of, Morocco, Seychelles, Spain, Thailand, Tunisia and Vietnam. Tables 9a and 9b show the quantities landed in ports located in the IOTC area of competence by the national longline and purse seine fleets.

Table 9a: Quantities landed by Mauritius-flagged longliners by species and gear in ports located in the IOTC area of competence

Species	Qty landed by gear in kg	
	Longline (inside the EEZ)	Longline (outside the EEZ)
Yellowfin	46095	213025
Bigeye	7642	79209
Swordfish	20782	307974
Albacore	36869	8970
Striped marlin	385	2504
Black marlin	2956	13972
Blue marlin	1560	5960
Longfin mako	1016	335
Shortfin mako	3326	2680
Blue shark	2160	914
Sailfish	711	6771
Dolphin fish	788	28021
Skipjack	68	5
Wahoo	3762	0
Oilfish	75	972
Spearfish	0	1256
Requiem Shark	0	50
Misc	1408	18631

Table 9b: Quantities landed by Mauritius-flagged purse seiners by species landed in ports located in the IOTC area of competence

Species	Qty landed in tons
Yellowfin	10600.7
Skipjack	7279.1
Bigeye	1576.6
Albacore	16.1

Table 10: Quantities (tons) transhipped by Mauritius-flagged purse seiners in 2018

Gear	Species		
	YFT	SKJ	BET
Purse seine	720.80	2,004.10	207.80

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

Catches Striped Marlin, Black Marlin and sailfish are reported to the Secretariat as per Resolutions 15/02. Masters and Skippers have been sensitised to the need to report these species. Masters and skippers are bound to comply with Resolution 18/05. Mauritian vessels do not target these species and the catch limits referred in Resolution 18/05 do not apply. The Masters/ skippers are aware that they have to report their catch in accordance with the requirements of resolution 15/01. Monitoring of the catches is done through logbook data. Observers are also placed on the Mauritian vessels.

7. NATIONAL RESEARCH PROGRAMS

No specific research programme was carried out in 2018 at the national level.

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 2011 and 2018.

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	2 observers were deployed on board national-flagged purse seiner and the observer coverage was 17% for purse seiners for 2018. 113 sets were observed. 2 Observers were deployed on the Mauritius-flagged longliners operating outside the Mauritius EEZ. They spent 49 days at sea and 35 sets were observed. The coverage was 3.7%.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Licensed fishing vessels have been notified about the mitigation measures proposed under this resolution. Furthermore, marine turtles and their eggs are protected by the Mauritian law as specified in Sections 16 and 17 of the Fisheries and Marine Resources Act 2007, Act no. 27 of 2007. Also, information for Resolution 12/04 has already been submitted to the IOTC as per the FAO Guidelines on 10/04/18
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	No encounter with seabirds has been reported in the fishing logbooks. All vessels have been advised on the application of the seabird mitigation measures. Furthermore, 'Seabird Identification Cards' provided by the IOTC, have been distributed to the agents of the Mauritius-flagged vessels.
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	Skippers of national flagged vessels have been trained in the identification of thresher sharks and have been informed to release live specimens of thresher sharks caught. They have also been provided with identification guides. No vessel has reported any encounter with thresher sharks.
13/04	On the conservation of cetaceans	Paragraphs 7– 9	As per the logbooks of the fishing vessels, there has been no encirclement of cetaceans by the Mauritius-flagged purse seiners. Skippers have to report any interaction with cetaceans. Also, the Fisheries and Marine Resources Act 2007, Act No. 27 of 2007 has prohibited the fishing of marine mammals, under Section 17. Compliance with Resolution 13/04 for the conservation of cetaceans is mandatory as per the fishing licence conditions

Res. No.	Resolution	Scientific requirement	CPC progress
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	One encounters with a whale shark was reported in 2018. The whale shark was released alive. Also, the masters and agents of the Mauritius-flagged vessels have already been sensitised on the importance to comply with Res 13/05.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	There has been no encounter with oceanic whitetip sharks during the year. Skippers have also been provided with identification guides All fishers have been informed on the need to comply with Resolution 13/06. Furthermore, the NPOA Sharks of Mauritius has made provisions for the conservation of the oceanic whitetip shark.
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	As per the license conditions, it is mandatory for the vessels to keep on board a copy of the logbook which has provision for daily recording the catch and effort. Logbooks are collected and data after each trip of each vessels. The data is then input and analysed. Logbook data is also verified against VMs record and declarations at landing ports.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	Data on mandatory statistical reporting is regularly submitted to the IOTC in June of every year. All the data pertaining to Resolution 15/02 for the year 2018 was submitted to the IOTC Secretariat on the 30/06/19 in accordance with the reporting requirements. As for the longline fleet, the final catch data shall be submitted by 31/12/19.
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	Mauritius is not a shark-fishing nation and does not issue licenses to foreign vessels targeting sharks. However, guides related to the shark identification have been distributed among the agents of the Mauritius-flagged vessels to avoid the retention of endangered shark species under the IOTC mandate onboard. Moreover, the NPOA-sharks of Mauritius highlights the conservation of sharks caught as bycatch. Hence, Mauritius has planned to hold a workshop on the 'Identification of sharks and sharks' fins with the aim to sensitise all relevant stakeholders. Data on sharks was submitted to the IOTC on 30/06/18.
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	Paragraphs 2-5	Mauritian vessels catching blue shark are required to record their catch in the logbooks. This data is reported as per Resolution 15/02. As per the fishing licence conditions it is mandatory for the skippers to record catch data on 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	All fishing vessels have to report in their logbooks Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish catches and whether released alive and/or discarded. Data about marlins are submitted to the IOTC in accordance with the Resolution 15/02. Compliance with Resolution 18/05 for the conservation of bill fishes is mandatory as per the fishing licence conditions.
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	The Implementation Report was submitted to the Secretariat on 10/04/18 and includes all measures taken for the reporting obligations regarding the mentioned resolutions in the different sections of the report. All columns in the form 1RC are filled and zero catches are recorded where applicable.

9. LITERATURE CITED

1. Fisheries and Marine Resources Act 2007

2. The first three years experience in the use of Fish Aggregating Devices in Mauritius (Roullot *et al* 1998)

3. Evolution of the swordfish longline fishery in Mauritius (D. Norungee *et al* 2002)

4. Tuna data collection and processing in Mauritius (D. Norungee and M. Munbodh, 1999)