

IOTC ROS DATA ON MITIGATION MEASURES AND SHARK CATCHES SUMMARY

Prepared by [IOTC Secretariat](#)¹

Background

The 20th Session of the Indian Ocean Tuna Commission's (IOTC) Working Party on Ecosystems and Bycatch - WPEB Data Preparatory meeting was held online early this year including in the agenda a Longline bycatch mitigation measures workshop. A number of research studies, mostly carried on the Pacific and Atlantic Oceans, were presented at this workshop which suggest that banning the use of wire leaders and shark lines in longline and other fisheries is likely to reduce both observed catches and fishing mortality of shark species ([IOTC-2024-WPEB20\(DP\)-R\[E\]](#), Appendix VI, Table 2).

The WPEB acknowledged that a comprehensive understanding of the use of shark lines and wire traces, as well as catch rates and conditions of pelagic sharks in IOTC longline fisheries, would greatly improve the assessment of the potential effectiveness of bycatch mitigation measures. Therefore, the WPEB has requested that the IOTC Secretariat compile summary statistics on the prevalence of shark line and wire trace usage, along with the catch conditions of pelagic sharks from the IOTC Regional Observer Scheme (ROS) database. The Secretariat were also requested to liaise with CPCs to acquire this information where feasible.

Materials

Regional Observer Scheme

Observer data collected as part of the ROS include: (i) fishing activities and vessel positions, (ii) catch estimates with a view to identifying catch composition and monitoring discards, bycatch and size frequency, (iii) gear type, mesh size and attachments employed by the master, and (iv) information to enable the cross-checking of entries made to the logbooks (i.e., species composition and quantities, live and processed weight and location).

In relation with the mitigation measures discussed during the workshop the reporting specifications defined in the [ROS standards](#) are summarized in the Table 1.

Table 1: Data fields related with potential mitigation measures included in the Gear specifications and fishing events information of the ROS standard.

Data field name	Data field description	Reporting
Shark lines set	Indicate Y or No if shark lines were set during the operation <i>Note: shark lines are branch lines running directly off the longline floats or drop lines, specifically for targeting sharks.</i>	MR
Mainline material	Record the material the mainline is made out of, e.g. kevlar, nylon, nylon multifilament	MR
Branchline material	Record the branchline material for each of the four sections where section 1 is that closest to the mainline and section 4 is the leader; note that wire trace may be sheathed by a plastic or nylon coating.	---
Hook type	Record the type of hooks used	MR
Bait type	Record bait type/condition used	MR
Leader material	For SSI only, record the leader material the individual was hauled on [Consistent with IOTC Res 12-04 and IOTC Res. 17/05]	OR

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The Secretariat also requested the CPCs to provide a summary of catches of the main shark species and the use of shark bycatch reduction measures from longline or self-sampling observer data (Table 2).

Table 2: Template summary table proposed to collect data regarding mitigation measures and shark catches.

Stratum	Observation coverage				Observed sets with some shark species		Mitigation		Observed catch (numbers)		
	Year	Hooks deployed	Hooks observed	Total sets	Observed sets	Using shark lines	Using wire trace	Type(s) of measure	Sets using measures	Pelagic sharks	Tunas

Observation coverage

Request the number of set and hooks deployed and the observed sets and hooks

Observed sets with some shark species

Refers to the number of observed sets which catches of sharks using shark lines and or wire trace

Mitigation measures

Refers to the use of some of the main mitigation measures identified (IOTC-2024-WPEB20(DP)-R[E] Table A2) and the number of sets in which they were used e.g.:

- Monofilament leaders
- Large circle hooks
- Finfish bait
- None (need to be indicated in case no mitigation measures were in place)
- Other (specify)

Observed catch (numbers)

Request the observed catch of sharks and tuna species

Results

Information provided by observer data and reports

Issues related with the ROS information provided to the Secretariat implies that some observer reports have been submitted to the Secretariat by some CPCs, but data sets were not provided in electronic format at the operational level following, *de facto* preventing the entry of the data in the ROS regional database. However, in order to understand the level of information provided to the Secretariat, data from 674 observer trip reports (in pdf documents or forms) and were reviewed and the coverage on the identified data elements in relation to mitigation measures reported is summarised in Table 3.

Table 3: Summary of the information provided for the materials of the Mainline, branch lines, leaders and shark lines on data from 674 observer trips between 2018-2022 Blue and green indicates data elements for mandatory and optional reporting respectively.

Data elements	Mainline	Branch line 1	Branch line 2	Branch line 3	Branch line 4	Leader 1	Leader 2	Leader 3	Shark lines
Materials reported	668	620	165	56	34	398	18	12	42 (NO)
	99.11	91.99	24.48	8.31	5.04	59.05	2.67	1.78	6.23
Nylon Monofilament	618	564	133	38	26	371	16	12	
Nylon Multifilament	25	4				5			
Braided monofilament	6			1		1			
Braided multifilament	1								
Braided rope/ rope/ Tarred rope	7	3	4	1	1		1		
Combination		8	5	5					
Cotton		1							
Core-spun yarn				1	1				
Glass fibre/Glass wire/ Glass silk	7		6	7	3				
Perlon	1	1							
Polyester	3	35	13	1		10	1		
Polythene		1		1					
Polypropolene		2							
Stainless steel		1				3			
Tetron cord			1	1					
Wire			3		3	8			

Mainline materials are mandatory for reporting and were recorded in almost all of the reports and data submitted. On the other hand, the use of shark lines (also mandatory) was only recorded at 6 %. Although Branch line and leader materials are optional for reporting, the use of monofilament instead of wire was considered as a possible mitigation measure to reduce shark catches. Table 3 presents the level of information reported on the materials used indicating that the use of wire and stainless steel is uncommonly reported but this should be taken with extreme caution given the nature of the reporting obligation.

The use of multiple formats for reporting observer data was discussed on several occasions. The variety of materials reported is an example of consideration of the recommended use of the ROS IOTC forms, designed to harmonize the information and facilitate its incorporation into the databases.

CPCs response to WPEB request

China, Indonesia, Japan, Mauritius, Seychelles and South Africa provided responses (Appendix I - V) to the request made by the WPEB through the Secretariat. Seychelles informed that both the industrial and artisanal longline fleets are currently not covered by any observer programme and of its progress towards the implementation of an EMS to address the lack of observer coverage with a pilot project that is expected to be implemented on a large scale during the period 2025 - 2026.

China and Mauritius reported that their longline fleets do not use shark lines and wire trace. Although China provided information on the mitigation measures applied, they do not correspond to those identified at the mitigation workshop and do not allow conclusions to be drawn on the potential impact on shark catches. The data provided by Mauritius are only for one year (2018) and do not allow for the consideration of different scenarios.

Yearly summaries provided by Indonesia (Annex II), Japan (Annex III) and South Africa (Annex IV) contain the requested information about the use of shark lines and wire trace and will be presented to facilitate further discussion of the possible mitigation measures considered for the reduction of observed catches and fishing mortality of shark species and the development of scientific advice by the WPEB.

References

[IOTC-WPEB20\(DP\) 2024](#). Report of the 20th Session of the IOTC Working Party on Ecosystems and Bycatch Data Preparatory Meeting. Online, 22 - 26 April 2024.

Appendices

Appendix I: Shark mitigation summary table provided by China

Stratum	Observation coverage			Observed sets with some shark species		Mitigation		Observed catch (numbers)	
	Hooks deployed	Hooks observed	Total sets	Using shark lines	Using wire trace	Type(s) of measure	Sets using measures	Pelagic sharks	Tunas (ALB/BET/SKJ/YFT)
2012	11,295,050	218,520	Not applicable	NO	NO	NO	NO	107	2,241
2013	23,439,470	216,640	Not applicable	NO	NO	NO	NO	200	1,369
2014	19,212,540	178,413	Not applicable	NO	NO	Bird-scaring lines	51	88	2,393
2015	26,616,190	105,201	Not applicable	NO	NO	Bird-scaring lines	59	114	625
2016	24,107,147	1,206,736	Not applicable	NO	NO	Bird-scaring lines/Line weighting/Night setting with	489	609	6,533
2017	33,070,839	1,767,428	Not applicable	NO	NO	Bird-scaring lines	576	698	14,346
2018	32,987,773	1,681,983	Not applicable	NO	NO	Bird-scaring lines/Line weighting	241	161	11,285
2019	26,380,951	1,814,426	Not applicable	NO	NO	Bird-scaring lines	644	141	14,434
2020	27,860,364	1,420,779	Not applicable	NO	NO	Tori lines (36 sets) / Line weight	134	58	10,283
2021	34,043,659	1,702,418	Not applicable	NO	NO	Tori lines (209sets) / Line weight	276	118	15,899
2022	38,273,218	2,013,450	Not applicable	NO	NO	NO	NO	1,105	13,356

Appendix II: Shark mitigation summary table provided by Indonesia

Hooks Observed	Total sets	Observed sets	Observed sets with some shark species		Mitigation		Observed catch (numbers)	
			Using shark lines	Using wire trace	Type(s) of measure	Sets using measures	Pelagic sharks	Tunas
136599.2	116	116	1245	170749	None	None	152	543
460791.2	400	400	938	28404	None	None	716	4380
322666.4	262	262	2632	199789	None	None	663	2799
408561.6	396	396	10163	213209	None	None	401	2357
262974.4	288	288	5601	140873	None	None	213	1663
177019.2	166	166	1510	117534	None	None	424	1345
88307.2	105	105	341	22632	None	None	74	752
232212	198	198	2185	49873	None	None	572	2185
185592	210	210	510	57997	None	None	117	1568
173364	184	184	310	27088	None	None	172	1446
139724	150	150	1113	29109	None	None	294	669
140694.4	130	130	981	14655	None	None	297	993
153750.4	139	139	1754	16015	None	None	342	824
210284.8	195	195	2151	26285	None	None	508	1145
173468.8	164	164	1682	27104	None	None	673	1081
69476	63	63	None	14474	None	None	135	492
157939.2	130	130	1170	24678	None	None	243	1773
176956.8	122	122	2952	23616	None	None	219	1609
210938.4	157	157	None	None	None	None	356	2191

Appendix III: Shark mitigation summary table provided by Japan

Year	Total effort		Observation coverage		Obs. Sets with some shark species		Mitigation		Obs. Catch (numbers) ⁵	
	Total Hooks	Total Sets	Hooks observed	Observed sets	With Shark lines	With wire trace ¹	Types of measure	Sets using measure	Pelagic sharks ³	Tunas ⁴
2015	28,958,872	9,181	1,501,702	713	0	36	Not applicable ²	Not applicable ²	4,331	22,688
2016	27,049,581	8,583	1,622,113	653	0	103			1,878	23,652
2017	23,377,667	7,346	1,949,946	743	0	53			2,477	23,975
2018	22,207,349	6,975	2,120,481	819	0	125			5,002	31,337
2019	19,950,030	6,332	2,039,504	805	0	134			5,541	37,805

1. The percentage of wire leader in the total hook per operation is variable.
2. No mitigation measure required in IOTC.
3. BSH, SMA, FAL, OCS, BTH, PTH, and SPL are included.
4. ALB, YFT, BET, and SBT are included.
5. This number includes catch reported in all observed operation (not catch by operation with wire leader only).

Appendix IV: Shark mitigation summary table provided by Mauritius

APPENDIX III Mauritius Summary data										
Stratum	Observation coverage				Observed sets with some shark species		Mitigation		Observed catch (numbers)	
Year	Hooks deployed	Hooks observed	Total sets	Observed sets	Using shark lines	Using wire trace	Types of measure	Sets using measures	Pelagic sharks	Tunas
2018	47940	39200	35	31	0	0	Monofilament	20	44	133



Appendix V: Shark mitigation summary table provided by South Africa

Stratum	Observation coverage				Observed sets with some shark species*		Mitigation						Observed catch (numbers) ^{##}	
Year	Hooks deployed	Hooks observed	Total sets	Observed sets	Using shark lines	Using wire trace	Type of measure: Monofilament leaders**	No. OBSERVED Sets using measure	Type of measure: Large circle hooks***	No. OBSERVED Sets using measure	Type of measure: Finfish bait [#]	No. ALL (OBSERVED AND UNOBSERVED) Sets using measure	Pelagic sharks	Tunas
2012	4313807	2538698	2209	946	0	1	Monofilament leaders	830	Large circle hooks	0	Finfish bait	1123	7804	39925
2013	4839341	2544502	2415	927	0	0	Monofilament leaders	780	Large circle hooks	0	Finfish bait	837	6473	50711
2014	3031507	1304913	1843	483	0	1	Monofilament leaders	428	Large circle hooks	33	Finfish bait	258	7135	21547
2015	2857101	1099450	1836	468	0	24	Monofilament leaders	443	Large circle hooks	48	Finfish bait	325	11525	21634
2016	2242160	697529	1475	270	0	0	Monofilament leaders	258	Large circle hooks	18	Finfish bait	269	4446	13285
2017	2680206	1068191	1663	437	0	1	Monofilament leaders	437	Large circle hooks	38	Finfish bait	549	18118	16887
2018	2871936	941947	1982	458	0	0	Monofilament leaders	446	Large circle hooks	172	Finfish bait	459	12751	13474
2019	2899049	987033	1816	431	0	27	Monofilament leaders	377	Large circle hooks	177	Finfish bait	283	6151	18105
2020	1659902	296319	1209	222	0	5	Monofilament leaders	201	Large circle hooks	193	Finfish bait	156	8472	7239
2021	2292533	416930	1583	232	0	0	Monofilament leaders	142	Large circle hooks	161	Finfish bait	245	2963	9831
2022	2488208	398791	1694	234	0	0	Monofilament leaders	227	Large circle hooks	178	Finfish bait	85	4711	7481
2023	2919658	316307	2037	224	0	1	Monofilament leaders	198	Large circle hooks	216	Finfish bait	68	3199	10559
*Sets where at least one shark was caught, all species, and that shark was caught on either a shark line or wire trace														
**Entire set used monofilament leaders														
*** Classified as hooks size 16/0 or larger														
[#] Includes sets with mixture of finfish and squid														
^{##} All fates included, retained, released alive, and discarded dead														