



Indonesia National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2022



Authors:

Ministry of Marine Affairs and Fisheries (MMAF)

Indonesia

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

<p>In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, for all fleets other than longline (e.g., for a National Report submitted to the IOTC Secretariat in 2022, final data for the 2021 calendar year must be provided to the Secretariat by 30 June 2022)</p>	<p>YES 30/06/2022*</p>
<p>In accordance with IOTC Resolution 15/02, provisional longline data for the previous year was provided to the IOTC Secretariat by 30 June of the current year (e.g., for a National Report submitted to the IOTC Secretariat in 2022, preliminary data for the 2021 calendar year was provided to the IOTC Secretariat by 30 June 2022).</p> <p>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 2022, final data for the 2021 calendar year must be provided to the Secretariat by 30 December 2022).</p>	<p>YES 30/06/2022</p>
<p>If no, please indicate the reason(s) and intended actions:</p>	

*) Provisional Numbers. The revision of annual catch data for the 2021 calendar year was provided to the IOTC Secretariat on 19 October 2022.



EXECUTIVE SUMMARY

For fisheries management purposes, Indonesian waters are divided into eleven Fisheries Management Areas (FMA). Three of them are located within the IOTC area of competence, namely FMA 572 (Western Sumatera and Sunda Strait), FMA 573 (South of Java to East Nusa Tenggara, Sawu Sea and western part of Timor Sea), and 571 (Malacca Strait and the Andaman Sea). Indonesian fishers operate various fishing gears such as longline, purse seine, handline, and gillnet to catch large pelagic fishes like tuna, skipjack, marlins, etc. Longline is the primary fishing gear type targeting tunas that operate in those FMAs. The total catch of the main species of tunas in 2021 was estimated at around 210,613 tons¹ which are composed of yellowfin tuna (57,106 tons), bigeye tuna (14,183 tons), skipjack tuna (129,754 tons), and albacore (9,570 tons). Landing ports, both artisanal and industrial, are still consistently monitored through various projects and scientific observer programs conducted altogether by the Research Institute for Tuna Fisheries (RITF) and Directorate General of Capture Fisheries (DGCF).

¹ Preliminary figures



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1. BACKGROUND/GENERAL FISHERY INFORMATION

Indonesia is an archipelagic nation located between Asia and Australia, surrounded by two oceans, the Pacific Ocean in the northern part and the Indian Ocean in the southern region. It consists of approximately 17,508 islands and a coastline of 81,000 km. Indonesia has 5.8 million km² of marine waters comprised of 3.1 million km² of territorial waters (<12 miles) and 2.7 million km² of EEZ (12-200 miles). For fisheries management purposes, Indonesian waters are divided into eleven Fisheries Management Areas (FMA). Three of them are located within the IOTC area of competence, namely FMA 572 (Western Sumatra and Sunda Strait), FMA 573 (South of Java to East Nusa Tenggara, Sawu Sea and western part of Timor Sea), and 571 (Malacca Strait and the Andaman Sea) (Figure 1a).

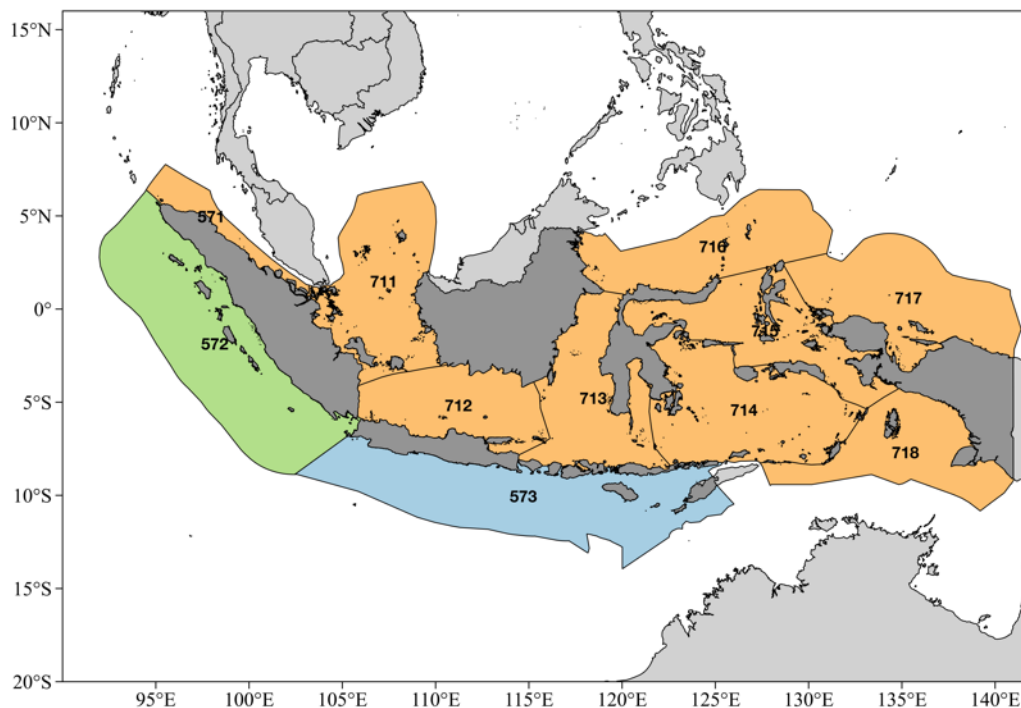


Figure 1a. The eleven Fisheries Management Area (FMA) in Indonesian waters

Main landing sites for tuna and tuna-like species are widespread across the west of Sumatra, south of Java, Bali, and Nusa Tenggara (Figure 1b). The area of western Sumatra is dominated by purse seine fleets (Lampulo and Sibolga) and longline fleets (Bungus). On the other hand, southern part of Java, Bali and Nusa Tenggara are dominated by handline/troll line fleets (Pacitan, Prigi and Labuhan Lombok) and longline fleets (Palabuhanratu, Cilacap and Benoa). Benoa Port is considered the main tuna landing port for Indonesia.

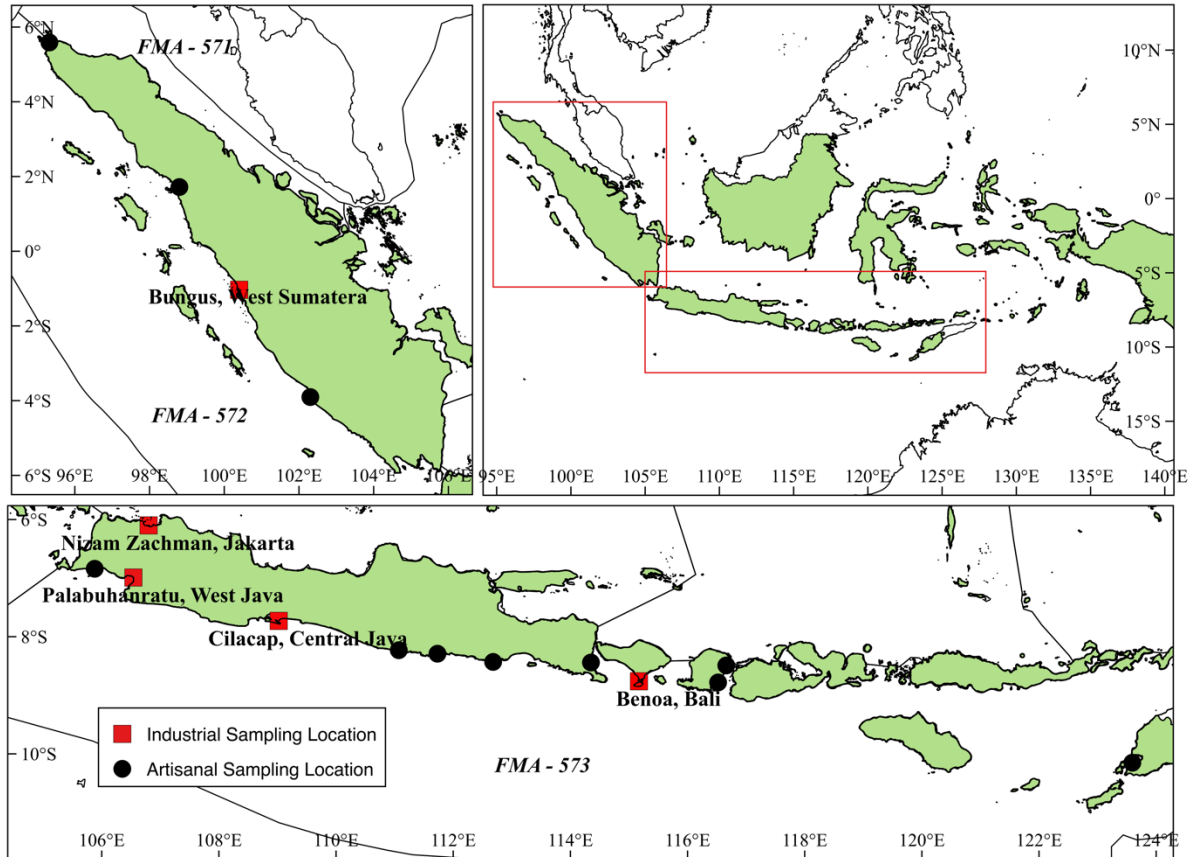


Figure 1b. Primary fishing port/landing sites, industrial (blue dot) and artisanal (red square).

2. FLEET STRUCTURE

Since 2021, the category of vessels size with a length of more than 24 m is determined for longline vessels with a minimum size of 85 GT and purse seine 78 GT. Other fishing vessels categorized the same as longlines. The total number of active fishing vessels operating in the FMAs 572, 573, and high seas area in the Indian Ocean reported to IOTC on 11th February 2022 were 435 fishing vessels. It consisted of longline (327), hand line (1), purse seine (107), and fourteen (14) registered carrier/cargo freezers (Table 1).

Table 1. Summary of active fishing vessels by size (GT) reported to IOTC on 11th February 2022 (Source: DGCF).

Size	Longliner	Hand line	Size	Purse Seiner
10 ≤ GT < 20	3	0	10 ≤ GT < 20	0
20 ≤ GT < 30	32	0	20 ≤ GT < 30	0
30 ≤ GT < 50	47	0	30 ≤ GT < 50	0
50 ≤ GT < 85	97	0	50 ≤ GT < 78	0
85 ≤ GT < 200	148	1	78 ≤ GT < 200	106
200 ≤ GT < 300	0	0	200 ≤ GT < 300	1
Total	327	1	Total	107

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

The total catch for four main tuna species, namely albacore, bigeye tuna, skipjack, and yellowfin tuna, in 2021 was estimated 210,613 tons, it is 2.4% higher compared to previous year's and recorded as the

highest catch in the last five years. Skipjack tuna remained the main contributor, 129,754 tons, followed by yellowfin, bigeye, and albacore tuna, around 57,106 tons, 14,183 tons, and 9,570 tons, respectively. The proportion average catch across all gear was dominated by skipjack (61.6%), yellowfin (27.1%), bigeye (6.7%), and albacore (4.5%). The average catch estimation of four species tunas from 2017 to 2021 was 184,001 tons. In addition, prior to 2021, the fishery categorization still used the terminology for vessels >30 GT as industrial and <30 GT as artisanal.

Table 2. Annual catch by gear and primary tuna species (ALB, BET, SKJ, and YFT) derived from the Indian Ocean from 2017-2021.

Gear Type	Species	Year					Average MT
		2017	2018	2019	2020	2021	
Small longline	Albacore	4,978	3,900	875	1,624	3,109	2,897
	Bigeye	2,155	1,942	2,375	3,457	3,828	2,751
	Skipjack	5,553	2,319	645	4,250	2,567	3,067
	Yellowfin	5,768	7,042	1,735	2,008	7,153	4,741
	Sub-total	18,454	15,202	5,630	11,339	16,656	13,456
Tuna longline	Albacore	1,421	789	878	2,381	2,231	1,540
	Bigeye	6,147	3,532	2,259	1,933	804	2,935
	Skipjack	1,003	2,249	1,457	1,843	1,019	1,514
	Yellowfin	4,759	2,568	2,525	3,648	3,402	3,380
	Sub-total	13,330	9,138	7,120	9,804	7,456	9,370
Danish seine	Albacore	0	0	2	0	0	0
	Bigeye	0	176	258	59	30	105
	Skipjack	0	3,786	3,820	3,773	1,791	2,634
	Yellowfin	0	888	1,288	376	0	510
	Sub-total	0	4,850	5,368	4,208	1,821	3,249
Gillnet	Albacore	0	97	80	0	6	36
	Bigeye	1,119	1,139	1,340	1,498	771	1,173
	Skipjack	6,023	6,738	10,079	6,954	12,925	8,544
	Yellowfin	1,160	1,603	3,726	3,248	5,594	3,066
	Sub-total	8,302	9,577	15,225	11,700	19,296	12,820
Handline	Albacore	488	578	915	891	2,804	1,135
	Bigeye	2,934	1,778	1,747	5,832	5,465	3,551
	Skipjack	10,168	12,589	26,210	25,127	21,482	19,115
	Yellowfin	7,663	5,254	6,756	8,846	12,702	8,244
	Sub-total	21,253	20,199	35,628	40,696	42,453	32,046
Others	Albacore	0	96	79	9	0	37
	Bigeye	137	1,107	459	2,675	0	876
	Skipjack	16,039	2,695	4,385	9,247	0	6,473
	Yellowfin	5,222	1,879	2,067	3,464	0	2,527
	Sub-total	21,398	5,778	6,990	15,396	0	9,913
Pole and line	Albacore	0	34	0	0	31	13
	Bigeye	4	1,344	0	57	381	357
	Skipjack	12,684	1,578	2,131	2,463	3,452	4,462



Gear Type	Species	Year					Average MT
		2017	2018	2019	2020	2021	
	Yellowfin	1,371	699	142	697	288	639
	Sub-total	14,059	3,655	2,273	3,217	4,153	5,471
Tuna purse seine	Albacore	30	13	0	0	131	35
	Bigeye	9,448	5,116	897	4	1,096	3,312
	Skipjack	43,613	14,203	53,612	6,181	44,888	32,499
	Yellowfin	11,595	5,430	14,719	733	14,349	9,365
	Sub-total	64,686	24,762	69,228	6,918	60,465	45,212
Small purse seine	Albacore	0	12	0	0	81	19
	Bigeye	0	803	507	4,550	880	1,348
	Skipjack	0	21,682	9,422	59,606	29,820	24,106
	Yellowfin	0	6,912	1,669	15,133	7,554	6,254
	Sub-total	0	29,408	11,598	79,289	38,336	31,726
Trolling	Albacore	78	85	95	193	1,177	326
	Bigeye	0	1,342	3,983	536	738	1,320
	Skipjack	1,741	11,138	10,090	10,566	8,059	8,319
	Yellowfin	0	2,975	4,397	5,275	5,721	3,674
	Sub-total	1,819	15,540	18,566	16,571	15,696	13,638
Liftnet	Albacore	0	0	0	0	0	0
	Bigeye	3	2,125	156	954	189	685
	Skipjack	46	6,301	6,258	4,445	3,751	4,160
	Yellowfin	2,372	5,056	2,459	1,043	342	2,254
	Sub-total	2,421	13,483	8,872	6,442	4,283	7,100
Grand Total	Albacore	6,995	5,604	2,925	5,099	9,570	6,039
	Bigeye	21,947	20,404	13,980	21,556	14,183	18,414
	Skipjack	96,870	85,277	128,110	134,455	129,754	114,893
	Yellowfin	39,910	40,306	41,483	44,471	57,106	44,655
	Total	165,722	151,592	186,499	205,582	210,613	184,001

Data collection validation from the e-logbook program showed significant improvement since its implementation in 2017. The distribution of effort (hooks) from longline fleets in 2021 derived from logbook data was concentrated on western Sumatra and south of Java, focused mainly between 0°-35°S and 80°-115°E (Figure 2). The range of effort used was between 500-2500 hooks/set with an average of 1300 hooks/set. To be noted, the total reported catch from the logbook was less than 5% of the total estimated catch submitted.

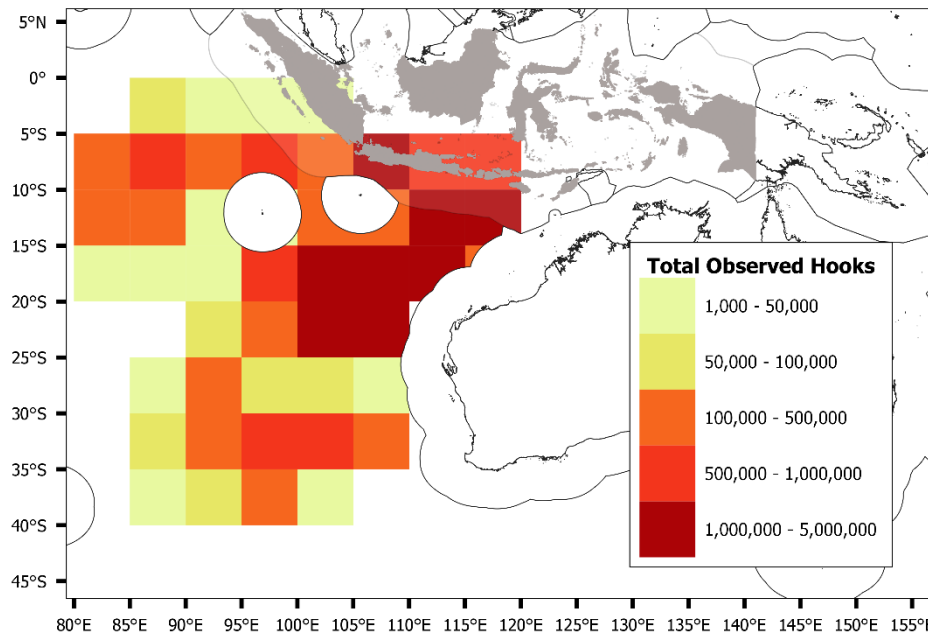


Figure 2. Map of the distribution of Indonesian tuna longline efforts year 2021 (source: Logbook data).

Reported catch distribution for three main species of tuna (ALB, BET, and YFT) in 2021 are derived from the logbook data. Sum of catch declared in kilogram (KG). The catch mainly concentrated above 20°S, except for yellowfin tuna, which high catches also occurred between 30°S-35°S. (Figure 3).

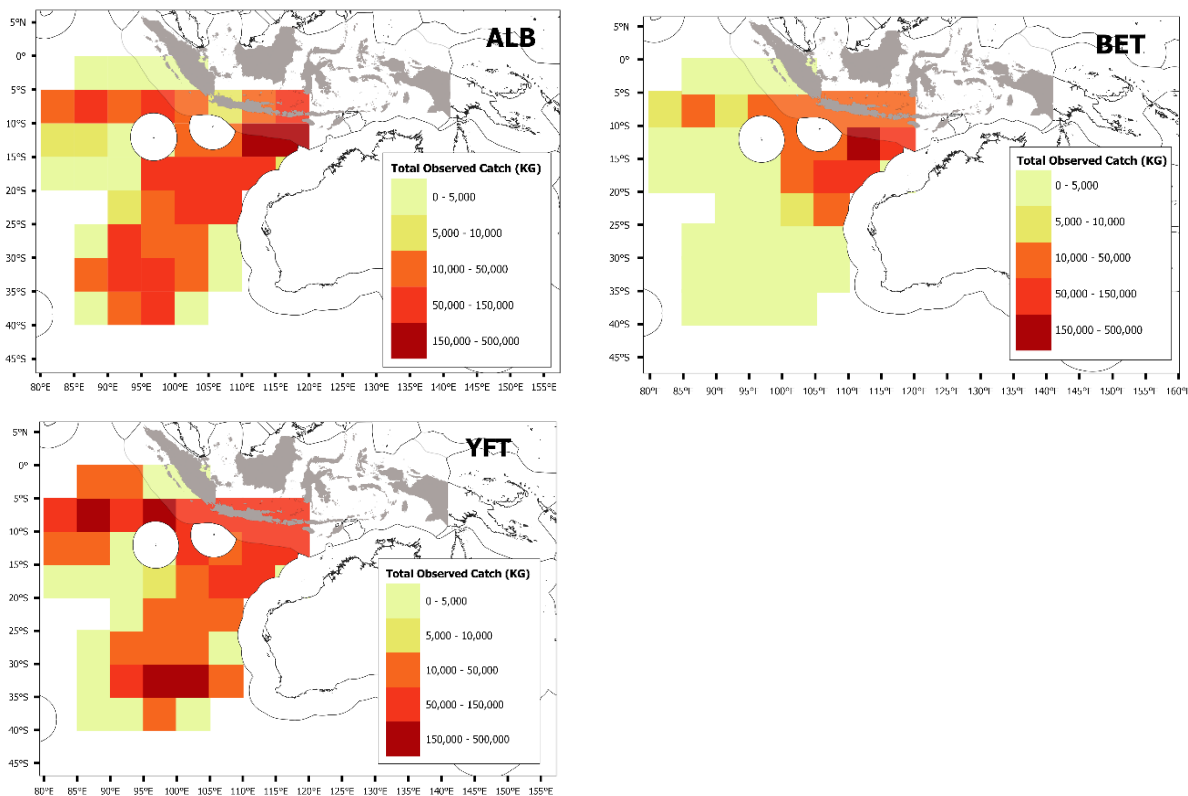


Figure 3. Map of reported catch distribution in 2021, aggregated by species and by 5x5 degree blocks (source: Logbook data).

4. RECREATIONAL FISHERIES

There is no official reported catch from Indonesia recreational fishing. An organization dealing with sport fishing has been established since 1997, namely "FORMASI" (*Indonesia Fishing Sports Federation*), where this organization is a member of the International game fish Association (IGFA), Currently no update of FORMASI activities. The Indonesian government focuses on assessing and managing commercial fishing and would include recreational fishing shortly.

5. ECOSYSTEM AND BYCATCH ISSUES

5.1. Sharks

Sharks and rays fisheries management is regulated through Minister of Marine Affairs and Fisheries Regulation No. 58/PERMEN-KP/2020 concerning the capture fisheries business superseded by Minister of Marine Affairs and Fisheries Regulation No. 10/2021 concerning the standards of business activities and products in the implementation of risk-based business licenses in the marine and fisheries sector, listed explicitly in the section 7 no. 5. It specifies the management measure and conservation of bycatch and ecologically related species in high seas and Indonesian jurisdiction waters. Several activities to raise the fishers' awareness of the importance of sharks resource sustainability are workshops, seminars, and producing and distributing posters that prohibit several key species of sharks to catch. In the framework of fisheries management of sharks and rays in Indonesia, several regulations have been issued, such as ministerial decree No. 18/KEPMEN-KP/2013 and 04/KEPMEN-KP/2014 related to the determination of full protection on whale sharks (*Rhincodon typus*) and manta rays (*Manta spp.*). Additionally, for the hammerhead sharks (*Sphyrna spp.*), the annual catch is based upon quota listed on the Decree of Director General of Natural Resources Conservation and Ecosystem number SK.1/KSDAE/KKH/KSA.2/1/2020. Meanwhile, there is also regulation of the Minister of Marine Affairs and Fisheries No. 05/PERMEN-KP/2018 concerning the export prohibition of the whitetip shark.

5.1.1. NPOA sharks

In response to the mandate for the establishment of an international plan of action in terms of conservation and management of sharks and rays by the member of United Nations through Fisheries and Agricultural Organization (FAO), as well as increasing global concern towards sharks and rays sustainability, Indonesia issued the first National Plan of Action (NPOA) for sharks and rays for 2010-2014. The document outlines strategy and action plan for the sustainability of the entire sharks and rays species. The 2nd NPOA for the period 2016-2020 then also has been issued and implemented as the continuation action plan of the 1st NPOA. The 2nd NPOA, however, is still being implemented because in the past years action plan implementation was quite limited due to global covid 19 pandemic that affecting in many aspect of the implementation including travel restriction, budget cut etc. In addition, for Manta Rays and Whale Sharks that have been fully protected according to our law (Ministerial Decree No 4/2014 and No 18/2013), Indonesia have developed particular national action plan documents. For a better implementation of NPOA, the Minister of Marine Affairs and Fisheries have issued Minister Decree No 16/2021 concerning Whale Sharks National Action Plan 2021-2025.

5.1.2. Sharks finning regulation

Indonesia prohibits shark finning, targeting juvenile or pregnant sharks and rays, as declared in Ministerial Regulation No. 10/PERMEN-KP/2021. Furthermore, all carcasses of sharks and rays incidentally caught during operation must be landed intact (all fins attached to its body). In case thresher sharks (*Alopias* spp.) is incidentally caught either dead or alive it must be discarded at sea, but must still be recorded in the logbook.

In general, sharks' carcasses and fins are traded for both domestic and export markets. Domestic trading and export of any parts of sharks and rays which are not protected by law and not included in the Appendix of CITES are regulated through ministerial regulation No. 33/PERMEN-KP/2017. Such trading activities must be supplemented with a letter of recommendation from the Directorate General of Marine Spatial Management as mentioned in regulation No. 13/PER-DJPRL/2018. Meanwhile for threatened species and other species included in the CITES Appendix, all kind of utilisations are regulated under Minister of Marine Affairs an Fisheries Regulation No 61/2018. Catch quota is determined upon annual basis and for this year of 2022, we based the quota on Minister of Marine Affairs and Fisheries Decree No 12/2022.

As recorded by the Marine and Coastal Resources Management Office (BPSPL), Denpasar during the 2019-2021 period, most of the sharks and rays carcasses and fins were intended for the domestic market, with nearly 3,000 tons in 2021, it was raised around 13% from the previous year. The number of fins designed for the overseas market in 2021 increased by around 30%. On the other hand, it decreased by nearly 60% in the domestic market (Table 3a). In terms of value, in 2021, exported carcasses decreased to IDR 13,1 billions or around 30% from the previous year. While domestic market fins decreased by around 40% (Table 3b).

Table 3a. Summary of trade traffic volume (kg) for carcasses and fins of sharks and rays from Denpasar, Bali for the period 2019-2021 (Source: BPSPL Denpasar).

Destination	Products	Volume (kg)		
		2019	2020	2021
Export	Carcasses	183,327	544,125	560,648
	Fins	71,756	171,272	247,467
Domestic	Carcasses	2,142,094	2,384,508	2,751,298
	Fins	96,392	122,932	49,279

Table 3b. Summary of trade traffic value (millions) for carcasses and fins of sharks and rays from Denpasar, Bali for 2019-2021 (Source: BPSPL Denpasar).

Destination	Products	Value (millions) - IDR		
		2019	2020	2021
Export	Carcasses	6,429	19,304	13,118
	Fins	24,432	24,828	55,784
Domestic	Carcasses	30,697	30,843	30,766
	Fins	6,451	10,250	6,134

5.1.3. Blue shark

The blue shark is the most common bycatch in tuna longline fisheries. Its catch and effort are closely monitored through a scientific observer program, while scientific port sampling and logbook programs are utilized with the sole purpose of monitoring its catches.

According to scientific observer data, blue shark (*Prionace glauca*, BSH) and crocodile shark (*Pseudocarcharias kamoharai*, PSK) dominated the incidental catch for sharks during 2015–2021. While most blue sharks were retained, crocodile sharks were usually discarded dead (Table 4). A nominal CPUE data series of blue sharks and the silky shark is presented in Annex 2.

Table 4. The total observed number of sharks, by species, released/discarded by the Indonesian tuna longline fleet in the IOTC area of competence (2015–2021).

Code	2015				2016				2017				2018				2019				2020				2021										
	N	Retained	Discarded		N	Retained	Discarded		N	Retained	Discarded		N	Retained	Discarded		N	Retained	Discarded		N	Retained	Discarded		N	Retained	Discarded								
			Alive	Dead			Alive	Dead			Alive	Dead			Alive	Dead			Alive	Dead			Alive	Dead			Alive	Dead							
PTH	nil	nil	nil	nil	nil	nil	nil	nil	2	2	nil	nil	2	nil	1	1	3	2	nil	1	nil	nil	nil	1	nil	nil	nil	1	nil	nil	nil	1	nil	nil	nil
BTH	nil	nil	nil	nil	4	4	nil	nil	3	3	nil	nil	15	13	nil	2	4	3	nil	1	12	1	nil	11	13	13	nil	nil	nil	nil	nil	nil	nil	nil	
CCB	1	1	nil	nil	3	3	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	
FAL	26	26	nil	nil	nil	nil	nil	nil	2	1	1	nil	12	12	nil	nil	10	10	nil	nil	nil	nil	nil	nil	5	2	nil	3	nil	nil	nil	nil	nil		
OCS	4	4	nil	nil	4	4	nil	nil	4	4	nil	nil	nil	nil	nil	nil	6	4	nil	2	2	nil	nil	2	9	7	nil	2	nil	nil	nil	nil	nil		
CCL	1	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	3	3	nil	nil	2	nil	nil	2	nil	nil	2	nil	nil	nil	nil	nil	nil	nil	
SMA	1	1	nil	nil	5	5	nil	nil	39	8	30	1	13	9	nil	4	6	6	nil	nil	2	nil	nil	2	4	4	nil	nil	nil	nil	nil	nil	nil	nil	
LMA	1	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	5	nil	nil	5	3	2	nil	1	nil	nil	nil	nil	1	nil	nil	1	nil	nil	nil	nil	nil	1	
BSH	nil	nil	nil	nil	105	105	nil	nil	184	160	24	nil	300	194	6	100	202	98	nil	104	119	26	nil	93	143	116	1	26	nil	nil	nil	nil	nil	26	
PSK	137	137	nil	nil	174	nil	nil	174	84	17	67	nil	148	2	nil	146	119	4	nil	115	25	nil	11	14	66	2	1	63	nil	nil	nil	nil	63	63	
SPL	108	nil	nil	108	nil	nil	nil	nil	nil	nil	nil	nil	1	nil	nil	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	
TIG	1	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	3	2	nil	1	4	nil	nil	4	nil	nil	nil	4	4	4	nil	nil	nil	nil	nil	nil	nil	nil	
ISB	nil	nil	nil	nil	nil	nil	nil	nil	39	1	35	3	9	2	nil	7	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	
TSK	nil	nil	nil	nil	nil	nil	nil	nil	6	6	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
SPY	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	1	nil	nil	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
THR	6	6	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
SHK	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil

5.2. Seabirds

Seabirds' data collection on longline fleets has been continuously monitored through ROS since mid-2005. However, only the last eight years' data are presented. In total, there were 38 incidental interactions with seabirds reported by the observers during observation (2014 – 2021). Data presented limited only for interaction in the area south of 25°S, under IOTC Resolution No. 12/06. Just three categories simplified the identification of seabirds prior to 2017 (B1=Seagull, B2=White Albatross, and B3=Black Albatross). Afterward, the improvement in seabird identification was expected courtesy of a workshop on seabird mitigation measures.

There was interaction reported in the area above 25°S during longline operation in 2021, it was one Shy albatross accidentally caught. However, in the lower latitude (20–25°S), there was also one observed accidental catch of flesh-footed shearwater (Table 5). Mitigation measure on seabirds is regulated through Ministerial Decree 58/PERMEN-KP/2020 and 10/PERMEN-KP/2021 related to mitigation for ecologically related species, including seabirds in which the tori line is obligatory for every vessel operated beyond 25°S (high seas). The identification card for Seabird from IOTC had been translated into Bahasa. In addition, Indonesia already developed NPOA for Seabird back in 2016, and has been reviewed by Birdlife South Africa, with full compliance remarks and obtained the green status.

Table 5. The number of observed incidental interactions of seabirds in tuna longline fishery from 2014–2021 (Source: RITF scientific observer data)

Code	Species	2014	2015	2016	2017	2018	2019	2020	2021
DCU	Shy albatross	nil	nil	nil	1	nil	nil	nil	1
PDM	Great-winged petrel	nil	nil	nil	18	1	nil	nil	nil
PTZ	Petrels nei	nil	nil	nil	nil	nil	5	nil	nil
PHU	Sooty albatross	nil	nil	nil	1	nil	nil	nil	nil
PFC	Flesh-footed Shearwater	nil	nil	nil	nil	nil	nil	2	1
USB	Other seabirds	1	7	nil	nil	nil	nil	nil	nil

5.3. Marine Turtles

Six out of 7 world's marine turtles are known to inhabit Indonesian waters. Since 1999, they have been nationally protected species following the latest regulation from the Ministry of Environment and Forestry Decree No. P.106/2018. Any catch and direct use are prohibited. In 2021, there was one leatherback turtle and two green turtle observed as an incidental catch from the tuna longline fleet (Table 6). Olive ridley turtle, loggerhead, and leatherback turtles are classified as vulnerable. At the same time, green turtles are endangered, and even hawksbill in a state is highly endangered. Indonesia established the National Plan of Action for marine turtles through the Directorate of Marine Conservation and Biodiversity, Ministry of Marine Affairs and Fisheries (MMAF). The NPOA for marine turtles are now being legalised as a ministerial decree that will valid until 2024. Indonesia also developed a cooperation with Coral Triangle countries like Malaysia, The Philippines, the Solomon Islands, Papua New Guinea, and Timor Leste through Coral Triangle Initiatives on Coral Reefs, Fish, and Food Security (CTI CFF) platform to protect threatened migratory species, including marine turtles. Bilateral Cooperation between Indonesia and US also being devised to protect Hawksbills Turtle migrating from Papua to California.

Table 6. The number of observed incidental interactions with marine turtles in tuna longline fishery from 2014-2021 (Source: RITF scientific observer data)

Code	Species	2014	2015	2016	2017	2018	2019	2020	2021
DKK	Leatherback turtle	nil	nil	nil	nil	nil	nil	nil	1
LKV	Olive-ridley turtle	12	1	15	5	12	2	nil	nil
TTH	Hawksbill turtle	nil	nil	nil	nil	nil	nil	nil	nil
TUG	Green turtle	nil	nil	nil	nil	nil	1	nil	2
TTX	Marine turtles nei	nil	nil	nil	nil	nil	nil	nil	nil

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

Pomfret, sickle pomfret, escolar, and lancetfish were the most common species caught as a by-product from tuna longline operations in 2014-2021. Neither marine mammals nor whale sharks were reported to be incidentally caught during that period (Table 7).

Table 7. The number of the observed catch of others ecologically related species in longline fisheries from 2014-2021 (source: RITF scientific observer data).

Code	Species	2014	2015	2016	2017	2018	2019	2020	2021
BAR	Baracuda	4	5	6	nil	2	15	nil	11
DOL	Common dolphinfish	15	7	13	32	11	29	4	15
DCO	Dolphin	nil	nil	nil	1	2	nil	nil	nil
EIL	Brilliant pomfret	nil	nil	nil	1	1	nil	nil	nil
HAR	Longnose chimaeras	3	14	46	nil	1	nil	nil	nil
LEC	Escolar	666	490	353	240	613	550	253	781
LAG	Moonfish	29	30	60	13	57	38	57	73
MOX	Ocean Sunfish	3	2	1	nil	3	2	1	nil
ALX	Long snouted lancetfish	921	739	693	796	1760	613	690	1112
OHR	Other hairtail fish	nil	nil	nil	nil	nil	nil	nil	nil
OIL	Oilfish	58	16	8	24	19	20	5	16
TCR	Pomfret	90	45	62	42	nil	11	5	14
TRF	Tappertail ribbon fish	1	nil	nil	nil	nil	nil	nil	nil
TST	Sickle pomfret	110	29	117	105	131	25	18	38
WAH	Wahoo	96	63	61	30	74	61	23	85

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification

Fisheries logbook submission is mandatory for fleets above 10 GT, according to Ministerial Regulation No. PER.18/MEN/2010 issued on 5 October 2010. A total of 2,373 vessels were complied to fill and hand out the logbook to the port authorities in 2021 (Table 8). There was only 0.5% increase compared to last year's submission, including e-logbook e-logbook format. Although data entry, validation, and verification before analysis are still the remaining issues, the data quality is incrementally improving every year. Hence, for effective implementation of this program, it is necessary to keep introducing and strengthening its capacity to fishers and port officers.

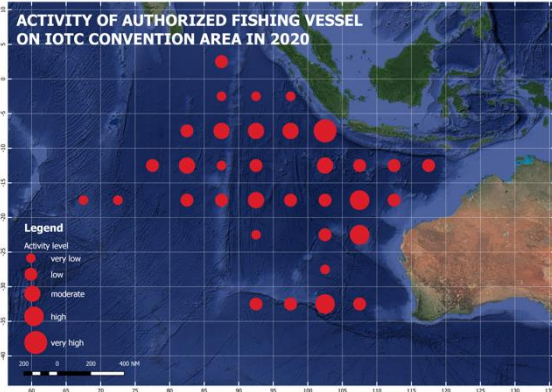
Table 8. The number of vessels submitted logbook (source: DGCF).

No	FMA	2014	2015	2016	2017	2018	2019	2020	2021
1	571	53	58	24	1	5	115	313	348
2	572	720	1,202	1,182	639	575	921	903	682
3	573	1,210	1,031	941	796	713	821	1,144	1343
Total		1,983	2,291	2,147	1,436	1,293	1,857	2,362	2373

6.2. Vessel Monitoring System

The Vessel Monitoring System (VMS) was started to be implemented in Indonesia in 2003. Through Ministerial Regulation No. 42/2015 about fisheries vessel monitoring system, all fishing vessels above 30 GT or operating in high seas are mandatory to be equipped with a VMS transmitter. Without a VMS transmitter on board, the fishing vessel will not get permission to leave the fishing port for their fishing operations. The fishing monitoring centre (FMC) for Indonesia's VMS is based in Jakarta. To fight against illegal, unreported, and unregulated (IUU) Fishing, Indonesia has started implementing Database Sharing Systems for Fisheries Management. The system is developed to integrate several databases, including the licensing, logbook, and VMS databases. The Minister of Marine Affairs and Fisheries has recently launched the system application on 19 November 2013 in Jakarta. Such a system will be applied to 45 fishing ports of Indonesia and can be accessed at <http://dkpvms.dkp.go.id>. Interactive VMS data visualization can also be accessed at <http://globalfishingwatch.org/map/>, which shows a strong statement from the Indonesian government in response to fisheries transparency. Figure 6 shows the spatial distribution of Indonesia fleets based on VMS information. The spatial distribution of longline and purse seine vessels from 2016 to 2021 is presented in Figure 4.

A)



B)



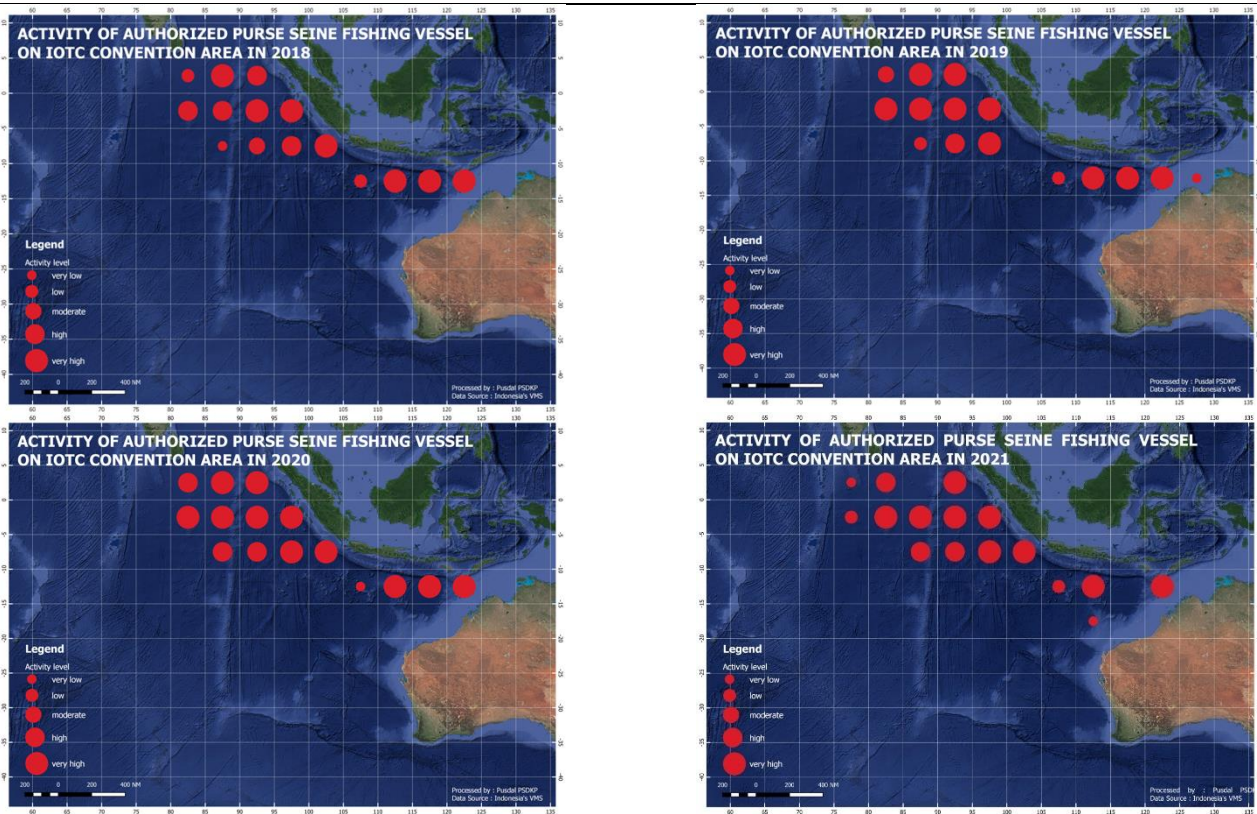


Figure 4. Map of the spatial distribution of longline (A) and purse seine (B) from 2016 to 2021 based on VMS data (Source: PSDKP).

6.3. Observer Scheme

Indonesia has joined Regional Observer Program (ROP) for Transshipment at Sea since 2009 under Resolution 11/05 and Resolution 12/05 (previously IOTC Resolution No. 08/02) concerning establishing a program for transshipment of large-scale fishing vessels. It clearly stated that "Each CPC shall ensure that all carrier vessels transshipping at sea have on board an IOTC observer." Indonesia also established a scientific observer program according to IOTC resolution 11/04 related to the Regional Observer Scheme (ROS). The number of scientific observers recorded until 2021 was 25 observers. New recruitment is imminent for the continuation of the program. Since 2014 the deployment of observers has been extended to other gears, such as small-scale purse seine, coastal drifting gillnet, and troll line/hand line (Table 9a-d). Ministerial Regulation No. 1/PERMEN-KP/2013 formally regulates national observers for fishing and carrier vessels, positive progress to secure the government budget for the observer program in the future.

Table 9a. Activity summary of Indonesian ROS from 2014-2021 (gear= longline).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2014	20	28	13	875	29-135	62
2015	4	5	5	241	31-61	48
2016	6	6	6	289	18-86	57
2017	12	15	13	524	15-108	58
2018	10	10	10	322	9-71	33
2019	6	10	5	348	14-104	36
2020	6	6	6	257	22-104	48
2021	16	16	13	796	18-77	44

Table 9b. Activity summary of Indonesian ROS from 2014-2021 (gear= purse seine).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2014	3	2	2	11	1-9	2
2015	2	1	1	10	8-15	11
2016	23	18	9	1088	2-240	25
2017	na	na	na	na	na	na
2018	4	20	15	126	8-13	9
2019	10	17	17	345	4-56	20
2020	5	5	5	446	57-116	89
2021	4	4	3	52	6-22	13

Table 9c. Activity summary of Indonesian ROS from 2014-2021 (gear= handline).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2014	10	70	10	70	1	1
2015	na	na	na	na	na	na
2016	9	9	4	150	8-15	10
2017	24	37	2	734	10-173	11
2018	21	48	38	903	28-78	41
2019	8	9	6	101	8-15	11
2020	2	2	2	51	10-41	26
2021	6	6	6	75	9-20	13

Table 9d. Activity summary of Indonesian ROS from 2014-2021 (gear= gillnet).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2014	na	na	na	na	na	na
2015	6	3	3	41	12-15	13
2016	na	na	na	na	na	na
2017	3	3	1	46	14-18	14
2018	3	15	7	31	1-19	1
2019	1	1	1	8	8	8
2020	na	na	na	na	na	na
2021	na	na	na	na	na	na

6.4. Port sampling program

The Port sampling program was conducted regularly at Benoa Port to represent Indonesia's main industrial fishing ports. The minimum sampling activity requirement is at least 30% of all landings at each processing plant (IOTC, 2002). In 2019 to 2020 coverage was below 50% due to changing personnel and restrictions related to the Covid-19 pandemic. The latter reason also substantially affected the number of fish sampled, for around 30% loss on average across all species in those years. However, it improved to more than 50% in 2021 (Table 10), followed by an increase in the number of fish sampled (Table 11).

Table 10. Coverage percentage of daily tuna and tuna-like species monitoring program based in Benoa port 2014-2021.

Year	No. Landed Vessel	No. Sampled Vessel	Sampling Coverage
2014	858	521	60.72%
2015	699	477	68.24%
2016	720	434	60.28%
2017	483	374	77.43%
2018	434	233	53.69%
2019	410	183	44.63%
2020	411	150	37.67%
2021	405	206	50.86%

Table 11. Some weighted samples by species and gear from daily tuna and tuna-like species monitoring based in Benoa Port 2014-2021.

Code	Species	No. fish sampled							
		2014	2015	2016	2017	2018	2019	2020	2021
ALB	Albacore	27,740	21,648	22,643	21,452	7,641	13,812	9,255	23,738
BET	Bigeye tuna	40,431	45,039	34,415	25,695	16,247	16,210	11,729	12,997
YFT	Yellowfin tuna	41,720	17,909	29,229	20,610	22,998	13,147	5,654	9,083
BUM	Blue marlin	716	780	219	216	82	60	138	330
BLM	Black marlin	342	120	111	48	20	20	96	264
MLS	Striped marlin	108	115	201	60	36	54	178	374
SSP	Short bill spearfish	68	192	337	209	125	1,020	121	323
SFA	Indo-Pacific sailfish	383	546	440	391	325	108	209	158
SWO	Swordfish	4,177	4,336	2,966	2,318	1,198	2	3,387	8,762
LEC	Escolar	13,705	9,567	5,201	15,006	1,603	8	3,812	43,060
OIL	Oilfish	1,120	1,842	1,394	849	349	349	652	1,638
WAH	Wahoo	1,776	1,102	913	325	47	229	388	1,375
DOL	Common dolphinfish	221	359	445	921	42	459	112	190
BSH	Blue shark	2,058	4,732	9,148	8,404	10,055	10,483	12,542	19,219
MAK	Mako sharks nei	83	124	166	168	227	154	331	386
OCS	Oceanic whitetip shark	99	153	66	20	14	1	2	29
THR	Thresher sharks nei	2	32	nil	2	nil	2	97	345
LAG	Moonfish	6,795	9,709	5,690	4,820	2,970	4,653	3,827	3,726
BAR	Barracuda	19	15	nil	5	nil	nil	nil	nil

6.5. Unloading/Transshipment of flag vessels

In connection with the Covid-19 pandemic, which disrupts fishery logistics and distribution, the Ministry of Marine Affairs and Fisheries has issued circular letter No. B-239/MEN-KP/IV/2020 on 21st of April, 2020 to relax fishery industries. One of which was the ease in terms of transshipment as follows:

- The possession of VMS (Vessel Monitoring System) and CCTV (Closed Circuit Television) are mandatory and must be installed onboard
- Join partnership with officially licensed vessel
- Must unload the catch at Indonesian territory ports
- Report the transshipment activities enclosed with CCTV recording to port authorities

The relaxation initially commenced on the 18th of August 2020; however, it was extended until the 31st of January 2021 by issuing circular letter No. B-483/MEN-KP/IX/2020.

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

The catch of striped marlin, black marlin, blue marlin, and Indo-Pacific sailfish are closely monitored through logbooks, scientific port sampling at main landing sites, and deployment of observers.

6.7. Gillnet observer coverage and monitoring

Scientific observers have been put on gillnet fleets since 2015 (Table 9-d). Despite low coverage, continuity is still the main priority. In addition, scientific port sampling on the gillnet fishery has been conducted since as early as 2012, with Cilacap as the leading monitoring site. Unfortunately, no observation was completed in 2021 due to the Covid-19 outbreak. Nowadays, gillnet targeting tuna is no longer considered an economical option for fishers. Most of them decided to convert to handline, utilize FADs, and upgrade the storage with refrigerated-type chiller for better quality products (Novianto et al., 2019).

6.8. Sampling plans for mobulid rays

Continuous monitoring on sharks and rays, especially mobulid from small-scale fisheries, will be conducted by collaboration with the associated Non-Government Organizations (NGOs).

7. NATIONAL RESEARCH PROGRAMS

Research on tuna-like species, billfishes, sharks, and rays in the Indian Ocean has been a national research priority mandated in Indonesia NPOA Tuna. Most of the national research programs were conducted by Research Institute for Tuna Fisheries, Bali, and several research activities were run by local universities and NGOs.

7.1. National research programs on blue shark

Research title: Study of the effectiveness of shark conservation policies implementation.
Population structure of tuna, billfishes, and sharks in Indonesian EEZ and high seas area.

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

Research title: Population structure of tuna, billfishes, and sharks in Indonesian EEZ and high seas area.

7.3. National research programs on sharks

Research title: Study of the effectiveness of shark conservation policies implementation.
Population structure of tuna, billfishes, and sharks in Indonesian EEZ and high seas area.

7.4. National research programs on oceanic whitetip sharks

Research title: Study of the Effectiveness of Implementing Shark Conservation Policies
Population Structure of Tuna, Billfishes, and Shark in EEZ of Indonesia and High Seas Area

7.5. National research programs on marine turtles

Research title: Marine Turtles Critical Habitat Mapping in Fisheries Management
Area of Indonesia

7.6. National research programs on thresher sharks

Research title: Study of the Effectiveness of Implementing Shark Conservation
Policies
Population Structure of Tuna, Billfishes, and Shark in EEZ of Indonesia and High Seas
Area

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

Indonesia participates in several IOTC SC working parties. Scientific observer and port sampling program continues to monitor catch and effort of tuna and other ecologically related species to implement scientific Committee Recommendation.

Table 12. Scientific requirements contained in Resolutions of the Commission, adopted between 2012 and 2021

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	Indonesia's regional observer scheme is governed through Ministerial Regulation No. 1/PERMEN-KP/2013 superseded by Ministerial Regulation No. 33/PERMEN-KP/2021 and it has been implemented ever since. Report of number active vessel monitored through ROS reported through a national report to SC-IOTC annually
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Conservation and protection of ecologically related species, mainly marine turtles, is governed through Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021. Indonesia established the National Plan of Action for marine turtles through the Directorate of Marine Conservation and Biodiversity, Ministry of Marine Affairs and Fisheries (MMAF). The NPOA for



Res. No.	Resolution	Scientific requirement	CPC progress
			marine turtles are now being legalised as a ministerial decree that will valid until 2024.
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	<p>Conservation and protection of ecologically related species, significantly reducing incidental bycatch of seabirds, is governed through Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021.</p> <p>Indonesia had NPOA for Seabird Mitigation Measures since late 2016 and implemented in early 2017</p>
12/09	On the conservation of thresher sharks (family Alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	<p>Conservation and protection of ecologically related species, significantly reducing incidental bycatch of seabirds, is governed through Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021.</p> <p>Report of ERS interaction monitored through ROS reported through a national report to SC-IOTC annually</p>
13/04	On the conservation of cetaceans	Paragraphs 7–9	<p>Conservation and protection of ecologically related species, mainly cetaceans, are governed through Government Regulation No. 7/1999 and Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021.</p> <p>Report of cetacean interaction monitored through ROS reported into a national report to SC-IOTC annually. However, no incident occurred related to cetacean interaction with tuna fishery</p>

Res. No.	Resolution	Scientific requirement	CPC progress
13/05	On the conservation of whale sharks (<i>Rhincodon typus</i>)	Paragraphs 7–9	<p>Conservation and protection of Whale sharks (<i>Rhincodon typus</i>) are governed through Government Regulation No. 7/1999 and Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021 as well as Ministerial Decree No. 18/KEPMEN-KP/2013.</p> <p>Indonesia have developed particular national action plan documents. For a better implementation of NPOA, Minister of Marine Affairs and Fisheries have issued Minister Decree No 16/2021 concerning Whale Sharks National Action Plan 2021-2025.</p> <p>Report of whale sharks interaction monitored through ROS reported into a national report to SC-IOTC annually. However, there are no incidents that occurred related to whales sharks interaction with tuna fishery</p>
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	<p>Aside from Ministerial Regulation No. 12/PERMEN-KP/2012, which governed the conservation and protection of ecologically related species, Indonesia also issued the first National Plan of Action (NPOA) for sharks and rays for 2010-2014. The 2nd NPOA for the period 2016-2020 then also has been issued and implemented as the continuation action plan of the 1st NPOA. The 2nd NPOA, however, is still being implemented because in the past years action plan implementation was quite limited due to global covid 19 pandemic that affecting many aspect of action plan implementation including travel restriction, budget cut etc.</p>



Res. No.	Resolution	Scientific requirement	CPC progress
			Report of sharks' interaction monitored through ROS, Port Sampling Program and logbook Fishing vessel and reported through a national report to SC-IOTC annually
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	Catch and effort are mandatory for vessels above 10 GT, based on Ministerial Regulation No. 48/PERMEN-KP/2014 regarding logbook program and Ministerial Regulation No. 1/PERMEN-KP/2013 regarding observer scheme, which records commercial fisheries operation onboard. All mandatory data reporting has been submitted annually.
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	All mandatory statistical reporting forms (1RC, 1DI, 1DR, 3CE, 4SF) have been submitted accordingly.
17/05	On the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 6, 9, 11	Aside from Ministerial Regulation No. 12/PERMEN-KP/2012, which governed the conservation and protection of ecologically related species, Indonesia also issued the first National Plan of Action (NPOA) for sharks and rays for 2010-2014. The 2nd NPOA for the period 2016-2020 then also has been issued and implemented as the continuation action plan of the 1st NPOA. The 2nd NPOA, however, is still being implemented because in the past years action plan implementation was quite limited due to global covid 19 pandemic that affecting many aspect of action plan implementation including travel restriction, budget cut etc. Data submission related to sharks' data 2021 had been submitted to IOTC on 30 th June 2022.
18/02	On management measures for the conservation of blue shark	Paragraphs 2-5	No specific management measure for blue sharks is issued at present.



Res. No.	Resolution	Scientific requirement	CPC progress
	caught in association with IOTC fisheries		<p>However, in general, conservation and protection of ecologically related species, including sharks and rays, are governed through Government Regulation No. 7/1999 and Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021.</p> <p>Data submission related to blue sharks 2021 had been submitted to IOTC on 30th June 2022 and reported through a national report to SC-IOTC.</p>
18/05	On management measures for the conservation of the Billfishes: Striped marlin, black marlin, blue marlin, and Indo-Pacific sailfish	Paragraphs 7 – 11	No management measure is specific for billfishes: striped marlin, black marlin, blue marlin, and Indo-Pacific sailfish. However, the catches are closely monitored through a scientific port sampling program at main landing sites.
18/07	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraphs 1, 4	<p>All mandatory statistical reporting forms (1RC, 1DI, 1DR, 3CE, 4SF) have been submitted annually.</p> <p>Improvement of data quality conducted by national validation data workshop twice a year and refreshment program for data field officers conducted annually.</p>
19/01	On an Interim Plan for Rebuilding the Indian Ocean Yellowfin Tuna Stock in the IOTC Area of Competence	Paragraph 22	<p>To implement IOTC Resolution 19/01, Indonesia shall reduce its yellowfin tuna catch in year 2017 until 2019 as much as 4,346 ton per year. The baseline year for yellowfin tuna catch limit is 2014. The detail methods was attached to the implementation report 2020 which was submitted to the IOTC Secretariat on 7 April 2021 in the attachment 17.</p> <p>Report on corrective actions taken to adhere to prescribed catch levels was submitted to the IOTC Secretariat on 11 January 2021 through the letter no. Ref: B. 630/DJPT/PI.110.D1/I/2021 subject</p>



Res. No.	Resolution	Scientific requirement	CPC progress
			<p>the Objection Regarding IOTC Circular 2020-55 on the Implementation of Resolution 19/01 Yellowfin Tuna Allocated Catch Limit for 2021.</p> <p>Observer for gillnet fisheries conducted despite some gillnet fisheries being very limited and operated in the EEZ</p>
19/03	On the Conservation of Mobulid Rays Caught in Association with Fisheries in the IOTC Area of Competence	Paragraph 11	<p>In general, conservation and protection of ecologically related species, including sharks and rays, are governed through Government Regulation No. 7/1999 and Ministerial Regulation No. 12/PERMEN-KP/2012 superseded by Ministerial Regulation No.58/PERMEN-KP/2020 superseded by Ministerial Regulation No. 10/PERMEN-KP/2021.</p> <p>In addition, Manta rays (<i>Manta spp.</i>) are fully protected under Ministerial Decree No. 4/KEPMEN-KP/2014.</p> <p>Report of mobulid interaction monitored through ROS reported into a national report to SC-IOTC annually. However, no incident occurred related to mobulid interaction with tuna fishery.</p>



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Annex 1. Summary of nominal CPUE of billfish (N/1000 hooks) derived from observer data.

Year	Coverage (No. boat covered)	BLM	BUM	MLS	SFA	SSP	SWO	Fishing Ground
2006	1.6%	0.15	0.09	0.05	0.03	0.13	0.37	Eastern Indian Ocean
2007	1.3%	0.05	0.03	0.08	0.01	0.12	0.31	Eastern Indian Ocean
2008	1.4%	0.06	0.05	0.03	0.03	0.17	0.22	Eastern Indian Ocean
2009	1.3%	0.22	0.07	0.04	0.10	0.02	0.57	Eastern Indian Ocean
2010	0.8%	0.08	0.10	0.01	0.04	0.10	0.35	Eastern Indian Ocean
2011	0.5%	0.23	0.23	nil	0.04	0.03	0.14	Eastern Indian Ocean
2012	0.6%	0.07	0.13	0.02	0.02	0.02	0.49	Eastern Indian Ocean
2013	0.2%	0.18	0.20	0.01	0.06	0.03	0.34	Eastern Indian Ocean
2014	0.5%	0.08	0.08	0.00	0.05	0.01	0.48	Eastern Indian Ocean
2015	0.4%	0.13	0.09	0.01	0.02	0.02	0.37	Eastern Indian Ocean
2016	3.4%	0.20	0.05	0.02	0.05	0.01	0.48	Eastern Indian Ocean
2017	6.9%	0.05	0.02	0.03	0.04	0.11	0.24	Eastern Indian Ocean
2018	1.9%	0.04	0.10	0.04	0.03	0.05	0.33	Eastern Indian Ocean
2019	6.2%	0.14	0.09	0.02	0.15	0.04	0.61	Eastern Indian Ocean
2020	0.7%	0.22	0.07	0.09	0.01	0.04	0.33	Eastern Indian Ocean
2021	1.7%	0.07	0.09	0.05	0.09	0.04	0.31	Eastern Indian Ocean

Annex 2. Summary of nominal CPUE of some sharks (N/1000 hooks) derived from observer data.

Year	Coverage (No. boat covered)	BSH	FAL	Fishing Ground
2006	1.6%	1.62	0.06	Eastern Indian Ocean
2007	1.3%	1.21	0.02	Eastern Indian Ocean
2008	1.4%	0.94	0.00	Eastern Indian Ocean
2009	1.3%	0.75	0.03	Eastern Indian Ocean
2010	0.8%	0.77	0.07	Eastern Indian Ocean
2011	0.5%	0.76	0.00	Eastern Indian Ocean
2012	0.6%	2.05	0.00	Eastern Indian Ocean
2013	0.2%	1.10	0.00	Eastern Indian Ocean
2014	0.5%	1.10	0.00	Eastern Indian Ocean
2015	0.4%	1.26	0.15	Eastern Indian Ocean
2016	3.4%	0.01	0.00	Eastern Indian Ocean
2017	6.9%	0.10	0.01	Eastern Indian Ocean
2018	1.9%	1.68	0.05	Eastern Indian Ocean
2019	6.2%	0.98	0.05	Eastern Indian Ocean
2020	0.7%	1.22	0.00	Eastern Indian Ocean
2021	1.7%	0.69	0.03	Eastern Indian Ocean