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Indonesia National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2017

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 15/02, final scientific data for the previous year was provided to the IOTC Secretariat by 30 June of the current year, **for all fleets other than longline** [e.g. for a National Report submitted to the IOTC Secretariat in 2016, final data for the 2015 calendar year must be provided to the Secretariat by 30 June 2016)	YES 15/11/2017
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 2016, preliminary data for the 2015 calendar year was provided to the IOTC Secretariat by 30 June 2016). **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 2016, final data for the 2015 calendar year must be provided to the Secretariat by 30 December 2016).	YES or NO [delete one] DD/MM/YYYY [Add submission date here]
If no, please indicate the reason(s) and intended actions:	

Executive Summary

For fisheries management purpose, Indonesian waters is divided into eleven Fisheries Management Areas (FMA). Three of them located within the IOTC area of competence, namely Fisheries Management Areas (FMAs) 572 (Indian Ocean – West Sumatera), FMA 573 (South of Java – East Nusa Tenggara) and 571 (Malacca Strait and Andaman Sea). Indonesian fishers operate various fishing gears such as Long line, Purse seine, hand line to catch large pelagic fishes such as tuna, skipjack, marlins etc. Longline is the main fishing gear type targeting tunas which operated in those FMAs. The national catch of four main tuna species in 2016 was estimated 132,961 tons which composed of albacore (7,179 t); bigeye tuna (22,016 t); skipjack tuna (67,657 t) and yellowfin tuna (35,839 t). Port sampling and scientific observer programs are still continuing and conducting by Research Institute for Tuna fisheries (RITF), in the meantime national observer programs developed and conducted by Directorate General of Captured Fisheries . Following the issuance of ministerial regulation No. 1/2013 concerning observer onboard for fishing and carrier vessel, the national tuna management plan (NTMP) was officially lunched in Bali in 2014 and legalized recently in 2015. Furthermore, transshipment at sea also banned by ministry regulation no 57/PERMEN/2014 and implemented by 2015.

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INDONESIA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 20174

1. BACKGROUND/GENERAL FISHERY INFORMATION

Indonesia is an archipelagic nation located between the continents of Asia and Australia surrounded by two oceans, Pacific Ocean in the northern part and Indian Ocean in southern part. It consists of approximately 17,508 islands and coast line of 81,000 km. Totally, Indonesia has 5.8

million km2 of marine waters consisting of 3.1 million km2 of territorial waters (<12 miles) and 2.7 million km2 of EEZ (12-200 miles). For fisheries management purpose Indonesia waters is divided into eleven Fisheries Management Areas (FMAs) (Figure 1). FMAs 572 (Indian Ocean – West Sumatera), 573 (South of Java – East Nusa Tenggara), and 571 (Malacca Strait and Andaman Sea) are located within the IOTC area of competence (Figure 1).

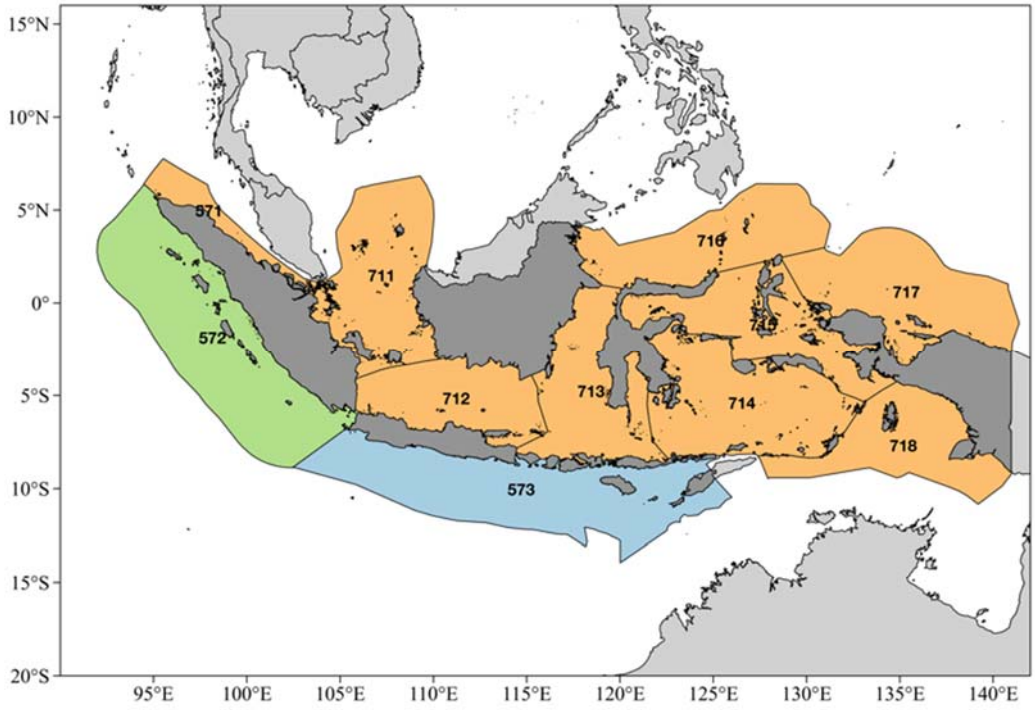


Figure 1a. The eleven of Fisheries Management Area (FMA) in Indonesian waters

South Indonesian marine waters from Banda Aceh to NTT (East Timor) there are at least 12 fishing ports as landing site for tuna. Five main landing sites for Indian Ocean tuna industrial fleet are Benoa Fishing Port (Bali), Muara Baru Port (Jakarta) and Cilacap Port (Jawa Tengah), Palabuhanratu (Jawa Barat) and Bungus (Sumatera Barat). There are also several non-industrial fishing ports located in Sumatera, Jawa, Bali and NTT Island that known as tuna landing place (Figure 2). Benoa Fishing Port is considered as main tuna landing port for Indonesian tuna catch.

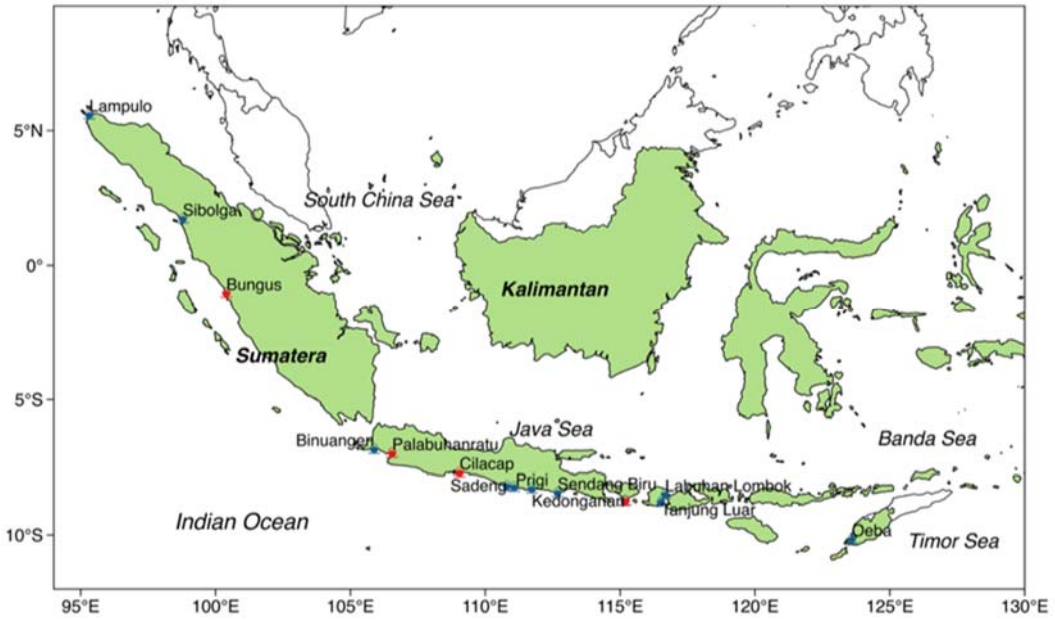


Figure 1b. Primary fishing port/landing sites the industrial (*blue label*) and artisanal (*red label*).

2. FLEET STRUCTURE

The number of registered fishing vessels operated, as reported to IOTC as per 1 November 2016 in the FMAs 572, 573 and high seas Indian Ocean was 1,389 fishing vessels which consisted of longliner (1,311), purse seiner (43), gillnetter (2), and carrier boat (11). Those fishing boats were vary in size from less than 50 GT to 1,025 GT. Number of active fishing vessel per 1 november 2016 about 265 approximately, consist 252 LL, 4 PS, 8 C and 1 others, while in 2015 total number of active vessel were 584.

Table 1. Registered Indonesian fishing vessels by size (GT) as reported to IOTC as per 1 November 2016 (Source: DGCF, 2017).

Size	Longliner	Purse Seiner	Gil Netter	Carrier/Cargo Freezer	Other	Total
<50	310	0	1	1	0	312
51-100	466	9	1	2	2	479
101-200	528	29	0	8	6	571
201-300	3	2	0	0	0	5
301-500	5	0	0	0	1	7
501-800	12	0	0	0	0	12
>800	0	3	0	0	0	3
Total	**1,311**	**43**	**2**	**11**	**9**	**1,389**

3. CATCH AND EFFORT (BY SPECIES AND GEAR)

Indonesian national statistic regularly reported the annual catch including four (4) main species such as bigeye tuna, yellowfin tuna, skipjack tuna and albacore. Official release expected to be issued before the end of the year. Total catch of main species of tunas in 2016 was 132,961tons which composed of albacore (7,179 t); bigeye tuna (22,016 t); skipjack tuna (67,657 t) and yellowfin tuna (35,839 t). The average catch of tunas from 2012 to 2016 was estimated 150,062 ton. The proportion average catch was dominated by skipjack tuna (51.4%), yellowfin tuna (25.9%), bigeye tuna (17.3%) and albacore (5.4%). All catches were reported to be lower than the previous year, varied from 1.33% - 7.94%. However, longline is still the main fishing gear targeting tuna that contribute a significant proportion among others gear type. Total catch from industrial longline (LLTU) in 2016 were 13,658 t which composed of 1,794 t (ALB), 6,095 t (BET), 551 t (SKJ) and 5,218 t (YFT) respectively, while total catch from artisanal longline (LLCO) in 2016 was 12,948 tons which composed 4,484 tons (ALB), 1,547 tons (BET), 1,730 tons (SKJ) and 5,186 tons of YFT. (DGCF, 2017).

Gear Type	Species	2012	2013	2014	2015	2016	Average (MT)
Gillnet							
	Albacore	115	74	63	61	20	67
	Bigeye tuna	1,471	1,653	1,405	1,368	729	1,325
	Skipjack tuna	12,926	14,519	12,343	12,016	12,892	12,939
	Yellowfin tuna	327	368	313	304	2,912	845
	Total	***14,839***	***16,614***	***14,124***	***13,749***	***16,553***	***15,176***

Line							
	Albacore	2,729	1,760	1,496	1,456	860	1,660
	Bigeye tuna	7,278	8,175	6,951	6,766	2,872	6,408
	Skipjack tuna	22,231	24,971	21,229	20,665	16,964	21,212
	Yellowfin tuna	13,373	15,021	12,771	12,432	9,276	12,575
	Total	***45,611***	***49,927***	***42,447***	***41,319***	***29,972***	***41,855***
Longline							
	Albacore	7,776	4,009	6,973	5,570	6,278	6,121
	Bigeye tuna	13,247	12,209	7,796	6,963	7,642	9,571
	Skipjack tuna	1	3	3	14	2,281	460
	Yellowfin tuna	20,788	22,951	16,822	17,795	10,404	17,752
	Total	***41,812***	***39,172***	***31,594***	***30,342***	***26,606***	***33,905***
Other							
	Albacore	210	135	115	112	3	115
	Bigeye tuna	2,098	2,356	2,002	1,949	1,573	1,996
	Skipjack tuna	6,825	7,665	6,517	6,344	6,692	6,809
	Yellowfin tuna	889	998	849	826	2,460	1,204
	Total	***10,022***	***11,154***	***9,483***	***9,231***	***10,729***	***10,124***
Purse Seine							
	Albacore	189	122	103	101	18	107
	Bigeye tuna	6,071	6,819	5,797	5,643	9,199	6,706
	Skipjack tuna	37,373	41,978	35,688	34,740	28,828	35,721
	Yellowfin tuna	5,379	6,041	5,136	5,000	10,786	6,468
	Total	***49,012***	***54,960***	***46,724***	***45,484***	***48,831***	***49,002***
	Grand Total	***161,296***	***171,827***	***144,372***	***140,125***	***132,691***	***150,062***

Table 2. Annual catch by gear and primary species of tuna (ALB, BET, SKJ and YFT) derived from Indian Ocean from 2012-2016.

The distribution of effort (hooks) from longline fleets in 2016 derived from scientific observer data was concentrated above 15° S and between 90°-120° E. The range of effort used was between 396-2700 hooks/set with average 1250 hooks/set (Figure 2a). Overall the average number of hooks/set used during 2012-2016 was between 396-2700 hooks/set (1250 hooks/set in average) with remarks that higher number of hooks/set was distributed between 15°-20° S and 70 (Figure 2b).

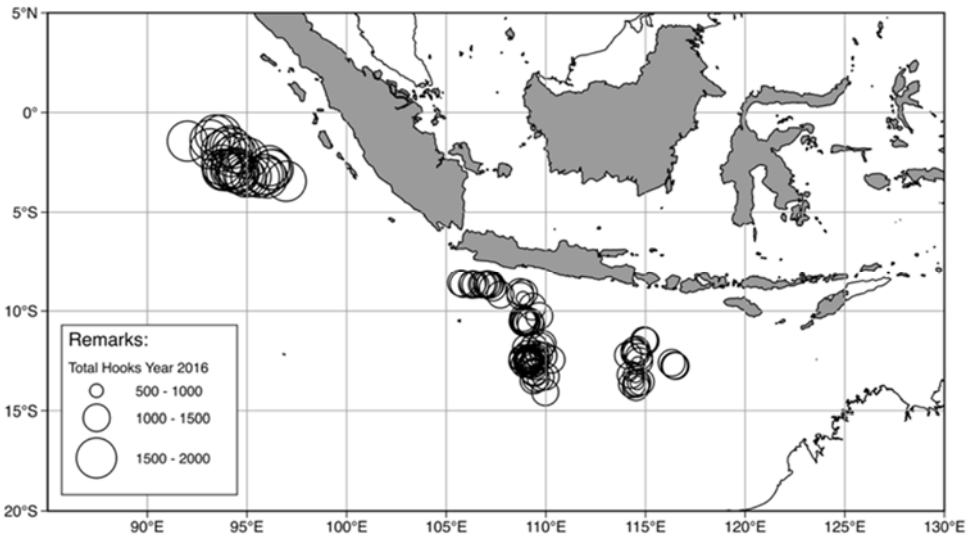


Figure 2a. Map of the distribution of Indonesian tuna longline efforts year 2016 (source: RITF Observer Program data).

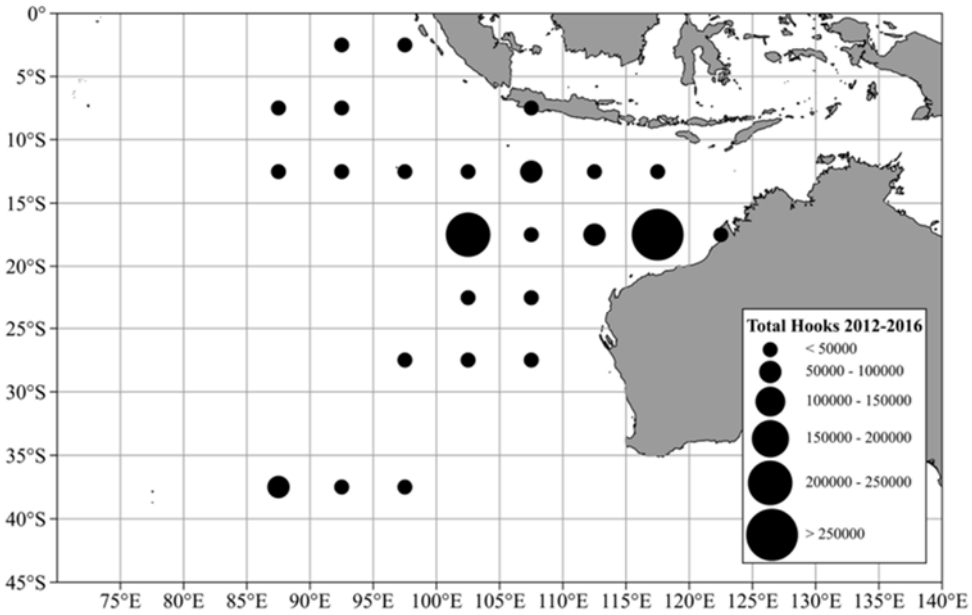
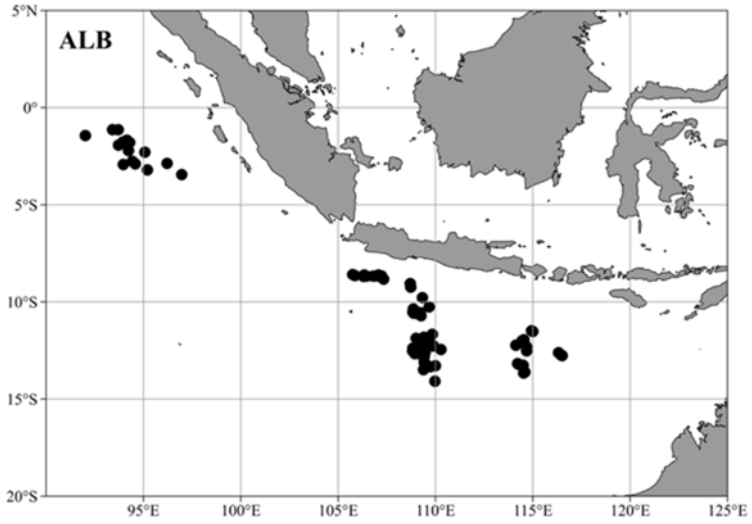


Figure 2b. Map of spatial distribution of observed longline effort (hooks) by 5-degree blocks, aggregated from 2012 to 2016 (source: RITF Observer Program data).

Observed fishing catch in 2016 for four main species of tuna was above 15° S, relatively close from Indonesian EEZ (Figure 3a). High number of yellowfin tuna was caught mainly inside the Indonesian EEZ, while albacore and southern bluefin tuna were distributed more to the south (high latitude). As for bigeye tuna could be found both in the high latitude and near equatorial area (Figure 3b).



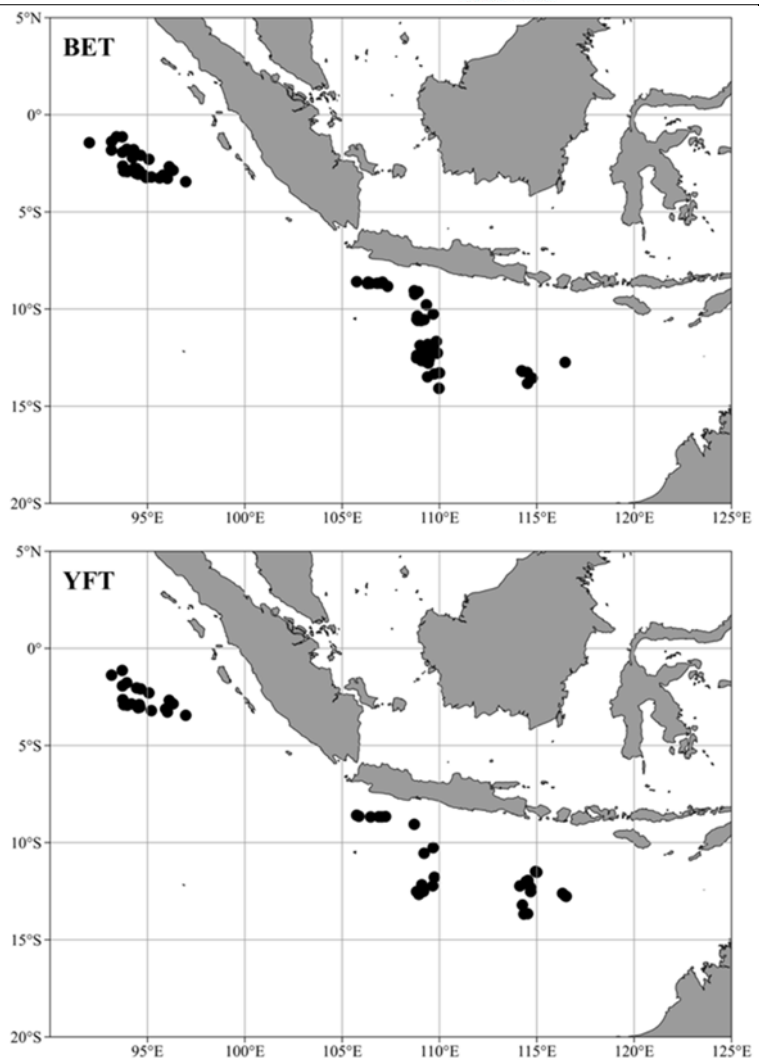
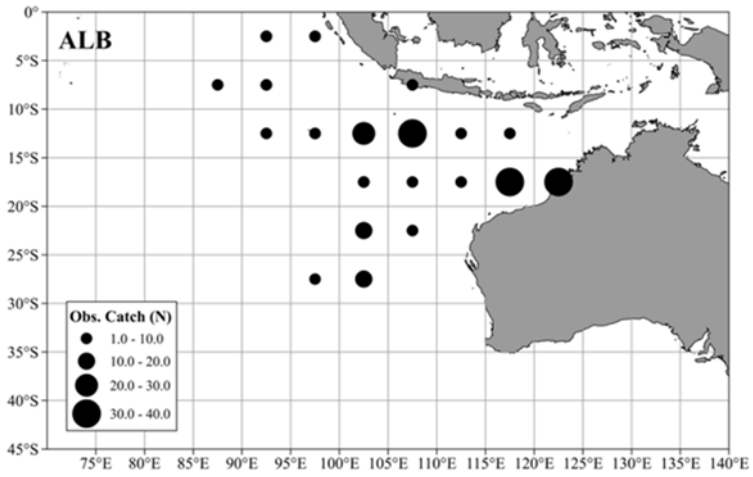


Figure 3a. Map of distribution of observed fishing catch, by species from Indonesia tuna longline fleets, year 2016 (source: RITF Observer Program data).



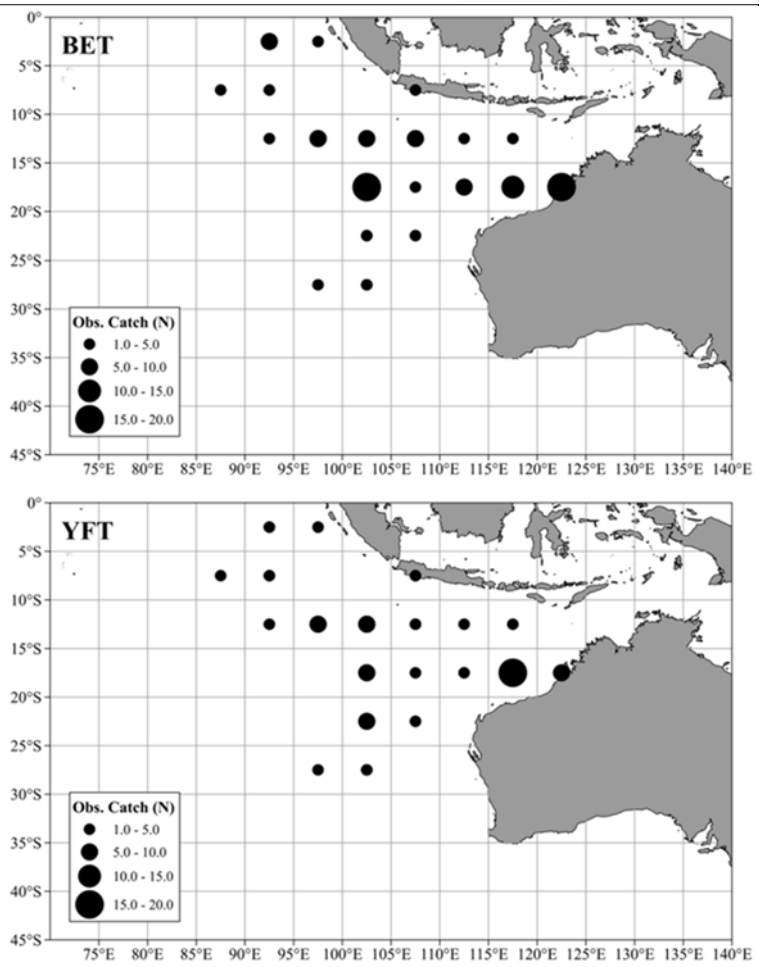


Figure 3b. Map of distribution of observed fishing catch, by species, by 5-degree blocks, aggregated from 2012 to 2016 (source: RITF Observer Program data).

3.1. Annual catch estimation at Benoa port

Annual catch that estimate from port sampling program at Benoa port reported a relatively stable trend for total tuna landed from 2012. Total estimated catch range between 4,903-6,110 tons. The recent estimated catch was 25% higher than the previous year. The recent year also recorded as the highest estimated catch in the last 5 years. The number of effort (number of landing) also showed the same trend as it shown in table 3 and figure 4.

Table 3. Annual catch estimation by gear and primary species of tuna (ALB, BET and YFT) landed in Benoa Port from 2012-2016.

Year	Annual Catch Estimation (ton)			
	YFT	BET	ALB	TOTAL
2012	2,049	2,719	1,221	5,989
2013	2,474	2,238	688	5,400
2014	2,654	2,312	687	5,653
2015	1,283	2,989	631	4,903
2016	2,562	2,385	1,584	6,110

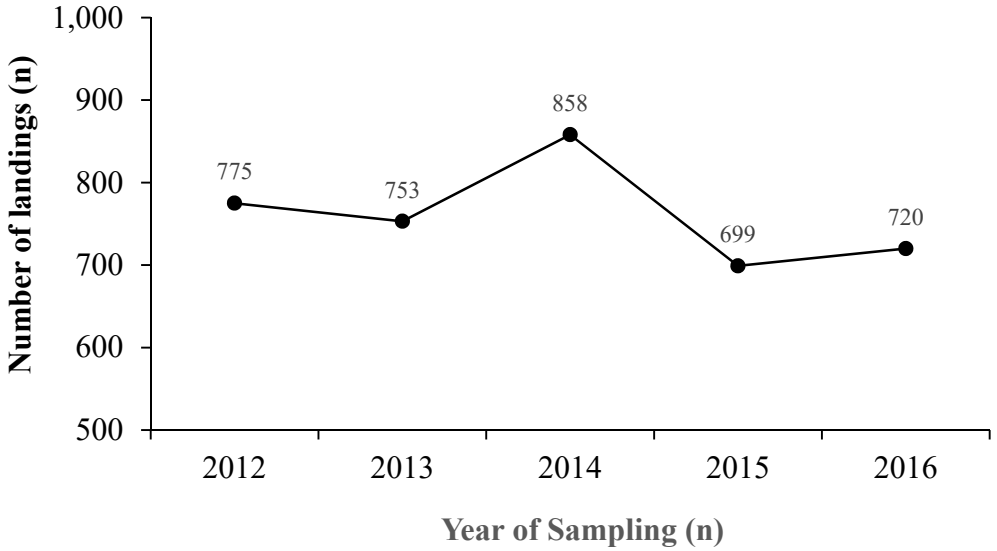


Figure 4. Total number of landing of Indonesian tuna longline vessels based in Benoa port during 2012-2016

Aside of daily monitoring on tuna landing activity in industrial scale, Research Institute of Tuna Fisheries (RITF) also conducting in small-scale fisheries since 2013. The sampling coverage was intended up to minimum 30% from total landing for each month (Table 4).

Table 4. Observed catch (kg) and landing (N) by gear and primary group species of tuna (BET, SKJ, YFT) from small-scale ports in Indonesia during 2013-2016.

Location	Gear	2013		2014		2015		2016	
		Catch (kg)	Landing (N)	Catch (kg)	Landing (N)	Catch (kg)	Landing (N)	Catch (kg)	Landing (N)
Labuhan Lombok	HL	138,001	153	198,480	129	95,925	73	307,454	264
Pacitan	HL	565,121	716	637,281	763	564,675	564	420,550	381
Pacitan	PS	396,282	186	1,233,200	335	1,851,560	309	944,066	342
Sibolga	PS	11,170,700	884	9,116,880	682	9,505,372	903	9,953,090	1641

Research Institute for Tuna Fisheries (RITF) informed about the Preliminary study for stock status of kawakawa (Euthynnus affinis Cantor, 1849) using data-limited approach in Indonesia. The result indicated that kawakawa stock in Indian Ocean south of Java waters are in under fishing condition (Jatmiko et al., 2017). WPNT appreciated the paper and noticed that the result is similar with report from Indian Ocean Tuna Commission that the stock status of kawakawa is in the secure condition. Acknowledging the importance of indices of abundance for future stock assessments, the WPNT recommended that the development of standardised CPUE series is explored, with priority given to fleets which account for the largest catches of neritic tuna and tuna-like species in Indonesia. The study of standardized CPUE will be presented in WPNT 2018 by scientist from RITF.

Result from DGCF-OFCF project to monitor neritic catch data in West Sumatera showed estimated landing data of neritic tuna were 549,858 kg (2014), 2,222,237 kg (2015) and 786,668 kg (2016) respectively (DGCF, 2016). Average of neritic tuna landed in west and north sumatera was 1,187,960 kg, dominated by frigate tuna (FRI), bullet tuna (BLT), kawa kawa (KAW) and longtail tuna (LOT).

3.2. Catch and Effort Data from Scientific Observer Program

Scientific observer program in Benoa Bali was initially a collaboration program between Indonesia's Ministry of Marine Affairs through Center of fisheries Research and Development and CSIRO Marine and Atmospheric Research (Australia), in 2005. Later, in 2011 a new research institution namely Research Institute for Tuna Fisheries (RITF) with full funded by Indonesian

government is established that basically conduct continuation of port sampling and scientific observer program for tuna fisheries in the Indian Ocean. Some data were collected by RITF scientific observer including catch, composition by species, fishing ground, number of setting, number of hooks etc. Following will be presented the calculated hook rate of tuna long liner recorded by observer at fishing vessels during 2005-2016. Hook rate of tuna longline for yellowfin and bigeye tuna was relatively stable, at approximately 1 per thousand hooks and 2 per thousand hooks, respectively. On the other hand, the hook rate of albacore was highly fluctuated over the years.

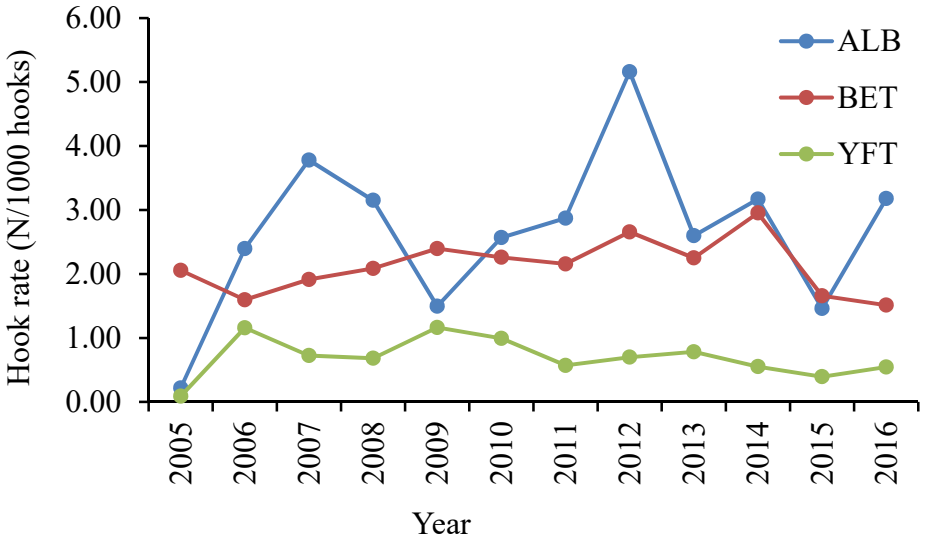


Figure 5a. Nominal hook rate series (N/1,000 hooks) for large tuna (ALB, BET and YFT) based on RITF scientific observer data in the Indian Ocean (2005- 2016).

4. RECREATIONAL FISHERIES

There is no official reported catch from Indonesia recreational fishing. An organization deal with sport fishing has been established since 1997, namely "FORMASI" (*Indonesia Fishing Sport Federation*) where this organization is a member of International game fish association (IGFA), Currently no update of FORMASI activities. Indonesia government is focusing on assessing and managing commercial fishing, and would including recreational fishing in the near future.

5. ECOSYSTEM AND BYCATCH ISSUES

5.1 Sharks

Recent progress related to the management of shark in Indonesia after establishment of National Plan of Action of the Shark (NPOA-Shark) on 10th October 2010 is the issuance of ministerial decree no 12, 2012, chapter X which regulates a management and conservation of bycatch and ecological related species on tuna fisheries. Several activities to raise the fishers' awareness on the important of sharks resource sustainability are through workshops, seminars and producing and distribute posters which prohibit several keys species of sharks to catch. In the framework of fisheries management of sharks and rays in Indonesia, the government through the minister of marine and fisheries has issued a ministerial regulation of marine and relevant fisheries management and use of sharks and rays in Indonesia, the latest regulations contained in the Minister of Marine and Fisheries No. 34/PERMEN-KP/2015 on the amendment of the Minister of Marine Affairs and Fisheries No. 59/PERMEN-KP/2014 concerning prohibition on the issuance of Oceanic white tip sharks (*Carcharhinus longimanus*) and hammerhead sharks (*Sphyrna* spp.) from the territory of Republic of Indonesia out of Indonesian territory. Indonesia also established National Plan of Action (NPOA) for sharks and rays 2015-2019.

Blue shark (*Prionace glauca*) is one of the dominant catch and most important bycatch shark species for Indonesian tuna longline fishery in the Indian Ocean. During the the 13th Session of the IOTC Working Party on Ecosystems and Bycatch, held in San Sebastian, Spain a continuing collaboration work between Indonesian scientist and Portuguese Institute for the Ocean and Atmosphere (IPMA, I.P.), Dr. Rui Coelho from Portugal produced the abundance indices for blue

shark. The working group acknowledge the work and the abundance indices also included into blue shark stock assessment.

Blue shark and crocodile shark (*Pseudocarcharias kamoharai*) dominated the incidental catch for sharks during 2012-2016. Most of the blue sharks were retained while crocodile sharks usually discarded dead (Table 5.).

Table 5. Total number of sharks, by species, released/discarded by the Indonesian tuna longline fleet in the IOTC area of competence (2012–2016).

CODE	Species	2012				2013				2014				2015				2016			
		N	Retained	Discard		N	Retained	Discard		N	Retained	Discard		N	Retained	Discard		N	Retained	Discard	
				Live	Dead			Live	Dead			Live	Dead			Live	Dead			Live	Dead
PTH	Alopias pelagicus	3	3	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
BTH	Alopias superciliosus	2	2	-	-	1	1	-	-	1	1	-	-	-	-	-	-	4	4	-	-
CCB	Carcharhinus brevipinna	1	1	-	-	4	4	-	-	17	17	-	-	1	1	-	-	3	3	-	-
FAL	Carcharhinus falciformis	-	-	-	-	-	-	-	-	-	-	-	-	26	26	-	-	-	-	-	-
OCS	Carcharhinus longimanus	-	-	-	-	2	2	-	-	9	8	-	1	4	4	-	-	4	4	-	-
CCL	Carcharhinus limbatus	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-
SMA	Isurus oxyrinchus	11	2	-	9	3	3	-	-	2	2	-	-	1	1	-	-	5	5	-	-
LMA	Isurus paucus	1	1	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-
BSH	Prionace glauca	381	132	-	249	39	38	-	1	67	62	-	5	137	137	-	-	105	105	-	-
PSK	Pseudocarcharias kamoharai	157	-	-	157	51	-	-	51	91	-	-	91	108	-	-	108	174	-	-	174
SPL	Sphyrna lewini	2	2	-	-	1	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-
TIG	Galeocerdo cuvier	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SPY	Sphyrnidae	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
THR	Thresher sharks nei	2	2	-	-	1	1	-	-	2	2	-	-	6	6	-	-	-	-	-	-
SHK	Shark nei	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**563**				**104**				**191**				**285**				**295**			

5.2 Seabirds

RITF Scientific observer program also include seabirds on their data record and since 2005 to 2016, involved in total 2.688 settings of tuna longline. There were 31 reports of incidental interaction with seagull, 3 white albatrosses and 22 black albatrosses, most of seabirds' interaction occurred in temperate waters (high latitude). In 2016, from RITF Scientific Observer program (3 trips of longline, 14 purse seines, 4 handlines), there is no reported data for unintentionally caught of seabird. (Table 6). Indonesia, through Ministry of Marine Affairs and Fisheries has released Ministerial Decree (PERMEN KP) No. 12/2012 related to mitigation for ecologically related species mitigation, including seabirds which stated that installment of tori line is obligatory for every vessel operated beyond 25°S (high seas). Identification card for Seabird from IOTC had been translated into Bahasa. Indonesia had developed NPOA for Seabird in 2016 and been reviewed by Birdlife South Africa. For Seabird, Indonesia has complied fully and gets the green status. Birdlife South Africa offered a traning for seabird mitigation measure for Indonesian observers which will be held on November 2017.

Table 6. The number of observed incidental interaction with seabirds in tuna longline fishery from 2011-2015 (Source: RITF scientific observer data)

Code	Species	2012	2013	2014	2015	2016
B1	Seagull	0	0	1	0	0
B2	White albatross	0	0	0	0	0
B3	Black albatross	9	0	0	7	0

5.3 Marine Turtles

The record results during 2012 - 2016 conducted by independent scientific observer onboard on tuna longline in the Indian Ocean to observe interaction longline fishery with marine turtle. There were 24 interactions with marine turtles in 2016, which dominated by olive ridley turtles (15), and green turtle (8) (Table 7). Green turtle incident entangled by longline reported consist of 6 female, 1 male, and 1 unidentified, and directly released back in live condition by fishermen (DGCF, 2017.

The olive ridley turtle, loggerhead and leatherback turtles are in a vulnerable status. While green turtles are in a state endangered and even hawksbill in a state extremely endangered. Policy

management of turtles in tuna longline fishery needs to be taken in order to be implemented include the socialization of the use of intensified circle hooks and if necessary the government issued regulations regarding the use of circle hooks, the implementation of the placement of fishing monitoring (observer) aboard the tuna longline in order to assist the skippers in monitoring the catch of turtles and turtle handling training for the skippers and crew how to handle the turtles on board in order to reduce the their mortality and could be released back into the sea alive (WWF, 2014). Areas of critical habitats, such as migratory corridors, nesting beaches, and Inter-nesting and feeding areas were identified. Indonesia had developed to improve NPOA of marine turtle to reduced entangled incident marine turtle by longline fishery according to FAO guidelines for marine turtle mitigation.

Table 7. The number of observed incidental interaction with marine turtles in tuna longline fishery from 2012-2016 (Source: RITF scientific observer data *and DGCF national observer data*)

Code	Species	2012	2013	2014	2015	2016
DKK	Leatherback turtle	0	0	0	0	0
LKV	Olive ridley turtle	5	6	12	1	15
TRT	Turtle	2	0	0	0	0
TTH	Hawksbill turtle	0	0	0	0	0
TTX	Marine turtles nei	0	0	0	0	0
TUG	Green turtle	0	0	0	0	8

5.4 Billfishes

Billfishes catch contributed more than 5% to total catch of tuna longline during 11 years of observation (2005-2016). There were 6 species of billfishes caught by Indonesian tuna longline fleets. Swordfish has the higher nominal CPUE, range from 0.133-0.553, followed by black marlin (0.066-0.317) and blue marlin (0.007-0.287) and sailfish, striped marlin and shortbill spearfish were not considered as significant contributors (Figure 6). During the IOTC 15th Working Party on Billfish, held in San Sebastian, Spain for the first time Indonesia produced a standardized CPUE of swordfish, a collaboration work between Indonesian scientist and Dr. Humber A. Andrade from Federal Rural University of Pernambuco, Recife, Brazil. The working group acknowledge the work and encourage to continue delivering the result with other species and in the upcoming years. The standardized CPUE was submitted to the IOTC secretariat and was considered into the analysis for stock assessment.

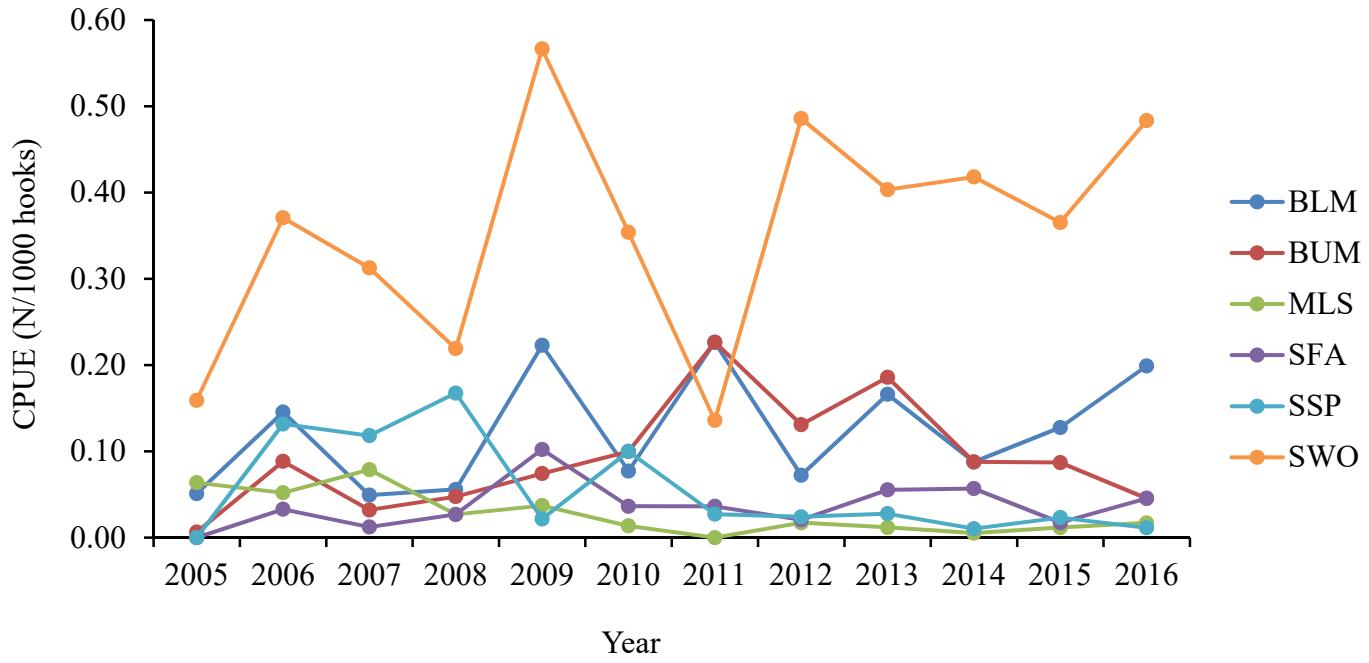


Figure 7. The nominal hook rate of known billfish species caught by Indonesian tuna longline fisheries from 2005-2016.

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

Pomfret, sickle pomfret, escolar and lancet fish were the most common species caught during longline operations from 2012-2016. No marine mammals or whale sharks recorded during that periods (Table 8).

Tabel 8. The number of observed catch of others ecologically related species in longline fisheries from 2011-2015 (source: RITF scientific observer data).

Code	Species	2012	2013	2014	2015	2016
BAR	Baracuda	11	0	4	5	6
BWL	Pomfret	1	194	232	121	0
CDF	Common dolphinfish	25	11	15	7	13
DOL	Dolphin	0	0	0	0	0
EIL	Brilliant pomfret	16	5	0	0	0
HAR	Long nose chimaeras	80	22	3	14	46
LEC	Escolar	1387	284	666	490	353
MON	Moon fish	971	51	29	30	60
MOX	Ocean Sunfish	9	11	3	2	1
NGA	Lancet Fish	1156	1738	921	739	693
OHR	Other Hair tail fish	0	1	0	0	0
OIL	Oilfish	65	7	58	16	8
TCR	Pomfret	60	91	90	45	62
TRF	Tapper tail ribbon fish	35	3	1	0	0
TST	Sickle pomfret	87	60	110	29	117
WAH	Wahoo	41	60	96	63	61

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1. Logsheet data collection and verification

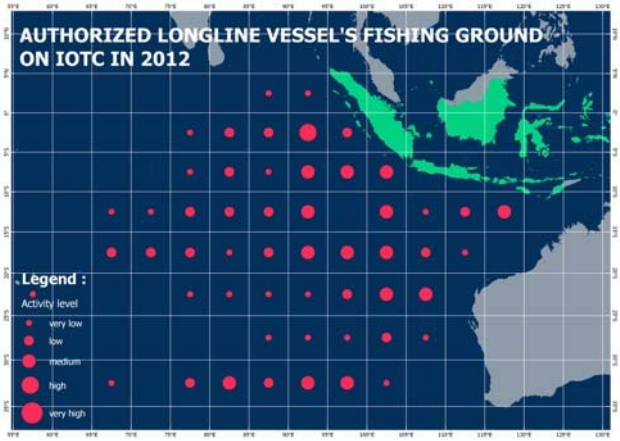
Template of Indonesia fishing logbook was developed under the collaboration with IOTC, WCPFC, CCSBT and OFCF Japan. There are three (3) types of logbook template such as longline/handline; purse-seine/pole and line and other gear. For implementation of this logbook program, Ministry of Marine Affairs and Fisheries has released Regulation Number 18 Year 2010 of 5 October 2010. It is stipulated that logbook report has to be submitted to port authority prior to catch landing and mandatory to vessels above 5 GT. Of a total of 1,389 vessel registered, 21% (289 vessel) were comply to fill and hand out the logbook to the port authority. Issues on data entry and validity as well as the need for verification and validation prior analysis is remained. For effective implementation of this program, it is necessary to continuing introducing this program and strengthen capacity both to fishers and port officers. The result indicated:

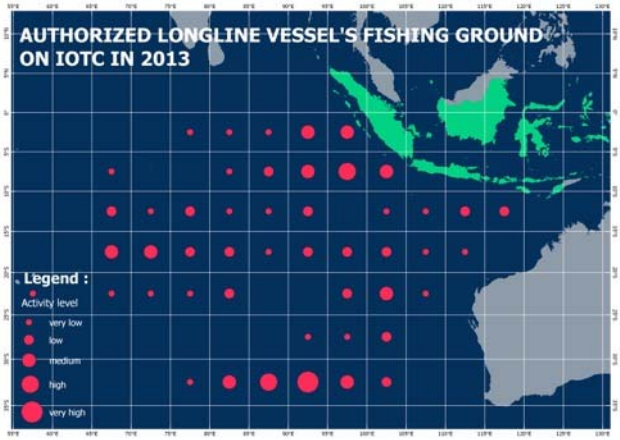
Table 9. The number of vessel submitted logbook (source: DGCF).

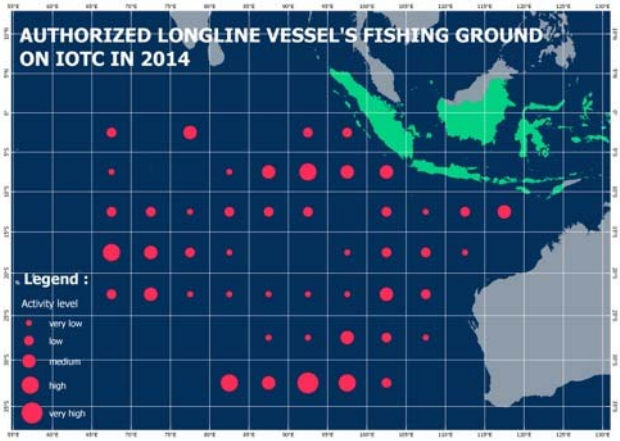
No	FMA	2012	2013	2014	2015	2016
1	571	18	92	53	58	24
2	572	83	315	720	1,202	1,182
3	573	463	1,600	1,210	1,031	941
Total		**564**	**2,007**	**1,983**	**2,291**	**2,147**

6.2. Vessel Monitoring System

Vessel Monitoring System (VMS) for fishing vessels has been started to be implemented in Indonesia since 2003, Currently, trough Ministerial Regulation No. 42/2015 about fisheries vessel monitoring system, all fishing vessel above 30 GT or operating in high seas are mandatory to be equipped with VMS transmitter. Without VMS transmitter on board, the fishing vessel will not get permission to leave the fishing port for their fishing operations, Fishing monitoring center (FMC) for Indonesia's VMS is base in Jakarta, In order to fight against illegal, unreported and unregulated (IUU) Fishing, Indonesia has started to implement Database Sharing Systems for Fisheries Management, The system is developed to integrate a number of databases, including the licensing, logbook and VMS databases, The Launching of the system application has recently been made by the Minister of Marine and Fisheries on 19 November 2013 in Jakarta that will be applied to 45 fishing ports of Indonesia, fisheries Information and services for Indonesia VMS is provided and could be accessed at http://dkpvms.dkp.go.id. Interactive VMS data visualization can also be accessed at http://globalfishingwatch.org/map/, which showing a strong statement from Indonesian government in response to fisheries transparency. Figure 8 showed the spatial distribution of Indonesia fleets based on VMS information.







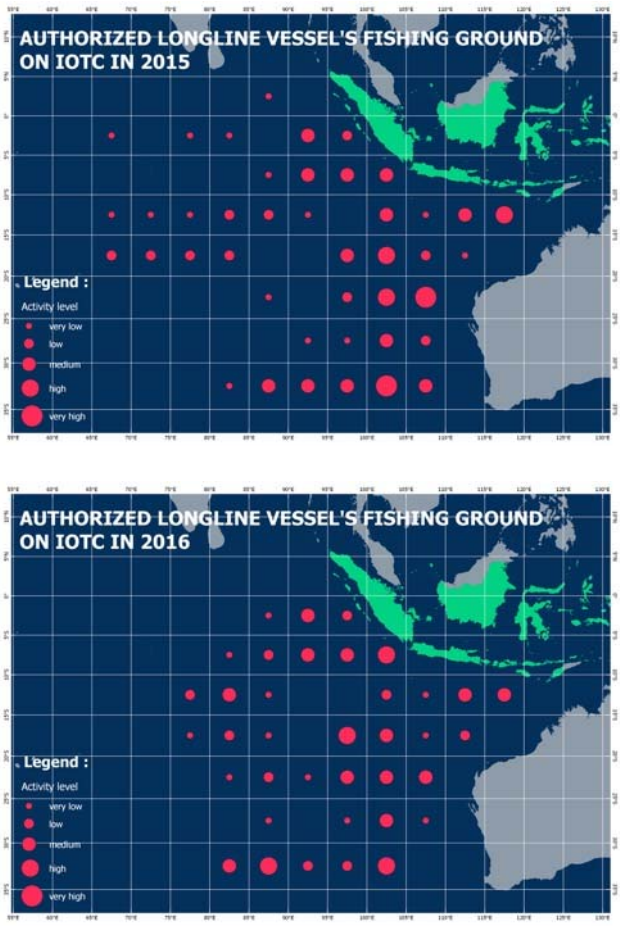


Figure 8. Map of spatial distribution of longline, aggregated from 2012 to 2016 based on VMS data (Source: DGMFRS, MMAF)

6.3. Regional Observer Program

Indonesia fishing vessels have joined Regional Observer Program for Transshipment at Sea since 2009 under resolution IOTC No, 08/02, which has been superseded by Resolution 11/05 and Resolution 12/05 concerning on establishing a program for transshipment by large-scale fishing vessels stated that "*Each CPC shall ensure that all carrier vessels transshipping at sea have on board an IOTC observer"*. Scientific observer program in Benoa Bali was initially a collaboration program between Indonesia's Ministry of Marine Affairs through research center for capture fisheries and CSIRO Marine and Atmospheric Research (Australia), in 2005 (see sadiyah *et al* 2011), Later, in 2011 a new research institution namely Research Institute for Tuna Fisheries (RITF) with full funded by Indonesian government is established that basically conduct continuation of port sampling and scientific observer program for tuna fisheries in the Indian Ocean. The number of scientific observer involved until 2014 was 15 observers. In 2013 and 2015 the observer was also including small scale purse seine, gillnet and troll line/hand line to be observed onboard (Table 10a-d). Recently ministerial regulation of MMAF No. 01/2013 formally regulates an observer onboard for fishing and carrier vessel, a positive progress to secure government budget for observer program in the future.

Table 10a. Activity summary of RITF's scientific observers from 2012-2016 (gear= longline).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2012	6	7	5	496	33208	83
2013	5	3	3	170	52 - 60	57
2014	8	6	4	371	29-90	62
2015	4	5	5	241	31-61	48

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2016	3	3	3	170	32-86	57

Table 10b. Activity summary of RITF's scientific observers from 2012-2016 (gear= purse seine).

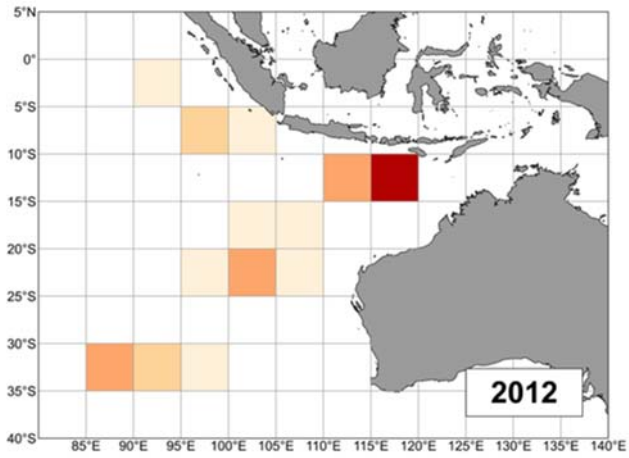
Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2012	-	-	-	-	-	-
2013	1	2	2	21	9-12	10.5
2014	2	1	1	2	1-2	1.5
2015	2	1	1	10	8-15	10.5
2016						

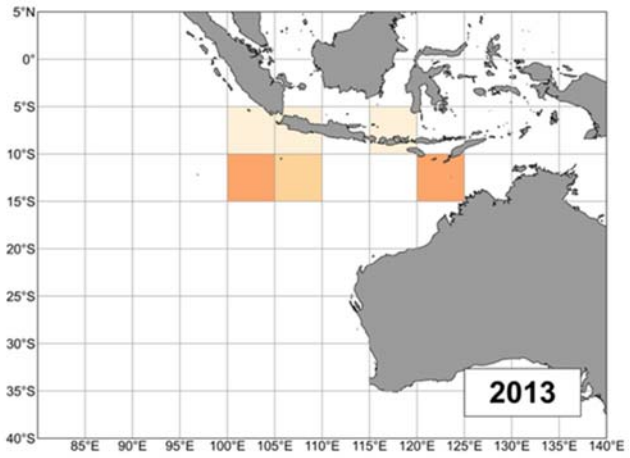
Table 10c. Activity summary of RITF's scientific observers from 2012-2016 (gear= hand line).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2012	-	-	-	-	-	-
2013	1	2	2	19	9-10	9.5
2014	10	70	10	70	1	1
2015	-	-	-	-	-	-
2016	4	4	4	40	8-13	10.0

Table 10d. Activity summary of RITF's scientific observers from 2012-2016 (gear= gillnet).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2012	-	-	-	-	-	-
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	6	3	3	41	12-15	13.0
2016	5	7	7	178	2-73	25.4





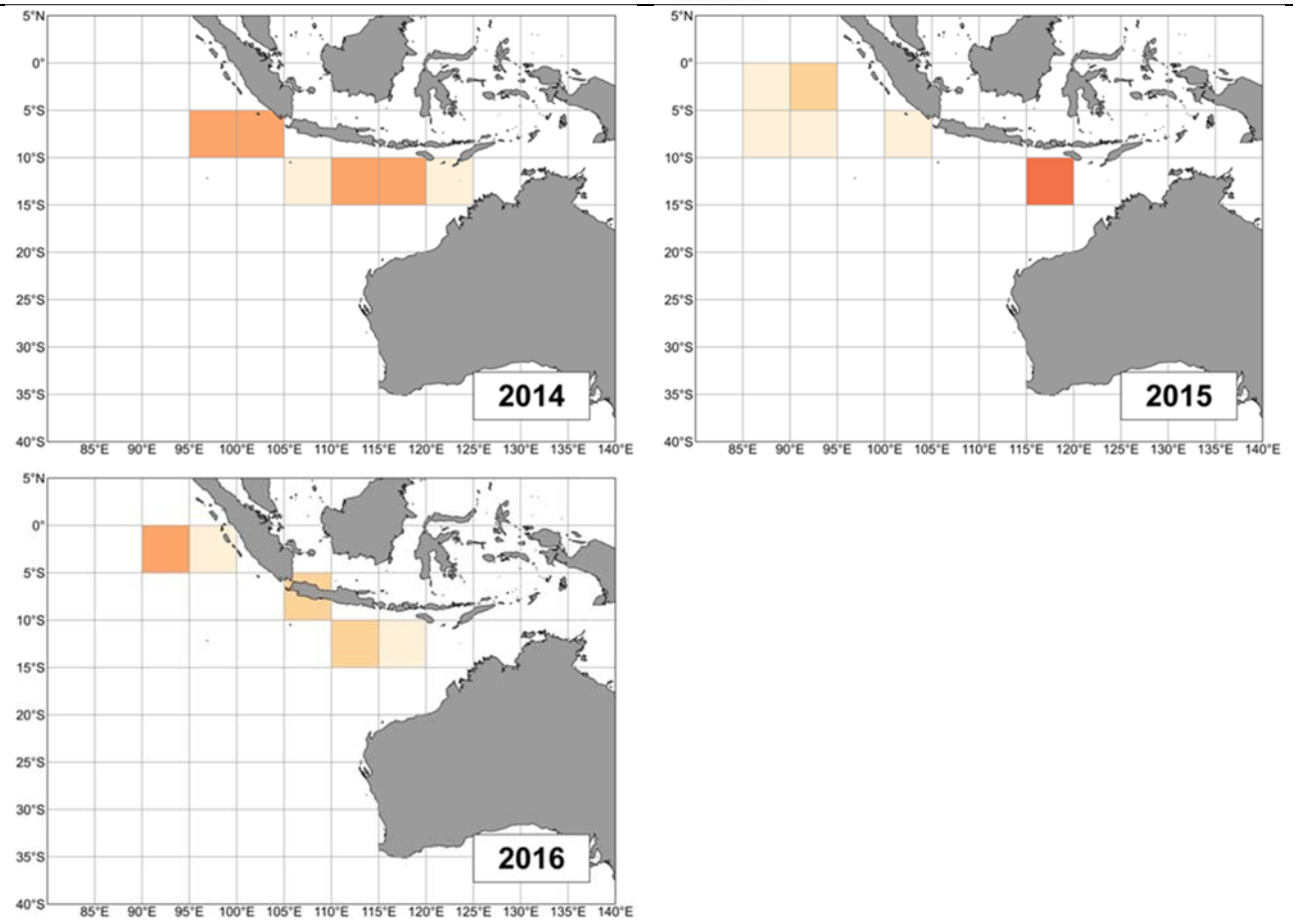


Figure 9a. Spatial distribution of the observed sets (gear=longline) from 2012 to 2016, the darker areas show intensity of fishing sets (source: RITF Observer Program data)

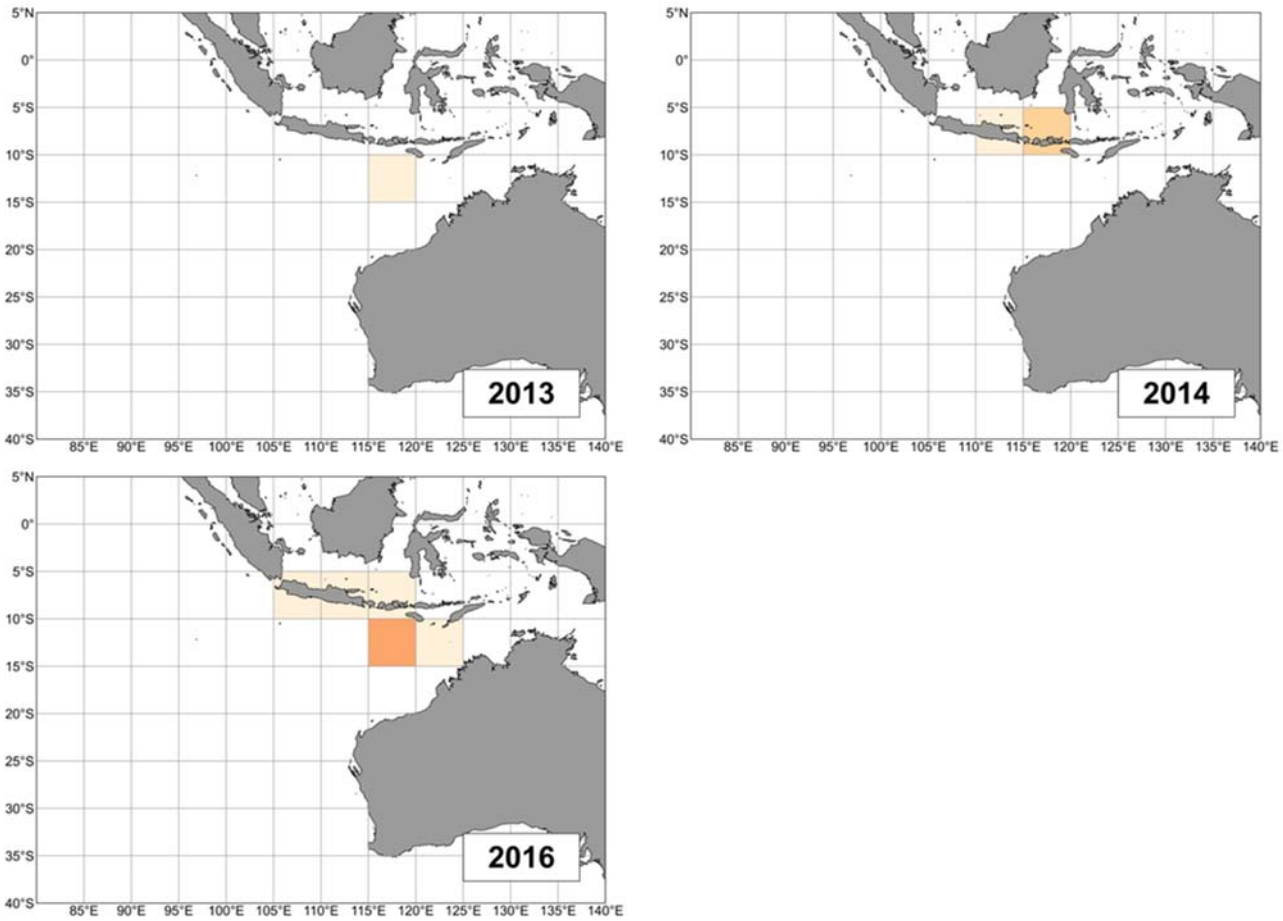


Figure 9b. Spatial distribution of the observed sets (gear=hand line) from 2013 to 2016 (No observer deployed in 2015), the darker areas show intensity of fishing sets (source: RITF Observer Program data)

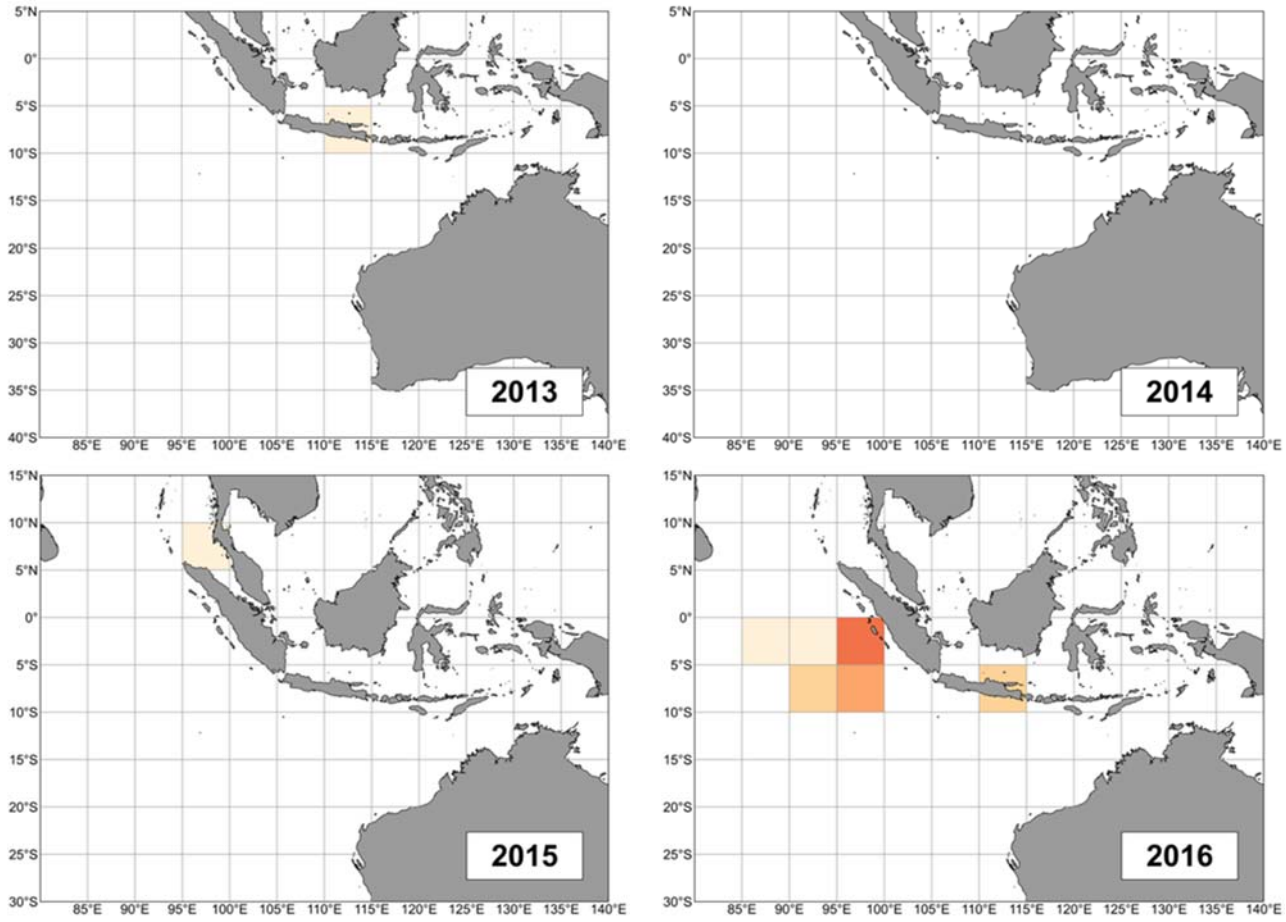


Figure 9c. Spatial distribution of the observed sets (gear=purse seine) from 2013 to 2016, the darker areas show intensity of fishing sets (source: RITF Observer Program data)

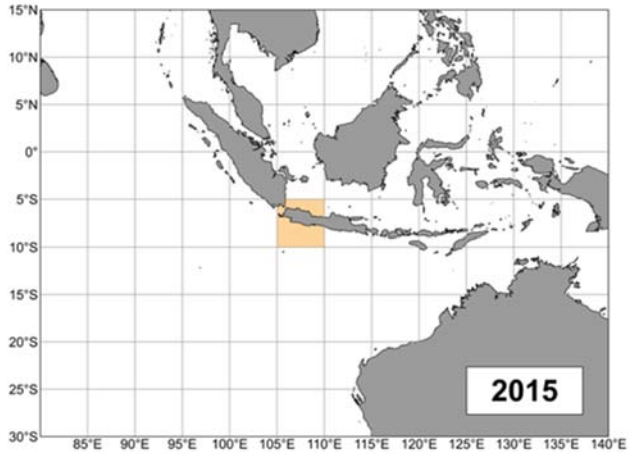


Figure 9d. Spatial distribution of the observed sets (gear=gillnet) in 2015 (source: RITF Observer Program data)

The observed longline sets from 2012 to 2016 covered the Eastern Indian Ocean between latitudes 0° and 35°S and longitudes 75° and 135°E (Figure 7). The observed sets mostly occurred within the area between 10° - 20°S and 105° - 120°E. After 2012 the scientific observer geographical coverage

became narrower due to short funding and retention from tuna longline fishing association. National observer program also conducted by DGCF and has recruited and trained at least 150 observer candidates in 2014. The data collected and acquired by the DGCF observers are remaining unverified and invalidated.

6.4. Port sampling program

Port sampling program at three major Indonesian ports, Nizam Zahman Jakarta fishing port, Benoa-Bali fishing port and Cilacap fishing port central of Java was initially commenced in the mid 2002. This was a collaborative research program between Indonesia's Research Centre for Capture Fisheries/Research Institute for Marine Fisheries (RCCF/RIMF) and Directorate General for Capture Fisheries (DGCF), CSIRO Marine and Atmospheric Research, Australia's Department of Agriculture of Fisheries and Forestry (DAFF), Australian Centre for International Agricultural Research (ACIAR), Indian Ocean Tuna Commission (IOTC) and Overseas Fisheries Cooperation Foundation of Japan (OFCF) (see Sadiyah *et al*., 2011). The aim of this port sampling program was to monitor the catches of all tuna species landed, and also to record the number of landings by Benoa-based longline vessel (Proctor *et al,*, 2006). Port sampling program at two sampling sites (Nizam Zahman and Cilacap fishing ports) have been undertook by DGCF since 2007, and Benoa sampling port also covered by DGCF since 2010, In February 2010, the RIMF commenced to undertake the sampling, collecting and monitoring activities (Noegroho *et al,*, 2013). RITF continue tuna catch monitoring program at Benoa Fishing Port with a minimum 30% coverage of landings at each processing plants a target coverage, as reported in previous year the coverage of port sampling in 2010-2015 was above 50%, continuing in 2015 the monthly monitoring of ports sampling was range from 45 – 72% coverage (Table 11).

Table 11a. Number of individuals measured, by species and gear from daily tuna and tuna-like species monitoring based in Benoa Port 2012-2016.

Code	Species	No. of fish measured				
		2012	2013	2014	2015	2016
ALB	Albacore	5,179	5,049	27,740	21,648	22,643
BET	Bigeye tuna	42,322	29,504	40,431	45,039	34,415
YFT	Yellowfin tuna	34,010	32,253	41,720	17,909	29,229
BUM	Blue marlin	1,011	726	716	780	219
BLM	Black marlin	575	318	342	120	111
MLS	Striped marlin	260	193	108	115	201
SSP	Shortbill spearfish	218	113	68	192	337
SFA	Indo-Pacific sailfish	462	262	383	546	440
SWO	Swordfish	4,790	3,049	4,177	4,336	2,966
LEC	Escolar	21,524	1,990	13,705	9,567	5,201
OIL	Oilfish	441	240	1,120	1,842	1,394
WAH	Wahoo	1,941	402	1,776	1,102	913
CDF	Common dolphinfish	351	86	221	359	445
BSH	Blue shark	2,151	87	2,058	4,732	9,148
MSO	Shortfin mako shark	112	21	83	124	166
OCS	Oceanic whitetip shark	194	69	99	153	66
TSS	Bigeye thresher shark	14	3	2	32	0
MON	Moonfish	3,359	724	6,795	9,709	5,690
BAR	Barracuda	61	14	19	15	0

Table 11b. Coverage percentage of daily tuna and tuna-like species monitoring program based in Benoa port 2012-2016.

Year	No. Landed Vessel	No. Sampled Vessel	Sampling Coverage
2011	921	372	40.39%
2012	775	452	58.32%
2013	753	431	57.24%
2014	858	521	60.72%
2015	699	477	68.24%
2016	720	434	60.28%

6.4. Unloading/Transhipment

Since the implementation of Ministerial Decree No. 57/PERMEN/2014 concerning the banning of any transhipment at sea. DGCF reported that no Indonesian flagged vessel involved in transhipment activity in 2016.

7. NATIONAL RESEARCH PROGRAMS (TO BE UPDATED)

(1) *Project title*: Catch monitoring and biological observation for tuna species caught by small scale fisheries in West Sumatera, Project Duration: 2014-2016
(2) *Project title*: Enabling Enforcement Through Improved Use Of The Monitoring Information To Support Surveillance, Project Duration : 2016-2018
(3) *Project title*: Structure and Characteristic of Artisanal Purse Seine in Western Sumatera, RITF 2016
(4) *Project title*: Characteristic of Ecobiology Fisheries associated with FAD in IFMA 573, RITF 2016
(5) *Project title*: Biopopulation Characteristic of Thunnus albacares in IFMA 572 and 573, RITF 2016

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 are continued to monitor catch and effort of tuna and other ecologically related species in order to implement scientific Committee Recommendation.

Table 12. Scientific requirements contained in Resolutions of the Commission, adopted between 2005 and 2016.

Res. No.	Resolution	Scientific requirement	CPC progress
15/01	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–10	Catch and effort data are recorded based on: - Ministerial Decree No. 48/PERMENKP/2014 on logbook - Ministerial Decree No. 1/PERMENKP/2013 on observer on board - Implementation of scientific observer on board
15/02	Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)	Paragraphs 1–7	- Nominal catch data has been submitted - Logbook program started - Tuna size data of longline-fleet have been submitted
15/05	On conservation measures for striped marlin, black marlin and blue marlin	Paragraph 4	

13/04	On the conservation of cetaceans	Paragraphs 7– 9	- Indonesia has been implementing Resolution 13/04 through Government Regulation No 7/1999. - Ministerial Regulation number 12/PERMENKP/2012 regarding captured fisheries fishing bussiness on high-seas
13/05	On the conservation of whale sharks (*Rhincodon typus*)	Paragraphs 7– 9	Indonesia has issued Ministerial Decree number 18/KEPMENKP /2013 regarding conservation of whale shark in Indonesian water
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries	Paragraph 5–6	Indonesia has developed national plan of action (NPOA) Shark on 10 October 2010 as well as ministerial decree no 12-2012 chapter X which regulate a management and conservation of by-catch and ecological related tuna involved in tuna fisheries.
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	Indonesia has been implementing Ministerial Regulation number 12/PERMENKP/2012 regarding capture fisheries fishing business on high-seas
12/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	Indonesia has been implementing Ministerial Regulation number 12/PERMENKP/2012 regarding captured fisheries fishing business on high-seas
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	Indonesia has been implementing Ministerial Regulation number 12/PERMENKP/2012 regarding captured fisheries fishing business on high-seas
11/04	On a regional observer scheme	Paragraph 9	Indonesia has been implementing Ministerial Regulation number 1/PERMENKP/2013 regarding observer onboard
05/05	Concerning the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 1–12	- Indonesia has been implementing Ministerial Regulation number 12/PERMENKP/2012 regarding capture fisheries fishing business on high-seas - NPOA shark and ray
16/06	On measures applicable in case of non-fulfilment of reporting obligations in the IOTC	Paragraph 1	

9. LITERATURE CITED

DGCF, 2013. Statistics of Marine Capture Fisheries by Fisheries Management Area, 2005-2013.

DGCF, 2014. Statistics of Marine Capture Fisheries by Fisheries Management Area, 2005-2014.

DGCF, 2015. Statistics of Marine Capture Fisheries by Fisheries Management Area, 2005-2015.

DGCF, 2017. Report of National Observer Data 2015-2016

DGCF, 2016. Annual Report of DGCF-OFCF Project.

Irianto. H.E, Wudianto, Z. Fahmi, B. Setyadji, F. Satria, L. Sadiyah, B. Nugraha, A.A Widodo. 2016. INDONESIA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2016.

Irianto. H.E, Wudianto, B. Nugraha, A.A. Widodo, F. Satria, L. Sadiyah. 2015. INDONESIA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2015.

Irianto. H.E, Wudianto, A. Suman, K. Susanto, B. Nugraha, F. Satria, S.D. Retnowati. 2014. INDONESIA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2014.

Jatmiko, I., F. Rochman & Z. Fahmi. 2017. Preliminary study for stock status of kawakawa (*euthynnus affinis* cantor, 1849) using data-limited approach in Indonesia. IOTC-2017-WPNT07-23.

Noegroho,T., Hidayat, T. and K. Amri. 2013. Some Biological Aspect of Frigate tuna (*Auxis thazard*), Bullet tuna (*Auxis rochei*) and kawakawa (*Euthynnus affinis*) in West Coast Sumatera FMA 572, Eastern Indian Ocean, IOTC-2013-WPNT03-19.

Novianto. D, A.F. Nugroho, R.R. Zedta. 2016. Composition and Abundance of Pelagic Shark Caught by Drift Gillnet in Cilacap Oceanic Fishing Port, Indonesia. IOTC-2016-WPEB12-17.

Novianto. D, B. Setyaji, R. Coelho. 2016. Preliminary Standardized CPUE of Blue Shark in the Indonesian Tuna Longline Fishery estimated from Scientific Observer Data, for the period 2005-2014. IOTC-2016-WPEB12-19.

Novianto. D, E. Susilo, Z. Fahmi, R. Coelho. 2017. Standardized CPUE of blue shark in Indonesian tuna longline fishery estimated from scientific observer data period 2005 – 2016. IOTC-2017-WPEB13-26 Rev_1.

Nugroho, D., Nugraha, B. and I. Jatmiko 2015. Indonesia National Report to the Scientific Committee CCSBT 2015.

Rochman. F, D. Novianto, A. Bachtiar. 2016. The Potential Fishing Ground and Spatial Distribution Pattern of Albacore (Thunnus alalunga) in Eastern Indian Ocean. IOTC-2016-WPTmT06-12.

Setyadji. B, Z. Fahmi, H. Andrade. 2017. Standardised CPUE indices for Swordfish (Xiphias gladius) from the Indonesian tuna longline fishery. IOTC-2017-WPB15-15.

Tampubolon, P.A.R.P, I. Jatmiko, B. Setyadji, Z. Fahmi. 2017. Catch Methods to Estimate The Production of Bigeye Tuna (Thunnus obesus) From Benoa Port, Bali, Indonesia atch Methods to Estimate The Production of Bigeye Tuna (Thunnus obesus) From Benoa Port, Bali, Indonesia. IOTC-2017-WPM08-09.

Zainudin, I.M. 2016. *Bycatch* biota laut dilindungi dan terancam punah pada perikanan rawai tuna di indonesia dan opsi mitigasinya (in Bahasa). Disertasi. Universitas Indonesia. 121 pp.