EU-Portugal National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2020

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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 2020, final data for the 2019 calendar year must be provided to the Secretariat by 30 June 2020)	N/A. Portugal does not have any fleets other than pelagic longlines.
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).	YES Dates submitted: 2 June 2020 (nominal catches; catch and effort) 16 June 2020 (size data)
If no, please indicate the reason(s) and intended actions:	

Executive Summary

During 2019 EU-Portugal active fishing fleet operating in the IOTC convention area consisted of only 3 pelagic longliners targeting swordfish mostly in the temperate southwest Indian Ocean. Overall, a total of 1,544 MT was caught, of which 629 MT corresponded to swordfish, 711 MT to blue shark, 114 MT to shortfin mako, 52 MT to tuna, 21 MT to billfish (excluding swordfish) and 17 MT to other species. In 2019, EU-Portugal kept fully implemented the data collection program, making use of two major sources: onboard observers and official logbooks. In 2018, and within the EU data collection framework, EU-Portugal continued the collection and revision of fisheries and biological data, including historical catches, catch and effort, and catch at size, which were provided to IOTC Secretariat in due time. The detailed observer data was fully reported in electronic format, including all detailed data for the target, bycatch and vulnerable species such as sea-turtles, sea-birds and marine mammals. EU-Portugal scientists produced and participated in several relevant working documents to several IOTC Working Parties, which are described in this report.

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1. CONTENTS

1. BACKGROUND/GENERAL FISHERY INFORMATION

The Portuguese fishing fleet operating in the IOTC area of competence consist only of pelagic longline freezer vessels, which started their activities in 1998. Since then, there have been some changes and variability on the fleet composition, as after a sharp increase on the number of active vessels, after 2007 the active fleet was substantially reduced. Currently, the fleet make use of the semi-automatic pelagic longline (Florida style gear), using J hooks baited with squid and/or mackerel, depending on abundance of the target species. Moreover, the increasingly use of wire traces has been registered, particularly in areas and/or seasons with higher abundance of pelagic sharks. Since recent years the fishing effort (number of active vessels) has been substantially reduced, with only 3 active vessels operating in recent years.

2. FLEET STRUCTURE

The Portuguese fishing vessels operating in the IOTC area of competence consist only of pelagic longline targeting swordfish. The number of vessels licensed increased from the beginning of the fishery in 1998 (five vessels) until 2009 (24 vessels). The number of active vessels followed a similar trend, with a peak in 2006 (17 vessels). However, during the last years, the active vessels in the convention area decreased occasionally to as low as three (in 2009 and 2012), and now also more recently in 2018 and 2019, when again the number of active vessels was only three. One of the main reasons for some of the previous decreasing trends on the number of active vessels, specifically the drop seen between 2008 and 2012, was piracy in the Mozambique Channel, which traditionally was a major fishing area for the Portuguese fleet operating in the IOTC Convention area. Then, for a number of years, specifically in 2013 and 2014, the number of active vessels increased again to 7. But since then and to the present date it has continued to decrease and currently there are only 3 active vessels (**Table 1**). The fishing operations are surface pelagic drifting longlines, set in shallow waters with night setting and targeting mainly swordfish, with blue shark being an important secondary target species.

Table 1: EU-Portugal longline fishing vessels licensed and actively operating in the IOTC area of competence, for the period 1998 to 2019.

Year	No. licensed vessels	No. active vessels
1998	5	1
1999	8	3
2000	9	3
2001	9	6
2002	11	7
2003	12	6
2004	14	5
2005	16	7

2006	18	17
2007	17	15
2008	21	4
2009	24	3
2010	18	4
2011	16	4
2012	16	3
2013	16	7
2014	18	7
2015	18	6
2016	18	6
2017	18	6
2018	18	3
2019	18	3

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

The overall catch had a peak in 2006 (4,867 MT), followed by a sharp decrease in 2008. In recent years an increasing trend has been observed, followed by reductions in the most recent years of 2018 and 2019. The 2019 overall production was 1,544 MT, which represents a 15% decrease from 2018 catches (1,808 MT) and a 51% decrease from 2017 (3,168 MT).

The Portuguese fleet has swordfish as the main target species. After a peak on the catches of swordfish in 2007 of 1,956 MT, the mean catches during the last 5 years were of 1133 MT. In 2019, a total of 629 MT of swordfish were caught (**Table 2** and **Figure 1**). Pelagic sharks, mainly blue shark, are the primary by-catch species. Pelagic sharks showed a peak on the catches in 2006, while tuna reached a peak in 2007. After a sharp decrease on the catches in 2008, both species groups followed a slightly increasing trend up to 2010, and more sharp increases in recent years, which are followed by a decrease in the most recent year. Among the pelagic sharks, the blue shark is the main species, followed by the shortfin mako. Their respective catches in 2019 were 711 and 114 MT, while their mean catch during the last five years were of 1076 and 193 MT (**Table 2** and **Figure 1**).

Table 2. Total EU-Portugal longline annual catch (MT - metric tons) and effort (x103 hooks) and catch for the primary species (or group of species) in the IOTC area of competence, for the period 2015 to 2019. SWO – swordfish; BSH – blue shark; SMA – shortfin-mako; TUS – tuna; BIL – other billfishes; NEI – not elsewhere included, category for all other species combined.

Year	Total effort	Total catch	SWO	BSH	SMA	TUS	BIL	NEI
2015	1415	3386	1454	1249	225	308	60	90
2016	1699	3511	1400	1375	241	311	84	100
2017	1618	3168	1439	1240	218	133	51	86
2018	893	1808	741	806	166	42	25	28
2019	809	1544	629	711	114	52	21	17

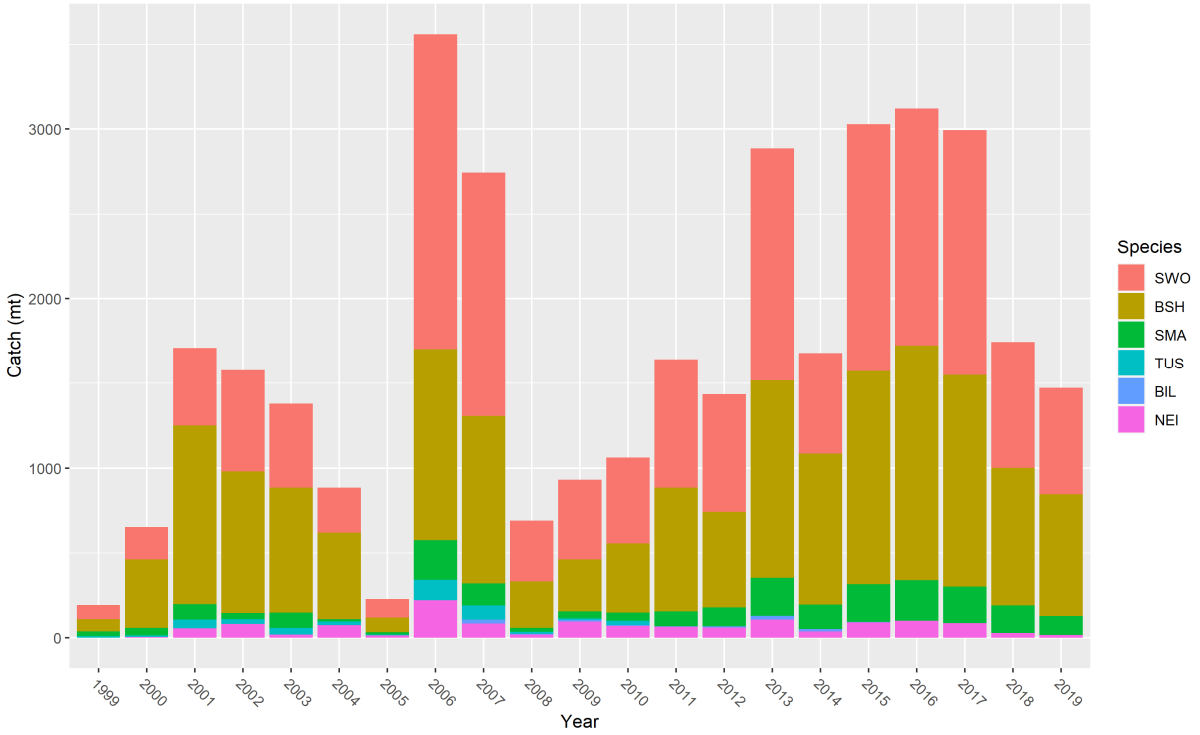

Figure 1. Historical annual catch for the Portuguese longline fleet, by primary species (or groups of species), for the IOTC area of competence for the entire history of the fishery (1999-2019). SWO – swordfish; BSH – blue shark; SMA – shortfin mako; TUS – tuna; BIL – billfishes; NEI - category for all other species combined.

During 2019 the overall fishing effort was 809 thousand hooks, with the SW area being the most heavily fished (**Figure 2a**). During the first years of the fishery the fishing effort was concentrated in the SW Indian Ocean, but then developed towards the Central and Eastern regions of the convention area (**Figure 2b**). However, in recent years due to several reasons (including piracy, oil price and the decreased number of active boats), most of the fishing activity in occurring in the SW area of the Indian Ocean. **Figure 3a** shows the spatial distribution of the catch for the three most important species in 2019. **Figure 3b** shows the geographical distribution of the catch (MT) for the three most important species during the period 2015-2019.

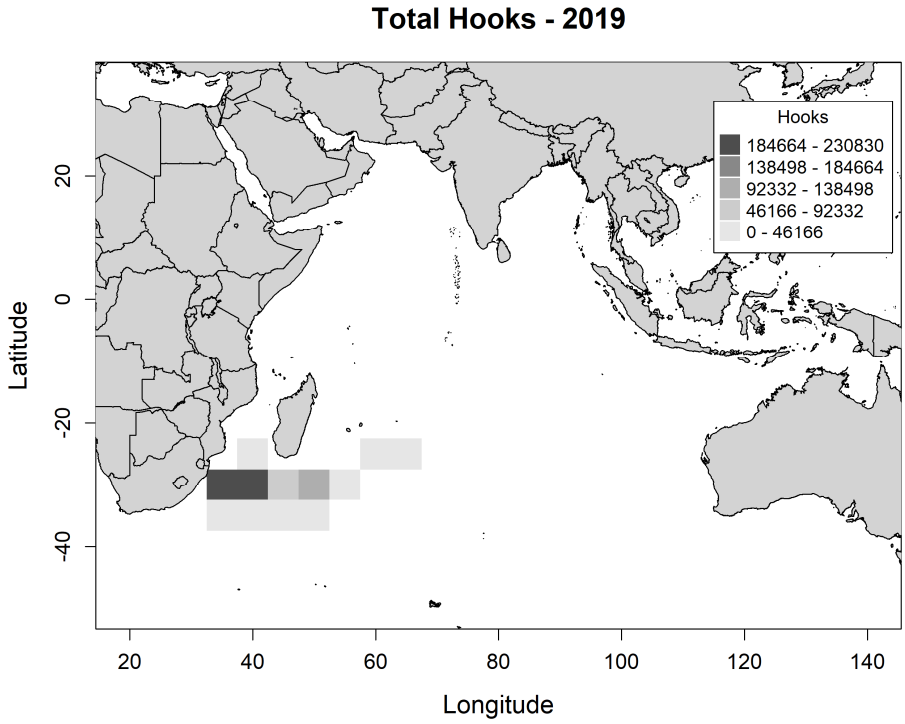

Figure 2a. Map of the distribution of fishing effort (number of hooks deployed), by the Portuguese longline fleet operating in the IOTC area of competence during 2019.

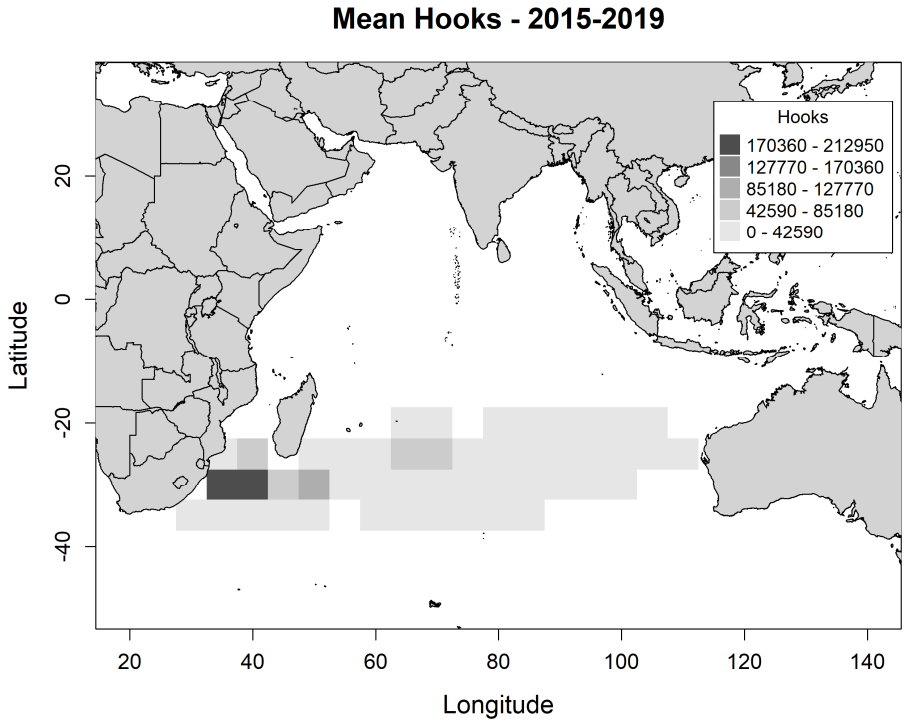

Figure 2b. Map of the distribution of mean fishing effort (number of hooks deployed), by the Portuguese longline fleet operating in the IOTC area of competence during the period 2015-2019.

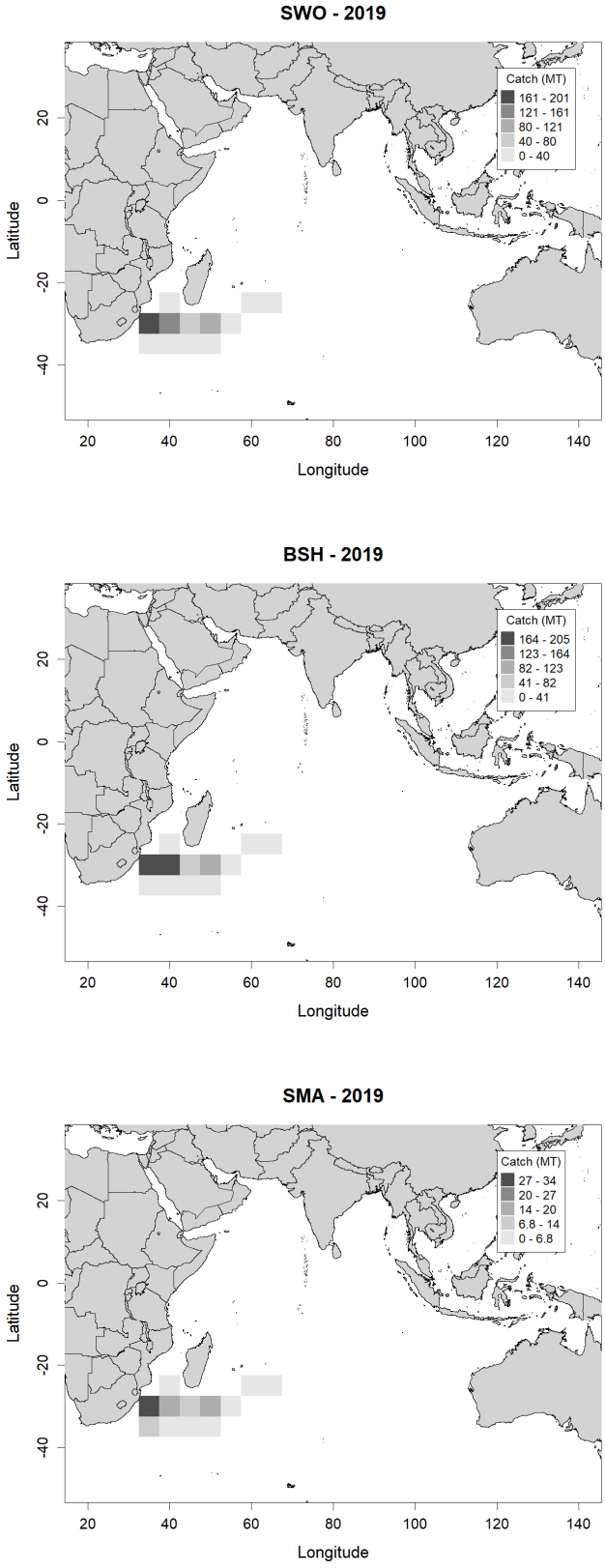

Figure 3a. Map of distribution of the catches (MT) by major species in the IOTC area of competence in 2019: SWO (swordfish) – *Xiphias gladius*; BSH (blue shark) – *Prionace glauca*; and SMA (shortfin mako) - *Isurus oxyrinchus*). Note: different catch scales.

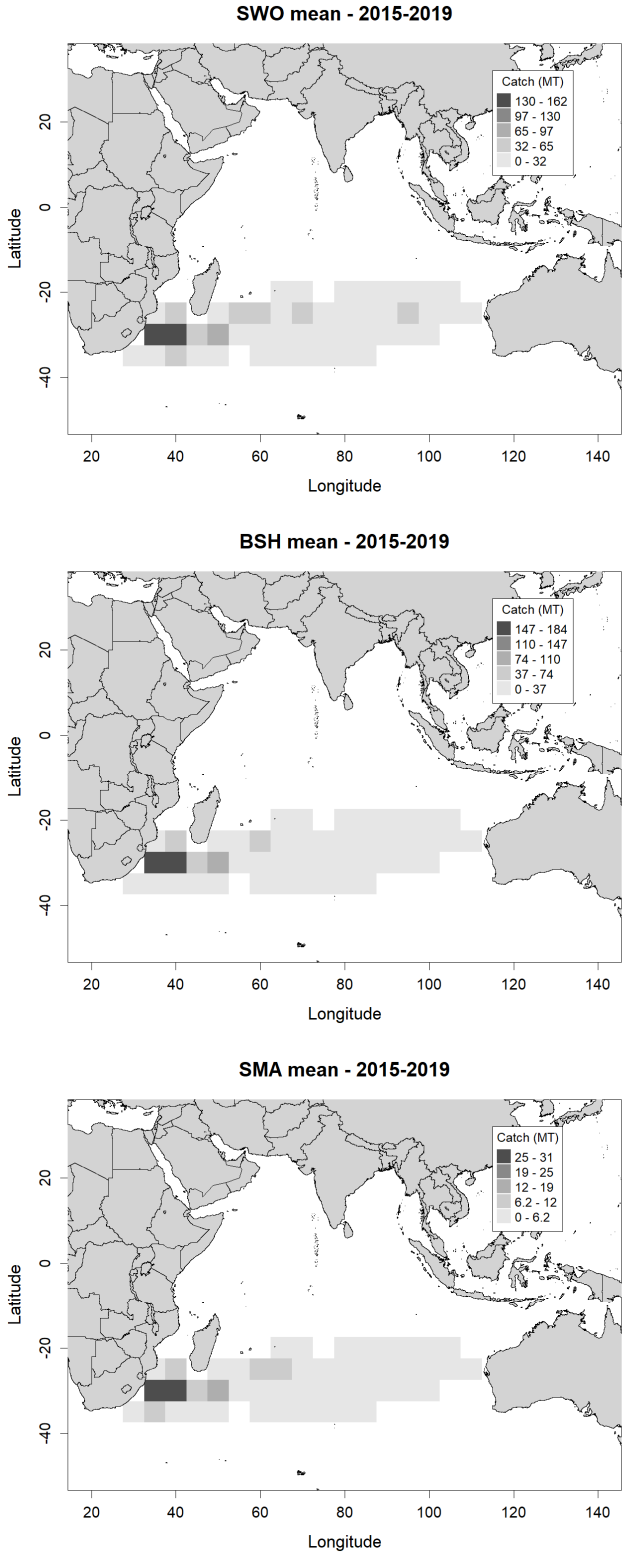

Figure 3b. Map of distribution of mean catches (MT) by major species in the IOTC area of competence during the period 2015-2019: SWO (swordfish) – *Xiphias gladius*; BSH (blue shark) – *Prionace glauca*; and SMA (shortfin mako) - *Isurus oxyrinchus*). Note: different scales in the colour codes.

4. RECREATIONAL FISHERY

No activity concerning recreational fishery by Portuguese vessels in the IOTC Convention Area have been carried out for the last years.

5. ECOSYSTEM AND BYCATCH ISSUES

All IOTC Resolutions and Recommendations concerning Sharks, Seabirds and Marine Turtles are broadly publicized among fishermen operating in the IOTC convention area. IPMA prepared and distributed among the fleet ID sheets for all major species usually caught in the fishery. These ID sheets include photos, FAO and scientific names for target, by-catch and accidentally species caught (including marine turtles and seabirds). The recently IOTC ID guides will be distributed as Portuguese and/or Spanish printed translations are made available.

5.1 Sharks

Major shark species catches are reported annually. Fishermen are encouraged to release by-catch species that are alive at-haulback, as well as juvenile specimens. The fleet must comply with the EU regulations on shark finning and fins-attached policy. Blue shark belly has been observed as being occasionally used as bait, particularly in areas/seasons when high shark bycatch occurs. Accordingly, an increase use of wire traces has also been observed. Shark catches have increased between 2014 and 2017, but dropped substantially in 2018 and 2019 (**Table 3**). Only blue shark and shortfin mako are retained by the national fleet and commercialized, while the other species are discarded due to International and/or EU regulations. Those other species are therefore not retainer or landed, but are recorded and reported by the onboard observer program describe further below.

Table 4 summarizes the observed number of sharks, by species, released/discarded in the IOTC area of competence in 2019, including their condition status at haulback and upon released/discarded. Those records come from the onboard observer program. These figures should be regarded carefully, as they are based on the observer coverage which represented 17.4% in 2019 of the total fishing effort and are limited both geographically and seasonally.

5.1.1. NPOA sharks

The EU has presented and implemented a NPOA for sharks. This was approved in 2009 and it is currently being implemented.

5.1.2. Sharks finning regulation

EU.Portugal follow EU regulations on this issue. Specifically, shark finning has been illegal under the EU's shark finning Regulation since 2003. That regulation was amended in 2013 to introduce a stricter fins-naturally-attached policy that prohibits all EU vessels, including EU.Portugal, from removing shark fins on board prior to landing the fish.

5.1.3. Blue shark

All vessels have electronic logbooks and major shark species catches, of which blue shark is the main species, are reported annually. Table 3 below summarizes the catches of the main shark species, namely blue shark and shortfin mako over the last 5 years.

Table 3: Total weight (MT) of sharks, by species, retained by the national fleet in the IOTC area of competence during the period 2015-2019.

FAO code	Species name	2015	2016	2017	2018	2019
BSH	*Prionace glauca*	124.8	1375	1240	806	711
SMA	*Isurus oxyrinchus*	225.1	241	218	166	114
	Total	1473.9	1616.0	1458.3	973	825

Table 4: Observed number of sharks (elasmobranchs), by species, released/discarded in 2019 by the EU-Portugal longline fleet in the IOTC area of competence, including life status at haulback and upon released/discard. Note: Information represents 17.4% of the total EU-Portugal fishing effort in 2019 and is limited in terms of geographical and seasonal distribution of the fishing effort in the Indian Ocean.

FAO code	Species name	Status at release		Total no. sharks released/discarded
		Dead	Alive	
BSH	*Prionace glauca*	37	4	41
BTH	*Alopias superciliosus*	12	12	24
FAL	*Carcharhinus falciformis*	35	7	42
PLS	*Pteroplatytrygon violacea*	0	124	12
POR	*Lamna nasus*	59	3	62
PSK	*Pseudocarcharias kamoharai*	2	4	6
RMB	*Manta birostris*	0	7	7
RMM	*Mobula mobular*	0	15	15
SMA	*Isurus oxyrinchus*	11	2	13
SPZ	*Sphyrna zygaena*	1	0	1
	Total	**157**	**178**	**335**

5.2 Seabirds

IOTC recommendations on seabirds have been made available to the fishermen operating longline gear. Skippers are encouraged to adopt mitigation measures, namely the use of tori lines, line weights and to conduct night gear setting with minimum deck lights, when fishing south of 25^{o} South or whenever interaction with seabirds is foreseen. Moreover, within the scope of the EU data collection framework (EU-Portugal mainland component), skippers are encouraged to report the incidental catches of sea birds. The recently IOTC ID sea-bird guides are distributed to the fleet.

The EU adopted in 2012 an Action Plan to address the problem of incidental catches of seabirds in fishing gears of its fishing fleets, that also applies to Portuguese vessels operating in the IOTC.

During 2019, 1 (one) seabird was accidentally captured in the sets covered by the fishery observer program (Table 5). In case of any interaction, as occurred in previous years, the full high resolution sea-bird interactions data with date, biology, fate and in 1*1 degree spatial resolution is reported to IOTC in the respective observer trip data, that has always been submitted by EU.Portugal fully and in due time, in electronic database format in the more recent years. Table 5 of this report provides a summary of this data.

EU-Portugal fully complied with the Data Call for seabirds according to IOTC circular 2016/043 and submitted the requested data within the established deadlines (full datasets from 2011-2015). This full data is more complete than the data requested to be submitted in the tables for the IOTC National Reports.

5.3 Marine Turtles

Fishermen are encouraged to carefully handle marine turtles accidentally caught, and immediately release them after gear removal. IPMA has provided guidance on how to safely handle and release the turtles, as well as ID guides. Within the scope of the EU data collection framework (EU-Portugal mainland component), skippers are encouraged to report the incidental catches of marine turtles.

The EU Council Regulation (EC) No 520/2007 of 7 May 2007 lay down technical measures for the conservation of migratory species including marine turtles incorporating articles and provisions to reduce marine turtle bycatch on EU member states fisheries. This also applies to EU.Portugal vessels operating in the IOTC area.

During 2019, 4 (four) sea turtles were accidentally captured in the sets covered by the fishery observer program. From those, all 4 specimens were released alive (Table 5). The full high-resolution sea-turtle interactions data with date, biology, fate and in 1*1 degree spatial resolution was reported to IOTC in the respective observer trip reports, that in recent years has been provided as full electronic datasets. Table 5 of this report provides a summary of this data.

As requested by the WPEB and SC, this year we provide a table with detailed data on sea turtle captures and releases, using data from the Portuguese pelagic fishery observer program. This data is currently available and provided for the years between 2016 and 2019. Such table is provided below:

	Fishery (loogbooks)			Observed (National Observer Program)				
Year	Lat (5*5)	Lon (5*5)	Total effort	Total effort observed	Species	Captures (N)	Mortalities (N)	Live releases (N)
2016	-37.5	77.5	1400	1288	TTX	0	0	0
2016	-32.5	52.5	59700	17395	TTX	0	0	0
2016	-32.5	57.5	29300	6932	TTX	0	0	0
2016	-32.5	77.5	33502	33502	DKK	1	0	1
2016	-32.5	77.5	33502	33502	TTL	1	0	1
2016	-32.5	82.5	9800	7542	DKK	1	0	1
2016	-27.5	47.5	52700	19816	DKK	1	0	1
2016	-27.5	52.5	54800	12648	TTX	0	0	0
2016	-27.5	57.5	74000	27239	TTX	0	0	0
2016	-27.5	62.5	155300	3176	TTX	0	0	0
2016	-27.5	67.5	84400	5670	TTX	0	0	0
2016	-27.5	72.5	25100	2022	TTX	0	0	0
2016	-27.5	82.5	8300	4176	TTX	0	0	0
2016	-22.5	82.5	16800	2076	TTX	0	0	0
2016	-22.5	87.5	19600	7085	TTX	0	0	0
2016	-22.5	92.5	19600	3506	TTL	2	0	2
2017	-32.5	37.5	269000	55391	DKK	1	0	1
2017	-32.5	37.5	269000	55391	TTL	1	0	1
2017	-32.5	42.5	191400	30365	DKK	1	0	1
2017	-32.5	42.5	191400	30365	TTL	2	0	2
2017	-32.5	47.5	100300	41291	TTL	1	0	1
2017	-27.5	37.5	287700	1154	TTX	0	0	0
2018	-37.5	37.5	1200	1200	TTX	0	0	0
2018	-32.5	32.5	24600	9637	TTL	3	0	3
2018	-32.5	37.5	392600	94328	DKK	1	1	0
2018	-32.5	37.5	392600	94328	TTL	1	0	1

2018	-32.5	42.5	68000	14600	TTX	0	0	0
2018	-27.5	37.5	136400	15810	TTX	0	0	0
2018	-27.5	42.5	35400	2670	TTX	0	0	0
2019	-32.5	37.5	309800	751	TTX	0	0	0
2019	-32.5	42.5	104000	42416	TTX	0	0	0
2019	-32.5	47.5	156600	47335	DKK	1	0	1
2019	-32.5	47.5	156600	47335	TTL	2	0	2
2019	-32.5	52.5	59600	45894	TTX	0	0	0
2019	-27.5	47.5	6200	3660	TTX	0	0	0
2019	-27.5	52.5	9600	3604	TTL	1	0	1

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

The accidental catch of other species such as marine mammals and whale sharks are considered extremely rare. Whenever such animals are caught, fishermen are encouraged to immediately and safely release them.

In 2019 there were 2 interactions with marine mammals in the sets covered by the fishery observer program, and in both cases the specimens died (**Table 5**). The full high resolution marine-mammal interactions data with date, biology, fate and in 1*1 degree spatial resolution was reported to IOTC in due time in the respective observer trip reports and data, which in recent years has been provided in electronic format.

Table 5. Observed catches of species of special interest (marine turtles, seabirds and marine mammals) in 2019, for the EU-Portugal longline fleet operating in the IOTC area of competence. Observer coverage represented 17.4% of total fishing effort in 2019.

Taxa	FAO Code	Scientific name	Status		Total no. specimens released/discarded
			Dead	Alive	
Sea birds	CTH	*Catharacta chilensis*	0	1	1
	Total sea birds		**0**	**1**	**1**
Marine turtles	TTL	*Caretta caretta*	0	3	3
	DKK	*Dermochelys coriacea*	0	1	1
	Total marine turtles		**0**	**4**	**4**
Marine mammals	MAM	*Mammalia nei*	0	2	2
	Total marine mammals		**0**	**2**	**2**

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification

All longline vessels operating in the area have records of their catches registered on official logbooks, since the year they have beginning the fisheries operations in the area. In 2012 electronic logbooks became mandatory. All logbooks are transmitted to the Portuguese Fisheries Administration, which processes the data and transmit it to IOTC Secretariat through the European Commission.

6.2. Vessel Monitoring System

Since 1998 all Portuguese vessels over 15 meters long are obliged to have VMS equipment on board. Thereby all Portuguese vessels operating in the convention area are monitored by a tracking satellite system. The specific national legislation that regulates the use of VMS in EU.Portugal vessels is the Decreto-Lei n.º 310/98, from 14 October 1998.

6.3. Observer scheme

Since 2011 an observer program was fully implemented by IPMA. Until 2018 the onboard fishery observers were part of the technical staff of IPMA, but since 2019 the onboard observers are hired through a private company. IPMA provides the training to the observers from the company and those are required to use IPMA protocols for data collections. The program aims to cover 10% of the fishing effort on the convention, while a minimum of 5% is established. **Table 6** provides the coverage of the program by year calculated both in number of hooks and sets.

Table 6. Annual observer coverage of the Portuguese pelagic longline fleet since it was established in 2011, measured as a percentage of the total effort in number of hooks and sets, for the period 2011–2019.

Year	Gear	Observer coverage		Size data coverage
		Hooks (%)	Sets (%)	
2011	Pelagic longline	17.9	16.3	Sizes are taken for all retained specimens and dead discards
2012	Pelagic longline	10.7	10.9	
2013	Pelagic longline	11.0	9.9	
2014	Pelagic longline	7.3	5.7	
2015	Pelagic longline	11.1	8.2	
2016	Pelagic longline	9.1	7.2	
2017	Pelagic longline	7.9	7.0	
2018	Pelagic longline	15.5	13.9	
2019	Pelagic longline	17.4	16.1	

Seven observers have received the necessary training to collect a wide range of fisheries data, to fulfil all fields covered by the IOTC Observer Trip Report. Starting in 2011, the observers started collecting information on all specimens caught, which includes: ID to the most detailed taxonomic possible level; size; sex; the condition at-haulback (alive / dead); fate (retained/discarded); and, condition if discarded (alive/dead). Finally, biological samples were collected for some of the major shark and bony fish species, aiming a number of studies focusing on: life history issues (ages, growth and reproduction); genetics (population structure and paternity; and, morphometrics (weight:length, length:length, weight:weight relationships). Until 2018 the onboard fishery observers were part of the technical staff of IPMA, but since 2019 are hired through a private company. Still, all the training and data collection protocols are provided by IPMA.

During 2019 observers were onboard one fishing vessel for 157 days, covering a total of 123 pelagic longline sets, which corresponded to 17.4% and 16.1% of the total fishing effort by the fleet in 2019, in terms of number of hooks and sets, respectively (**Figure 4**; **Table 6**). The corresponding full data in electronic format was sent to the IOTC Secretariat in due time.

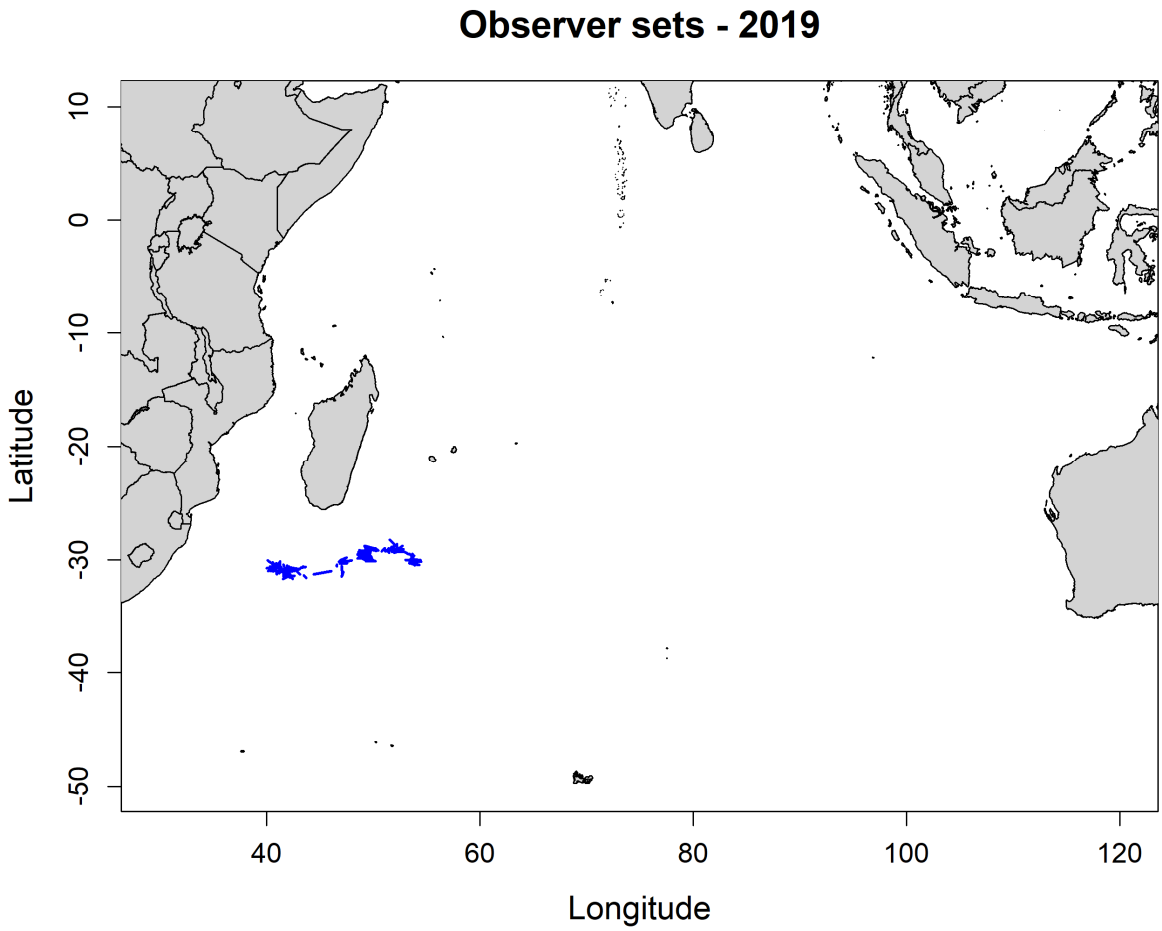

Figure 4. Map showing the spatial distribution of longline sets covered by the observer program in 2019.

Size data were recorded for 6,269 specimens during 2019 (**Table 8**). Most of the records corresponded to swordfish (34.5%) the target species of the fisheries, followed by the blue shark (42.8%), and to a much lower level the other species that are bycatch of the fishery. It is worth noting that in the past years (until 2013), skippers used to self-report size data for the major target species, as well as additional information on discards. However, since the new EU regulation (June 2013) that obliges sharks to be landed with fins naturally attached became mandatory (fishermen are no longer allowed to cut off shark fins at sea, while in the past some vessels had special permits that allow shark fin removal on board vessels), the level of self-reporting has decreased dramatically. Specifically, since 2017 no self-reporting size data was provided, and as such all the measurement reported come directly from the fishery observer program (**Table 8**).

Table 7. Number of vessel trips monitored by the onboard observer program, by species and gear.

Year	Gear	Number of vessel trips monitored	Species (data coverage)
2017	Pelagic longline	1	All species are recorded including retained specimens and discards
2018	Pelagic longline	1	
2019	Pelagic longline	1	

Table 8. Number of individuals caught by pelagic longline onboard observer program, that were measured during 2019.

FAO Code	Species name	Size measurements
ALB	*Thunnus alalunga*	43
ALX	*Alepisaurus ferox*	165

BET	*Thunnus obesus*	63
BLM	*Makaira indica*	3
BSH	*Prionace glauca*	2160
BTH	*Alopias superciliosus*	20
BUM	*Makaira nigricans*	5
DOL	*Coryphaena hippurus*	79
FAL	*Carcharhinus falciformis*	36
GBA	*Sphyraena barracuda*	8
GES	*Gempylus serpens*	38
LAG	*Lampris guttatus*	3
LEC	*Lepidocybium flavobrunneum*	321
MLS	*Tetrapturus audax*	1
MOX	*Mola mola*	1
OIL	*Ruvettus pretiosus*	183
POA	*Brama brama*	6
POR	*Lamna nasus*	56
PSK	*Pseudocarcharias kamoharai*	6
RMB	*Manta birostris*	1
SFA	*Istiophorus platypterus*	9
SKJ	*Katsuwonus pelamis*	1
SMA	*Isurus oxyrinchus*	280
SPZ	*Sphyrna zygaena*	2
SSP	*Tetrapturus angustirostris*	6
SWO	*Xiphias gladius*	2686
WAH	*Acanthocybium solandri*	6
YFT	*Thunnus albacares*	81

6.4. Port sampling programme

All Portuguese vessels operating in the IOTC convention area catches are moved to containers in ports of those countries and shipped to non-Portuguese ports in Europe (mostly Vigo, Spain). Thus, the current port sampling program for the Portuguese longline fleet does not cover those vessels operating in the IOTC conventional area.

6.5. Unloading/Transhipment of flag vessels

All Portuguese vessels operating in the IOTC convention area catches are moved landed and moved to containers in ports of those countries and shipped to non-Portuguese ports in Europe (mostly Vigo, Spain). Thus, the EU.Portugal official landing is officially done at EU ports, usually in Spain. As such we provide **Table 9** with the catch landed in ports located in the IOTC area, while **Table 10** does not apply to the fleet.

Table 9. Quantities by species and gear landed in ports located in the IOTC area of competence.

Species	Landed weight (MT)	Gear
ALB	0.575	Pelagic Longlines
BET	35.137	
BSH	323.024	

DOL	0.707	
LEC	7.991	
MLS	15.257	
SAI	0.106	
SMA	75.97	
SWO	407.4	
WAH	0.156	
YRS	0.038	

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

In terms of species identification, the onboard observers and skippers are distributed with the IOTC Billfish identification cards, as well as material like dichotomic keys prepared by IPMA- Portugal.

In terms of data recording and reporting, as mentioned previously all catch for all species (including retained species, alive and dead discards) are recorded in the observer program and dully reported in electronic format to the IOTC Secretariat by the established deadlines. This includes all billfish species when those are captured. **Table 8** above provides a summary of that catch in 2019 and what has been reported to the IOTC secretariat.

6.7. Gillnet observer coverage and monitoring

This point does not apply to EU.Portugal, as EU.Portugal does not have any gillnets fisheries.

6.8 Sampling plans for mobulid rays

This point seems to be mostly for subsistence and artisanal fisheries and therefore does not apply to EU.Portugal fleet.

We can add that all mobulids rays from the UE.Portugal longline fleet are discarded. In terms of data recording and reporting, and as mentioned previously, all catch for all species (including retained species, alive and dead discards) are recorded in the observer program and dully reported in electronic format to the IOTC Secretariat by the established deadlines. This includes all mobulid rays when those are captured and discarded. **Table 8** above provides a summary of that catch in 2019 and what has been reported to the IOTC secretariat.

7. NATIONAL RESEARCH PROGRAMS

The Portuguese research program for highly migratory species begun in 2010, being carried out by IPMA (Portugal mainland). The programme covers 3 main research lines: fisheries, fleet dynamics and biological studies. The fisheries research lines involves: i) revisiting historical official logbook data and the collection of skippers logbooks and VMS data; ii) spatial-temporal analysis of fishing effort and catch at size for major species caught; and iii) haulback mortality. The fleet dynamics involves: i) the spatial-temporal analysis of the fishing activity and catches; and ii) investigating the link between gear configuration/characteristics and target vs. by-catch of sharks. Finally, the biological studies focus all major species, but primarily on pelagic sharks, namely in terms of: i) life history parameters (age, growth and reproduction); ii) genetics (population structure and paternity); iii) morphometrics (weight:length, length:length and weight:weight relationships); and iv) movements and habitat use. Among shark species, particular attention is being provided to the two most important species caught (blue shark and shortfin mako), and to a less extent to other species, including threshers, hammerheads, oceanic whitetip and silky sharks (**Table 11**). It is also worth noting that IPMA

scientists are participating in the technical work for the development of MSE for the Indian Ocean swordfish, and involved in several other EU funded projects that have focused migratory species in the Indian Ocean.

7.1. National research programs on blue shark

As mentioned before, the biological studies carried out at IPMA focus all major species, but primarily on pelagic sharks, namely in terms of: i) life history parameters (age, growth and reproduction); ii) genetics (population structure and paternity); iii) morphometrics (weight:length, length:length and weight:weight relationships); and iv) movements and habitat use. Among shark species, particular attention is being provided to the two most important species caught (blue shark and shortfin mako), and to a less extent to other species, including threshers, hammerheads, oceanic whitetip and silky sharks.

One recent work specific to blue shark was estimating ages and modelling growth in the SW Indian Ocean. The results from that work have been shown to the WPEB ((Andrade et al., 2017) and published in the peer review literature (Andrade et al., 2019).

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

All billfish interactions are recorded in the observer program and reported to IOTC. Those interactions are relatively rare, so at this stage EU.Portugal does not do biological sampling on those species. A program has started a few years ago to collect spines and otoliths of swordfish and that could be expanded to other billfishes in the future.

7.3. National research programs on sharks

As mentioned before, the biological studies carried out at IPMA focus all major species, but primarily on pelagic sharks, namely in terms of: i) life history parameters (age, growth and reproduction); ii) genetics (population structure and paternity); iii) morphometrics (weight:length, length:length and weight:weight relationships); and iv) movements and habitat use. Among shark species, particular attention is being provided to the two most important species caught (blue shark and shortfin mako), and to a less extent to other species, including threshers, hammerheads, oceanic whitetip and silky sharks.

Some experimental work has been done with the use of monofilament *versus* wire traces in the pelagic longline configuration, which has been presented to the WPEB (Santos et al., 2014) and published in the peer review literature (Santos et al., 2017).

Additionally, EU.Portugal recently lead a EU Project on a meta-analysis for the effects of hook, bait and leader type effects on surface pelagic longline retention and mortality rates, comparing target, bycatch and vulnerable fauna interactions. The last update made to the WPEB is provided in Santos et al., 2019). That project final report is available from Coelho et al. (2020)

7.4. National research programs on oceanic whitetip sharks

See point 8.3 above. With regards to biological samples, it is worth noting that since the inclusion of oceanic whitetip shark in CITES in 2014, all biological sampling has stopped (e.g., tissue for genetics and vertebrae).

EU.Portugal participates in a collaborative project on oceanic whitetip shark habitat use and post-release mortality using satellite telemetry (last update at Bach et al., 2019)

7.5. National research programs on marine turtles

All sea turtle interactions are recorded in the observer program and reported to IOTC.

EU.Portugal is currently participating in a collaborative research that includes the Atlantic (ICCAT) and Indian Ocean (IOTC) scientists and data.

Furthermore, since 2016 IPMA has been collaborating with projects from Ifremer (EU.France) and NGOs to deploy satellite tags on sea turtles to study their movements and migrations in the Indian Ocean.

7.6. National research programs on thresher sharks

See point 8.3 above. With regards to biological samples, it is worth noting that since the inclusion of thresher sharks in CITES in 2017, all biological sampling has stopped (e.g., tissue for genetics and vertebrae), due to complications in sample transportation.

Since 2018, IPMA has been collaborating with IOTC projects to deploy satellite tags on bigeye thresher sharks to study movement patterns and migrations, and determine post-release mortality (last update at Bach et al., 2019).

Table 11 Summary table of national (EU-Portugal) research projects focusing migratory species in the Indian Ocean, that were ongoing or finishing in 2019.

Project title	Period	Countries involved	Budget total	Funding source	Objectives	Short description
National Program for Biological Sampling (PNAB)	2011-2022	Portugal	50,000€ (yearly)	EU (DCF – Data Colletion Framework) and National funds	Data collection, sampling and reporting of data for the Portuguese pelagic longline fleet.	This yearly program involves the collection of data, biological samples and scientific work to provide advice in the IOTC area of competence.
Integrating biology, ecology and modeling to promote sustainable pelagic longline fisheries of highly migratory species in the Atlantic and Indian Oceans	2015-2019	Portugal	50,000€	National funds - FCT (*Portuguese Foundation for Science and Technology*)	Study biology, ecology and model the main fisheries resources from pelagic longline fisheries.	The research project involves scientific work in terms of biology, population dynamics and genetics for a comparison between the Atlantic and Indian Oceans.

Based on the data collected in 2019 and during previous years, a number of working documents and info papers were prepared or co-authored by the Portuguese research team during several 2019 IOTC meetings. Those also include technical documents produced within international cooperative initiatives, either involving other EU colleagues or having a broader international scope.

The technical papers presented to IOTC in 2019 were:

- Rosa, D., Mosqueira, I., Fu, D., Coelho, R., 2019. Updates on the Indian Ocean swordfish management strategy evaluation: initial testing of candidate management procedures. 10th Working Party on Methods, 17-19 October 2019, Donostia-San Sebastian, Spain. IOTC Document, IOTC-2019-WPM10-12. 22pp.

- Santos, C.C., Rosa, D., Coelho, R., 2019. Hook, bait and leader type effects on surface pelagic longline retention and mortality rates: a meta-analysis with comparisons for target, bycatch and vulnerable fauna interactions. 15th Working Party on Ecosystems and Bycatch (WPEB). 3-7 September 2019, La Reunion Island. IOTC Document, IOTC-2019-WPEB15-39. 23pp.
- Juan-Jordá, M.J., Murua, H., Apostolaki, P., Lynam, C., Perez-Rodriguez, A., Baez-Barrionuevo, J.C., Abascal, F., Coelho, R., Todorovic, S., Billet, N., Uyarra, M., Adonegi, E., Lopez, J. 2019. Selecting ecosystem indicators for fisheries targeting highly migratory species: An EU project to advance the operationalization of the EAFM in ICCAT and IOTC. 15th Working Party on Ecosystems and Bycatch (WPEB). 3-7 September 2019, La Reunion Island. IOTC Document, IOTC-2019-WPEB15-29. 24pp.
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- Bach, P., Sabarros, P.S., Coelho, R., Murua, H., Krug, I., Romanov, E.V. 2019. Second progress report on the post release mortality of the oceanic whitetip shark (POREMO project) discarded by EU purse seine and pelagic longline fisheries. 15th Working Party on Ecosystems and Bycatch (WPEB). 3-7 September 2019, La Reunion Island. IOTC Document, IOTC–2019–WPEB15–19. 14pp.
- Bach, P., Bonhommeau, S., Coelho, R., DeBruyn, P., Martin, S., Murua, H., Norman, S., Romanov, E.V., Sabarros, P.S., Semba, Y., da Silva, C., Tsai, W-P., Zhu, J. 2019. The second progress report on the implementation of the IOTC bigeye thresher shark post-release mortality study project (IOTC BTH PRM Project). 15th Working Party on Ecosystems and Bycatch (WPEB). 3-7 September 2019, La Reunion Island. IOTC Document, OTC-2019-WPEB15-16. 14pp.
- Rosa, D., Mosqueira, I., Fu, D., Coelho, R., 2019. Indian Ocean Swordfish Management Procedure - status report. 3rd session of the IOTC Technical Committee on Management Procedures (TCMP). 14-15 June 2019. Hyderabad, India. IOTC Document, IOTC-2019-TCMP03-12. 3pp.

Apart from the technical papers presented to the IOTC Working Parties, EU-Portugal scientists have also been involved in scientific peer-review publications including data and research from the Indian Ocean and within the IOTC fisheries.

The peer-review literature published in 2019 that also pertains to IOTC issues were:

- Andrade, I., Rosa, D., Muñoz-Lechuga, R., Coelho, R. 2019. Age and growth of the blue shark (*Prionace glauca*) in the Indian Ocean. *Fisheries Research*, 211: 238–246. DOI: https://doi.org/10.1016/j.fishres.2018.11.019

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

Table 12. 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	In late 2010 a national observer program was approved under the EU data collection framework. The observer program has been fully implemented since 2011 and is currently ongoing. The trip reports have always been submitted in due time to the IOTC Secretariat. Since 2017, all data has been fully transmitted in electronic format. Since 2019 the onboard observers are no longer part of the IPMA staff but hired through a private company. Still, all training and data protocols use are from IPMA, and IPMA is still responsible for the implementation, data

Res. No.	Resolution	Scientific requirement	CPC progress
			compilation and quality check, and data transmission to IOTC.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Incidental interaction with marine turtles is now being increasingly recorded by skippers and by onboard observers. The information is fully submitted and provided to the IOTC Secretariat in the fishery observer reports and datasets. Fishermen are encouraged to carefully handle marine turtles accidentally caught, and immediately release them after gear removal. They are aware of and use proper mitigation, handling and de-hooking techniques and keep on board all necessary equipment for the release of marine turtles (including line cutters and de-hookers), in accordance with IOTC and FAO handling guidelines. Furthermore, since 2016 IPMA has been collaborating with projects from Ifremer (EU.France) and NGOs to deploy satellite tags on sea turtles to study their movements and migrations in the Indian Ocean.
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	All longline fishing vessels are aware of the need to use tori lines and/or line weights when operating south of 25°S. The incidental capture of sea birds in Portuguese longliners is rare. EU-Portugal fully complied with the Data Call for seabirds according to IOTC circular 2016/043 and submitted to the IOTC Secretariat the requested data within the established deadlines (full and detailed datasets from 2011-2015). IPMA fishery observers record all interactions with sea-birds, which are fully reported in the observer trips data submitted to IOTC in due time.
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	Fishers are encouraged to release thresher sharks if recognised on the line before bringing them onboard the vessel. Skippers are requested to record and report incidental catches as well as live releases of thresher sharks. Scientific observers from IPMA used to collect biological samples (vertebrae and tissues) from thresher sharks taken in the IOTC area of competence that were dead at haulback, as part of a research project approved by the IOTC Scientific Committee. The information compiled by IPMA has been presented to the WPEB. Given than thresher sharks were listed in CITES in 2016, IPMA also had to completely stop all sampling on this species, due to complications in sample transportation. Since 2018, IPMA has been collaborating with IOTC projects to deploy satellite tags on bigeye thresher sharks to study movement patterns and migrations, and determine post-release mortality.
13/04	On the conservation of cetaceans	Paragraphs 7– 9	EU.Portugal does not have purse seiners operating in the IOTC area of competence. For other gears, namely pelagic longlines, interactions with cetaceans are considered rare. If such animals are caught, fishermen are encouraged to immediately and safely release them. IPMA fishery observers record all interactions with cetaceans, which are reported in the observer trips and electronic data submitted to IOTC in due time.
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	EU.Portugal does not have purse seiners operating in the IOTC area of competence. For other gears, namely pelagic longlines, such interactions are extremely rare (almost non-existent). In the extremely unlikely event of such animals being caught, fishermen are encouraged to immediately and safely release them. IPMA fishery observers record any possible interaction with whale

Res. No.	Resolution	Scientific requirement	CPC progress
			sharks, which are reported in the observer trips submitted to IOTC in due time.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	Fishers are encouraged to release oceanic whitetip sharks if recognised on the line before bringing them onboard the vessel. Skippers are requested to record and report incidental catches as well as live releases of oceanic whitetip sharks. Scientific observers from IPMA used to collected biological samples (vertebrae and tissues) from oceanic whitetip sharks taken in the IOTC area of competence that were dead at haulback, as part of a research project approved by the IOTC Scientific Committee and before inclusion of this species in CITES in 2014. However, after 2014 all biological sampling on this species stopped after the CITES listings due to complications in sample transportation internationally. Since 2018, IPMA has been collaborating with IOTC projects to deploy satellite tags on oceanic whitetip sharks to study movement patterns and migrations, and determine post-release mortality.
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	All operating longline vessels have records of their catches registered on official logbooks, since the year they have beginning the fisheries operations in the IOTC convention area. In 2012 electronic logbooks became mandatory. All logbooks are transmitted to the Portuguese Fisheries Administration, which processes the data and transmit it to European Commission (EU). EU is responsible for providing the data to the IOTC Secretariat.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	Since 2009 catch by species in weight and effort in number of hooks deployed has been provided by 5° x 5° grid area.
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	EU. Portugal reports all data for catches of sharks, in accordance with IOTC data reporting requirements and procedures. Additionally, all data from sharks recorded by the onboard observers is also full reported and submitted to the IOTC Secretariat in electronic format. Furthermore, IPMA continue several lines of research on sharks, including: • Fishing gear selectivity • Improvement of knowledge on biological parameters • Shark tagging studies aiming to identify habitat use. • Shark tagging studies for post-release mortality. Finally, fishermen, operating in the area, are made aware of practices that should be put in place, namely: • Shark species catches need to be reported annually; • Shark fining is banned on all licensed vessels; commercial sharks that are retained have to be with the fins attached Bycatch species are released, and should use the best handling practices.
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	Paragraphs 2-5	The EU.Portugal longline fleet is aware that all major sharks, including blue shark catches, have to be fully reported. Portugal has an electronic logbook system and uses VMS data for preparing nominal catches and catch and effort data, respectively, that is fully submitted to the IOTC Secretariat. Additionally, EU.Portugal has an ongoing onboard observer program that records all shark species catches,

Res. No.	Resolution	Scientific requirement	CPC progress
			including blue shark. All detailed data from the observer program is fully submitted to IOTC Secretariat in electronic format. IPMA continue scientific research in all shark species, including blue shark, especially for life history characteristics, and the information is made available to the WPEB.
18/05	On management measures for the conservation of the Billfishes: Striped marlin, black marlin, blue marlin and Indo-Pacific sailfish	Paragraphs 7 – 11	Fishers are encouraged to release any stripped, black or blue marlins that are captured or brought alive alongside the vessel. Skippers are requested to record and report incidental catches as well as live releases of those marlin species. Scientific observers from IPMA record all catches of marlins as well as their status when captured and when released in trips with onboard observers. The information is fully provided to the IOTC secretariat in the observer trip reports and data. The information is also compiled to be presented to the WPB.
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	EU-Portugal reports annually the catches, catch and effort and size samples of the main IOTC species, including sharks and other bycatch. Besides the official statistics, skippers are encouraged to report data using the self-sampling program, and all data is reported to the IOTC Secretariat. Additionally, EU-Portugal has been fully reporting in due time the observer trip reports, providing full details on the operations and catches (including all bycatch) since the start of the fishery observer program in 2011. These reporting obligations are included in the Portuguese National Data Collection Framework under the EU legislation (article 25, of EU Regulation 1380/2013, of 11 December). Still according to EU rules, the failure by a Member State to collect and /or provide data in a timely manner may result in a proportionate suspension or interruption of relevant Union financial assistance to that Member State. Thus, according to EU Regulation 665/2008, of 14 July the proportion of reduction is 1% of the total Community financial assistance per failure to satisfy a demand.
19/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Paragraph 22	Tropical tunas are an occasional bycatch of the EU.Portugal pelagic longline fleet that is mostly targeting swordfish and blue shark.
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	Paragraph 11	All mobulid rays incidentally captured by the EU.Portugal longline fleet are discarded. In terms of data recording and reporting, all interactions with those species are recorded in the observer program and dully reported in electronic format to the IOTC Secretariat by the established deadlines, including data on the status at discarding (dead or alive).

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