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INDONESIA National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2011

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 10/02, final scientific data for the previous year was provided to the Secretariat by 30 June of the current year, **for all fleets other than longline** [*e.g.* for a National report submitted to the Secretariat in 2010, final data for the 2009 calendar year must be provided to the Secretariat by 30 June 2010)	YES or NO [delete one] DD/MM/YYYY [Add submission date here]
In accordance with IOTC Resolution 10/02, provisional **longline data** for the previous year was provided to the Secretariat by 30 June of the current year [*e.g.* for a National report submitted to the Secretariat in 2010, preliminary data for the 2009 calendar year was provided to the Secretariat by 30 June 2010). **REMINDER:** Final longline data for the previous year is due to the Secretariat by 30 Dec of the current year [*e.g.* for a National report submitted to the Secretariat in 2010, final data for the 2009 calendar year must be provided to the Secretariat by 30 December 2010).	YES or NO [delete one] DD/MM/YYYY [Add submission date here]
If no, please indicate the reason(s) and intended actions:	

Executive Summary

Fisheries management Areas (FMA) 572 (Indian Ocean – west Sumatera) and 573 (South of Java – East Nusa Tenggara), are two fisheries management area among eleven FMAs that located within the IOTC area of competence**.** Long line contribute a bigger proportion (44 %) of tuna catch com pare to other gears and the number of active long liners registered and operated on the two FMAs is 1118**.** The national catch of four main tuna species in 2009 is estimated 101,292 while the total catch for all species by all gears type tend to increase to just above 600,000 mt in 2010. Benoa fishing port has demonstrated a long history of both port sampling and scientific observer programs. Although observer data set is currently the most detailed and most reliable data available from the fishery expanding the coverage of scientific observer is substantially required. Indonesia since 10 October 2010 already has a National Plan of Action of the Shark (NPOA-Shark). Template of Indonesia fishing logbook was developed and regulated, however it is required more effort to introduce and implement for both to fishers as well as port officers as required by the commission.

Contents

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 consist of 17,508 islands and coast line of 81,000 km. Totally, Indonesia has 5.8 million km^2 of marine waters consisting of 3.1 million km^2 of territorial waters (<12 miles) and 2.7 million km^2 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) and 573 (South of Java – east Nusa Tenggara), are located within the IOTC area of competence (Figure 1).

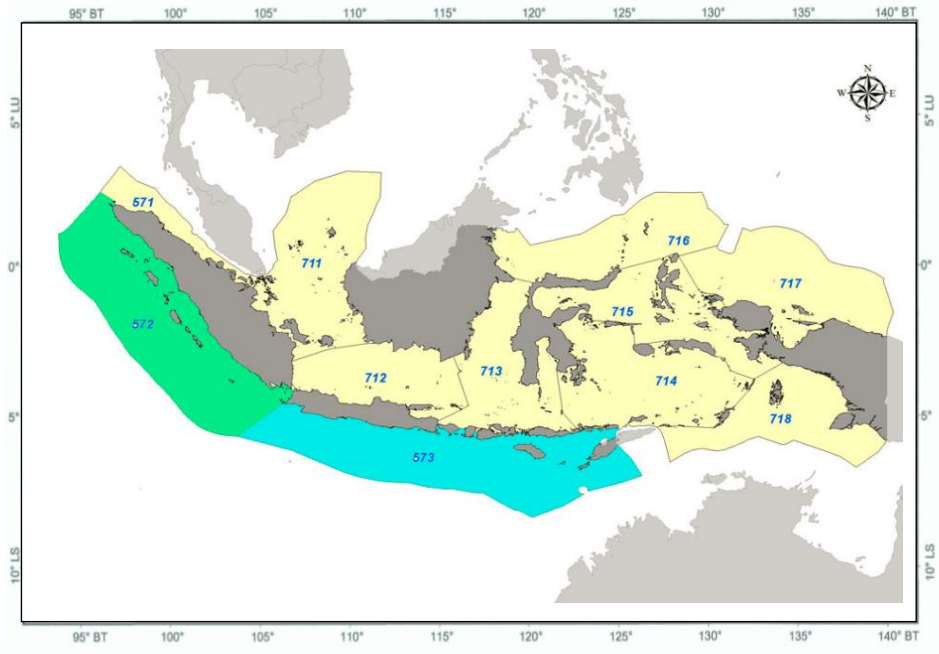

Figure 1. The eleven of fisheries management area in Indonesian marine waters

Across South Indonesian marine waters from Banda Aceh to NTT (East timor) there are at least 12 fishing ports as landing site for tuna. Three main landing sites for Indian Ocean tuna industrial fleet are Benoa Fishing Port (Bali), Muara Baru Port (Jakarta) and Cilacap Port (Central Java) (Proctor et al., 2003). 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 contributes more than 60% of Indonesian tuna catch (Satria *et al.*, 2011)

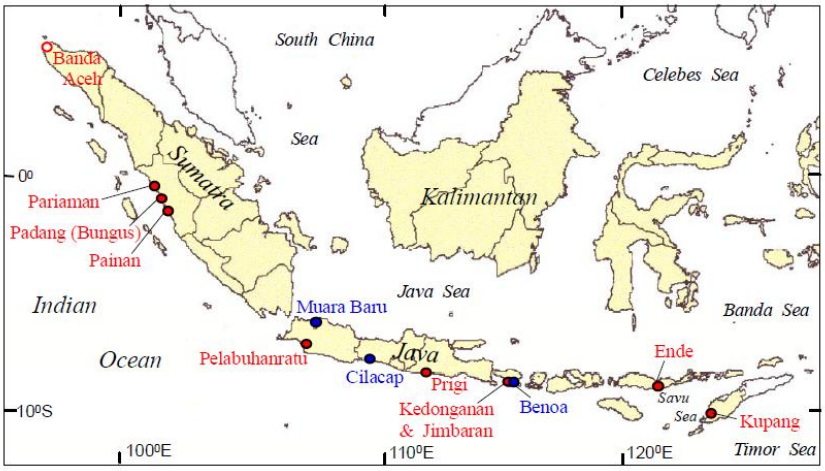

Figure 2. Primary fishing port/landing sites the induxtrial (*blue label*) and artisanal (*red label*) Source: RCCF- ACIAR Report 2003 (Source of map Proctor *et all* 2003)

There are several fishing gears targeting tuna operating in the area such as longline , purse seine, pole and line, drifting gill net, hand line and troll line.

2. FLEET STRUCTURE

The number of registered fishing boats operated, as reported to IOTC as per 2010, in the FMAs 572 and 573 was 1203 with breakdown for longline (1188), purse seine (11), gillnet (3) , carrier boat (1). Those fishing boats were vary in size from less than 50 GT to 1025 GT, among them only 31 vessels over 200 GT and mostly 100-200 GT. In general the number of tuna longline fishing in the Indian ocean decreased from 1,850 boats in 2009 compared to 1,188 boats in 2010. However, there are fishing fleets targeting tunas less than Loa 24m operated in the territorial water up to Indonesian EEZ that not included in the table 1.

Table 1. Registered Indonesian vessels by size (GT) as reported to IOTC in 2011 (Source DGCF 2011)

Range of GT	Longline	Purse seine	Gillnet	Longline carrier vessel	Total
<50	145	-	1	-	146
51 – 100	353	4	1	-	358
101 – 200	659	4	1	-	664
201 – 300	3	-	-	-	3
301 – 500	12	-	-	1	13
501 – 800	16	-	-	-	16
> 800	-	3	-	-	3
Total	**1188**	**11**	**3**	**1**	**1203**

3. NATIONAL CATCH

Indonesian national statistic reported that annual catch of four (4) main species such as bigeye tuna, yellowfin tuna, skipjack tuna and albacore as described in the (Table 2). , the average of tunas catch since 2005 to 2009 is estimated 101,291 ton which composed of yellowfin tuna (34,153 ton); bigeye tuna (15,875 ton), skipjack tuna (43,025 ton) and albacore (8,238 ton). The catch proportion was yellowfin tuna (30.72%), bigeye tuna (15.67%), skipjack tuna (42.48%) and albacore (8.13%). Long line was the main fishing gears targeting tuna that contribute a significant proportion (44 %) among others gear type. Table 2 did not yet include data for tuna like species, sharks, billfishes, seerfish and others associated species, therefore the total catch estimation might be much larger, for example the total catch for all species caught by all gears type in 2007, 2008 and 2009 was 250,296.5 mt, 334,559.3 mt, 336,372.7 mt and moreover in 2010 it is estimating for 604,452.1 mt (DGCF 2011).

Table 2 . Annual catch estimation by main tuna species and by gears during 2005-2009

Gear type	Tuna Species						Average	*)
		2005	2006	2007	2008	2009	(MT)	(%)
Longline	Yellowfin	47,570.0	27,090.0	15,837.1	15,133.4	13,487.7	23,824	***52.75***
	Bigeye	13,337.0	13,278.0	12,708.5	11,830.4	10,001.7	12,231	***27.08***
	Cakalang	1,850.0	2,741.0	1,306.4	492.4	585.3	1,395	***3.09***
	Albacore	10,839.0	2,383.0	10,190.5	11,159.5	4,015.6	7,718	***17.09***
	Total	**73,596.0**	**45,492.0**	**40,042.5**	**38,615.7**	**28,090.3**	***45,167***	
Purse-seine	Yellowfin	651.0	371.0	1,282.5	3,373.2	1,717.9	672	***7.09***
	Bigeye	-	237.0	1,478.9	726.6	2,125.9	415	***4.38***
	Cakalang	22,960.0	11,722.0	16,982.3	13,216.9	27,209.7	8,372	***88.24***
	Albacore	-	-	218.3	86.6	-	28	***0.29***
	Total	23,611.0	12,330.0	19,962.0	17,403.3	31,053.5	9,487	
Pole and Line	Yellowfin	684.0	373.0	-	-	358.7	472	***13.01***
	Bigeye	-	-	-	-	-	-	***0.00***
	Cakalang	2,071.0	3,780.0	-	-	3,613.1	3,155	***86.99***
	Albacore	-	-	-	-	-	-	***0.00***
	Total	**2,755.0**	**4,153.0**	**-**	**-**	**3,971.8**	**3,627**	
Handline	Yellowfin	80.0	554.0	856.0	5,256.5	3,028.8	1,955	***47.81***
	Bigeye	-	-	1.8	58.9	200.8	87	***0.22***
	Cakalang	66.0	353.0	685.3	2,947.1	3,720.2	1,554	***3.99***
	Albacore	-	-	0.6	984.8	-	493	***1.27***
	Total	146.0	907.0	1,543.7	9,247.3	6,949.8	**4,089**	
Others	Yellowfin	8,343.0	2,196.0	10,979.4	969.1	13,664.9	7,230	***18.58***
	Bigeye		732.0	2,843.8	-	5,848.6	3,141	***8.07***
	Cakalang	21,721.0	31,922.0	28,723.0	30,222.6	30,155.7	28,549	***73.35***
	Albacore	63.0	-	1,716.6	-	1,544.4	-	***0.00***
	Total	**30,127.0**	**34,850.0**	**44,262.8**	**31,191.7**	**51,213.6**	**38,921**	
Grand Total	Yellowfin	57,328	30,584	28,955	24,732	32,258	34,153	***33.72***
	Bigeye	13,337	14,247	17,033	12,616	18,177	15,875	***15.67***
	Cakalang	48,668	50,518	47,697	46,879	65,284	43,025	***42.48***
	Albacore	10,902	2,383	12,126	12,231	5,560	8,238	***8.13***
	Total	***119,333***	***95,349***	***93,685***	***84,227***	***115,719***	***101,291***	

Source data: Indonesia capture Fisheries statistic (2000-2010)

***): catch proportion (%) by species for all gears.**

3.1 Annual Catch Estimation at Benoa Fishing Port

Estimation of annual catch through port sampling program at Benoa, reported a decrease trend of total tuna landed 9,089 ton in 2010 with dominant catch of Yellowfin tuna 5,372 ton, Big eye tuna 2,680 ton, southern bluefin tuna 566 ton, Albacore 983 ton (Table 3).

Table 3. Estimation of annual catch of primary species by longline landed at the Benoa Port (YFT=Yellowfin tuna, BET=Bigeye tuna, SBT=Southern bluefin tuna, ALB=Albacore)

Year	YFT	BET	SBT	ALB	TOTAL
2004	4,413	4,184	613	1,906	11,116
2005	4,196	3,939	1,690	1,494	11,319
2006	4,323	4,366	558	1,450	10,697
2007	5,354	5,292	1,077	1,132	12,855
2008	6,924	5,033	905	2,811	15,673
2009	7,240	4,680	746	1,020	13,686
2010	5,372	2,168	566	983	9,089
2011*	2,882	2,413	407	383	6,085
Total	40,704	32,075	6,562	11,179	90,520

Note *): data recorded up to November 2011

The number of tuna longliner unloaded the catch at Benoa fishing port since 2004 showing a steady decrease trend down up to 60 % in 2010 compare to 2004 (Figure 3), indicate decrease production of catch from the Indian Ocean

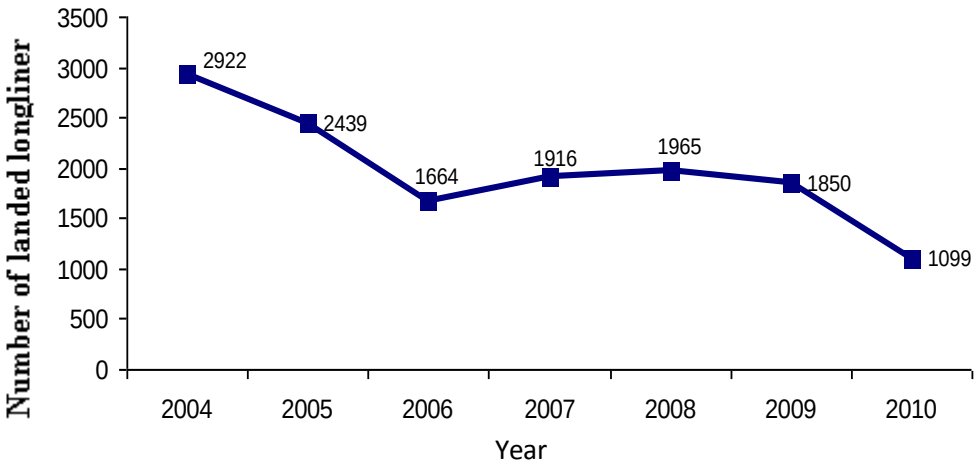

Figure 3. The number of tuna longliner landed at Benoa Fishing Port during 2004-2010

4. RECREATIONAL FISHERY

There is no official reported catch from Indonesia recreational fishing. An organization deal with sport fishing has been established since 1997 "FORMASI" (*Indonesia Fishing Sport Federation*) and this organization is a member of International game fish association (IGFA). FORMASI regularly conduct international sport fishing tournament at least once time a year in the Indian Ocean, information could be accessed at www.formasi.or.id activities in the convention area.

5. ECOSYSTEM AND BYCATCH ISSUES

Sharks

Indonesia since 10 October 2010 already has a National Plan of Action of the Shark (NPOA-Shark). This NPOA derived from the International Plan of Action of the Shark (IPOA-Shark) is intended for conservative management of shark and rays in Indonesia (DGCF 2010). Key actions adopted in the NPOA include: 1) Review status of shark and ray fisheries in Indonesia.2)Compilation of methods and data collection process. 3) Development of shark and ray research 4) Improving the management measures 5) Concern would increase the shark and ray fisheries 6) Institutional Strengthening. Due to budget constraint, implementation of the key actions is being focussed in Tanjung Luar Fish Landing Center (East Lombok), since this place is considered a main place where sharks is llanded. Workshop for reviewing implementation of key actions has been undertaken on October 2011. Workshop has promoted the additional activities in order to increase the effective implementattion of the NPOA. Research collaboration between RCFM and ACIAR through project FIS/ 2006/142, one of the project output improve our knowledge on sharks landed across south of java and Tanjung luar lombok and provide a good knowledge for shark management across the area.

Seabirds

Scientific observer program also include seabirds on their data record and since 2005 to 2010, *black albatross* was observed several time by observer in 2007 whilts other seabirds also recorded in dead condition in total 42 seabirds (9 black albatross, 33 other seabirds).The scientific observer from RITF Benoa reported that there was no seabird caught during the longline operation until October 2011. Indonesia currently do not has national plan of action for searbird mitigation.

Marine Turtles

Through Benoa observer program during 2005 – 2010 the total marine turtles caught by longliner operated in Indian ocean was 51, with dead 14, release alive 37. There were 5 species recorded by the observer leatherback turtle, Olive ridley turtle, Loggerhead turtle, Hawksbill turtle, Green turtle. Among them Olive ridley turtle was the most dominant sea turtle caught by longliner during the observation. Up to mid 2011 the observer reported leatherback sea turtle (*Dermochelys coriacea*) which was recorded on July 2011, coordinate: 13^0 40.234" S and 117^0 04.284" E. and Olive ridley sea turtle (*Lepidochelys olivacea*) which was recorded several times on March, July, and November 2010 and on June 2011.

Since 2005, WWF-Indonesia has facilitated efforts to reducing sea turtle bycatch in tuna longlines. WWF collaborates with the Research Centre for Capture Fisheries, Currently naming as Research center for fisheries management and conservation (RCFMC). The onboard observers are well accepted and supported by the Indonesian Tuna Longline Association (ATLI), the Indonesian Tuna Association (ASTUIN) as well as by other individual tuna long-line Industry members. In Benoa only, data collected by the onboard observer between May 2006 – July 2011 covering 33 vessels documented 55 sea turtles harvested, most of the sea turtle bycatch was olive ridley (source WWF 2011). Currently Indonesia does not have NPOA for marine turtles in Indonesia.

Bill fish

There were at least 5 species of billfish recorded as bycatch of indonesian tuna longliners operated in the Indian ocean observed by scientific observer includes 3 species of marlins; black marlin (BLM) (*Makaira indica*), blue marlin (BLZ) (*Makaira mazara),* striped marlin (MLZ) *(Tetrapturus audax*), and two species non-marlin species such as sailfish *(Istiophorus platypterus)* and the swordfish *(Xiphias gladius).* Result of observer program activity year 2005-2010 show that the total hook rate of billfish fluctuates every year and ranged between 0,032 and 0.123. Total production of billfish in 2010 was 6148 mt decrease 50 % from the previous year as reported by Anung *et al* 2011

Albacore Tuna

The ALB catch landed at the Benoa Fishing Port in 2010 was estimated by RITF to be about 983,14 tons, whereas based on ATLI, ALB catch landed at Benoa Fishing Port in 2010 amounted of 2715,42 tons. This discrepancy was due to sampling for frozen catch (including ALB) could not be conducted in some companies and also there was one company that sell their catch direct to the

collector. The observed longline sets were concentrated within the area between 10° - 20°S and 105° - 120°E. Since 2008, the observed setting positions have never extended to south of 20°S. ALB had higher catch rates in area south of 15°S (see Sadiyah *et al* 2011).

Neritic Tuna

Neritic tuna and sheerfish in the Indonesian Indian Ocean were caught by various of fishing gears and landed in various fishing port in along coastal of west Sumatera (Banda Aceh, Pariaman, Bungus/Padang and Painan) as well as south Java (Muarabaru/Jakarta, Pelabuhanratu, Cilacap, Kedonganan and Benoa). In Cilacap, especially tuna drifting gillnet fishery produces neritic tuna and sheerfish as by product. Result of onboard observation on drifting gillnet in Cilacap showed that the catch rate of drifting gillnet targeting tuna during year 2008, 2009 and 2010 were 285.60, 170.65 and 106.31 kg/setting respectively. 29 species have been identified from the onboard observation on drifting gillnetter based at Cilacap during 2008 to 2010. From 30 species, 3 species was tuna (skipjack, yellowfin and big eye tuna), whereas 5 species was neritic tuna (bullet tuna, frigate tuna, narrow barred Spanish mackerel, Indo Pacific king mackerel and longtail tuna) and others such as billfish, shark and other pelagic fishes. The catch composition about 46 % tuna, 9 % neritic tuna and 35 % others (see Anung *et al 2011)*

Southern Bluefin Tuna

Mostly SBT are landed in Benoa port, Bali that recorded more than 90 % from the total catch of SBT in Indonesia. The result of estimation on the basis of data from catch monitoring at Benoa, showed that the SBT catch could be up to 566 tons. The annual trend of fish size landed in Benoa port, Bali revealed that the mean size of SBT landed steady decrease through year from 182 cm TL in the 90's to 168 cm TL in 2010. The nominal CPUE had higher catch rates in the temperate regions. The maximum SBT catch rates (0.1-0.2 fish per 1000 hooks) occurred within 2 squares between 25°-35°S and 100°-105°E. The highest landings of SBT generally occur during the months of December to February. The average of hook rate was 0,01 with a decreasing trend through year. A higher hook rate of SBT occured on October, November, February and March for 0,01-0,03. Lower hook rate occured on May, June and Juli for 0-0,0005 (Satria *et al* 2011).

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.Therea are three (3) kind 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. For a time being, data taken from logbook may not be able yet analysed due to limited submission by fishers. For effective implementation of this program, it is necessary to increase efforts to introduce this program both to fishers as well as port officers

6.2. Vessel Monitoring System

Ministrial decree No PER.05/MEN/2008 article was issued in 2008 regulate the obligation of fishing boats to have transmitter of Vessel monitoring system onboard, particularly for boats larger than 30 GT. Raising awereness on the importance of VMS for managing and ensuring the sutanability of fisheries resourced is one of a crucial field to underpin the successfull VMS program. fisheries Information and services for Indonesia VMS is provided and could be accessed at http://dkpvms.dkp.go.id.

6.3. Observer programme

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 was decrease from 6 person in 2007 become 5 person in 2010. The average day sea /trip was vary from 20 d/trip to 50 d/trip thus the total day at sea also vary from 150 days to 758 days /total number (Table 5). The Observer Program data set is currently the most detailed and most reliable data available from the fishery, in providing catch and effort information.

Table 5 Activity summary of observer based at Benoa Fishing Port (this Table was presented in Satria *et al.* (2011))

YEAR	No. of Obs	No. of trips	No. of Comp	Total day at sea	days/trip	Avg (d/trip)
2005	6	6	1	251	19 – 22	20
2006	6	19	5	758	7 – 99	39
2007	6	14	5	648	21 – 108	34
2008	5	15	7	481	23 – 66	30
2009	5	14	8	535	15 – 59	38
2010	5	8	4	240	40-50	45
2011	5	6	3	210	30-50	40

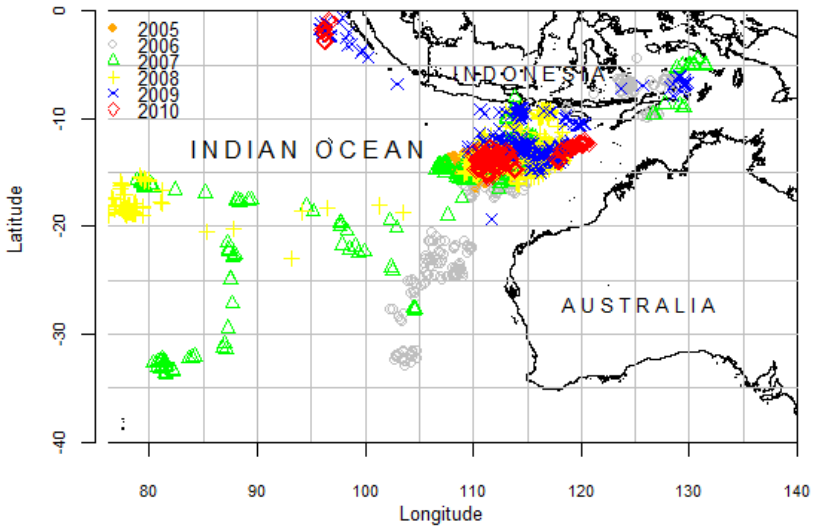

Figure 4. Spatial distribution of the observed sets from 2005 to 2010. This figure was presented in Sadiyah *et al.* (2011)

Observed fishing positions included the Eastern Indian Ocean between latitudes 0° and 34°S and longitudes 75° and 132°E, but also the Banda Sea (Figure 4). The observed longline sets were concentrated within the area between 10° - 20°S and 105° - 120°E. The furthest distance of these sets occurred in 2006 and 2007. Since 2008, the observed setting positions have never extended to south of 20°S.

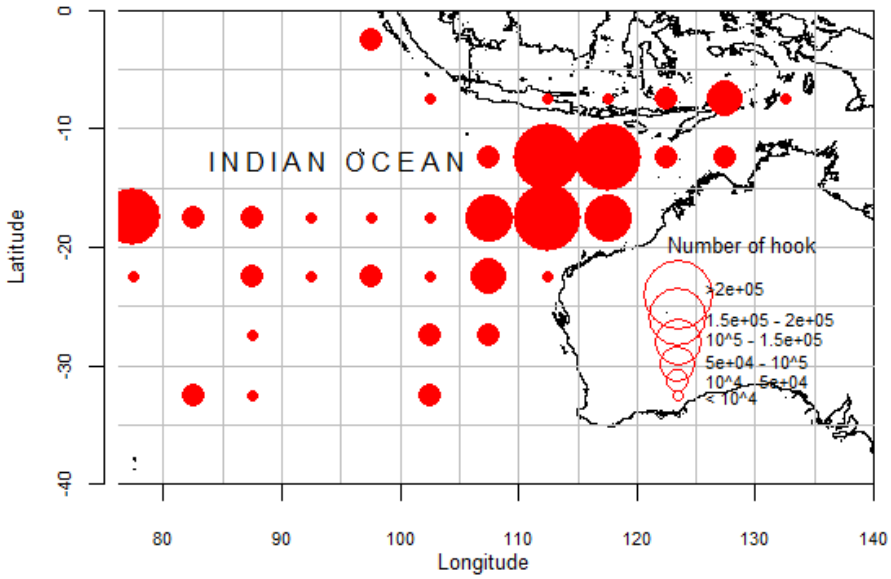

Figure 5. Spatial distribution of observed longline effort (hooks) by 5-degree blocks, aggregated from 2005 to 2010 (source: Observer Program data).

The spatial distribution of observed effort is presented by 5-degree blocks (5° latitude x 5° longitude) (Figure 5). More than 50% of the total number of hooks recorded were concentrated between 110° and 120°E and 10° and 20°S (Figure 5). South of 20°S (the temperate area of the Indian Ocean) and in the Banda Sea, the effort recorded in any 5-degree block never exceeded 100,000 hooks.

6.4. Port sampling programme

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 Lilis *et all* 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 (Nugroho *et al.*, 2010). In 2011 RITF continue the tuna catch landed monitoring program at Benoa Fishing Port with a minimum 30% coverage of landings at each processing plant as a target coverage, as result in average the port sampling in 2009 – 2011 was range from 37 – 57 % coverage.

Table. Summary of RITF Monitoring activities at Benoa during 2009-2011 (Technical report of port sampling monitoring program RITF November 2011)

Years	Month	Number Landings	Number Sampled	% Covered	Number of Weight Recorded	Number of Length & Weight Measured
2009	January	211	108	51.18	18199	695
	February	89	47	52.81	11291	619
	March	156	71	45.51	16399	445
	April	210	100	47.62	26187	681
	May	157	71	45.22	14132	389
	June	189	90	47.62	21805	503
	July	130	60	46.15	15180	960
	August	110	56	50.91	14168	896
	September	160	76	47.50	19228	1216
	October	140	72	51.43	18216	1152
	November	120	68	56.67	17204	1088
	December	170	75	44.12	18975	1200
2010	January	no sampling				
	February	9	5	55.56	730	302
	March	25	13	52.00	3866	210
	April	100	39	39.00	11868	655
	May	111	52	46.85	13200	870
	June	155	68	43.87	22315	782
	July	144	67	46.53	17143	1625
	August	104	47	45.19	13602	756
	September	131	63	48.09	9285	730
	October	109	46	42.20	13812	546
	November	117	51	43.59	15005	580
	December	94	37	39.36	5962	485
2011	January	125	53	42.40	8602	1006
	February	73	30	41.10	6648	475
	March	81	31	38.27	6680	815
	April	88	37	42.05	9431	782
	May	77	30	38.96	5432	548
	June	60	26	43.33	6291	856
	July	65	24	36.92	3719	228
	August	98	43	43.88	9782	526
	September	46	23	50.00	4840	333
	October	65	32	49.23	6671	641
	November	70	26	37.14	3530	313

7. NATIONAL RESEARCH PROGRAMS

1. Project title: Indian Ocean Pelagic fisheries research through Port sampling and observer program, Project Duration: 2010-2013
   Objectives: Continuation of port sampling and observer
   Implementing unit: RITF Benoa
2. Project title: Developing capacity for management of Indonesias pelagic fisheries resources , Planned Project Duration : 2012-2015 .
   Objectives: To improve Indonesia's capacity to assess and manage its tuna fisheries to improve Indonesia's pelagic fisheries research capacity
   Implementing Unit : RCFMC - ACIAR

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

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9. LITERATURE CITED

Directorate General of Capture Fisheries, Ministry of MAF, 2007. *Statistics of Marine Capture Fisheries by Fisheries Management Area, 2001 – 2005.* Jakarta.

_____,2008. *Capture Fisheries Statistics of Indonesia, 2001 – 2006.* Jakarta.

_____,2008. *Statistics of Marine Capture Fisheries by Fisheries Management Area, 2002 – 2006.* Jakarta.

_____,2009. *Capture Fisheries Statistics of Indonesia, 2002 – 2007.*

_____,2010. *Capture Fisheries Statistics of Indonesia, 2004– 2009*

Directorate General of Capture Fisheries, Ministry of MAF, 2010. National Plan of Action (NPOA) Sark and Rays Management

Nugroho, D., Satria, F. and Nugraha, B. (2010) National report Indonesia southern bluefin tuna fishery. CCSBT 15th Meeting of the Extended Scientific Committee, Taipei, Taiwan, 4 – 10 September 2010. CCSBT – ESC/1009/SBT FISHERIES – Indonesia

Proctor, C. H., Merta, I. G. S., Sondita, M. F. A., Wahju, R. I., Davis, T. L. O., Gunn, J. S. and Andamari, R. (2003) A review of Indonesia's Indian Ocean tuna fisheries. ACIAR Country Status Report. 106 pp

Proctor, C. H., Andamari, R., Retnowati, D., Herrera, M., Poisson, F., Fujiwara, S. and Davis, T. L. O. (2006) The catch of SBT by the Indonesian longline fishery operating out of Benoa, Bali in 2005. CCSBT 7th Meeting of the Stock Assessment Group and the 11th

Meeting of the Extended Scientific Committee, Tokyo, Japan, 4-11 September and 12-15 September 2006

Satria, F., Wudianto, Nugroho, D., Sadiyah, L., Nugraha, B., Barata, A. and Suryanto (2011) National report Indonesia southern bluefin tuna fisheries. Bali, Benoa, 19 - 28th July 2011. CCSBT – ESC/1107/SBT FISHERIES – Indonesia (revised).

Sadiyah, L., Nugraha, B., Widodo (2011) catch and effort Information for Albacore by Indonesia's Indian Ocean Tuna Longline Fishery based at Benoa Fishing Port . IOTC–2011–WPTmT03–14

Widodo, A. Satria ,F. Sadiyah, L. And Riyanto J. Neritic Tuna Species Caught Drifting Gillnet in Indian Ocean Based In Cilacap-Indonesia IOTC-2011- WPNT01-21

Widodo, A. Nugraha B, Satria F, and Barata A. (2011) Species composition and size distribution of billfish caught by Indonesian tuna long-line vessels operating in the Indian Ocean IOTC-2011-WPEB.

Zainudin, IM, Soede LP., Hittipeuw C., and Adnyana I.B. (2007) Reducing Sea Turtle Bycatch and Other Marine Endangered Species of Indonesian Tuna Longline through Onboard Observer Program, Data from field observation 2006 to 2007. WWF - NOAA-PIRO