IOTC-2023-SC26-NR06-Annex2

EU-SPAIN National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2023

IEO[1] & SGP[2]

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[2] Secretaría General de Pesca, Ministerio de Agricultura, Pesca y Alimentación, Spain

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 2023, final data for the 2022 calendar year must be provided to the Secretariat by 30 June 2023)	YES [20/10/2023] to the SGP (Spanish Fisheries Secretariat), for its transmission [25/10/2023] to the IOTC
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 2023, preliminary data for the 2022 calendar year was provided to the IOTC Secretariat by 30 June 2023). **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 2023, final data for the 2022 calendar year must be provided to the Secretariat by 30 December 2023).	YES [20/10/2023] to the SGP (Spanish Fisheries Secretariat), for its transmission [25/10/2023] to the IOTC
If no, please indicate the reason(s) and intended actions:	

Executive Summary

In 2022, the Spanish fleets that have performed fishing activities in the IOTC area of competence were:

1. Surface longline fisheries are comprised of 8 active vessels (with an average of 30 meters in length, 159 TRB & 576 HP) based in Durban port (South Africa). The total catch of swordfish rose to 1621 tons with a total effort of 1983 thousand hooks. The swordfish (SWO-*Xiphias gladius*) catch represents a 39% of the catch, the sharks a 56% and the contribution of tunas (YFT-*Thunnus albacares*, BET-*Thunnus obesus* & ALB-*Thunnus alalunga*) rose to a 2%. Billfishes and other fish species are a minority (less than 1% of the catch each one). The scientific observer programs of the IEO-CSIC and the General Fisheries Secretariat, covered together 103,079 thousand hooks, which represents a 5% of the effort.
2. Tropical purse seiner fisheries consisted of 15 active vessels (14 in the last quarter of the year and 13 by the end of the year) based mainly in Victoria port (Seychelles). The carrying capacity remains stable. Twelve of these vessels range in capacities from 1200 m^3 to 2000 m^3, and 3 of them exceeded 2000 m^3. In 2022, 4 supply vessels supported this fleet activity. The total catch landed for the three target species (29% YFT, 11% BET and 60% SKJ-*Katsuwonus pelamis*) amounted to approximately 147300 tons (a 5% less than in 2021) with a total effort of 3216 days, performing 3934 sets (75% on log schools and 25% on free-swimming schools). The whole fleet has deployed 4293 FADs (Fishing Aggregating Devices). The observers programs on board raised the coverage to a 39,7% of the total sets vs. 23,7% in 2021.

The performance of the 2022 fishing trips, mainly for purse seiners, has been driven by the underlying Order APA/332/2022 (Official Spanish State Bulletin "BOE" No. 92, of April 18th, 2022), which regulates the exercise of tropical tuna fishing under the Spanish flag during the 2022 campaign in the Indian Ocean, following the Order APA/25/2021 (Official Spanish State Bulletin "BOE" No. 18, of January 19th, 2021).

Contents:

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1. BACKGROUND/GENERAL FISHERY INFORMATION

1.1 Purse Seine

A total of 15 Spanish tuna purse seiner vessels operated in the area (14 in the last quarter and 13 in December). The carrying capacity has remained stable. The average catches of the previous five years 2016-2020 (approximately 165 thousand tons) was about 11% more than the catches during the 2022 campaign. This decrease in the catches is mainly comprised by skipjack tuna (SKJ-*Katsuwonus pelamis*).

With a fishing effort of 3216 days, this fleet has performed a 75% of the sets on log schools, surrounding with a net of approximately 1500 m long and 250 m depth the FAD and the associated tuna school, mainly composed by SKJ, YFT and BET. The rest of the sets were targeting free-swimming schools of tropical tunas. In 2022, most of the sets were concentrated from 50° to 60° East and distributes between 10ºS an 10ºN. Particularly for the free school sets, the fleet focused on the zone next to 50º E and southwards.

All the catches are frozen or deep-frozen on board and the landings are followed at port by sampling teams coordinated by research centres.

1.2 Longline

In the year 1993 commenced prospecting the Spanish longline fishery targeting swordfish (SWO – *Xiphias gladius*) in international waters of the Indian Ocean areas. A total of 8 longline units have been operating in the Indian Ocean during the year 2022. None of them alternating the Indian with Atlantic and Pacific oceans.

2. FLEET STRUCTURE

2.1 Purse Seine

Table 1 shows the number of Spanish purse seiners fishing in the Indian Ocean in the period 2008-2022. During 2019, a new vessel has been incorporated into the Spanish freezer purse seine fleet, increasing the carrying capacity by more than 2400 t, and for 2021 two more movements has decreased a 1% the carrying capacity. In 2022, the number of tuna purse seiners has been the same as 2021. Only in the third quarter two of them changed their flag.

2.2 Longline

Table 1 shows the number of Spanish longliners fishing in the Indian Ocean during the period 2008-2022. The average characteristics of the vessels were 159 TRB, 30 m in length and 576 HP. Since the year 2000 the fleet replaced the multifilament traditional Spanish longline type by the monofilament American (Florida style), which uses an average of around 1,200 hooks per set -a smaller number than in the traditional longline- although slightly higher than in the Florida style longline gear.

Table 1: Number of Spanish purse seiners and surface longliners operating in the IOTC area of competence during the period 2008-2022, by gear type (purse seine & longline) and categories (C.Cap.- carrying capacity in m^3). Data of previous years have been already reported.

	PURSE SEINE									LONGLINE
Year/Class	**50-400**	**401-600**	**601-800**	**801-1200**	**1201-2000**	**>2000**	**total**	**# Supply vessels**	**C.Cap.**	**# SHIPS**
2008	0	0	0	3	10	4	17	11	24212	19
2009	0	0	0	2	9	4	15	11	20805	15
2010	0	0	0	1	8	4	13	6	20677	12
2011	0	0	0	1	8	4	13	7	20458	14
2012	0	0	0	1	9	4	14	6	21657	18
2013	0	0	0	1	9	4	14	4	22056	22
2014	0	0	0	2	9	4	15	7	20761	21
2015	0	0	0	1	11	5	17	10	23251	18
2016	0	0	0	0	10	4	14	11	23507	13
2017	0	0	0	0	10	4	14	10	22811	14
2018	0	0	0	0	10	4	14	6	22811	11
2019	0	0	0	0	10	5	15	6	24061	11
2020	0	0	0	0	10	5	15	5	24061	11
2021	0	0	0	0	12	3	15	5	22716	8
2022	0	0	0	0	12	3	15	4	22716	8

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

3.1 Purse Seine

The number of associated school sets (FADs and logs) has increased steadily from the early period (1984–1990), with a 31,9% of the sets focusing on FOB (floating objects) associated schools, to around 76% of the sets in the recent years (2008–2017 period). A maximum peak was recorded in 2018 (96%) (Báez et al. 2020[1]), and an 83% in 2019. During the 2022 the number was 2956 sets, going again to a 75% of the total sets performed by the fleet vs. a 90% in 2020.

The fishing effort measured both in fishing days and in searching days was the lowest of the historical series in 2021 (Table 2.a), rising slightly in 2022. The number of sets was also lower than in previous years (4417 sets in average for the period 2011-2021 vs. 3934 sets recorded during 2022, the minimum of the last decade). Therefore, in a short space-time period the number of sets continues to decrease year on year.

Since 2017, the Indian Ocean yellowfin tuna (YFT-*Thunnus albacares*) stock has been subject to an interim Rebuilding Plan (IOTC Resolution 21/01 at present for the EU). During 2021 the General Secretariat for Fisheries (SGP) adopted Individual Vessel Quotas, for the total tropical tuna (Order APA/25/2021; https://www.boe.es/buscar/act.php?id=BOE-A-2021-885), according the quotas from Supplementary Table SS1.

Supplementary Table SS1: 2022 total tropical tuna quotas per authorized purse seiner vessel, according to Order APA/25/2021. Key: Spanish purse seiner name, Name of the vessel; GT, Gross Tons; Upper catch limit for YFT (in %); Tropical tuna upper catch limit (in kg).

Spanish purse seiner name	GT	YFT upper catch limit (%)
ALAKRANA	3716	8,908351
ALBACAN	2347	5,577146
ALBACORA CUATRO	2082	5,995828
ALBACORA UNO	3584	3,342036
ALBATÚN DOS	4406	8,512197
ALBATÚN TRES	4406	3,793354
ATERPE ALAI	2789	5,144659
DONIENE	6674	5,755224
ELAI ALAI	2217	4,887882
ITSAS TXORI	2994	4,637273
IZURDÍA	4089	7,933852
PLAYA DE RIS	2591	2,587639
PLAYA DE ARITZATXU	2458	4,374856
PLAYA DE NOJA	1259	2,848669
TXORI ARGI	4134	9,505596
TXORI ZURI	3671	7,680655
TXORI GORRI	2937	7,514783

By species, 88991,7561 tonnes have been caught of SKJ, 42173,50619 tonnes have been caught of YFT, and 16153,85881 tonnes have been caught of BET (bigeye -*Thunnus obesus*) (Table 2.a). Taking into account these three main tropical tuna species, the SKJ catch is the value that has decreased the most in the recent years. Thus the 5-year average SKJ catches between 2017 and 2021 was 103056 tons versus 88991,7561 tons in 2022. Since 1984, the maximum catches of SKJ were recorded, by order, in 2018 and 2019. In 2021 the sixth maximum data have been recorded, and in 2020 the eighth. Namely, in the last 10 years, there have been 5 new historical peaks since 2017.

The figure 1.a displays the historical quantity of the catch by main tropical species and the effort (in searching days), showing a decrease trend for the last year. The figure 2.ai gives the spatial distribution of the effort (in fishing days) in 2022, taking into account the quarter and the fishing mode. Figure 2.bi shows this distribution by 1ºx1º squares,

[1] BÁEZ, J.C., Mª.L. RAMOS, M- HERRERA, H. MURUA, J.L. CORT, S. DENIZ, V. ROJO, J. RUIZ, P.J. PASCUAL-ALAYÓN, A. MUNIATEGI, A. PEREZ SAN JUAN, J. ARIZ, F. FERNÁNDEZ & F. ABASCAL (2020). Monitoring of Spanish flagged purse seine fishery targeting tropical tuna in the Indian ocean: Timeline and history. ***Marine Policy***, 119: 104094. https://doi.org/10.1016/j.marpol.2020.104094

representing the average in 2018-2022. The figures 3.a (i to iii) display the distribution of catches by main tropical species in 2022, per quarter and fishing mode.

The figures 3.b. (i to iii) represent in maps the distribution of average catches by species in 5ºx5º squares in 2018-2022.

3.2 Longline

The historical annual swordfish (SWO - *Xiphias gladius*) trend of catches of the Spanish longline fleet in the IOTC area of competence since the fishery began its exploration in this ocean in September of 1993 is shown in Figure 1.b.

A total of 1621 t of swordfish (round weight) were caught during 2022 and the overall nominal catch rate was 817,6 kg (round weight) per thousand hooks. All the species caught are dressed, frozen and stowed on board. Table 2.b gives the total yearly catches of swordfish by year, in number of fish and in kg of round weight (RW) as well as the nominal fishing effort (thousands of hooks) for the 2008-2022 period. Figure 1.c shows the annual nominal fishing effort since the year 2008. The Figure 2.aii represents the distribution of the nominal effort in 2022 by 5ºx5º squares.

Figure 2.bii shows the average of the nominal effort (thousand hooks) by 5ºx5º squares of the years 2018-2022.

During the year 2022 a total of 1983 thousand hooks were deployed by 8 longliners. The distribution of swordfish catches (kg of round weight) by 5ºx5º squares of the Spanish surface longline fleet in 2022 is shown in figure 3.aiv. The figure 3.av displays the spatial distribution for the nominal yield (in kg of round weight) of swordfish landed per thousand hooks set in the Indian Ocean by the Spanish surface longline fleet during 2022 in the Indian Ocean.

In figures 3.biv & 3.bv the distribution of SWO catch (round weigh in kg) and the nominal CPUE (round weight per thousand hooks) are mapped by 5ºx5º squares, respectively, for the years 2018-2022.

Table 2.a: Spanish purse seiners total catch (in tons) by year and primary species, and nominal fishing effort in fishing days and searching days of the purse seine Spanish fleet in the IOTC area of competence during the period 2008-2022 (data of previous years have been already reported).

TOTAL CATCH BY SPECIES				NOMINAL FISHING EFFORT	
YEAR	YFT	SKJ	BET	**Fishing**	**Searching**
2008	46051	65096	12490	4792	3882
2009	33511	66570	11781	3784	2992
2010	45209	75131	10022	3825	2938
2011	52256	67247	10702	3851	2944
2012	57745	42892	7589	3991	3150
2013	68352	64632	13880	4224	3326
2014	57892	66597	8988	4185	3340
2015	52631	58283	9832	4157	3287
2016	51489	75264	9371	4261	3268
2017	54513	84432	12345	3512	2618
2018	46991	132986	28167	3633	2632
2019	42273	119138	11303	3397	2567
2020	44246	85193	13338	3797	2838
2021	44347	94165	16190	3182	2277
2022	42173	88992	16154	3216	2384

Table 2.b: Catch in number of fish and in kg of round weight of swordfish (SWO) obtained by the Spanish surface longline fishery and total number of hooks (in thousands) set in the IOTC area of competence during the period 2008-2022 (data of previous years have been already reported).

TOTAL CATCH of SWO			NOMINAL FISHING EFFORT
YEAR	**Number of fish**	**Kg RW**	**Hooks*1000**
2008	76882	3924743	4885

	TOTAL CATCH of SWO		NOMINAL FISHING EFFORT
YEAR	**Number of fish**	**Kg RW**	**Hooks*1000**
2009	66000	3306663	3634
2010	61100	3116458	3174
2011	63165	3191553	3758
2012	85472	4396670	4674
2013	92909	4766588	6263
2014	79373	4164218	6107
2015	64698	3421352	4509
2016	66952	3354291	4427
2017	58671	2897902	3579
2018	39803	1971026	2822
2019	41713	2097373	2992
2020	33378	1601720	2654
2021	30639	1491681	2087
2022	32974	1621333	1983

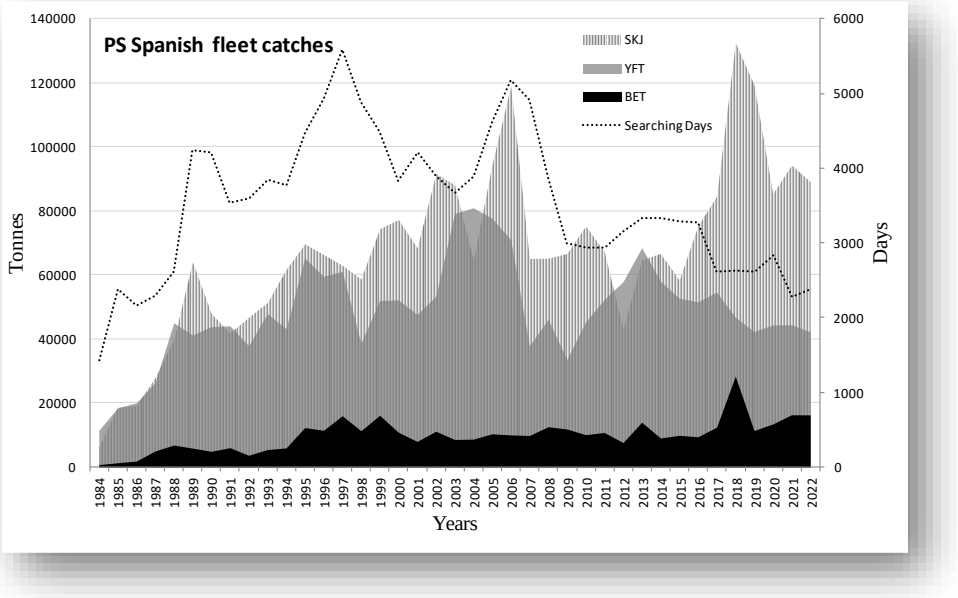

Figure 1.a. Historical annual catch and effort (searching days) of the Spanish purse seine fleet by main tropical tuna species, in the IOTC area of competence since 1984 to present.

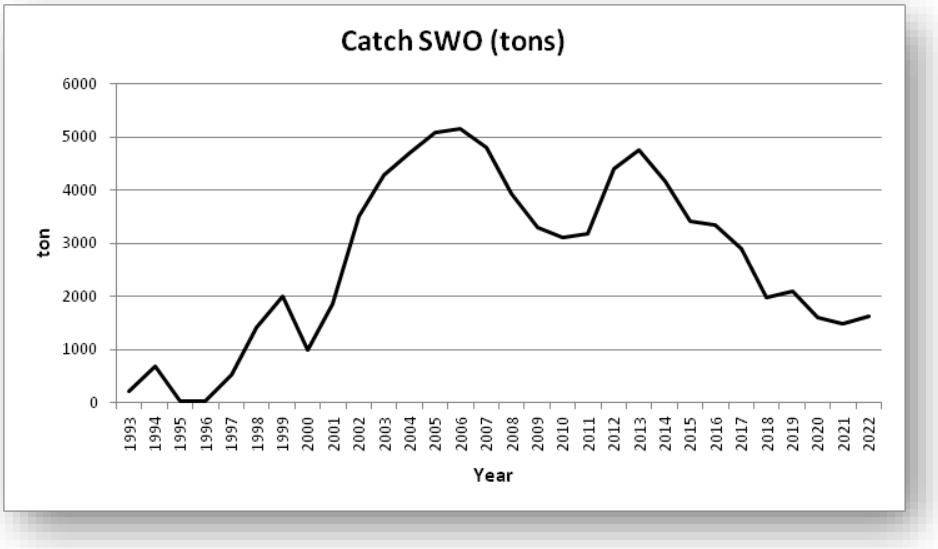

Figure 1.b. Historical annual swordfish catches (tons of RW) of the Spanish longline fleet, for the IOTC area of competence since 1993 to present.

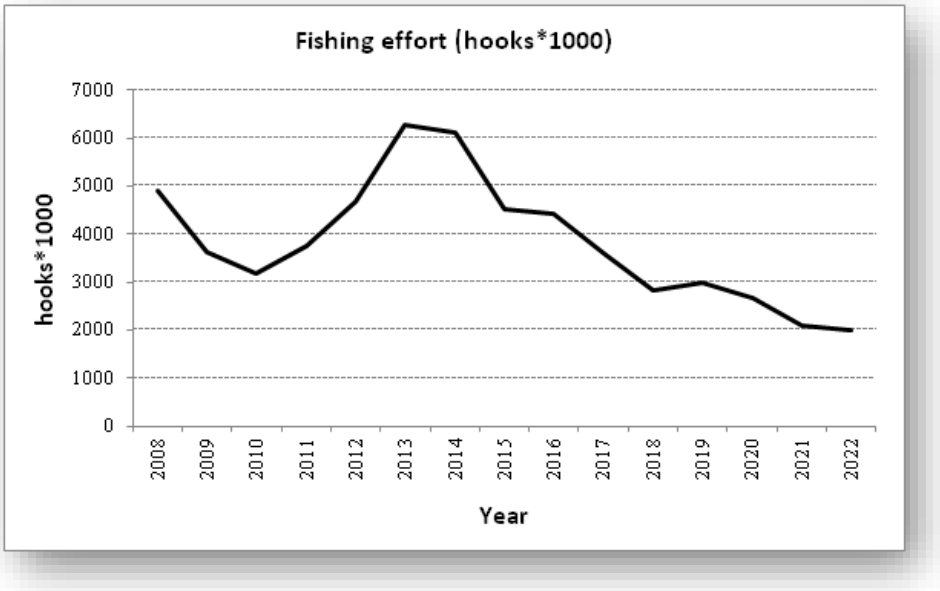

Figure 1.c. Historical annual nominal effort (in thousands of hooks) of the Spanish surface longline fleet, in the IOTC area of competence since 2008 to present.

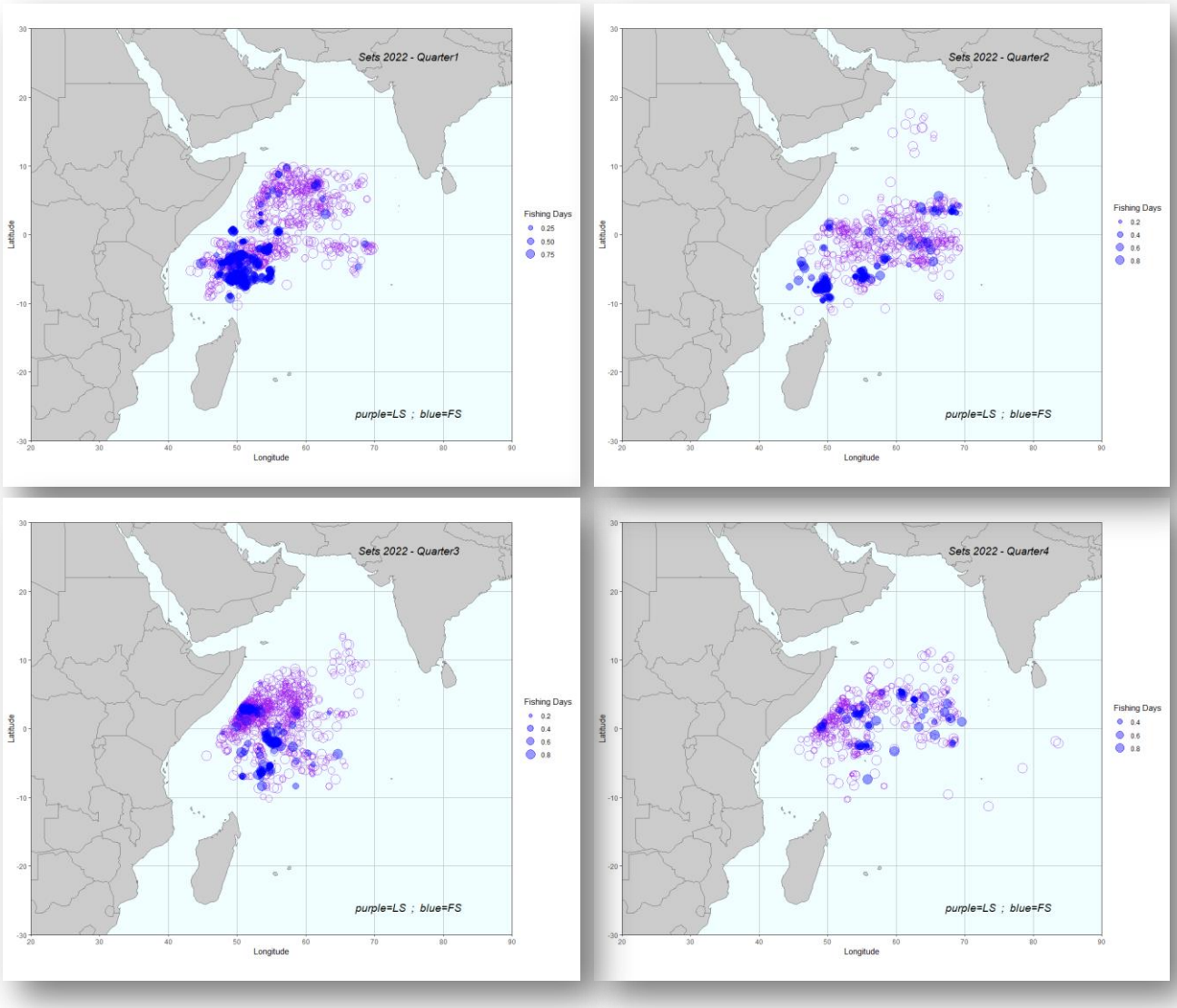

Figure 2.ai. Map of the distribution of the fishing effort (fishing days) of the Spanish purse seine fleet in 2022, per quarter and fishing mode, in the IOTC area of competence. Key: Purple, Log School associated sets; Blue: Free-Swimming School sets.

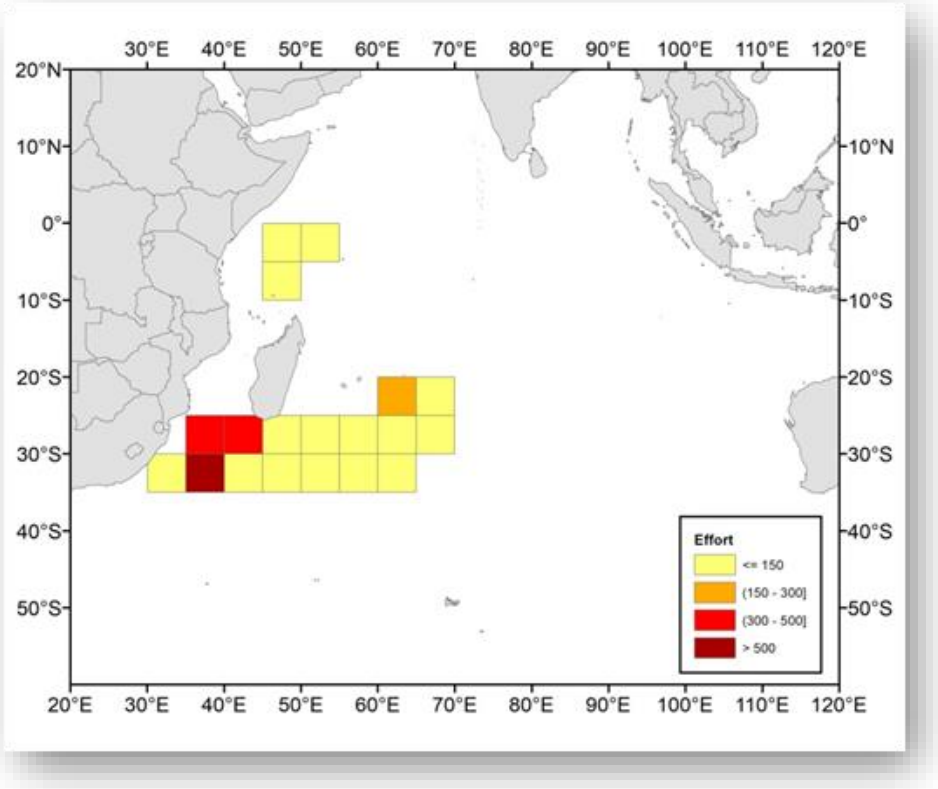

Figure 2.aii. Map of the distribution of the nominal fishing effort (thousand hooks), by 5ºx5º squares of the Spanish longline fleet during the year 2022, in the IOTC area of competence.

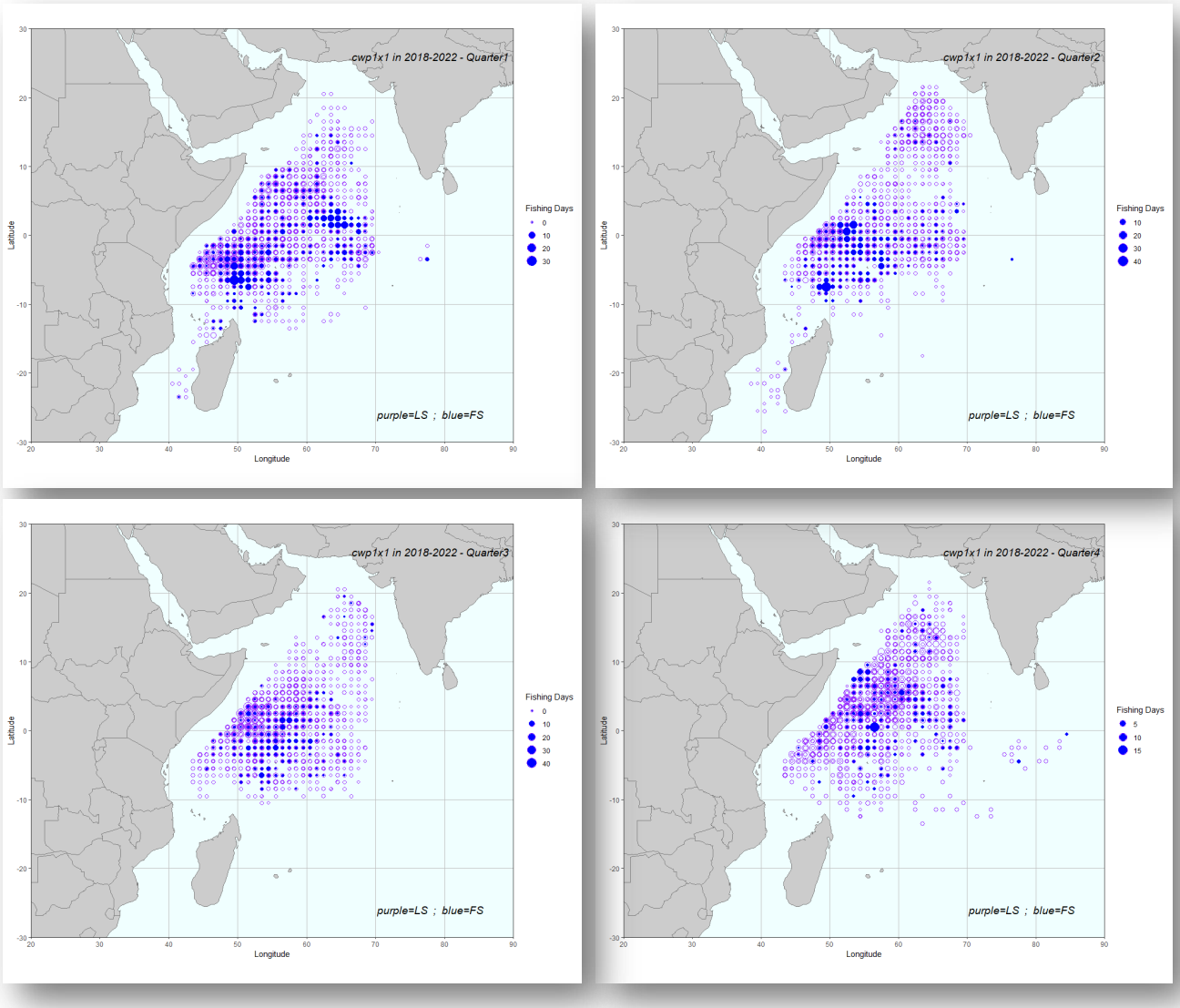

Figure 2.bi. Map of the distribution of fishing effort (fishing days), by cwp1x1, of the purse seine Spanish fleet in 2018-2022 (average of the 5 most recent years), per quarter and fishing mode, in the IOTC area of competence. Key: Purple, Log School associated sets; Blue, Free-swimming School sets.

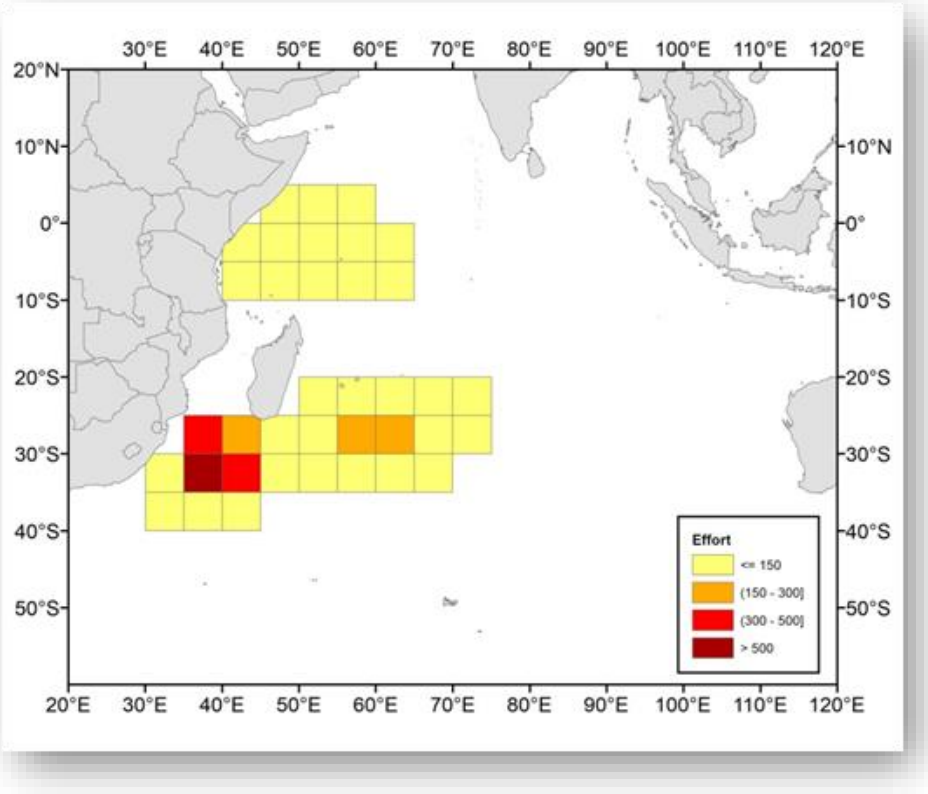

Figure 2.bii. Distribution of the nominal fishing effort (thousand hooks) by 5ºx5º squares carried out by the Spanish surface longline fleet in the Indian Ocean (average of the 5 previous years 2018-2022).

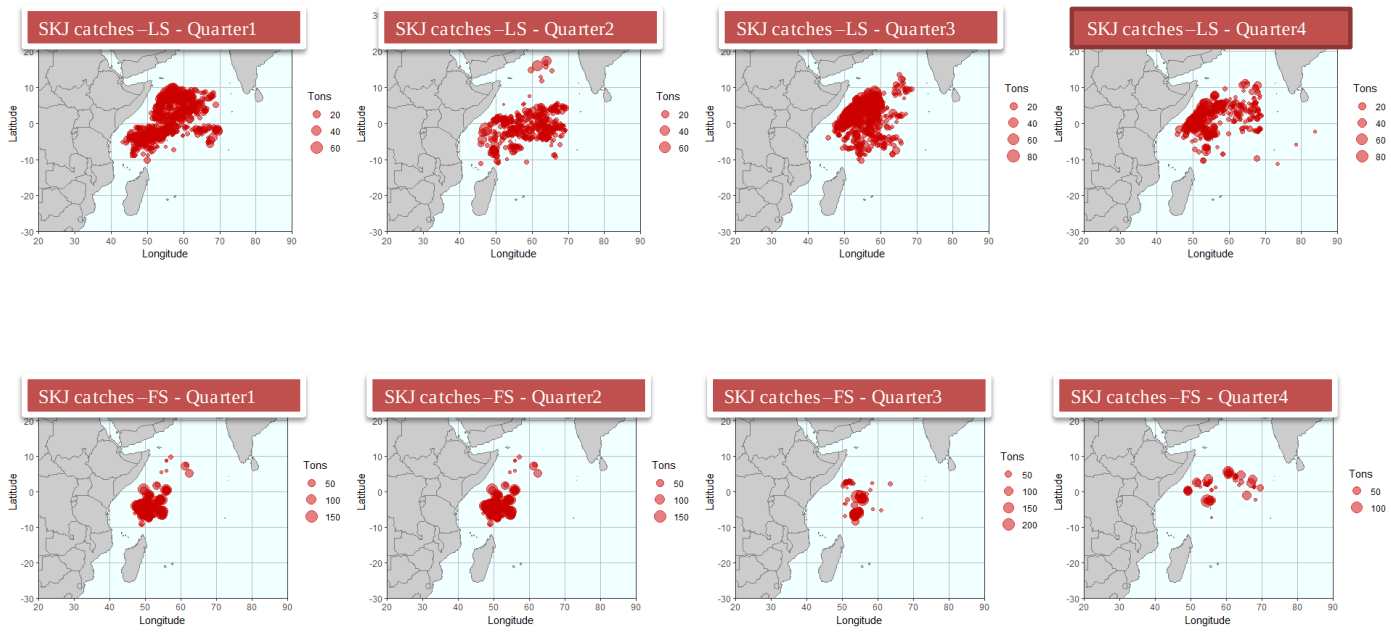

Figure 3.ai. Map of distribution of SKJ catches of the Spanish purse seine fleet in 2022, in the IOTC area of competence, per quarter and fishing mode. Key: LS = Log Schools associated sets; FS = Free-swimming Schools sets.

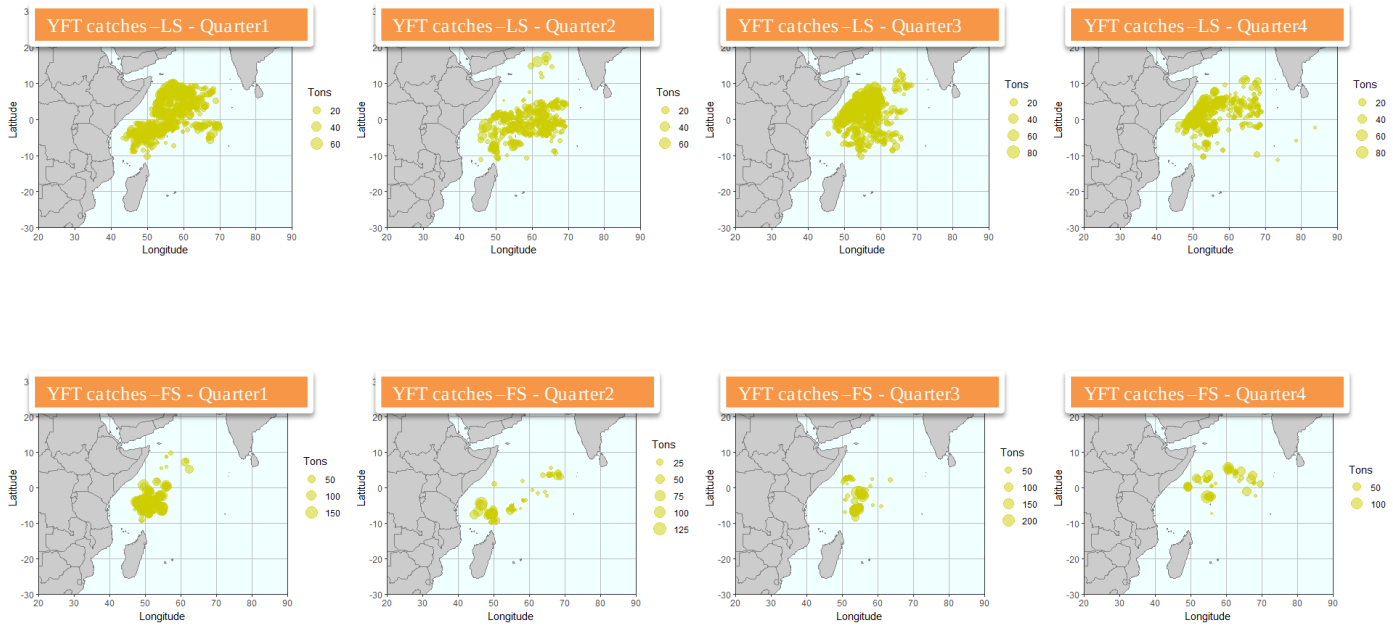

Figure 3.aii. Map of distribution of YFT catches of the Spanish purse seine fleet in 2022, in the IOTC area of competence, per quarter and fishing mode. Key: LS = Log Schools associated sets; FS = Free-swimming Schools sets.

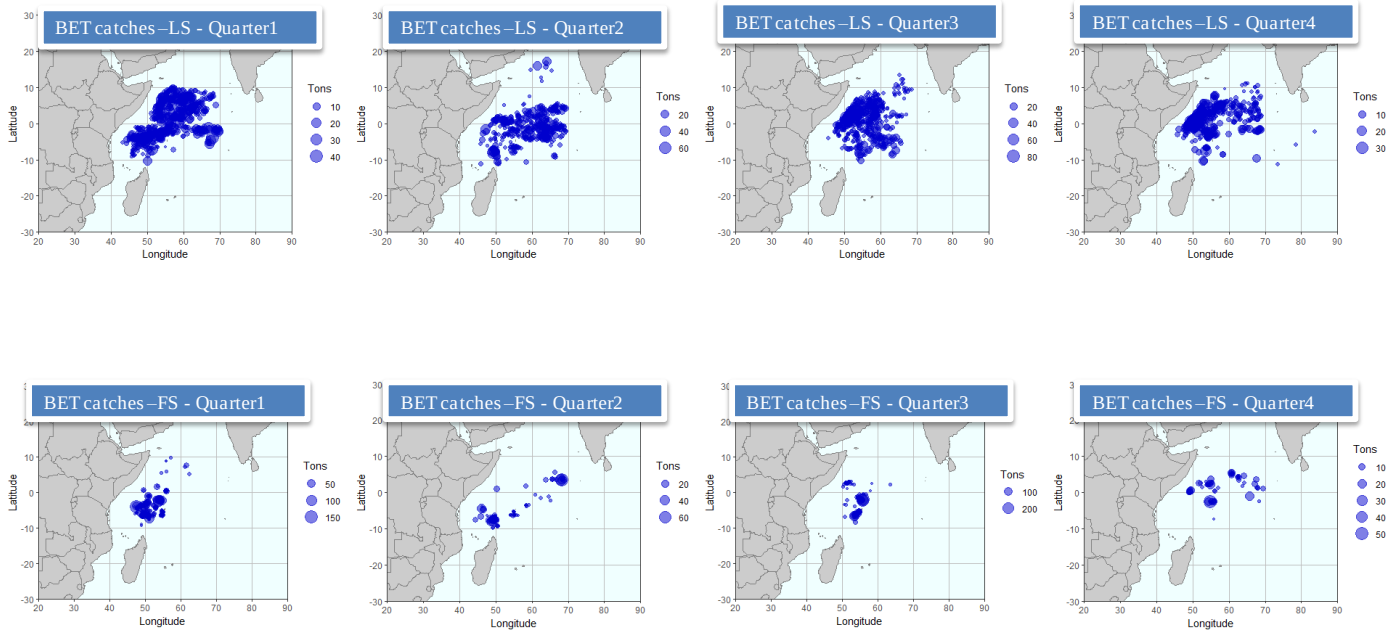

Figure 3.aiii. Map of distribution of BET catches of the Spanish purse seine fleet in 2022, in the IOTC area of competence, per quarter and fishing mode. Key: LS = Log Schools associated sets; FS = Free-swimming Schools sets.

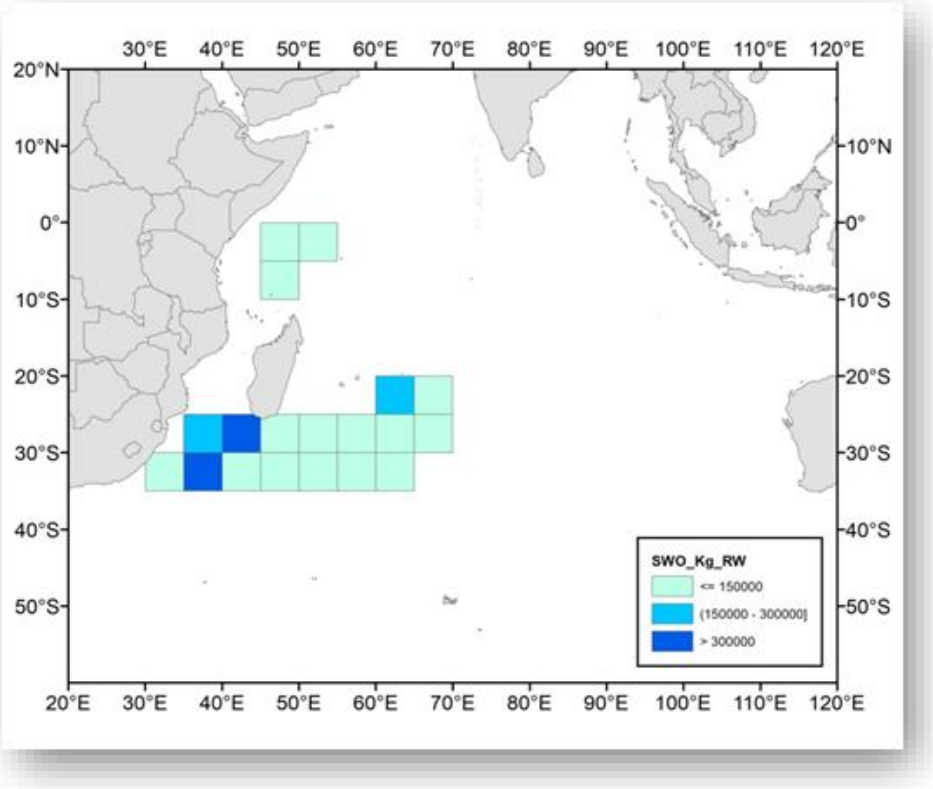

Figure 3.aiv. Map of distribution of SWO catches (kg of round weight) of the Spanish surface longline fleet in 2022, by 5ºx5º squares, in the IOTC area of competence.

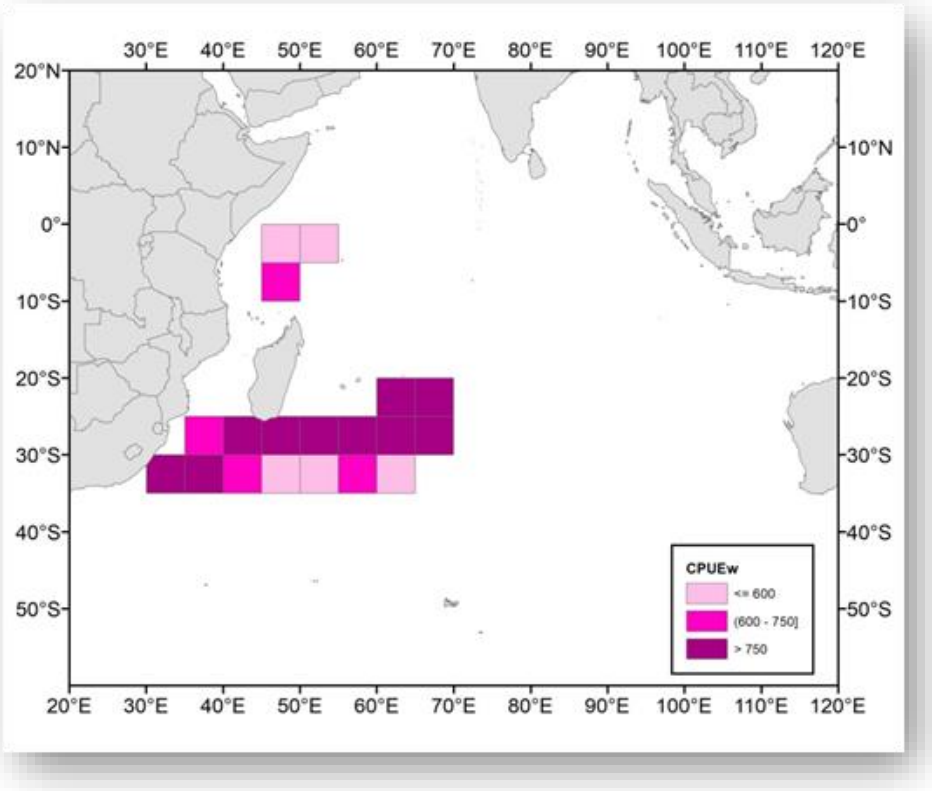

Figure 3.av. Map of distribution of the nominal CPUEw in kg (round weight) of SWO landed per thousand hooks set by 5ºx5º squares, carried out by the Spanish surface longline fleet in 2022, in the IOTC area of competence.

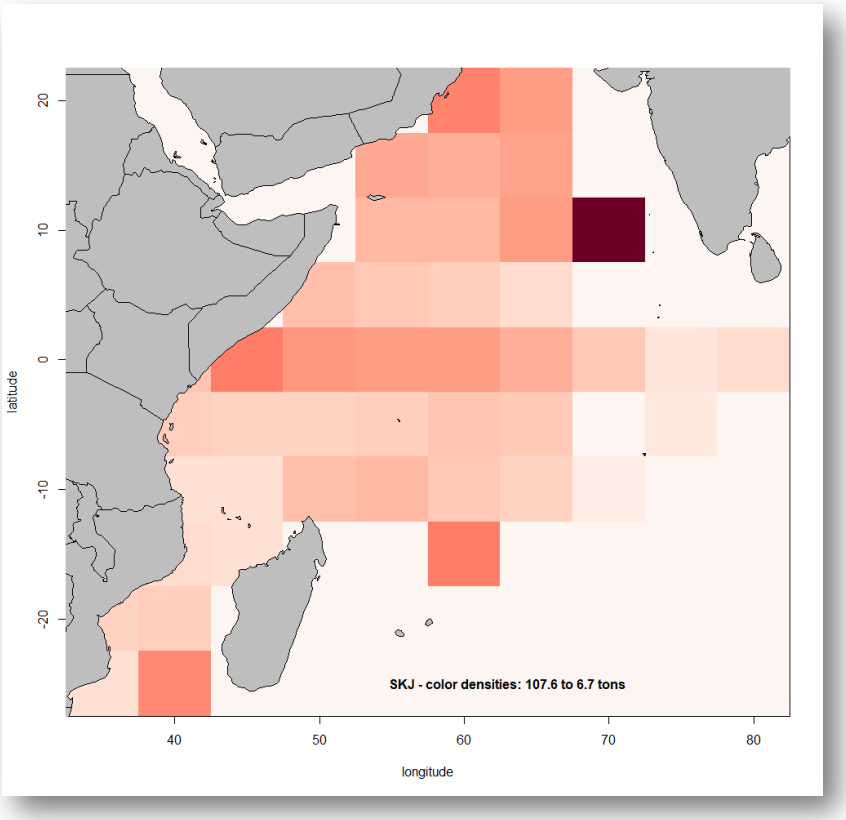

Figure 3.bi. Map of distribution of SKJ catches, in cwp5x5 squares, by the Spanish purse seine fleet, in the IOTC area of competence (average of the 5 previous years: 2018–2022).

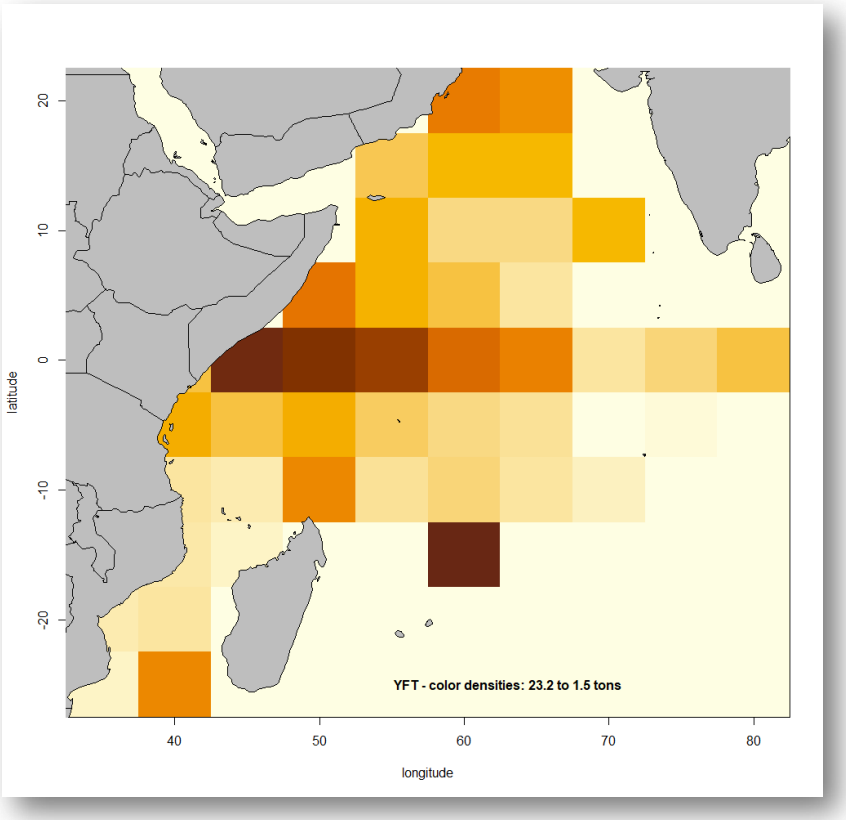

Figure 3.bii. Map of distribution of YFT catches, in cwp5x5 squares, by the Spanish purse seine fleet, in the IOTC area of competence (average of the 5 previous years: 2018–2022).

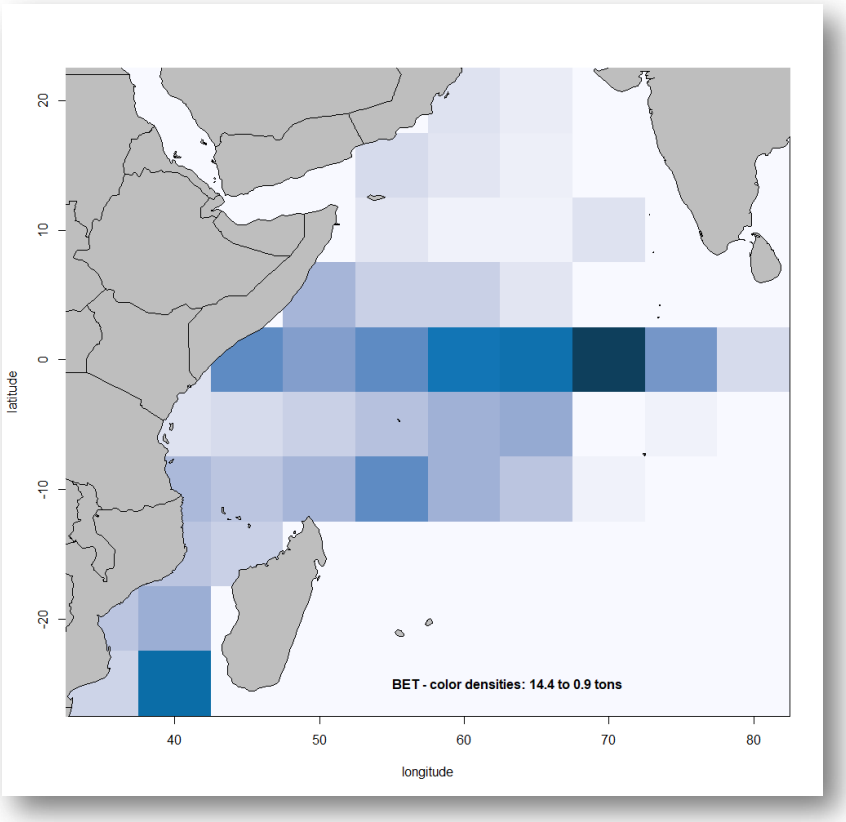

Figure 3.biii. Map of distribution of BET catches, in cwp5x5 squares, by the Spanish purse seine fleet, in the IOTC area of competence (average of the 5 previous years: 2018–2022).

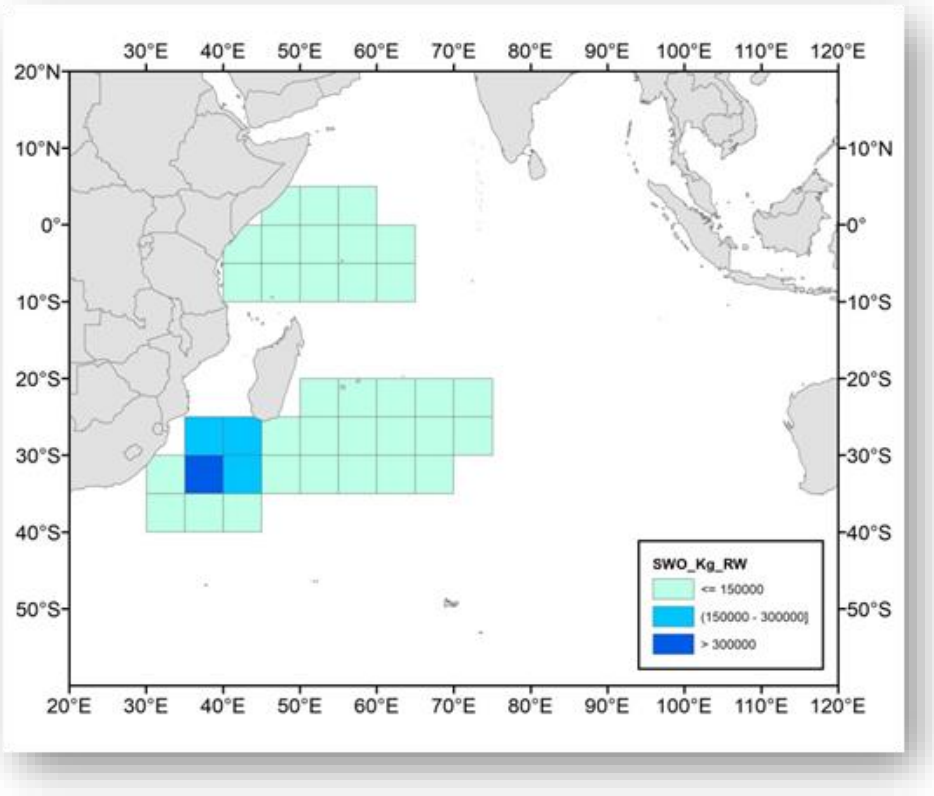

Figure 3.biv. Map of distribution of SWO catches (kg of round weight), in cwp5x5 squares, by the Spanish surface longline fleet, in the IOTC area of competence (average of the 5 previous years: 2018–2022).

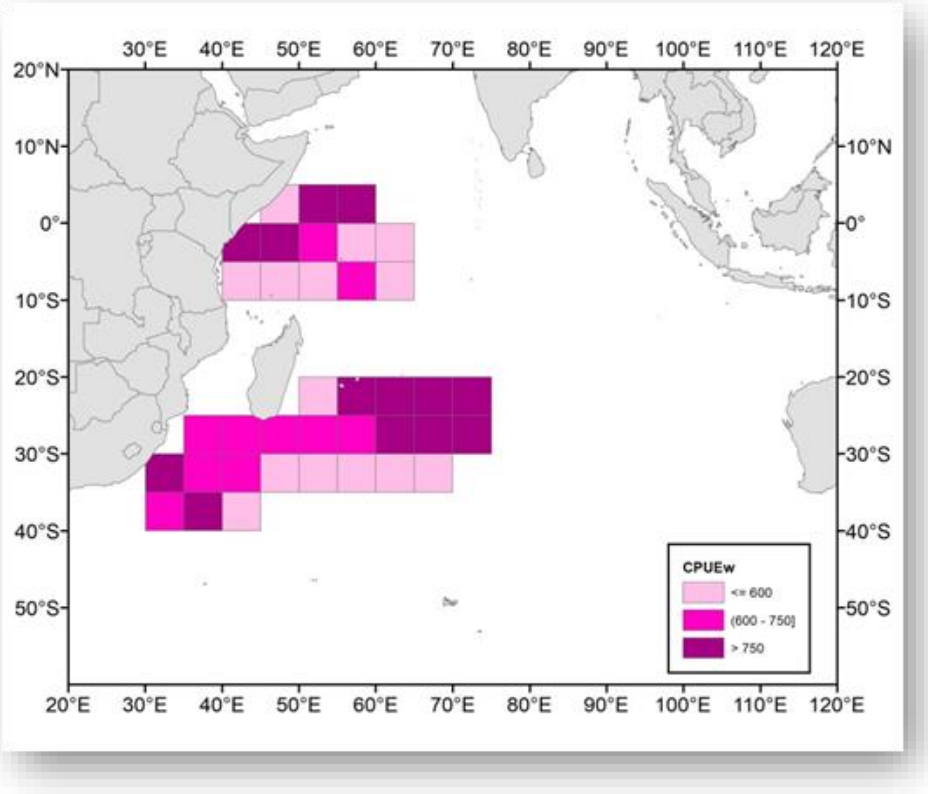

Figure 3.bv. Map of distribution of the nominal CPUE in kg (round weight) of SWO landed per thousand hooks set, in 5x5 squares, by the Spanish surface longline fleet, in the IOTC area of competence (average of the 5 previous years: 2018–2022).

4. RECREATIONAL FISHERY

There are no recreational fishing activities of Spanish vessels in the IOTC area.

5. ECOSYSTEM AND BYCATCH ISSUES

Purse Seine

A total of 1560 sets (approximately a 39,7 % of the total sets performed by this fleet on board 11 of the 15 Spanish tropical tuna purse seiners in the Indian Ocean have been covered by human observers on board. They are shown in the table 3.

Table 3: Observed effort on board Spanish PS in 2022. Per vessel, the number of days at sea, the number of trips and the number of set types are stated.

IOTC vessel code	Days at sea	N sets on Free schools	N sets on Object schools	Total number of sets	Number of trips
TOTAL	**1589**	**319**	**1241**	**1560**	**65**

Apart from tuna species, a total of 71 species and taxa belonging to species groups associated to tropical tuna fisheries have been identified and measured during the sampled trips, having an approximate global retained catch of 81447 kg, an equivalent to 28138 individuals. The discarded fraction of these taxa reached an estimation of 125266 individuals. A total of 19225 individuals were sampled (from the retained and the discarded fraction), most of them belonging to the species FAL (*Carcharhinus falciformis)*, RRU (*Elagatis bipinnulata)*, DOL (*Coryphaena hippurus)*, CNT (*Canthidermis maculata)* and WAH (*Acanthocybium solandri)*.

The highest volume of discarded associated catches, considering the number of individuals, corresponds to the species, in order: CNT (*Canthidermis maculata*), RRU (*Elagatis bipinnulata*), DOL (*Coryphaena hippurus*) and FAL (*Carcharhinus falciformis*). For the retained fraction, the most numerous species were: RRU (*Elagatis bipinnulata)*, CNT (*Canthidermis maculata),* DOL (*Coryphaena hippurus*) and MSD (*Decapterus macarellus*).

Considering only the weight, the highest volume corresponds to, in order: DOL (*Coryphaena hippurus*), RRU (*Elagatis bipinnulata*), CNT (*Canthidermis maculata*) and WAH (*Acanthocybium solandri*).

The table 4.a shows specifically the number of sharks observed in the discarded fraction, by species and condition when released.

A total of 11 sea turtles were observed interacting with purse seiners, all of them were released alive. The turtles were related with sets on floating objects (FOBs).

The global resulting interaction and mortality rates were 0,0028 turtles per set and 0, respectively (see table 5.bii). Total interaction rate was slightly higher than to last year's (2021) bycatch ratio (0,0019).

The observers on board the Spanish purse seine fleet in the Indian Ocean have also recorded 2 non-identified turtles not involved in the sets but in FOBs. Both were entangled alive in a drifting piece of net found by a vessel and were released alive in good conditions. The ratio of turtles observed was 0.0006, having observed 3538 visits to FOBs.

- There were no records of interactions with cetaceans.
- There was one record of an interaction with a whale shark, which was found after the set and released alive.
- There were no records of interactions with seabirds.

Longline

The scientific monitoring of the swordfish fishery and some research was conducted to find out what species are captured as by-catch or incidental interactions occurred.

This report includes data of bycatch data obtained during the year 2022. The catches of the bycatch by species since the beginning of this fishery in 1993 have been described in several scientific papers previously presented and also provided by reports of the National Fishing Authority. Total catch of sharks was estimated as 2312t (see table 4.b), 108t of tuna, 53t of billfish and 35t for other species in the year 2022.

Studies about the interaction between seabirds and the Spanish surface longline targeting swordfish were carried out following the scientific recommendations of the SC and reported in several papers in previous years.

A total 83520 hooks were observed by the General Fisheries Secretariat and analyzed in the Spanish surface longline fishery targeting swordfish in the Indian Ocean during the year 2022, which corresponded to a total of 95 sets and 93 days at sea.

In this period 10 interactions with marine turtles were reported, the species found were *Caretta caretta* (8 individuals) and 2 non-identified.

All the specimens were released alive except for 1 that was released dead. Taking this into consideration, the global (both programs included) resulting observed interaction rate was $9{,}7013^{-05}$ per hook and the mortality rate per hook has been $9{,}7013E\text{-}^{06}$ (see table 5.bi)

Regarding the scientific at-sea sampling program coordinated by the IEO-CSIC (A Coruña) during 2022, a total of 19559 hooks were observed during 18 fishing days and 35 days at sea. There was no interaction with marine turtles, therefore the interaction and mortality rates were null.

- There has been no interaction on marine mammals.
- There were no records of interactions with seabirds.
- There were no records of interactions with basking or whale sharks.

5.1 Sharks

For the **purse seine** fishery, shark bycatch, while not significant globally compared to other fishing gears, is tried to be avoided by the implementation of good practices, such as the application of appropriate handling and release protocols. The fleet is strictly regarding the practice of shark finning, which is completely prohibited.

For the surface **longline** fishery, the profitable use of the different parts of the sharks is regularly better than that most bony fish species. The sharks are processed on board as trunks or carcass with their respective fins naturally attached, frozen and stowed on board, and landed for human consumption. Bycatch data of sharks is summarized in table 4.b for 2012-2022 periods. It was not feasible to obtain a scientifically robust data by extensive area-time stratification due to the low occurrence of most bycatch species. However, total catches of all bycatch species are scientifically estimated and reported for assessment.

5.1.1. NPOA sharks

Currently, there are no National Plans of Action developed.

5.1.2. Sharks finning regulation

Sharks finning legislation is settled in the COUNCIL REGULATION (EC) No 1185/2003 of 26 June 2003 on the removal of fins of sharks on board vessels, amended by COUNCIL REGULATION (EC) No 605/2013. It came into force in September of 2003.

The mentioned regulation forbids practising finning in sharks and retaining on board, tranship and land fins without bodies directly from the vessel. It is also forbidden to purchase, offer for sale or sell shark fins which have been removed on board, retained on board, transhipped or landed.

The regulation allows partially sliding of fins for a better on-board storage and under a special fishing permit is also allowed to retain, tranship and land shark fins. An annual report of the practices is mandatory for all the Member States fishing sharks.

This EU regulation is mandatory for all Spanish vessels which are subject to aleatory inspections on board and in port.

5.1.3. Blue shark

Electronic Reporting System is mandatory for all Spanish vessels operating in the IOTC area, according to the Regulation 1224/2009, establishing a Community control system for ensuring compliance with the rules of the common fisheries policy. Blue shark has no special regulation related to the report of its catches. Catches of blue sharks have to be reported by ERS as for the rest of the species.

Table 4.a: Total number of sharks observed on board, by species, released/discarded by the purse seiner national fleet in the IOTC area of competence (for the most recent five years at a minimum, e.g. 2017–2021). Life status upon released/discard is indicated. Observer coverage, in number of sets is indicated.

	2017_17%sets		2018_22%sets		2019_23%sets		2020_14%sets		2021_24%sets		2022_40%sets	
Species	No. Released Alive	No. Released Dead	No. Released Alive	No. Released Dead	No. Released Alive	No. Released Dead	No. Released Alive	No. Released Dead	No. Released Alive	No. Released Dead	No. Released Alive	No. Released Dead
Carcharhinidae	1								10	25	2	
Carcharhiniformes	1	5				11						
Carcharhinus falciformis	1709	869	3466	2985	3910	1621	2223	894	1576	2060	659	3077
Carcharhinus longimanus	17	2	99	26	20	7	14	5	21	17	64	18
Isurus oxyrinchus			1			1					1	1
Prionace glauca			2						1			
Rhincodon typus	2		1		5				1		9	
Rhyna ancyclostomus												1

Table 4.b: Scientific estimation of sharks by species, of the annual bycatch landings (tons of round weight) retained by the Spanish surface longline fleet in the Indian Ocean for the 2012-2022 period.

SPECIES/YEAR	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Carcharhinus falciformis	25	0.5	0	0	0	0	4	0,9	0	0	0
Isurus oxyrinchus	561	620	823	441	450	532	399	424	348	390	285
Isurus paucus	0.2	0.7	0.1	0	0.1	0	0,8	0,6	0	0	0
Prionace glauca	3686	414	4657	3701	3592	3059	2162	2646	2417	2125	2026

5.2 Seabirds

In 2022 a total of 19559 hooks were observed and the sampling program was coordinated by the IEO-CSIC (A Coruña) during 18 fishing days and 35 days at sea. There was no interaction with seabirds, therefore the resulting interaction per hook and mortality rate has been null (see table 5.a).

A total of 83520 hooks were observed in total by the IEO.CSIC and SGP sampling program on board and there were no reported interactions with seabirds (see table 5.a).

Table 5.a: IEO-CSIC (A Coruña) observed annual interactions rates of surface longline gear on seabirds for the 2010-2022 period and number of individuals observed during the sets coordinated by the IEO-CSIC (A Coruña).

	Year	Interaction rate	Mortality rate	Number
SEABIRDS	2010	0	0	0
	2011	0	0	0
	2012	0	0	0
	2013	7,19E^{-05}	7,19E^{-05}	13
	2014	2,83E^{-05}	2,83E^{-05}	2
	2015	8,75E^{-05}	8,75E^{-05}	4
	2016	0	0	0
	2017	0	0	0
	2018	0	0	0
	2019	2,10E^{-05}	2,10E^{-05}	1
	2020	0	0	0
	2021	0	0	0
	2022	0	0	0

Observer seabird interaction data sheet for the IOTC longline fleet [Desirable]

Reporting period* or calendar year_____

Species _____

Fishery		Observed					Estimate
Area[1]	Total effort[2]	Total observed effort[2]	Observer coverage[3]	Captures (number)	Mortalities (number)	Live releases (number)	Mortality estimate (number)
Total							

*This field can be used to specify a temporal stratification to the data e.g. season

[1]Spatial stratification (5x5, 10x10 or other – to be determined)

[2]Number of hooks observed hauled

[3]Percentage of all hooks set that were observed hauled

1. How many vessels operated south of 25˚S in the period covered by this report?
2. How many of those vessels used bird scaring lines (as a proportion of total effort)?
3. How many of those vessels used line weighting (as a proportion of total effort)?
4. How many of those vessels used night setting (as a proportion of total effort)?

5.3 Marine Turtles

The national strategy on marine turtle sis based on international, European and Spanish regulation. The main acts are the following:

- Resolution IOTC 12/04 on the conservation of marine turtles.
- Regulation (EC) No. 520/2007, of the Council, of May 7, 2007, which establishes technical measures for the conservation of certain populations of highly migratory fish species and which repeals Regulation (EC) No. 973/2001. Specifically the provisions of articles 15, 20 and 27 (relating to sea turtles).
- Order APM / 1057/2017, of October 30, which modifies Order AAA/658/2014, of April 22, which regulates fishing with surface longline gear for the capture of highly migratory species, and which repeals Order ARM / 1647/2009, of June 15, which regulates the fishing of highly migratory species (BOE of November 3, 2017).
- Order AAA / 658/2014, of April 22, regulating surface longline fishing for the capture of highly migratory species and creating the unified surface longline census.
- FAO Guidelines to reduce the mortality of sea turtles in fishing operations (2009).

Spanish mitigation measures on sea turtles are carried out through Temporary Fishing Licences (PTP) issued by the General Fisheries Secretariat (SGP) which is mandatory for all Spanish vessels operating in the IOTC area, both for the purse-seine fishery and for the surface longline fishery. The mentioned licences have an annex that includes the obligation to comply with the regulations issued by IOTC, mandatory measures on sea turtles and the obligation to record the interactions that occur with them.

These licences are reviewed and updated annually to include the new provisions that emanate from regulations approved by the IOTC Commission, as well as other European and national regulations.

There are other mitigation measures on marine turtles:

- Management Plan on Fisheries Aggregation Devices (FAD): established by the Spanish administration as mandatory since 2010. It includes mitigation measures on non-target species as marine turtles, through the use of non-entangling FADs.

- This plan is updated annually to incorporate new regulation.

- “Code of Good Practices on board purse seiners”: it includes the design and use of non-entangling FADs that reduce entanglement mortality of vulnerable species such as sea turtles, among others; best practices for their release and, the application of a FAD management system through the implementation of a FAD logbook and responsible use of active FADs.

- Training sessions on Mitigation measures on marine turtles by the industry and the administration and projects involved in this action field.

	Fishery			Observed **				
Year	Lat*	Lon	Total effort	Total effort observed	Species	Captures (number)	Mortalities (number)	Live releases (number)

NB: Effort units should be appropriate for the gear type, i.e., hooks or sets for LL and sets of fishing days for purse seine or gillnet fleets and fishing days for pole and line fleets.

*The resolution should be consistent with the standard data requirements (i.e. 5°x5° for longline and 1°x1° for surface fisheries)

**Indicate data source (e.g. logbooks or observer data)

See Annex I. Tables of marine turtle data for time/area strata, in purse seiners and longliners in period 2010 to 2022.

Table 5.bi: Observed annual interactions rates of surface longline gear by the LL Spanish fleet on marine turtles for the 2010-2022 period and number of individuals observed during the sets coordinated by the IEO-CSIC (A Coruña) and under the framework of the IEO.CSIC-SGPM program.

	Year	Interaction rate	Mortality rate	Number
TURTLES	2010	0	0	0
	2011	0	0	0
	2012	0	0	0
	2013	1,49E^{-04}	2,76E^{-05}	27
	2014	7,07E^{-05}	0	5
	2015	4,37E^{-05}	0	2
	2016	3,78E^{-05}	9,44E^{-06}	4
	2017	3,34E^{-05}	0	2
	2018	0	0	0
	2019	2,10E^{-05}	0	1
	2020	6,038E^{-05}	0	3
	2021	1,979E^{-05}	0	3
	2022	9,701^{-05}	9,701E-^{06}	10

Table 5.bii: Rates of interaction and mortality of marine turtles by species and total, obtained during the year 2022 in the Indian Ocean by the observers sampling programs on board the Spanish purse seine fleet.

Species	**Year**	**Interaction rate (turtles/sets observed)**	**Mortality rate**	**Number of turtles**
Testudinata	2022	0,0003	0	1
Eretmochelys imbricata	2022	0,0010	0	4
Lepidochelys olivacea	2022	0,0010	0	4
Chelonias mydas	2022	0,0005	0	2
Total turtles	**2022**	**0,0028**	**0**	**11**

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

Purse seine

- There were no records of interactions with cetaceans.
- There were 9 records of an interaction with a whale shark, which were found after the set and released alive.
- There were no records of interactions with seabirds.

Longline

- There has been no interaction on marine mammals.
- There were no records of interactions with seabirds.
- There were no records of interactions with barking or whale sharks.

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

Purse seine: During 2020, the sampling activities of the landings in Port Victoria (Seychelles) (that are subsequently used in the catch correction process), currently under Spanish coordination, has been stopped due to the outbreak of COVID19 pandemic. This activity was resumed in 2021.

A total of 126 trips (approximately an 85% of the total trips performed by this fleet) and 1015 sets. On board 11 of the 15 Spanish tropical tuna purse seiners in the Indian Ocean have been carried out covered by scientific observation on board a (23,7% of the total sets vs. 14% in 2020). All the sets performed (917 on object schools and 98 on free schools) were sampled by the observers on board.

Longline: Since the beginning of this fishery in the Indian Ocean in 1993, the implementation of an Information and Sampling Network (IEO-CSIC, A Coruña) has provided the basic data for the study research and for estimating the annual statistics for swordfish by 5ºx5º degrees up to the year 2022. Same size-sex variables of swordfish and blue shark were obtained. The voluntary tagging program is still being carried out tentatively on both, swordfish and bycatch species. Information about interaction with marine turtles, seabirds or others incidental unwanted captures continues being collecting.

Besides, since 2017 the Fisheries General Secretariat carries out an additional National Program of Observers onboard longliners in the IOTC area which continued developed these observations in 2021.

6.1 Logsheet data collection and verification (including date commenced and status of implementation)

The Electronic Fisheries Reporting Logbook was implemented in Spanish fleet according to Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, according to the following calendar:

- since 2010 in fishing vessels of 24 metres' length overall or more
- since 2011 in fishing vessels of 15 metres' length overall or more and less than 24 metres' length overall
- since 2012 in fishing vessels of 12 metres' length overall or more and less than 15 metres' length overall

Currently, at the national level, more than 21% of the vessels use the Electronic Reporting Logbook (Diario Electrónico de Abordo, DEA).

Purse Seine: The General Secretariat of Fisheries (SGP) has implemented a new module of the Electronic Fisheries Reporting Logbook, where the captains and fishing patterns indicate the type of fishing mode (school free or associated), and total catch by species among other information.

6.2 Vessel Monitoring System (including date commenced and status of implementation)

Council Regulation (EEC) No 2847/93 of 12 October 1993 establishing a control system applicable to the common fisheries policy in accordance with the amendment of Council Regulation (EC) nº 686/97 of April 14, 1997, established as mandatory the VMS since June 30, 1998 for vessels operating in the high seas greater than 24 m.
Later, Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy extended the obligation to carry VMS equipment installed to all vessels with an overall length greater than 12 meters and less than 15 meters from 01-01-2012. Those under 15 meters may be exempted if they only fish in territorial waters of the flag state or do not make tides greater than 24 hours.
Currently, at the national level, 1.865 fishing vessels are subject to carrying a monitoring team, of which 163 vessels (9%) correspond to surface longliners in international waters, freezer tuna seiners and auxiliary vessels that habitually fish in third party waters. All Spanish vessels operating in IOTC have installed a VMS equipment.

6.3 Observer scheme (including date commenced and status; number of observer, include percentage coverage by gear type)

Purse Seine: The EU establishes a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy (CFP) through the [2]Regulation (UE) 2017/1004 of the European Parliament and of the Council of 17 May 2017.

Under the coordination of the Spanish Fisheries Secretariat (SGP), a multi-annual data collection program (PNDB – *Programa Nacional de Datos Básicos*) is implemented with the collaboration of various research centres since 2003.

The Spanish Institute of Oceanography (IEO), together with the AZTI Foundation, are in charge of the implementation concerning the '*National Program of Tropical Tuna Fishing*'. Commercial vessels are sampled with Scientific Observers to estimate the bycatch and discards of Spanish-flagged tuna purse seiners operating in tropical waters of the Atlantic and Indian Oceans.

In addition to PNDB, a Memorandum of Understanding (MoU) for the deployment of fisheries observers on tuna purse-seine fleet between TAAF, Mauritius Ministry of Fisheries, Seychelles Fisheries Authority (SFA) and AZTI Foundation was signed in 2014. This agreement has allowed placing local observers on board instructed with the directives of the PNDB.

_____

[2] Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast). ELI: http://data.europa.eu/eli/reg/2017/1004/oj

During each trip, the observers on board must collect the required data by filling in the following FORMS:

- ✓ Form TRIP: general characteristics of the trip (start date, end date, port…)
- ✓ FORM A: route and environmental parameters (types of activity, coordinates, temperature…)
- ✓ FORM B: fishing characteristics (type of banc, tuna discards, bycatch, catch, destiny…)
- ✓ FORM C1: tuna discards length sampling
- ✓ FORM C2: bycatch length and sex sampling

✓ FORM D: description and components of floating objects

The main tasks to be performed by these scientific observers during the set follow a PRIORITY order, which is:

✓ 1st Tuna discards and estimation of bycatch:

Tuna discards by species

Tuna Length sampling (FL to the lowest nearest cm)

Bycatch estimation (weight or number) by species

✓ 2nd Sampling of other species:

The whole bycatch will be sampled or a representative sample will be selected whenever its quantity is high. Sampling will be done following a list of priorities by species group, measuring always the size to the lowest nearest cm:

- Sharks and rays
- Turtles
- Billfishes
- Other fishes

✓ 3rd Tuna catch:

The data collected will be obtained from the information provided by the skipper and/or the main engineer, registering the catch weight (in tonnes) by species and the destiny well/s. If any discrepancy were observed, it will be described in the comments of the suitable form.

1. COVERAGE:

The number of sets sampled supposes approximately a 40% of the total number of sets performed by the Spanish tropical tuna purse seiner fleet in the Indian Ocean in 2022.

2. VESSELS AND SETS SAMPLED:

A total of 65 trips (approximately a 44 % of the total trips performed by this fleet) and 1560 sets (a 39,7% of the total sets) on board 11 of the 15 Spanish tropical tuna purse seiners in the Indian Ocean have been carried out (table 6.a). They are shown in the following table, stating the number of days at sea and the number of sets (on free schools or object schools) by vessel performed in 2022. All the sets performed (1241 on object schools and 319 on free schools) were sampled by the observers on board.

Table 6.a: Effort of scientific observation on board Spanish purse seiner fleet, by vessel, indicating the days at sea, the number of sets by fishing mode and the number of trips (unloadings).

IOTC vessel code	Days at sea	N sets on Free schools	N sets on Object schools	Total number of sets	Number of trips
IOTC000161	217	81	138	219	7
IOTC000175	239	18	202	220	11
IOTC000187	234	49	85	134	7
IOTC000811	28	24	40	64	2
IOTC000812	26	6	23	29	1
IOTC000879	13	0	15	15	1
IOTC000907	227	48	273	321	10
IOTC015353	44	5	35	40	1
IOTC015569	289	58	208	266	14
IOTC016254	51	16	45	61	2
IOTC017253	221	14	177	191	9
TOTAL	**1589**	**319**	**1241**	**1560**	**65**

3. FISHING GROUND:

The following figure (figure 4.a) shows the position of the sets performed in the 65 trips sampled, including a graphical distinction between by fishing mode, over the whole fleet effort in 2022 (3934 set positions).

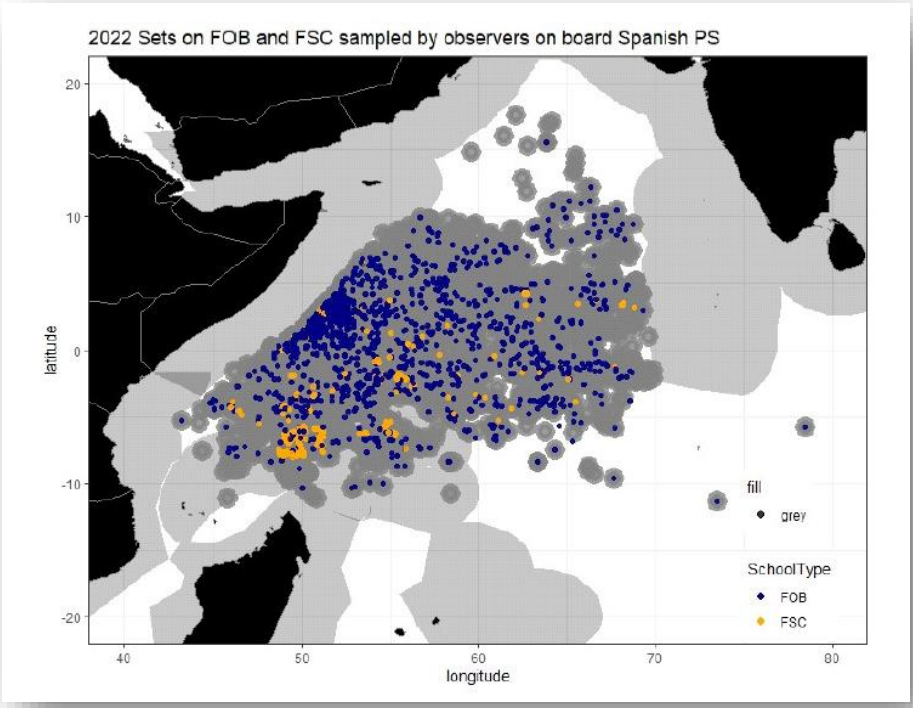

Figure 4.a: Distribution of the observed sets on board Spanish purse seiners in 2022. Key: Blue, Log School associated sets (FOB); Yellow, Free-Swimming Schools sets (FSC).

4. TARGET CATCHES AND DISCARDS

The following table (table 6.b) specifies the observed tuna catches by species (in kilograms), depending on whether they have been retained or discarded, and the number and weight of the individuals sampled by scientific observers.

Table 6.b: Nominal catches and discards of tuna species sampled by scientific observers on board Spanish purse seiner vessels, by species and fraction, in kg and number of fish by species.

Tuna species	Observed retained catches (Kg)	Observed Discards (Kg)	No of individuals measured*	Weight (Kg) of the measured individuals*
ALB (Thunnus alalunga)	13000	-	-	-
BET (Thunnus obesus)	5691000	12863	147	61,550
BLT (Auxis rochei)	1000	51	5	22,000
FRI (Auxis thazard)	182200	102654	2427	414,370
FRZ (Auxis spp.)	97000	11034	1486	270,460
KAW (Euthynnus affinis)	1000	7012	229	51,837
SKJ (Katsuwonus pelamis)	32437215	101455	2943	726,442
YFT (Thunnus albacares)	17547765	68561	632	411,010

* all measurements of tuna species belong to discarded fraction

Longline:

The main task of the samplers onboard is recording catch and effort data as well as sampling the size of the target species, the species composition of catches to the more detailed taxonomic level possible and observing the interaction with bycatch and incidental-bycatch species. At the same time, information about fishing operations and fishing gear configuration is also taken. The working protocol for scientific purposes of sampler is based on recording of catches of the target species, obtaining biological and biometric information and sampling to various studies. They also record the number of individuals affected by the false killer whale attacks. In the case of sharks, sometimes reproductive factors and presence-absence of embryos is also studied. In another hand it continues tagging different species.

In 2022 a total of 19559 hooks, 18 sets and 35 fishing days were observed by the IEO-CSIC (A Coruña) sampling program on board.

On the other hand, the Program of the General Fisheries Secretariat in 2022 observed a total of 83520 hooks (see table 6.c) of the Spanish surface longline fishery targeting swordfish in the Indian Ocean that means a total of 93 fishing days which corresponds to 95 sets.

The distribution of the effort is shown in figures 4.b by IEO-CSIC (A Coruña) and in figure 4.c by SGP-IEO.CSIC.

Table 6.c: Annual observer coverage by year, indicating the number of longline hooks observed (for the most recent five years at a minimum, e.g. 2017–2021 or to the extent available).

Year	Hooks
2015	45732

2016	105918
2017	278437
2018	181282
2019	126056
2020	49686
2021	151605
2022	103079

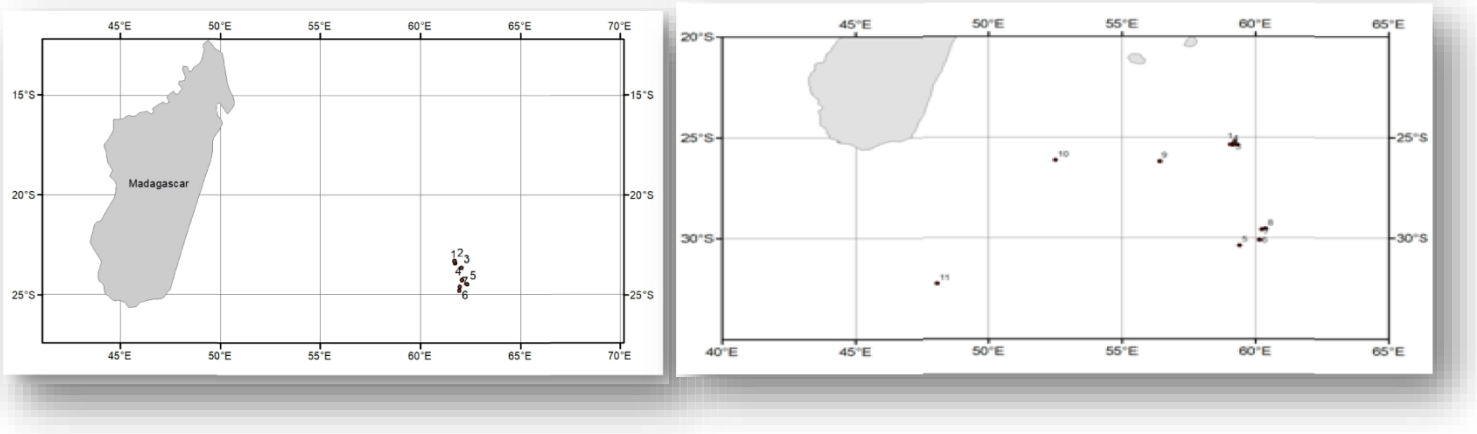

Figure 4.b: Map showing the spatial distribution of observer coverage IEO.CSIC (A Coruña) on board Spanish longline vessels in 2022 (7 observed sets on the left and 11 observed sets on the right)

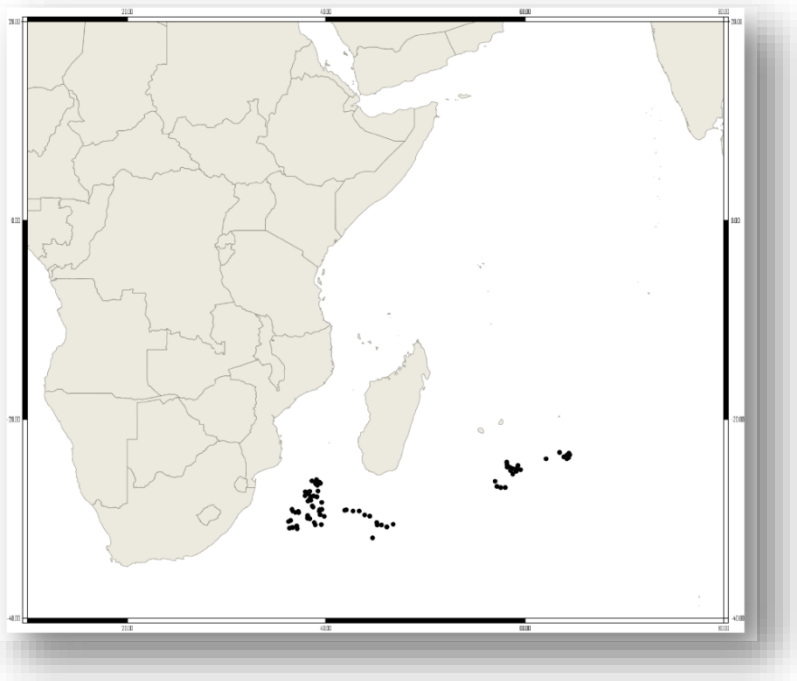

Figure 4.c: Map showing the spatial distribution of observer coverage SGPM-IEO.CSIC on board Spanish longline vessels in 2022 (95 observed sets)

6.4 Port sampling programme

In January 2019, Spain reinforced the sampling team in the port of Victoria (Seychelles), which is the main port of discharge for the Spanish freezer **purse seine** fleet. 2020 data are unable to provide at this time due to the pandemic and a lack of agreement between Spanish private companies, which provided services to Spanish administration and the Spanish administration itself.

Currently, the sampling port team is made up of a Spanish coordinator, 3 technicians and 1 computer technician responsible for the databases. In 2022, 263607 tuna fishes were sampled during the landings of the Spanish purse seine fleet in Victoria. The number of sampling units in wells was 548 (1665 wells in total). Considering the number of landings performed by the EU-Spain purse seiner fleet was 142 in Victoria-Seychelles, the sampling effort covered by around 92% of the yearly unloading (132 landings).

Regarding the **longline** fleet, Spain do not have stablished a port sampling programme.

Tables 7, 8.a and 8.b display the number of fish sampled and counted at port, including the number of fishing trips, vessels and sets by species an month.

Table 7: Number of vessel trips and fish sampled at port by species during 2022 in the Spanish purse seine fleet landings performed in Victoria – Seychelles. The number of sets were the species sampled were present is also indicated.

FAO code	Species	N length measures at port	N fishes counted at port	n fishing trips sampled	n unique vessels sampled	n sets presence (source logbooks)
ALB	*Thunnus alalunga*	13	13	1	1	1
BET	*Thunnus obesus*	9375	9375	119	15	1971
FRI	*Auxis thazard*	3986	3986	103	15	290
KAW	*Euthynnus affinis*	7	7	2	2	0
SKJ	*Katsuwonis pelamis*	46349	190257	116	15	2991
YFT	*Thunnus albacares*	59792	59969	126	15	2892
Total		**119522**	**263607**			

Table 8a: Number of tuna fishes sampled at Victoria port during 2022 by month and species.

Month	Tuna especies	Number of fishes measured	Number of fishes counted
January	*Thunnus albacares*	4580	4580
January	*Katsuwonus pelamis*	4099	15333
January	*Thunnus obesus*	1406	1406
January	*Auxis thazard*	353	353
February	*Thunnus albacares*	9610	9610
February	*Katsuwonus pelamis*	4400	16892
February	*Thunnus obesus*	971	971
February	*Auxis thazard*	393	393
February	*Euthynnus affinis*	7	7
March	*Thunnus albacares*	5343	5343
March	*Katsuwonus pelamis*	3300	18527
March	*Thunnus obesus*	474	474
March	*Auxis thazard*	691	691
April	*Thunnus albacares*	4476	4653
April	*Katsuwonus pelamis*	3650	15701
April	*Thunnus obesus*	141	141

Month	Tuna especies	Number of fishes measured	Number of fishes counted
April	*Auxis thazard*	399	399
May	*Thunnus albacares*	3914	3914
May	*Katsuwonus pelamis*	4000	15993
May	*Thunnus obesus*	972	972
May	*Auxis thazard*	377	377
June	*Thunnus albacares*	3540	3540
June	*Katsuwonus pelamis*	3150	12689
June	*Thunnus obesus*	659	659
June	*Auxis thazard*	281	281
July	*Thunnus albacares*	4363	4363
July	*Katsuwonus pelamis*	3000	11835
July	*Thunnus obesus*	615	615
July	*Auxis thazard*	230	230
August	*Thunnus albacares*	4684	4684
August	*Katsuwonus pelamis*	3650	14433
August	*Thunnus obesus*	564	564
August	*Auxis thazard*	244	244
September	*Thunnus albacares*	7226	7226
September	*Katsuwonus pelamis*	5900	23552
September	*Thunnus obesus*	1530	1530
September	*Thunnus alalunga*	13	13
September	*Auxis thazard*	178	178
October	*Thunnus albacares*	7189	7189
October	*Katsuwonus pelamis*	6500	26670
October	*Thunnus obesus*	1188	1188
October	*Auxis thazard*	270	270
November	*Thunnus albacares*	4190	4190
November	*Katsuwonus pelamis*	4100	16255
November	*Thunnus obesus*	778	778
November	*Auxis thazard*	538	538
December	*Thunnus albacares*	677	677
December	*Katsuwonus pelamis*	600	2377
December	*Thunnus obesus*	77	77
December	*Auxis thazard*	32	32

Table 8b: Number of Spanish purse seine trips sampled at Victoria port by month during 2022.

Months	Number of landings sampled	Species sampled
January	43	Tropical tunas
February	68	Tropical tunas
March	52	Tropical tunas
April	47	Tropical tunas
May	41	Tropical tunas
June	35	Tropical tunas
July	37	Tropical tunas

August	42	Tropical tunas
September	66	Tropical tunas
October	71	Tropical tunas
November	41	Tropical tunas
December	6	Tropical tunas

6.5 Unloading/Transhipment of flag vessels:

Table 9: Quantities (tons) by species and gear landed in ports located in the IOTC area competence.

AL3	Purse seiner	Longliner (t)
ALB	11,55	1,15
BAZ	0,60	0,00
BET	15.700,07	62,03
BIL	2,87	0,00
BLM	7,19	17,18
BLT	0,73	0,00
BSH	0,00	1.909,46
BUM	1,59	0,00
BWA	0,00	1,36
CFW	0,64	0,00
CNT	77,50	0,00
CYO	0,00	1.034,74
DCA	0,00	3,59
DOL	80,44	4,47
FAL	0,45	0,00
FRI	609,87	0,00
FRZ	5,00	0,00
GBA	7,36	0,00
GRV	0,00	3,73
GUP	0,00	9,73
GUQ	0,00	87,89
LEC	0,00	28,99
MLS	0,00	10,52
MSD	1,01	0,00
OIL	0,00	0,06
RFA	0,00	2,17
RIB	0,00	66,92
RRU	111,81	0,00
SAI	0,00	0,53
SCK	0,00	21,44
SFA	0,00	10,43
SHL	0,00	190,95
SKJ	87.378,45	0,00
SMA	0,00	261,31
SSP	0,00	12,09
SWO	0,00	1.561,26
TOP	0,00	35,64
TRG	0,20	0,00
WAH	29,99	0,35
WRF	0,00	13,67
YFT	40.313,48	43,00

Table 10: Quantities (tons) by species and gear transshipped at ports located in the IOTC area of competence:

Gear	AL3	Transhipped (kgs)
Longliner	ALB	0,94
Longliner	BET	50,07
Longliner	BLM	14,58
Longliner	BSH	1.036,40
Longliner	BWA	2,30
Longliner	BXD	0,15
Longliner	CYO	665,89
Longliner	DCA	1,09
Longliner	DOL	3,94
Longliner	EDR	0,17
Longliner	GRV	4,01
Longliner	GUP	2,95
Longliner	GUQ	29,03
Longliner	LEC	24,11
Longliner	MLS	8,61
Longliner	OIL	0,11
Longliner	RFA	9,82
Longliner	RIB	20,65
Longliner	SAI	0,48
Longliner	SCK	11,51
Longliner	SFA	8,50
Longliner	SHL	57,87
Longliner	SMA	227,13
Longliner	SSP	8,39
Longliner	SWO	1.277,23
Longliner	TOP	93,21
Longliner	WAH	0,28
Longliner	WRF	20,53
Longliner	YFT	34,19
Purse seiner	ALB	11,55
Purse seiner	BET	15.630,65
Purse seiner	BIL	4,12
Purse seiner	CNT	0,84
Purse seiner	DOL	3,00
Purse seiner	FRI	80,49
Purse seiner	RRU	1,60
Purse seiner	SKJ	79.876,65
Purse seiner	WAH	1,59
Purse seiner	YFT	34.249,76

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

[Res 18.05 paragraph 9: CPCs shall include in their Annual Reports to the Scientific Committee information on the actions they have taken domestically to monitor catches and to manage fisheries for sustainable exploitation and conservation of Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish.]

Electronic Reporting System is mandatory for all the vessels operating in the IOTC area, according to the Regulation 1224/2009. Marlins and sailfish have no special regulation related to the report of its catches. Catches of these species have to be reported by ERS as for the rest of the species.

6.7 Gillnet observer coverage and monitoring [Desirable]

[Res 19.01 paragraph 22]: CPCs are encouraged to increase their observer coverage or field sampling in gillnet fishing vessels by 10% using alternative data collection methodologies (electronic or human) verified by the IOTC Scientific Committee by 2023.

6.8 Sampling plans for mobulid rays [Mandatory]

[Res 19.03 paragraph 11]: CPCs, unless clearly demonstrate that intentional and/or incidental catches of mobulids do not occur in their fisheries, shall develop, with the assistance from the IOTC Secretariat where required, sampling plans for the monitoring of the mobulid rays catches by the subsistence and artisanal fisheries. The sampling plans, including their scientific and operational rationale, shall be reported in the national scientific reports to the Scientific Committee, starting in 2020, which will provide its advice on their soundness by 2021 at the latest. The sampling plans, where required, will be implemented by the CPCs from 2022 onward taking into account the Scientific Committee advice.

As there are no mobulid catches, there is no plan regarding this species.

7. NATIONAL RESEARCH PROGRAMS

Several internal IEO projects are responsible for the scientific tracking of Spanish tuna fisheries from Indian Ocean.

7.1 National research programs on blue shark

[Res 18.02 paragraph 5: CPCs are encouraged to undertake scientific research on blue shark that would provide information on key biological/ecological/behavioural characteristics, life-history, migrations, post-release survival and guidelines for safe release and identification of nursery grounds, as well as improving fishing practices. Such information shall be made available to the Working Party on Ecosystem and Bycatch and Scientific Committee through working documents and the national Annual Reports.]

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

[Res 18.05 paragraph 11: CPCs are encouraged to undertake scientific research on key biological/ecological/behavioural characteristics, life-history, migrations, post-release survival and guidelines for safe release, identification of nursery grounds, improving selectivity of fishing practices and fishing gears, for Striped Marlin, Black Marlin, Blue Marlin and Indo-pacific Sailfish. The results of such researches shall be made available to the Working Party on Billfishes and the Scientific Committee through working documents and their national Annual Reports.]

7.3 National research programs on sharks

[Res 17.05 paragraph 11: CPCs shall undertake research to: a) identify ways to make fishing gears more selective, where appropriate, including research into the effectiveness of prohibiting wire leaders; b) improve knowledge on key biological/ecological parameters, life-history and behavioural traits, migration

patterns of key shark species; c) identify key shark mating, pupping and nursery areas; and d) improve handling practices for live sharks to maximise post-release survival.]

7.4 National research programs on oceanic whitetip sharks

[Res 13.06 paragraph: 6. CPCs shall, where possible, implement research on oceanic whitetip sharks taken in the IOTC area of competence, in order to identify potential nursery areas.]

7.5 National research programs on marine turtles

[Res 12.04 paragraph 10: 10. All CPCs are requested to, where appropriate undertake research trials of circle hooks, use of whole finfish for bait, alternative FAD designs, alternative handling techniques, gillnet design and fishing practices and other mitigation methods which may improve the mitigation of adverse effects on marine turtles.]

7.6 National research programs on thresher sharks

[Res 12.09 paragraph: 6. CPCs shall, where possible, implement research on sharks of the species Alopias spp in the IOTC area of competence, in order to identify potential nursery areas.]

Table 11. Summary table of national research programs, including dates. [currently underway]

Project title	Period	Countries involved	Budget total	Funding source	Objectives	Short description
Programme régional de marquage de thons	2017–2021	EU – France and Spain		ED- DG FISH	Observer program: collection of bycatch data	

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

Longline: Vessels are tracked by the Spanish National Fishery Authority and also required to fill in EU fishery logbooks system to be presented to the pertinent authorities and well as VMS and other requirements for fishing.

This surface longline fleet is part of a group of vessels that operate far from their port bases and may not call at their home ports for as long as several years. These vessels have similar structural and fishery characteristics and carry out extremely lengthy trips in terms of time. They may even change oceans between trips providing that this is allowed under their administrative situation.

Table 12. Scientific requirements contained in Resolutions of the Commission, adopted between 2012 and 2022.

Res. No.	Resolution	Scientific requirement	CPC progress
22/04	On a regional observer scheme	Paragraph 9	Since 2017 an observer program is implemented in the longliners fleet, to reach the 5% of mandatory observation in that fleet. In the purse seine fleet the observation reach a 100%, according to their "*Código de Buenas Prácticas*". The achievement of the observation in each fleet has been positive, with the exemption of problems in 2020 due to the COVID pandemic.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6-10	Each year the report of the implemented measures and the interaction with sea turtles is provided by Spanish Fisheries Secretariat. The report of the interaction in 2021 with marine turtles was provided 28/07/2023 Interactions and mortality in marine turtles are annually reported by Spain. The associations are involved in projects to inform the fishermen with the best techniques to release and to manage turtles in accordance with FAO requirements (achieved thanks to different initiatives such as FIP in longline fleet, "Código de Buenas Prácticas" for purse seine fleet) The Instituto Español de Oceanografía (IEO) elaborates studies related to marine turtles' interactions and measures to reduce the impact of fishing in them. Reference of the studies about bycatch: Ruiz J., F.J. Abascal, P. Bach, J.C. Báez, P. Cauquil, M. Grande, I. Krug, J. Lucas, H. Murua, M. L. Ramos Alonso & P.S. Sabarros (2018). Bycatch of the European, and associated flag, purse-seine tuna fishery in the Indian Ocean for the period 2008-2017. IOTC-2018-WPEB14-15. Working Party on Ecosystems and Bycatch (WPEB), Mon, 10/09/2018 (All day) to Fri, 14/09/2018. Cape Town, South Africa. Báez J.C., Mª. L. Ramos & I.A. Czerwinski (2019). Analysing the bycatch taxonomic structure changes from observers' data on board Spanish purse seiners in the Indian Ocean. IOTC-2019-WPEB15-40. Working Party on Ecosystems and Bycatch (WPEB), IOTC meeting, 03/09/2019 to 07/09/2019, La Reunión (France).
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3-7	Each year the report of the interaction with sea birds is provided by Spanish Fisheries Secretariat, In 2022 there were no reported interactions with seabirds. The mitigation measures applied are reported in the Implementation report each year. For the 2022 data, the report was provided to the European Commission on 3rd of March 2023.

Res. No.	Resolution	Scientific requirement	CPC progress
			Mitigation measures summed up in the Resolution have to be implemented in the longline vessels according to the Fishing Temporary Permission and provided as information with the "Fichas de Aves y Tortugas" Complete scientific studies about sea birds interaction with this surface longline gear have been presented for the period 2011-2015 for areas South of 25ºS (Fernández-Costa et al. 2016). A broader study was presented in 2018 including a retrospective and geographical overview of the interaction observed between seabirds and this fishery during the long 1993-2017 period inferred from data provided by scientific observers (Fernández-Costa et al. 2018 ref. IOTC-2018-WPEB14-23).
12/09	On the conservation of thresher sharks (family *Alopiidae*) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	Thresher shark is a forbidden species to be caught according to the temporary fishing permission for longliners fishing in the Indian Ocean (a permission mandatory to fish in the IOTC area) and the Spanish law (Orden ARM/2689/2009 & Orden AAA/658/2014). If accidentally catched, it is mandatory to report the catches in the ERS As the Spanish fleet is not directed to catch these species, nor there are no interactions reported, these species aren't, by the moment, subject of study for the IEO.
23/06	On the conservation of cetaceans	Paragraphs 7– 9	Cetaceans are forbidden species to be fished in Spain. As the Spanish fleet is not catching these species, nor there are no interactions reported, these species aren't by the moment subject of study for the IEO.
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	Whale sharks are forbidden to be fished as stated in the TAC/Quota regulation. As the Spanish fleet is not catching these species, nor there are no interactions reported, these species aren't by the moment subject of study for the IEO.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	It is forbidden to catch whitetip sharks while it is mandatory to daily report in the Electronic Reporting System the bycatches of every species and to release whitetip sharks avoiding damage to them. Reference of the studies about whitetip sharks: Ramos-Cartelle, A., B. García-Cortés, J. Fernández-Costa, J. Mejuto (2012). Standardized catch rates of the oceanic whitetip shark (Carcharhinus longimanus) from observations of the Spanish longline fishery targeting swordfish in the Indian Ocean during the 1998-2011 period. IOTC-2012-WPEB08-27 (2012). García-Cortés, B., A. Ramos-Cartelle, I. González-González, J. Mejuto (2012). Biological observations

Res. No.	Resolution	Scientific requirement	CPC progress
			of oceanic whitetip shark (Carcharhinus longimanus) on Spanish surface longline fishery targeting swordfish in the Indian Ocean over the period 1993-2011. IOTC-2012-WPEB08-25 (2012). Lopetegui L., Poos J.J, Arrizabalaga H., Guirhem G., Murua H., Lezama-Ochoa N., Griffiths S., Ruiz Gondra J., Sabarros P.S., Báez J.C. & Juan-Jordá, M.J. (2021). A preliminary habitat suitability model for oceanic whitetip shark in the western Indian Ocean. 17th Working Party on Ecosystems and Bycatch: Assessment Meeting, 13-17 de septiembre online. IOTC-2021-WPEB17(AS)-25. Báez J.C., A.M. Barbosa, M.L. Ramos, P. Pascual, J. Ruiz, P.S. Sabarros, M.Tolotti, P. Bach, H. Murua & F. Abascal (2019). Forecasting Oceanic Whitetip shark potential global distribution in a context of climatic change. Joint t-RFMO By-catch WG Doc. No. BYC-13/2019 December 11, 2019. Oporto (Portugal) 16-18 de diciembre 2019. Resumen
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	Electronic Reporting System is mandatory in accordance with Regulation 1224/2009. Actualised template of the logbook sent to EU Commission on 6/09/2021, not requested since then in this context.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	1 Estimated catches are sent as part of the obligations each year. 2021 Estimated catches provided 31/07/2023 2 Reports of the interaction and measures implemented related to sea birds and marine turtles are sent regularly. For 2022, there was no reported interaction with sea birds, marine turtles interactions reported on 31/07/2023, there were 11 interactions. 4 ERS is mandatory for Spanish vessels. 5 Size data has been provided regularly, for 2022, data provided on 31/07/2023. 6. FADs obligations are fulfilled every year, in 2022, active vessels 24/01/2023, information about the daily FADs use provided monthly. 7. Timeliness fulfilled or causes reported.
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	The statistical requirements about sharks are sent annually to the EU Commission, Estimated catches provided for sharks was fully (ps+ll) sent on 31/07/2023. Reference of the studies about sharks in IOTC area: Murua, H., Abascal, F.J., Amande, J., Ariz, J., Bach, P., Chavance, P., Coelho, R., Korta, M., Poisson, F., Neves, M., Seret, B. (2013). Provision of scientific advice for the purpose of the implementation of the EUPOA sharks. Final Report. European Commission, Studies for Carrying out the Common Fisheries Policy (MARE/2010/11 - LOT 2). Poisson, F., Abascal, F., Ellis, J.R., Chavance, P., Bach, P., Santos, M.N., Séret, B., Korta, M., Coelho, R., Ariz, J., Murua, H. (2016). Technical mitigation measures for sharks and rays in tuna and tuna-like

Res. No.	Resolution	Scientific requirement	CPC progress
			fisheries: turning possibility into reality. Aquatic Living Resources 29, 402 García-Cortés, B., Ramos-Cartelle, A., Mejuto, J., Carroceda A. and Fernández-Costa, J. (2021). Biological observations of shortfin mako shark (Isurus oxyrinchus) on Spanish surface longline fishery targeting swordfish. IOTC-2021-WPEB17(AS)-INF07. Queiroz, N., Humphries, N.E., Couto, A., Vedor, M., da Costa, I, Sequeira, A.M.M., Mucientes, G., Santos, A.M., Abascal, F.J. et al. (2019) Global spatial risk assessment of sharks under the footprint of fisheries. Nature 572, 461-466. Brunel T., R. Coelho, G. Merino, J. Ortiz De Urbina, D. Rosa, C. Santos & H. Murua, P. Bach, S. Saber & D. Macias (2018). A preliminary stock assessment for the shortfin mako shark in the Indian ocean using a data-limited approach. IOTC-WPEB14-2018-033. Working Party on Ecosystems and Bycatch (WPEB), Mon, 10/09/2018 (All day) to Fri, 14/09/2018. Cape Town, South Africa. Murua, H., J. Santiago, R. Coelho, I. Zudaire, C. Neves, D. Rosa., I. Zudaire, Y. Semba, Z. Geng., P. Bach, H. Arrizabalaga, P. Bach, J.C. Baez, M.L. Ramos, J.F Zhu & J. Ruiz (2018). Updated Ecological Risk Assessment (ERA) for shark species caught in fisheries managed by the Indian Ocean Tuna Commission (IOTC). Submitted to 21th IOTC Scientific Committee. IOTC-2018-SC21-14_Rev.1. Diallo A, Travassos T.M., Sabarros P., Dagorn L., Deneubourg J.L., Murua H., Ruiz J., Ramos M.L., Báez J.C., Abascal F., Pascual P. & Capello M. (2019). Silky Shark Population Trend In The Indian Ocean Derived From Its Associative Behavior With Floating Objects. IOTC-2019-WPEB15-23. Working Party on Ecosystems and Bycatch (WPEB), IOTC meeting, 03/09/2019 to 07/09/2019, La Reunión (France). Diallo A., M.T. Tolotti, P. Sabarros, L. Dagorn, J.L. Deneubourg, H. Murua, J. Ruiz, M.L. Ramos, J.C. Báez, F.J. Abascal, P.J. Pascual & M. Capello (2019). Deriving abundance indices for pelagic sharks based on their associative behavior with floating objects. Joint t-RFMO By-catch WG Doc. No. BYC-23/2019. Oporto (Portugal) 16-18 de diciembre 2019. Tolotti, M., Sabarros, P.S., Bach, P., Grande, M., Ruiz, J., Murua, H., Coelho, R., Abascal, F., Báez, J.C., Pascual, P., Ramos, M.L., Shahid, U. and Juan-Jordá, M.J. (2019). In support of the IOTC ecosystem report card: Indicators for non-retained sharks and rays. 15th Working Party on Ecosystems and Bycatch. Indian Ocean Tuna Commission. IOTC-2019-WPEB15-25_Rev1
18/02	On management measures for the conservation of blue shark caught in association with IOTC fisheries	Paragraphs 2-5	It is mandatory to notify all the catches and bycatches in the ERS, according to Regulation 1224/2009. Fernández-Costa J., A. Ramos-Cartelle, B. García-Cortés, J. Mejuto. (2015). Standardized catch rates

Res. No.	Resolution	Scientific requirement	CPC progress
			for the blue shark (Prionace glauca) caught by the Spanish longline in the Indian Ocean during the 2001-2013 period. IOTC-2015-WPEB11-25. Reference of the studies about blue sharks: Coelho, R., J. Mejuto, A. Domingo, K. Liu, E. Cortés, K. Yokawa, F. Hazin, F. Arocha, Ch. da Silva, B. García-Cortés, A.M. Ramos-Cartelle, P. Lino, R. Forselledo, S. Ohshimo, F. Carvalho, M. Neves. (2018). Distribution patterns and population structure of the blue shark (Prionace glauca) in the Atlantic and Indian Oceans. Fish and Fisheries. 19(1): 90-106 (https://doi.org/10.1111/faf.12238). Fernández-Costa, J., Ramos-Cartelle, A. and Mejuto, J. (2021). Updated standardized catch rates in biomass for the blue shark (Prionace glauca) caught by the Spanish surface longline fleet in the Indian Ocean during the 2001-2019 period. IOTC-2021-WPEB17(DP)-09.
18/05	On management measures for the conservation of the Billfishes: Striped marlin, black marlin, blue marlin and Indo-Pacific sailfish	Paragraphs 7 – 11	It is mandatory to notify all the catches and bycatches in the ERS, according to Regulation 1224/2009 Data on discards and retained catches provided (31/07/2023).
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	Report of Implementation is annually sent to the EU Commission. For 2022, report of implementation sent on 3rd March 2023. Nominal catches provided in 2023 as stated by the IOTC for purse seiners and longliners (31/07/2023,).
21/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Paragraph 22	Gillnets are not a gear used by Spain in IOTC.
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	Paragraph 11	There wasn't any catch of Mobulid Rays by Spanish fleet between 2012 and 2022 in the Indian Ocean

9. LITERATURE CITED

- BÁEZ, J.C., Mª.L. RAMOS, M- HERRERA, H. MURUA, J.L. CORT, S. DENIZ, V. ROJO, J. RUIZ, P.J. PASCUAL-ALAYÓN, A. MUNIATEGI, A. PEREZ SAN JUAN, J. ARIZ, F. FERNÁNDEZ & F. ABASCAL (2020). Monitoring of Spanish flagged purse seine fishery targeting tropical tuna in the Indian ocean: Timeline and history. ***Marine Policy***, 119: 104094. https://doi.org/10.1016/j.marpol.2020.104094
- Order APA/25/2021; https://www.boe.es/buscar/act.php?id=BOE-A-2021-885
- Order APA/332/2022; https://www.boe.es/diario_boe/txt.php?id=BOE-A-2022-6381
- COUNCIL REGULATION (EC) No 1185/2003 of 26 June 2003 on the removal of fins of sharks on board vessels, amended by COUNCIL REGULATION (EC) No 605/2013
- Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017 on the establishment of a Union framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the common fisheries policy and repealing Council Regulation (EC) No 199/2008 (recast). ELI: http://data.europa.eu/eli/reg/2017/1004/oj

Annex I

Table A1 displays, in a 5°x5° grid, the marine turtles catch performed by the purse seiner fleet between 2010 and 2021. The data collection was strongly influenced by the intensity of Somali piracy (between 2009 and 2014) and the recent pandemic. The observation on board has covered most of the 5°x5° squares where the fleet has been working.

Recently, for the period 2010-2018, some data have been recovered from the Good Practices Program, under the MoU agreement (see section 6.3).

Table A1. Marine turtle bycatches of the purse seiner fleet in 2022 from observers' data in 5°x5° grids

Year	Cwp1x1	Lat	Lon	Total effort (number of sets)	Total effort observed (number of sets)	Species	nCaptures	nMortalities	nLiveReleases
2022	100050	00	050	107	31	*Eretmochelys imbricata*	1	0	1
2022	100055	00	055	77	41				
2022	100060	00	060	47	19				
2022	100065	00	065	25	13				
2022	100070	00	070	4	2				
2022	101050	01	050	71	43	*Eretmochelys imbricata*	1	0	1
						Chelonia mydas	1	0	1
2022	101055	01	055	133	58				
2022	101060	01	060	64	25				
2022	101065	01	065	26	11				
2022	101070	01	070	11					
2022	102050	02	050	56	22				
2022	102055	02	055	249	139	*Eretmochelys imbricata*	1	0	1
2022	102060	02	060	71	20				
2022	102065	02	065	35	15				
2022	102070	02	070	10					
2022	103055	03	055	170	88	*Testudinata*	1	0	1
2022	103060	03	060	60	15	*Chelonia mydas*	1	0	1
2022	103065	03	065	44	8				
2022	103070	03	070	36	21				
2022	104055	04	055	50	27				
2022	104060	04	060	77	22	*Lepidochelys olivacea*	1	0	1
2022	104065	04	065	50	22				
2022	104070	04	070	20	8				
2022	105055	05	055	37	22				
2022	105060	05	060	75	18				
2022	105065	05	065	24	2				
2022	105070	05	070	15	3				
2022	106055	06	055	30	19				
2022	106060	06	060	74	27				
2022	106065	06	065	8	2				
2022	106070	06	070	3					
2022	107055	07	055	13	1				

Year	Cwp1x1	Lat	Lon	Total effort (number of sets)	Total effort observed (number of sets)	Species	nCaptures	nMortalities	nLiveReleases
2022	107060	07	060	39	9				
2022	107065	07	065	30	8				
2022	107070	07	070	11	1				
2022	108055	08	055	10					
2022	108060	08	060	27	8				
2022	108065	08	065	17	4	*Lepidochelys olivacea*	1	0	1
2022	108070	08	070	6	6	*Lepidochelys olivacea*	1	0	1
2022	109060	09	060	20	2				
2022	109065	09	065	6	4				
2022	109070	09	070	6	6				
2022	110065	10	065	5	3				
2022	110070	10	070	3	3	*Lepidochelys olivacea*	1	0	1
2022	111065	11	065	4	1				
2022	111070	11	070	1	1				
2022	112065	12	065	2					
2022	112070	12	070	1	1				
2022	113065	13	065	2					
2022	114060	14	060	1					
2022	114065	14	065	2					
2022	115065	15	065	3	1				
2022	116065	16	065	2					
2022	117065	17	065	2					
2022	200050	00	050	54	16				
2022	200055	00	055	42	28				
2022	200060	00	060	29	11				
2022	200065	00	065	27	20				
2022	200070	00	070	16	5				
2022	201050	01	050	61	14				
2022	201055	01	055	80	32	*Eretmochelys imbricata*	1	0	1
2022	201060	01	060	33	23				
2022	201065	01	065	65	30				
2022	201070	01	070	35	12				
2022	201085	01	085	1	1				
2022	202050	02	050	45	12				
2022	202055	02	055	143	57				
2022	202060	02	060	36	22				
2022	202065	02	065	18	8				
2022	202070	02	070	20	3				
2022	202085	02	085	1	1				
2022	203045	03	045	10	4				
2022	203050	03	050	127	38				
2022	203055	03	055	86	30				
2022	203060	03	060	43	11				
2022	203065	03	065	25	16				
2022	203070	03	070	6	3				

Year	Cwp1x1	Lat	Lon	Total effort (number of sets)	Total effort observed (number of sets)	Species	nCaptures	nMortalities	nLiveReleases
2022	204045	04	045	9	4				
2022	204050	04	050	102	33				
2022	204055	04	055	47	8				
2022	204060	04	060	17	9				
2022	204065	04	065	23	16				
2022	204070	04	070	5	1				
2022	205045	05	045	3	2				
2022	205050	05	050	65	21				
2022	205055	05	055	58	23				
2022	205060	05	060	8	7				
2022	205065	05	065	6	4				
2022	205070	05	070	4	1				
2022	205080	05	080	1	1				
2022	206045	06	045	1					
2022	206050	06	050	163	54				
2022	206055	06	055	142	56				
2022	206060	06	060	16	8				
2022	206065	06	065	3	2				
2022	207045	07	045	3	2				
2022	207050	07	050	171	72				
2022	207055	07	055	39	14				
2022	207060	07	060	4	3				
2022	207065	07	065	1	1				
2022	208045	08	045	2					
2022	208050	08	050	17	5				
2022	208055	08	055	12	3				
2022	208060	08	060	3	2				
2022	208065	08	065	2	2				
2022	208070	08	070	2					
2022	209045	09	045	1					
2022	209050	09	050	15					
2022	209055	09	055	2	1				
2022	209070	09	070	2	1				
2022	210050	10	050	3	1				
2022	210055	10	055	3	3				
2022	210060	10	060	1					
2022	211045	11	045	1					
2022	211050	11	050	1					
2022	211075	11	075	1	1				

Table 2. Marine turtle bycatches of the Spanish surface longline fleet in 2022 from observers' data in 5ºx5º grids.

Year	Cwp5x5	Lat	Lon	Total effort (number of hooks)	Total effort observed (number of hooks)	Species	nCaptures	nMortalities	nLiveReleases
2022	200045	0	45	33000					
2022	200050	0	50	18000					
2022	200055	0	55	1000					
2022	205045	5	45	15000					
2022	205050	5	50	5000					
2022	220055	20	55	24440					
2022	220060	20	60	195389	35477				
2022	220065	20	65	12770					
2022	225035	25	35	375900	29949	*Caretta caretta*	7	1	6
						Unidentified turtle	2	0	2
2022	225040	25	40	319040	3514	*Caretta caretta*	1	0	1
2022	225045	25	45	64870					
2022	225050	25	50	45710	1340				
2022	225055	25	55	73228	16774				
2022	225060	25	60	97956	1968				
2022	225065	25	65	47380					
2022	230030	30	30	29760					
2022	230035	30	35	514510	6798				
2022	230040	30	40	48930	600				
2022	230045	30	45	30610	4667				
2022	230050	30	50	3600					
2022	230055	30	55	1080	1080				
2022	230060	30	60	912	912				