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Indonesia National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2016

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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 or NO [delete one] DD/MM/YYYY [Add submission date here]
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 2015[1] was estimated 135,799 tons which composed of yellowfin tuna (35,060 t), bigeye tuna (22,433 t), skipjack tuna (70,206 t) and albacore (8,080 t). Port sampling and scientific observer programs are still continuing and conducting by Research Institute for Tuna fisheries (RITF). 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.

[1] Current estimation from DGCF (unvalidated)

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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).

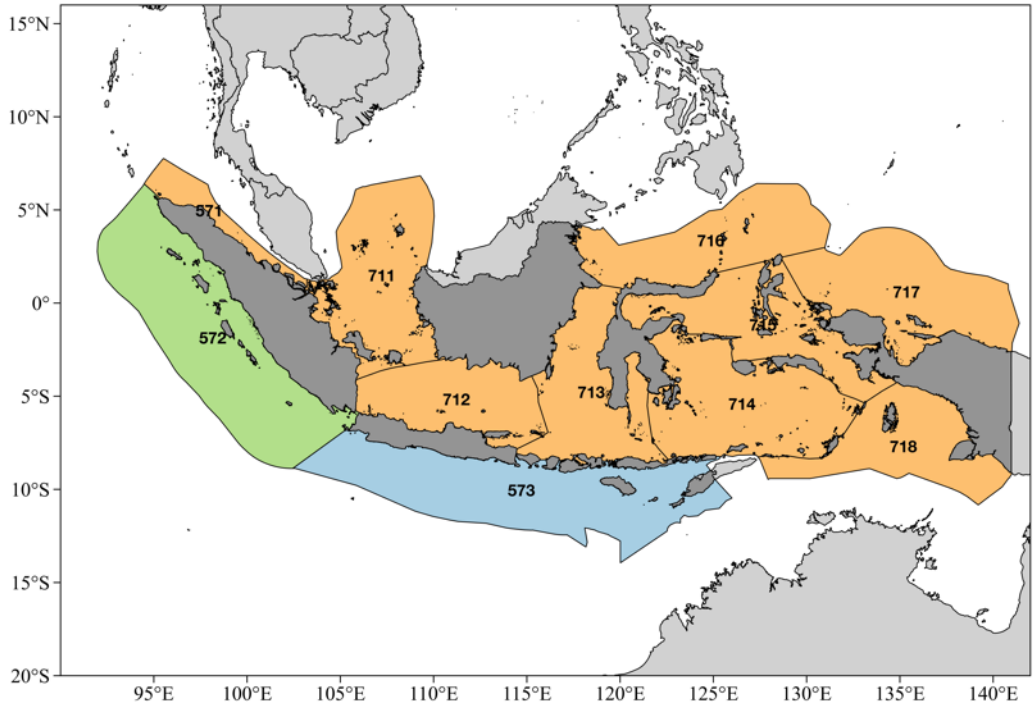

Figure 1a. The eleven of Fisheries Management Area (FMA) in Indonesian waters

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.

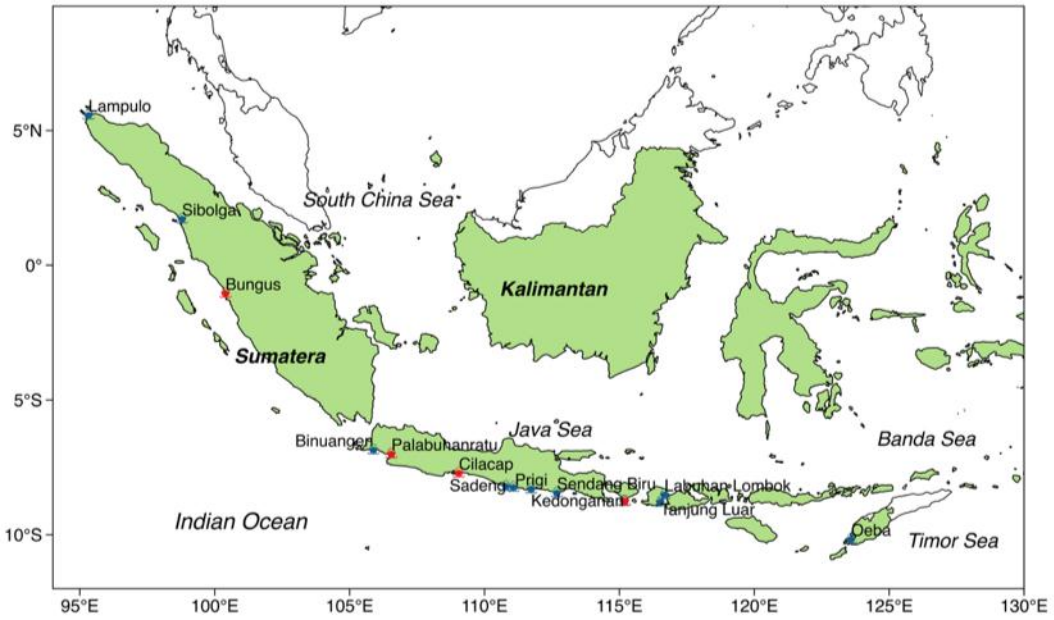

Figure 1b. Primary fishing port/landing sites the industrial (*blue label*) and artisanal (*red label*).

2. FLEET STRUCTURE

The number of registered fishing boats operated, as reported to IOTC as per 2 November 2016 in the FMAs 572, 573 and high seas Indian Ocean was 1,376 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.

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

Size	Longliner	Purse Seiner	Gil Netter	Carrier/Cargo Freezer	Other	Total
<50	289	0	1	1	0	291
51-100	471	9	1	2	2	485
101-200	530	29	0	8	6	573
201-300	3	2	0	0	0	5
301-500	6	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**	**1,376**

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. However, the annual catch for 2015 is still currently under step by step validation process assisted by RFMOs expert. Official release expected to be issued before the end of the year. Total catch of main species of tunas in 2015 was 135,779 tons which composed of yellowfin tuna (35,060 t); bigeye tuna (22,433 t), skipjack tuna

(70,206 t) and albacore (8,080 t). The average catch of tunas from 2011 to 2015 was estimated 133,092 t (ton). The proportion average catch was dominated by skipjack tuna (49.79%), yellowfin tuna (26.53%), bigeye tuna (18.14%) and albacore (5.53%). All catches were reported to be lower than the previous year, varied from 2.68% - 44.48%. Albacore has the slightest, while bigeye tuna has the worst decline. However, longline is still the main fishing gear targeting tuna that contributes a significant proportion among other gear types. Table 2 does not include data for Southern bluefin tuna (SBF), tuna like species, sharks, billfishes, seerfish and others associated species. Therefore, the actual total catch of all species might be higher (DGCF, 2016).

Table 2. Annual catch by gear and primary species of tuna (ALB, BET, SKJ and YFT) derived from Indian Ocean from 2011-2015.

Gear Type	Species	Year					Average
		2011	2012	2013	2014	2015*	(MT)
Longline	Yellowfin	9,315	11,222	16,325	12,645	6,783	18,795
	Bigeye	8,207	11,150	15,037	16,197	8,209	13,191
	Skipjack	4,167	8,943	9,517	5,729	1,331	3,338
	Albacore	8,775	7,631	6,021	8,539	4,573	8,352
	Total	30,464	38,946	46,900	43,110	20,896	43,676
Purse seine	Yellowfin	8,737	11,776	20,229	14,582	15,250	6,899
	Bigeye	7,309	9,537	12,012	9,516	8,254	5,364
	Skipjack	34,838	31,190	33,871	26,468	38,024	25,260
	Albacore	1,027	98	70	199	8	171
	Total	51,911	52,601	66,182	50,765	61,536	37,694
Pole and	Yellowfin	1,535	394	3,860	2,782	-	913
Line	Bigeye	-	-	-	-	-	0
	Skipjack	2,545	8,328	12,256	9,577	-	3,882
	Albacore	-	-	-	-	-	0
	Total	4,080	8,722	16,116	12,359	-	4,795
Handline	Yellowfin	1,997	3,634	9,524	6,865	3,350	3,194
	Bigeye	237	218	745	590	1,279	294
	Skipjack	2,653	5,002	8,167	6,382	6,813	3,353
	Albacore	39	423	3	9	1,229	183
	Total	4,926	9,277	18,439	13,846	12,671	7,023
Others	Yellowfin	16,087	11,506	11,442	8,248	9,677	10,678
	Bigeye	10,267	11,635	7,711	6,109	4,691	4,930
	Skipjack	40,398	33,870	30,626	23,932	24,038	30,610
	Albacore	1,642	2,875	1	3	2,270	1,301
	Total	68,394	59,886	49,780	38,292	40,676	47,518
Grand Total	Yellowfin	37,671	38,532	61,380	45,122	35,060	43,553
	Bigeye	26,020	32,540	35,505	32,412	22,433	29,782
	Skipjack	84,601	87,333	94,437	72,088	70,206	81,733
	Albacore	11,483	11,027	6,095	8,750	8,080	9,087
	Total	**159,775**	**169,432**	**197,417**	**158,372**	**135,779**	**164,155**

The distribution of effort (hooks) from longline fleets in 2015 derived from scientific observer data was concentrated above 15° S and between 85°-120° E. The range of effort used was between 768-1456 hooks/set with average 1165 hooks/set (Figure 2a). Overall the average number of hooks/set used during 2011-2015 was between 881-2700 hooks/set (1191 hooks/set in average) with remarks that higher number of hooks/set was distributed between 15°-35° S and 70 (Figure 2b).

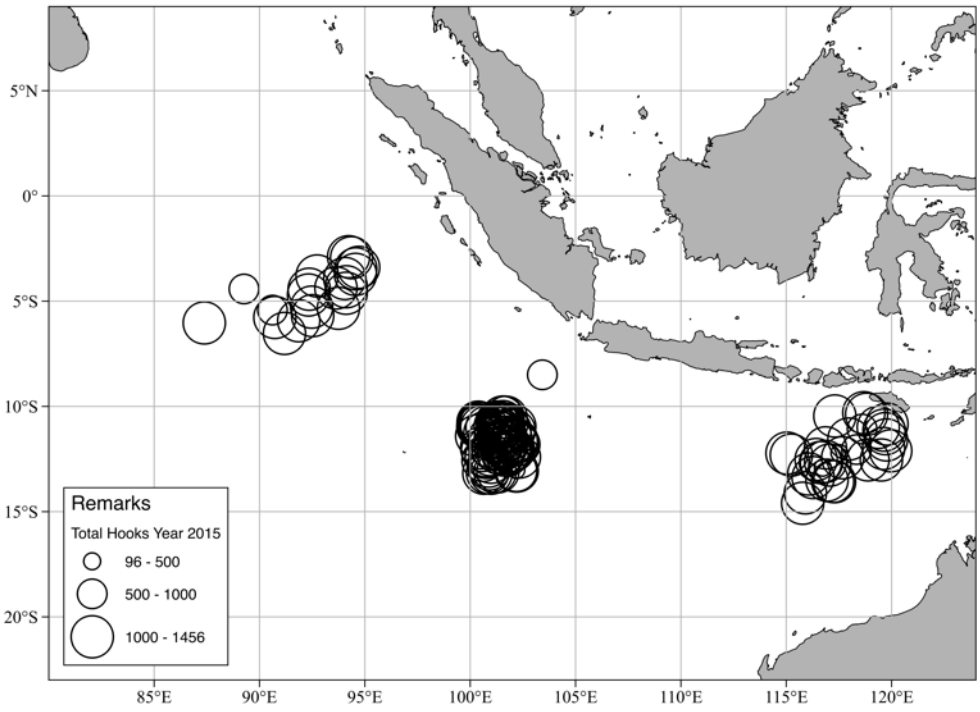

Figure 2a. Map of the distribution of Indonesian tuna longline efforts year 2015 (source: RITF Observer Program data).

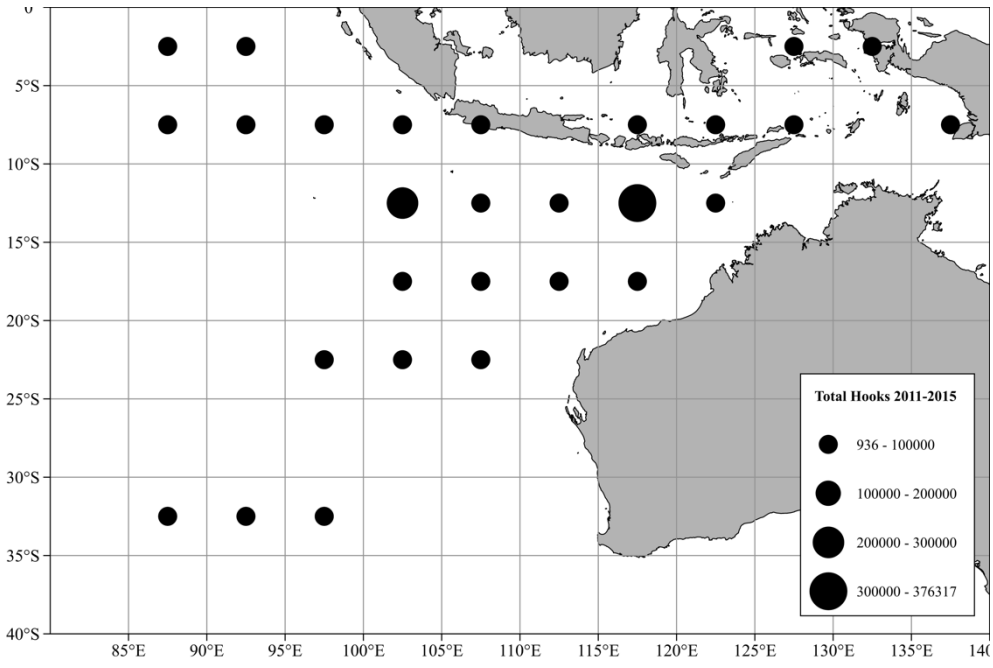

Figure 2b. Map of spatial distribution of observed longline effort (hooks) by 5-degree blocks, aggregated from 2011 to 2015 (source: RITF Observer Program data).

Observed fishing catch in 2015 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 was distributed more to the south. As for bigeye tuna could be found both in the high latitude and near equatorial area (Figure 3b).

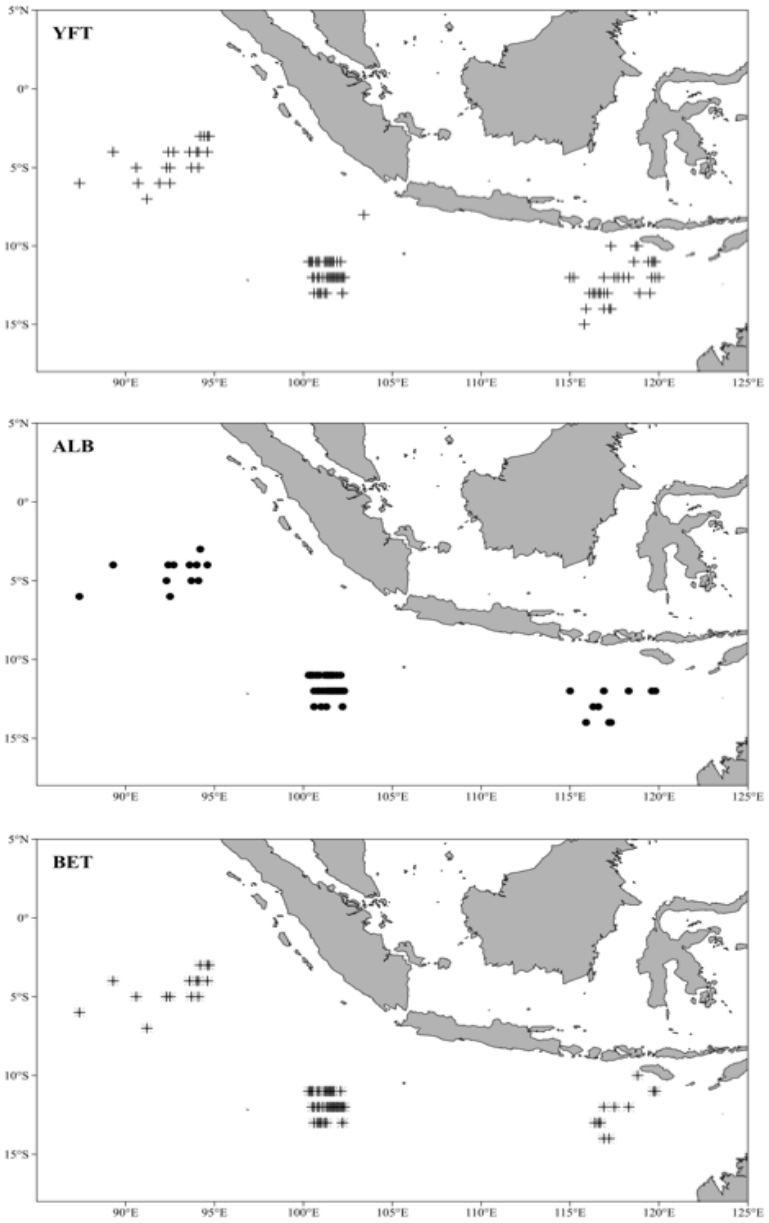

Figure 3a. Map of distribution of observed fishing catch, by species from Indonesia tuna longline fleets, year 2015 (source: RITF Observer Program data).

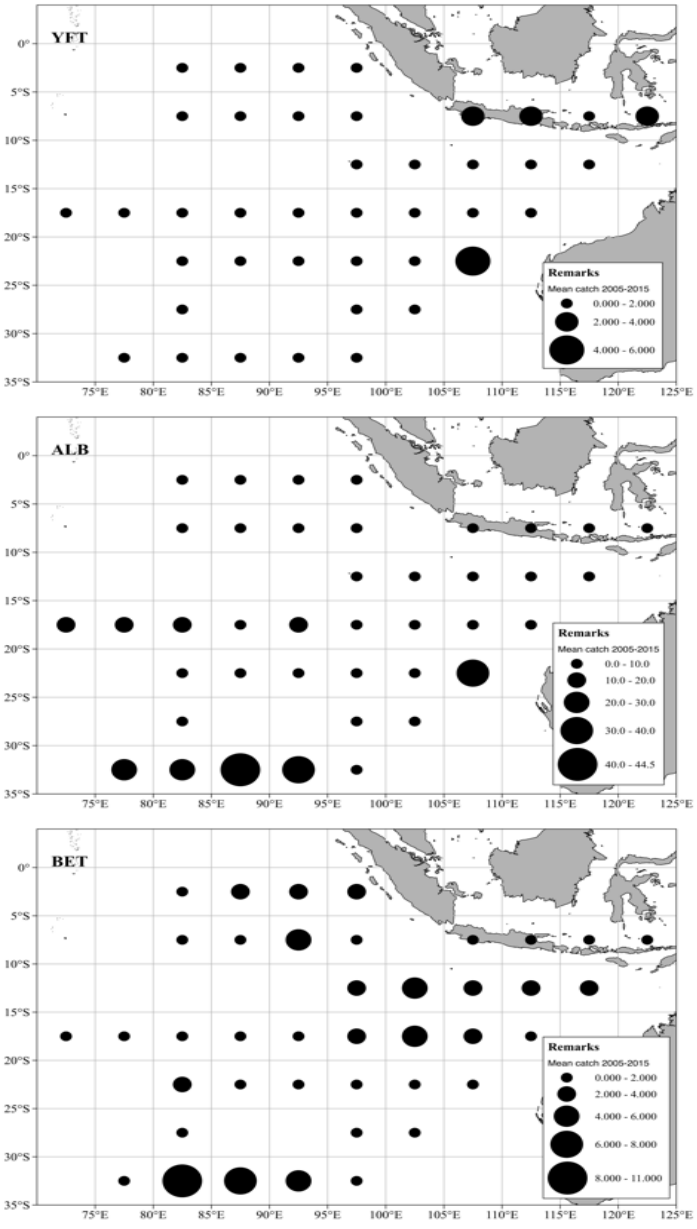

Figure 3b. Map of distribution of observed fishing catch, by species, by 5-degree blocks, aggregated from 2011 to 2015 (source: RITF Observer Program data).

3.1. Annual catch estimation at Benoa port

Annual catch that estimate from port sampling program at Benoa port reported a decrease trend of total tuna landed from 2011. Reached its lowest production in 2013 for 6,121 tons and then bounced back afterward. The recent catch was slightly higher than the two previous 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 2011-2015.

Year	Annual Catch Estimation (ton)			
	YFT	BET	ALB	TOTAL
2011	3,006	2,504	384	6,326
2012	2,049	2,719	1,221	6,602
2013	2,474	2,238	688	6,121
2014	2,654	2,312	687	6,669
2015	1,283	2,989	631	7,081

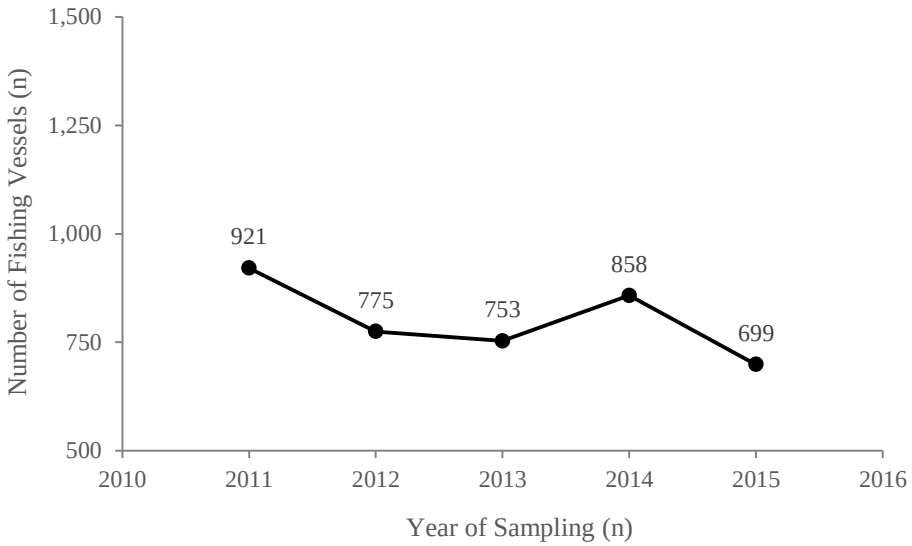

Figure 4. Total number of landing of Indonesian tuna longline vessels based in Benoa port during 2011-2015

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% for each month (Table 4).

Table 4. Annual catch and by gear and primary species of tuna (BET, SKJ, YFT) from small-scale ports in Indonesia from 2013-2015.

Location	Gear	2013		2014		2015	
		Obs. Prod. (kg)	Obs. Landing (kg)	Obs. Prod. (kg)	Obs. Landing (kg)	Obs. Prod. (kg)	Obs. Landing (kg)
Labuhan Lombok	Hand line	138,001	153	198,480	129	95,925	73
Pacitan	Hand line	565,121	716	637,281	763	564,675	564
Pacitan	Purse Seine	396,282	186	1,233,200	335	1,851,560	309
Sibolga	Purse Seine	11,170,700	884	9,116,880	682	9,505,372	903

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 2011-2015. Monthly average hook rate showed that higher hook rate for SBF appeared in November and March, as for the other tuna it can be found during June to September. Hook rate of tuna longline for yellowfin tuna and albacore tuna were lower compared to two previous years and continuing the negative trend. As for bigeye, the hook rate was much lower than previous year after showing a positive trend from 2011-2014.

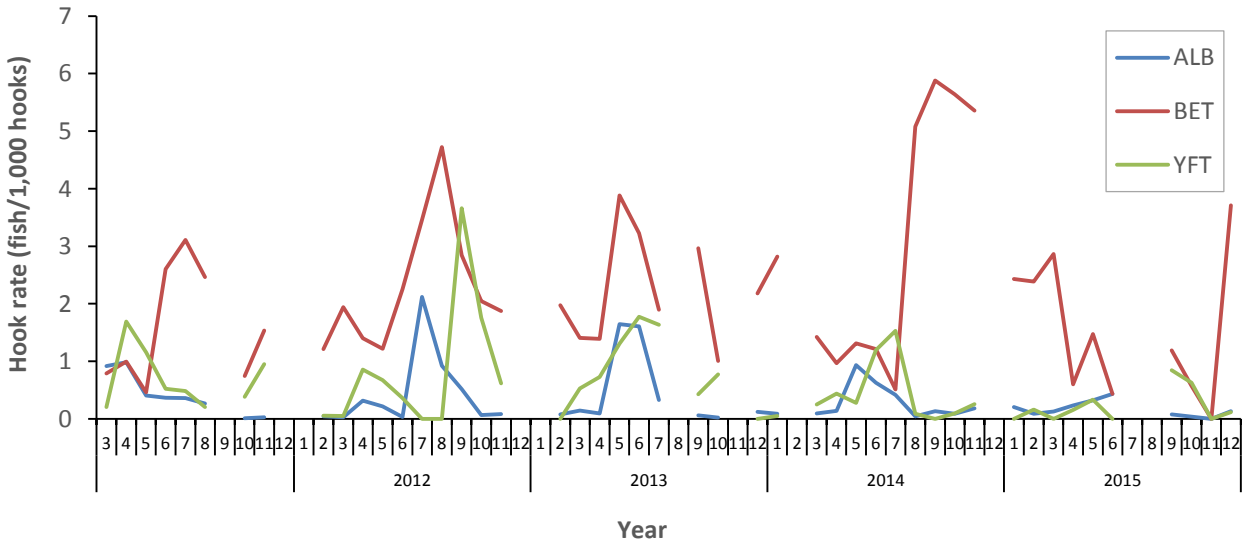

Figure 5a. Fluctuation of monthly nominal hook rate (fish/1,000 hooks) for tuna (ALB, BET and YFT) based on RITF scientific observer data in the Indian Ocean (2011- 2015).

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 12th Session of the IOTC Working Party on Ecosystems and Bycatch, held in Victoria, Seychelles for the first time Indonesia produced a standardized CPUE of blue shark, a collaboration work between Indonesian scientist and Portuguese Institute for the Ocean and Atmosphere (IPMA, I.P.). The working group acknowledge the work and encourage to continue delivering the result with another variable and further explore standardizing the CPUE in biomass as well as numbers as a comparison. The working group acknowledge also to the work quantify shark bycatch from the gillnet fisheries and encourage to continue monitoring drift gillnet fisheries with increasing number of scientific observer onboard trip.

RITF also provides scientific observer data for blue shark in high resolution (1x1 degree based) from 2005-2015 in response to the inquiry from Working Party of Ecosystem and By-catch (WPEB) through IOTC Secretariat to conduct analysis regarding the CPUE trends of blue sharks. The data also used for estimating total blue shark catch in the eastern Indian Ocean.

Blue shark and crocodile shark (*Pseudocarcharias kamoharai*) dominated the incidental catch for sharks during 2011-2015. 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 (2011–2015).

CODE	Species	2011				2012				2013				2014				2015			
				Discard				Discard				Discard				Discard				Discard	
		N	Retained	Live	dead	N	Retained	Live	dead	N	Retained	Live	dead	N	Retained	Live	dead	N	Retained	Live	dead
PTH	*Alopias pelagicus*	0				3	3			1		1									
BTH	*Alopias superciliosus*	0				2	2			1	1			1	1						
CCB	*Carcharhinus brevipinna*	**0**				1	1			4	4			17	17			1	1		
FAL	*Carcharhinus falciformis*	**0**				**0**				**0**								26	26		
OCS	*carcharhinus longimanus*	0				0				2		2		9	8		1	4	4		
CCL	*Carcharhinus limbatus*	**0**				**0**				**0**								1	1		
SMA	*Isurus oxyrinchus*	**0**				11	2		9	3	3			2	2			1	1		
LMA	*Isurus paucus*	**0**				1	1			**0**				2	2						
BSH	*Prionace glauca*	2	2			381	132		249	39	38		1	67	62		5	137	137		
PSK	*Pseudocarcharias kamoharai*	63	0	22	41	157			157	51			51	91			91	108			108
SPL	*sphyrna lewini*	1	1			2	2			1	1							1	1		
TIG	*Galeocerdo cuvier*	**0**				**0**				1		1									
SPY	Sphyrnidae	**0**	**0**			**2**	**2**			**0**											
THR	Thresher sharks nei	**1**	**1**			**2**	**2**			**1**	**1**			2	2			6	6		
SHK	Shark nei	**0**				**1**	**1**			**0**											
	Total	67				563				104				191				285			

5.2 Seabirds

RITF Scientific observer program also include seabirds on their data record and since 2005 to 2015, involved in total 2558 settings. 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 2015, although there was no observer trip followed frozen tuna fleets which operated at 15 – 35^{o} S, there were 8 black albatrosses was recorded (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 ^{o}S (high seas). Indonesia also currently in a stage of arranging national plan of action for seabird mitigation.

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

Code	Species	2011	2012	2013	2014	2015
B1	Seagull	0	0	0	1	0
B2	White albatross	0	0	0	0	0
B3	Black albatross	0	9	0	0	7

5.3 Marine Turtles

The record results during 2011 - 2015 conducted by independent scientific observer on board on tuna longline in the Indian Ocean with 881 times number of setting and over 1 million hooks deployed. There were 28 interactions with marine turtles, which dominated by olive ridley turtles (25), leatherback turtles (1) and unidentified turtles (2) (Table 7). WWF reported that during onboard observer report from 2006-2014, the highest likelihood of accidental catch of marine turtle was olive ridley turtle (LKV), while the other, like leatherback turtle (DKK), hawksbill turtle (TTH), green turtle (TUG) and flatback turtle (FBT) were not too significant.

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. Map that shows migration corridors, nesting beaches, and critical habitats for marine turtle in Indonesia are produced and available online http://kkji.kp3k.kkp.go.id/sig. Indonesia also established National Plan of Action for marine turtles 2016-2020 through Directorate of Conservation of Marine Biodiversity (KKHL), Ministry of Marine Affairs and Fisheries (MMAF).

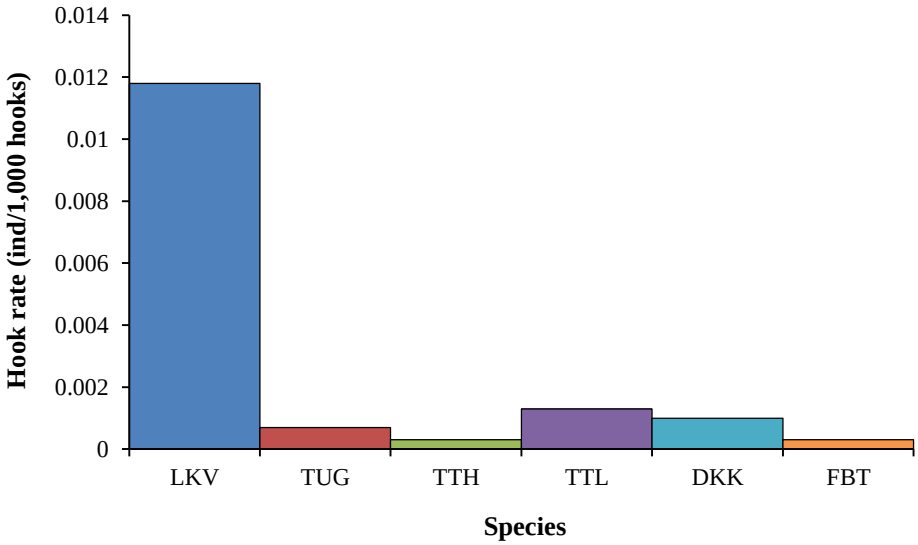

Figure 6. The nominal hook rate of various recorded catch of marine turtle associated with tuna longline fishery from 2006-2014 (Source: WWF Observer Data; Zainudin *et al.*, 2014)

Table 7. The number of observed incidental interaction with marine turtles in tuna longline fishery from 2011-2015 (Source: RITF scientific observer data)

Code	Species	2011	2012	2013	2014	2015
DKK	Leatherback turtle	1	0	0	0	0
LKV	Olive ridley turtle	1	5	6	12	1
TRT	Turtle	0	2	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	0

5.4 Billfishes

Billfishes catch contributed up to 5.15% to total catch of tuna longline during 10 years of observation (2011-2015). 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 contribute significantly. The high catch occurred in November 2015 where swordfish and black marlin reached their peak (22 and 5, respectively) (Figure 6). During the IOTC 14th Working Party on Billfish, held in Victoria, Seychelles for the first time Indonesia produced a standardized CPUE of black marlin, a collaboration work between Indonesian scientist and IOTC invited expert, Dr. Humber A. Andrade from 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.

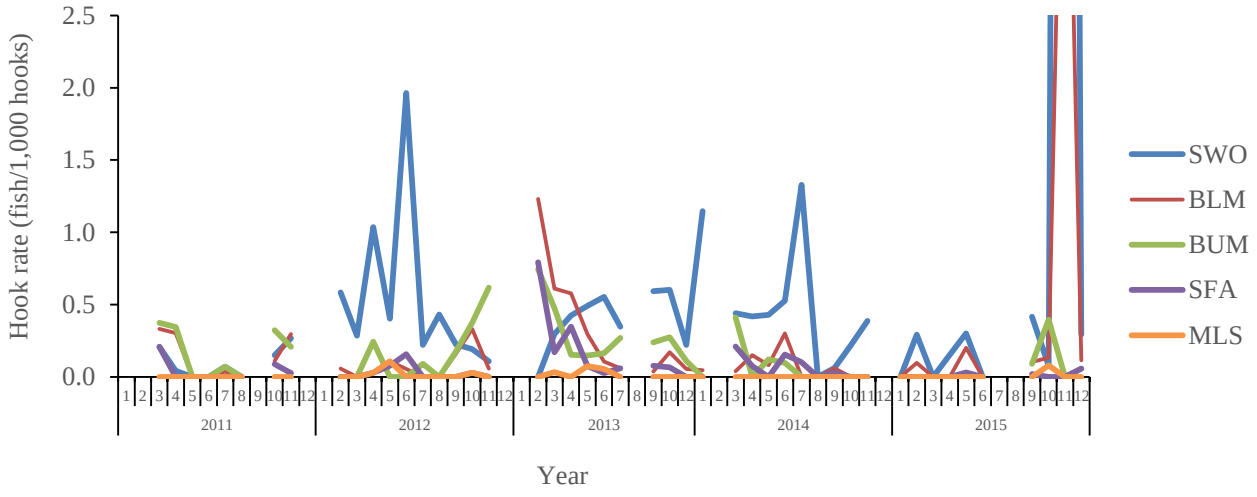

Figure 7. The nominal CPUE of known billfish species caught by Indonesian tuna longline fisheries from 2005-2015.

5.5. Neritic Tuna

Research Institute for Tuna Fisheries informed about the length distribution and reproductive aspects from two neritic tunas, namely: bullet tuna (*Auxis rochei*) and frigate tuna (*Auxis thazard*). WPNT appreciated the paper and noticed that the size of first length maturity for bullet tuna based on this research was smaller than the one which was noticed by IOTC before whereas the frigate was still within the expected range. The study of *Auxis* spp regarding the fish distribution and reproduction aspect were carried out based on the data landed catch by purse seiner and lift netter. The size range of *A. rochei* and *A. thazard* were 15-39 cmFL and 19-65 cmFL. *A. thazard* has a bigger first length maturity (34.89 cmFL) than *A. rochei* (27.16 cmFL). The fecundity of *A. thazard*

was 27,534-720,800 eggs and *A. rochei* was 24,727-220,000 eggs. Both *A. thazard* and *A. rochei* were partial spawner.

According to the lack of information about reproductive biology of neritic tunas, WPNT was encouraged to extend the size range of samples and provide an estimate of maturity stage. IOTC also requested that the result of "Research of Structure and Characteristic of Purse Seine Fisheries in Indian Ocean", which was on 2016 budget will be presented in WPNT 2017 once the study is complete.

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 2011-2015. 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	2011	2012	2013	2014	2015
BAR	Baracuda	2	11	0	4	5
BWL	Pomfret	31	1	194	232	121
CDF	Common dolphinfish	18	25	11	15	7
DOL	Dolphin	1	0	0	0	0
EIL	Brilliant pomfret	2	16	5	0	0
HAR	Long nose chimaeras	22	80	22	3	14
LEC	Escolar	4	1387	284	666	490
MON	Moon fish	51	971	51	29	30
MOX	Ocean Sunfish	2	9	11	3	2
NGA	Lancet Fish	1184	1156	1738	921	739
OHR	Other Hair tail fish	0	0	1	0	0
OIL	Oilfish	135	65	7	58	16
TCR	Pomfret	24	60	91	90	45
TRF	Tapper tail ribbon fish	2	35	3	1	0
TST	Sickle pomfret	19	87	60	110	29
WAH	Wahoo	26	41	60	96	63

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. Up to December 2015, for three FMA's (571-573), there were discrepancy of logbook number for each of it. During 2015, total number of vessel which filling logbook for FMA 571, 572 and 573 were 58, 1,202 and 1,031 respectively. Catch and effort data have been collected through Logbook and national observer program. 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	2011	2012	2013	2014	2015
1	571	0	18	92	53	58
2	572	0	83	315	720	1,202
3	573	0	463	1,600	1,210	1,031
Total		**0**	**564**	**2,007**	**1,983**	**2,291**

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. Figure 8 showed the spatial distribution of Indonesia fleets based on VMS information.

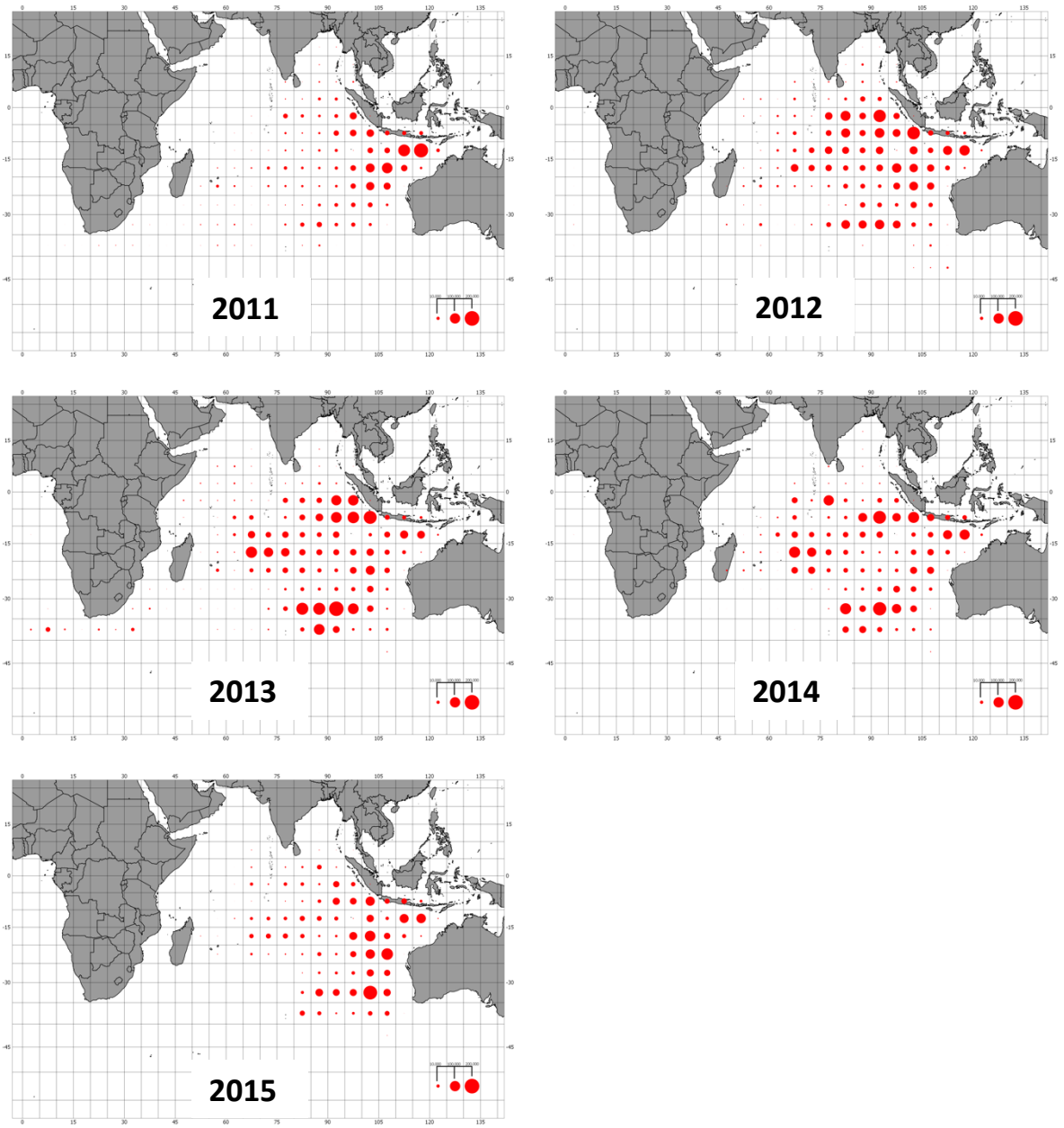

Figure 8. Map of spatial distribution of longline sets by 5-degree blocks, aggregated from 2011 to 2015 based on VMS data (Source: PSDKP).

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 2011-2015 (gear= longline).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2011	5	6	3	210	30 - 50	40
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

Table 10b. Activity summary of RITF's scientific observers from 2011-2015 (gear= purse seine).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2011	-	-	-	-	-	-
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

Table 10c. Activity summary of RITF's scientific observers from 2011-2015 (gear= hand line).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2011	-	-	-	-	-	-
2012	-	-	-	-	-	-
2013	1	2	2	19	9-10	9.5
2014	10	70	10	70	1	1
2015	-	-	-	-	-	-

Table 10d. Activity summary of RITF's scientific observers from 2011-2015 (gear= gillnet).

Year	No. Of Obs	No. Of Trips	No. Of Company	Total Day at Sea	Days/Trip	Avg (d/trip)
2011	-	-	-	-	-	-
2012	-	-	-	-	-	-
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	6	3	3	41	12-15	13

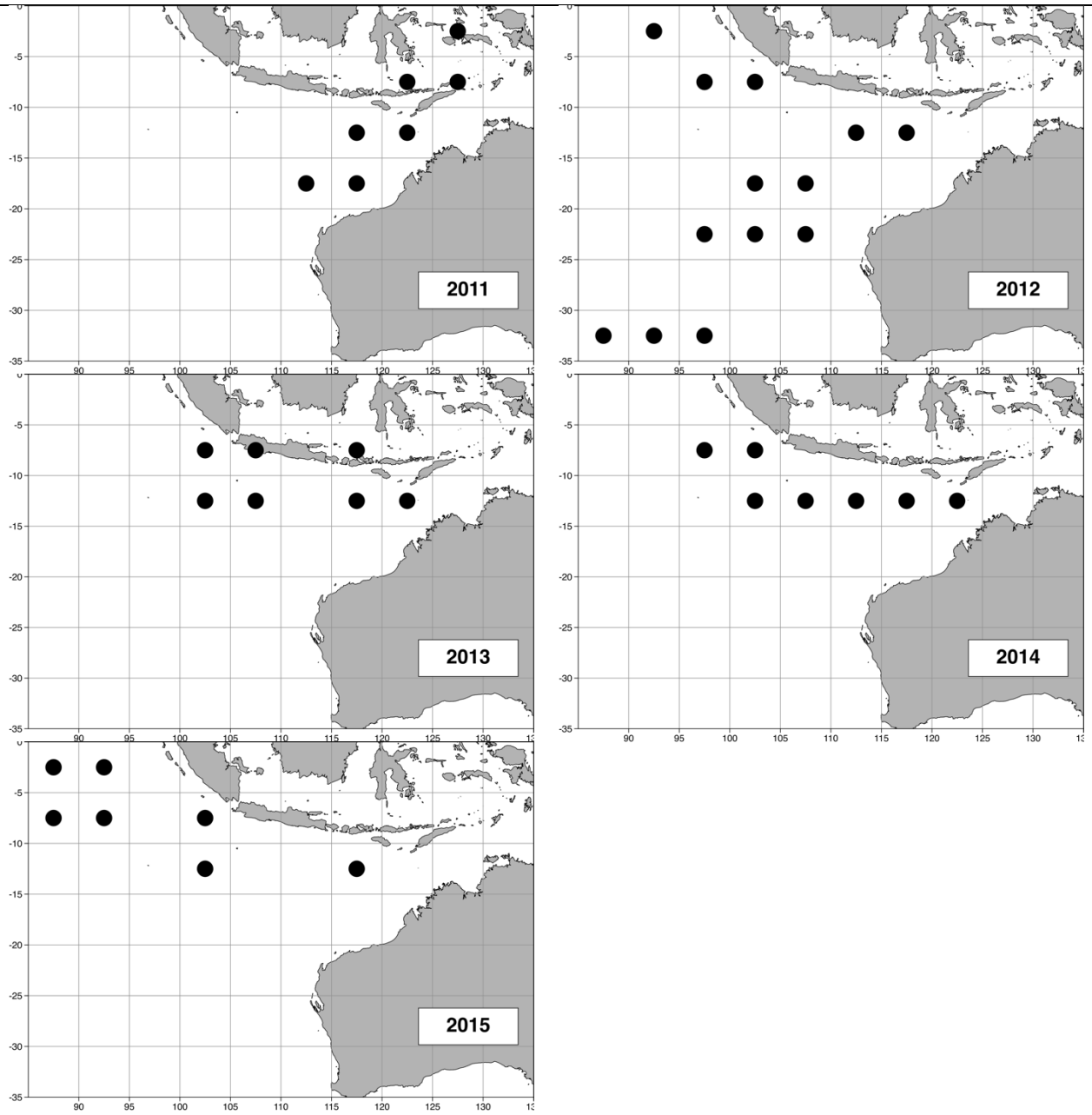

Figure 9a. Spatial distribution of the observed sets (gear=longline) from 2011 to 2015 (source: RITF Observer Program data)

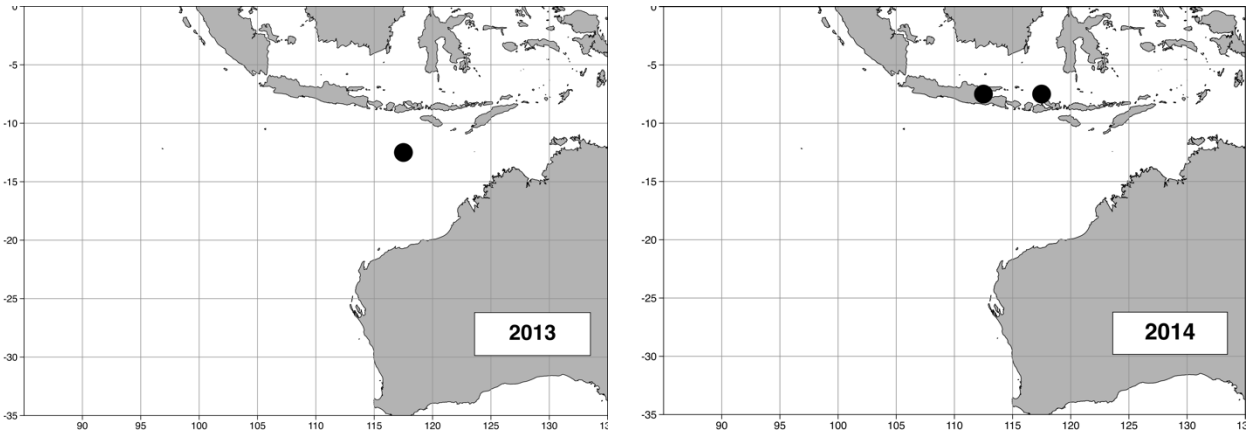

Figure 9b. Spatial distribution of the observed sets (gear=hand line) from 2013 to 2014 (source: RITF Observer Program data)

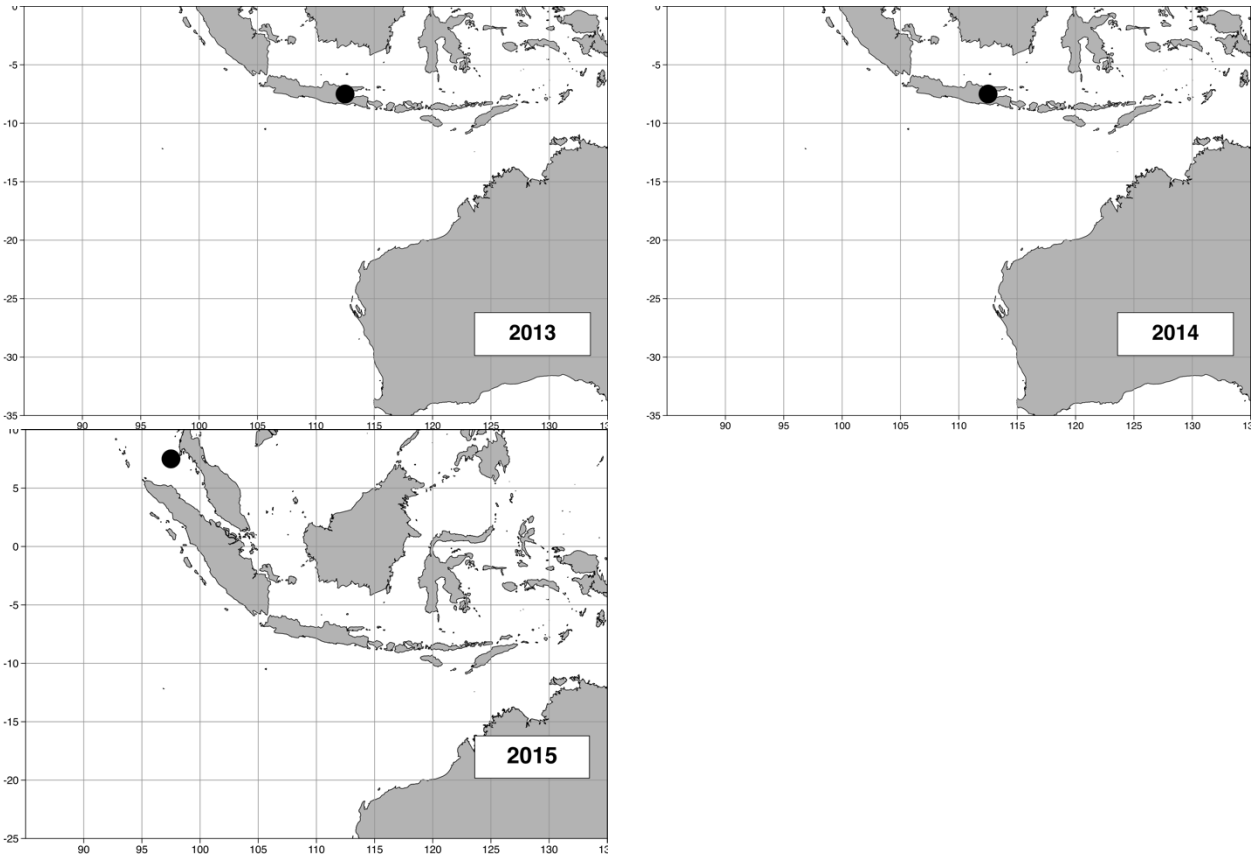

Figure 9c. Spatial distribution of the observed sets (gear=purse seine) from 2013 to 2015 (source: RITF Observer Program data)

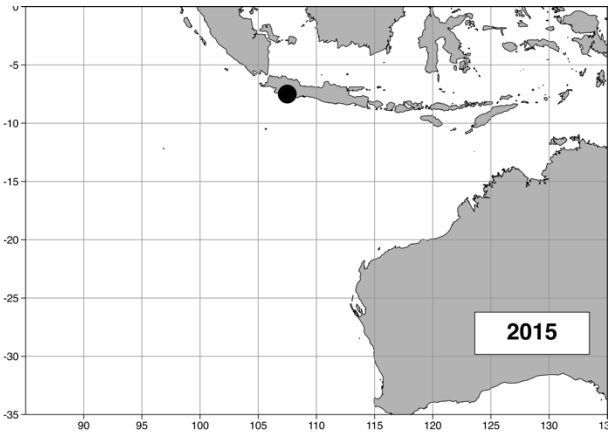

Figure 9d. Spatial distribution of the observed sets (gear=gillnet) from 2011 to 2015 (source: RITF Observer Program data)

The observed longline sets from 2005 to 2015 covered the Eastern Indian Ocean between latitudes 0° and 34°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. The furthest distance of these sets occurred in 2006, 2007 and 2012. Smaller area was covered by the observed longline sets in 2011. The observed sets in 2005 and between 2009 - 2011 have never extended to south of 20°S. 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 2011-2015.

Code	Species	No. of fish measured				
		2011	2012	2013	2014	2015
ALB	Albacore	7,276	5,179	5,049	27,740	21,648
BET	Bigeye tuna	25,361	42,322	29,504	40,431	45,039
YFT	Yellowfin tuna	28,253	34,010	32,253	41,720	17,909
BUM	Blue marlin	850	1,011	726	716	780
BLM	Black marlin	529	575	318	342	120
MLS	Striped marlin	186	260	193	108	115
SSP	Shortbill spearfish	78	218	113	68	192
SFA	Indo-Pacific sailfish	307	462	262	383	546
SWO	Swordfish	1,968	4,790	3,049	4,177	4,336
LEC	Escolar	3,927	21,524	1,990	13,705	9,567
OIL	Oilfish	391	441	240	1,120	1,842
WAH	Wahoo	895	1,941	402	1,776	1,102
CDF	Common dolphinfish	350	351	86	221	359
BSH	Blue shark	981	2,151	87	2,058	4,732
MSO	Shortfin mako shark	172	112	21	83	124
OCS	Oceanic whitetip shark	94	194	69	99	153
TSS	Bigeye thresher shark	54	14	3	2	32
MON	Moonfish	100	3,359	724	6,795	9,709
BAR	Barracuda	60	61	14	19	15

Table 11b. Coverage percentage of daily tuna and tuna-like species monitoring program based in Benoa port 2011-2015.

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%

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 2015.

7. NATIONAL RESEARCH PROGRAMS

(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*: Developing capacity for management of Indonesia's pelagic fisheries resources, Planned Project Duration: 2012-2016.
Objectives: To improve Indonesia's capacity to assess and manage its tuna fisheries to improve Indonesia's pelagic fisheries research capacity. The project also addresses population structure of Bigeye tuna and yellowfin tuna through genetic and parasites analysis.
Implementing Unit: Centre for Fisheries Research and Development (CFRD) (previously known as RCFMC) –collaboration with ACIAR.

(3) *Project title*: Preliminary study of climate change impact on tuna fisheries (need collaboration in a regional scale)
Recent progress: Field trip and survey to collect samples have been performed and still continuing.

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 2011.

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	

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