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# INDONESIA National Report to The Scientific Committee of The Indian Ocean Tuna Commission, 2015

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| | |
|---|---|
| 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 2014, final data for the 2013 calendar year must be provided to the Secretariat by 30 June 2014) | YES or NO [delete one]<br><br>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 2014, preliminary data for the 2013 calendar year was provided to the Secretariat by 30 June 2014).<br><br>**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 2014, final data for the 2013 calendar year must be provided to the Secretariat by 30 December 2014). | YES or NO [delete one]<br><br>DD/MM/YYYY [Add submission date here] |
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**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 2014 was estimated 185,675 ton which composed of yellowfin tuna (65,686 t); bigeye tuna (34,400 t), skipjack tuna (79,999 t) and albacore (5,590 t). Port sampling and scientific observer programs are still continuing and conducting by Research Institute for Tuna fisheries (RITF) Benoa. Following the issuance of ministerial regulation of MMAF no 01 year 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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## 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 approximately 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) , 573 (South of Java – East Nusa Tenggara),and 571 (Malacca Strait and Andaman Sea) are located within the IOTC area of competence (Figure 1).

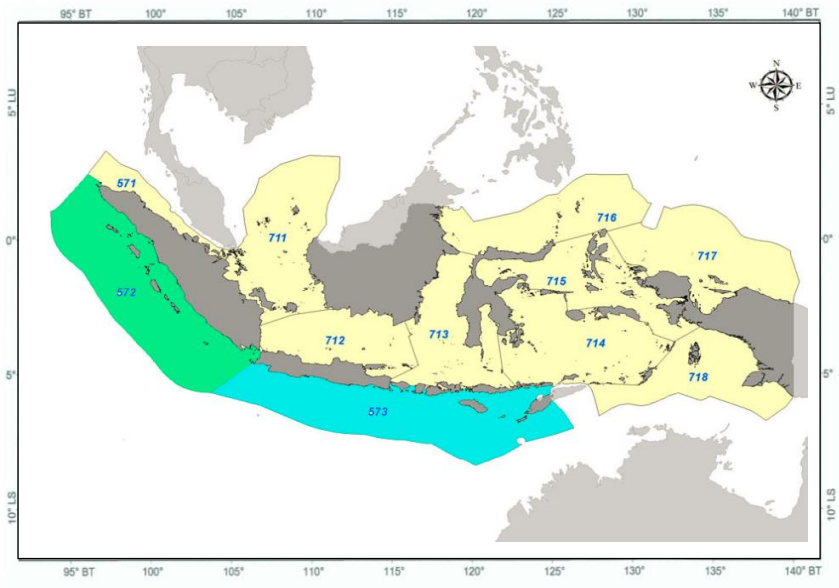


Figure 1. The eleven of Fisheries Management Area (FMA) in Indonesian waters

Across South Indonesian marine waters from Banda Aceh to NTT (East Timor) there are at least 12 fishing ports as landing site for tuna. Five main landing sites for Indian Ocean tuna industrial fleet are Benoa Fishing Port (Bali), Muara Baru Port (Jakarta) and Cilacap Port (Central Java), Pelabuhan Ratu (West Java) and Bungus (West Sumatera). 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.

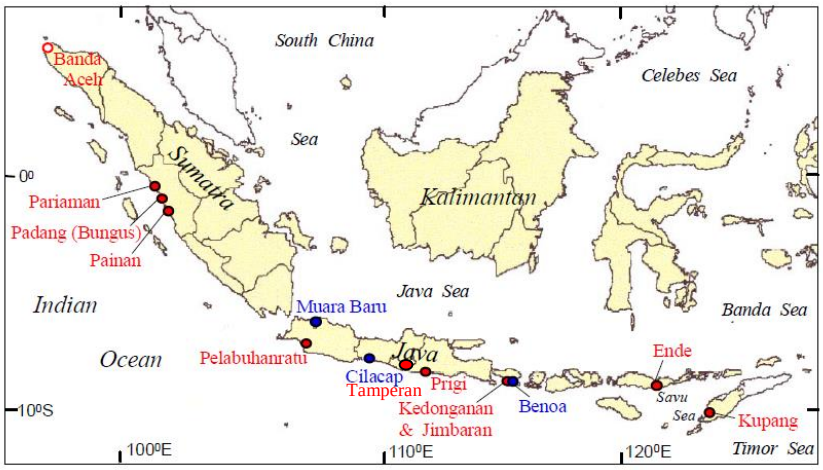


Figure 2. Primary fishing port/landing sites the industrial (*blue label*) and artisanal (*red label*) modified from Proctor 2003).

The species of tropical tuna that are commonly found in south Indonesia waters within IOTC competence area are skipjack tuna (SKJ). yellowfin tuna (YFT), bigeye tuna (BET), albacore (ALB) and southern bluefin tuna (SBT)These species are targeted by various fishing gears such as tuna longline (LL), purse seine (PS), pole and line (PL), hand line (HL), and gill net (GN). Among those, long line and purse seine are gears type that mainly contributes a significant catch from the total catch of tuna.

## 2. FLEET STRUCTURE

The number of registered fishing boats operated, as reported to IOTC as per 26 November 2014 in the FMAs 572, 573 and high seas Indian Ocean was 1,334 fishing vessels which consisted of longliner (1,282), purse seiner (40), gillnetter (2) , carrier boat (10). 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 26 November 2014 (Source: DGCF, 2014).

| Size | Long liner | Purse seiner | Gill netter | Carrier/cargo freezer | Total |
|---|---|---|---|---|---|
| <50 | 241 | 0 | 2 | 1 | 244 |
| 51-100 | 474 | 8 | 0 | 1 | 483 |
| 101-200 | 546 | 28 | 0 | 7 | 581 |
| 201-300 | 3 | 1 | 0 | 0 | 4 |
| 301-500 | 6 | 0 | 0 | 1 | 7 |
| 501-800 | 12 | 0 | 0 | 0 | 12 |
| >800 | 0 | 3 | 0 | 0 | 3 |
| Total | 1,282 | 40 | 2 | 10 | 1,334 |

## 3. NATIONAL CATCH

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 2014 in the process of validation until 4 December 2015 assisted by RFMOs expert. The annual catch data up to 2014 described in table 2, total catch of main tunas in 2014 was 185,675 ton which composed of yellowfin tuna (65,686 t); bigeye tuna (34,400 t), skipjack tuna (79,999 t) and albacore (5,590 t). The average of tunas catch since 2005 to 2014 is estimated 133,092 t (ton). The catch proportion in average since 2005 to 2014 was yellowfin tuna (29.82 %), bigeye tuna (16.76%), skipjack tuna (46.52%) and albacore (6.88%). The catch of albacore was slightly decrease for 8 % and Skipjack catch was decrease by 15 % compare to 2013 catch. Longline still the main fishing gears targeting tuna that contribute a significant proportion among others gear type. Table 2 did 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 much more*(DGCF, 2014)*.

Table 2. Annual catch of tuna by main species and gears type during 2005-2014.

| Gear Type | Species | Year | | | | | | | | | | | Rata-Rata |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014*) | (MT) |
| Longline | Yellowfin | 35,566 | 47,570 | 27,090 | 15,837 | 15,133 | 13,488 | 14,571 | 9,315 | 11,222 | 16,325 | 14,811 | 220,929 |
| | Bigeye | 24,132 | 13,337 | 13,278 | 12,709 | 11,830 | 10,002 | 14,202 | 8,207 | 11,150 | 15,037 | 16,414 | 150,297 |
| | Skipjack | 1,933 | 1,850 | 2,741 | 1,306 | 492 | 585 | 1,463 | 4,167 | 8,943 | 9,517 | 6,337 | 39,335 |
| | Albacore | 11,178 | 9,222 | 7,950 | 9,148 | 8,654 | 13,026 | 5,505 | 8,775 | 7,631 | 6,021 | 5,538 | 92,648 |
| | SBT | 665 | 1,831 | 447 | 1,079 | 888 | 641 | 474 | 700 | 910 | 1,382 | 1,063 | 10,080 |
| | *Total* | 73,474 | 73,810 | 51,506 | 40,079 | 36,998 | 37,741 | 36,215 | 31,164 | 39,857 | 48,282 | 44,163 | 47,468 |
| Purse-seine | Yellowfin | 487 | 651 | 371 | 1,283 | 3,373 | 1,718 | 4,334 | 8,737 | 11,776 | 20,229 | 22,842 | 75,801 |
| | Bigeye | - | - | 237 | 1,479 | 727 | 7,071 | 8,226 | 7,309 | 9,537 | 12,012 | 10,556 | 57,152 |
| | Skipjack | 23,986 | 22,960 | 11,722 | 16,982 | 13,217 | 27,210 | 22,652 | 34,838 | 31,190 | 33,871 | 29,381 | 268,008 |
| | Albacore | - | - | - | 218 | 87 | - | 341 | 1,027 | 98 | 70 | 49 | 1,890 |
| | *Total* | 24,473 | 23,611 | 12,330 | 19,962 | 17,403 | 35,999 | 35,553 | 51,911 | 52,600 | 66,182 | 62,828 | 29,781 |
| Pole and Line | Yellowfin | 511 | 684 | 373 | - | - | 359 | 457 | 1,535 | 394 | 3,860 | 4,359 | 12,531 |
| | Bigeye | - | - | - | - | - | - | - | - | - | | | - |
| | Skipjack | 2,164 | 2,071 | 3,780 | - | - | 3,613 | 2,255 | 2,545 | 8,328 | 12,256 | 10,631 | 47,643 |
| | Albacore | - | - | - | - | - | - | - | - | - | | | - |
| | *Total* | 2,675 | 2,755 | 4,153 | - | - | 3,972 | 2,712 | 4,080 | 8,722 | 16,116 | 14,990 | 3,050 |
| Handline | Yellowfin | 60 | 80 | 554 | 856 | 5,257 | 3,029 | 3,117 | 1,997 | 3,634 | 9,524 | 10,754 | 38,862 |
| | Bigeye | - | - | - | 2 | 59 | 201 | 200 | 237 | 218 | 745 | 655 | 2,315 |
| | Skipjack | 69 | 66 | 353 | 685 | 2,947 | 3,720 | 3,373 | 2,653 | 5,002 | 8,167 | 7,084 | 34,120 |
| | Albacore | - | - | - | 1 | 454 | - | 39 | 39 | 423 | 3 | 2 | 961 |
| | *Total* | 129 | 146 | 907 | 1,544 | 8,716 | 6,950 | 6,729 | 4,926 | 9,278 | 18,439 | 18,495 | 4,021 |
| Others | Yellowfin | 6,238 | 8,343 | 2,196 | 13,044 | 428 | 15,479 | 25,446 | 16,087 | 11,506 | 11,442 | 12,920 | 123,129 |
| | Bigeye | - | | 732 | 6,508 | 3,510 | 5,849 | 2,142 | 10,267 | 11,635 | 7,711 | 6,776 | 55,130 |
| | Skipjack | 22,691 | 21,721 | 31,922 | 33,278 | 31,444 | 34,678 | 38,723 | 40,398 | 33,870 | 30,626 | 26,566 | 345,916 |
| | Albacore | 65 | 63 | - | - | - | 1,544 | 7,145 | 1,642 | 2,875 | 1 | 1 | 13,336 |
| | *Total* | 28,994 | 30,127 | 34,850 | 52,830 | 35,382 | 57,550 | 73,456 | 68,395 | 59,887 | 49,780 | 46,263 | 50,069 |
| | | | | | | | | | | | | | |
| Grand Total | Yellowfin | 42,862 | 57,328 | 30,584 | 31,020 | 24,191 | 34,072 | 47,925 | 37,672 | 38,533 | 61,380 | 65,686 | 471,252 |
| | Bigeye | 24,132 | 13,337 | 14,247 | 20,697 | 16,126 | 23,122 | 24,770 | 26,019 | 32,540 | 35,505 | 34,400 | 264,895 |
| | Cakalang | 50,843 | 48,668 | 50,518 | 52,252 | 48,100 | 69,806 | 68,466 | 84,601 | 87,333 | 94,437 | 79,999 | 735,023 |
| | Albacore | 11,243 | 9,285 | 7,950 | 9,367 | 9,194 | 14,570 | 13,030 | 11,483 | 11,028 | 6,095 | 5,590 | 108,835 |
| | *Total* | *129,080* | *128,618* | *103,299* | *113,336* | *97,611* | *141,570* | *154,191* | *159,775* | *169,434* | *197,417* | *185,675* | 133,092 |

*Source Data: Statistik Perikanan Tangkap (2004-2014)*

*) Unvalidated number

Data for 2010-2013 was last revised and reported to IOTC

## 3.1. Annual Catch Estimation at Benoa Fishing Port

Annual catch that estimate from port sampling program at Benoa Fishing Port reported a decrease trend of total tuna landed from 2004 to 2014. A peak landed of catch occurred in 2008 for 15,673 tones. After 2009 the landed catch was significantly decreased to around 6,669 tons in 2014. This is in line with the decrease of number of tuna longliners landed in Benoa Bali as shown in table 3 and figure 3.

Table 3. Estimation of annual catch (in tonnes) of primary species by longliner landed at the Benoa Port (YFT = yellowfin tuna, BET = bigeye tuna, SBF = southern bluefin tuna, ALB = albacore) from 2004 to 2014.

| YEAR | Annual Catch | | | | |
|---|---|---|---|---|---|
| | YFT | BET | SBF | 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 | 3,006 | 2,504 | 432 | 384 | 6,326 |
| 2012 | 2,049 | 2,719 | 613 | 1,221 | 6,602 |
| 2013 | 2,474 | 2,238 | 721 | 688 | 6,121 |
| 2014 | 2,654 | 2,312 | 1,016 | 687 | 6,669 |
| TOTAL | 48,005 | 39,435 | 8,937 | 13,776 | 110,153 |

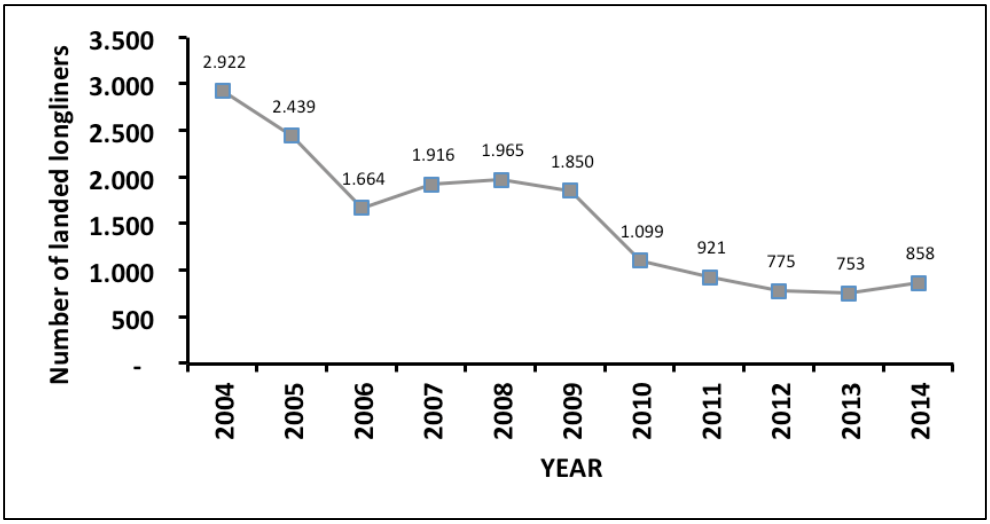


Figure 3. The number of tuna longliner landed at Benoa Fishing Port during 2004-2014

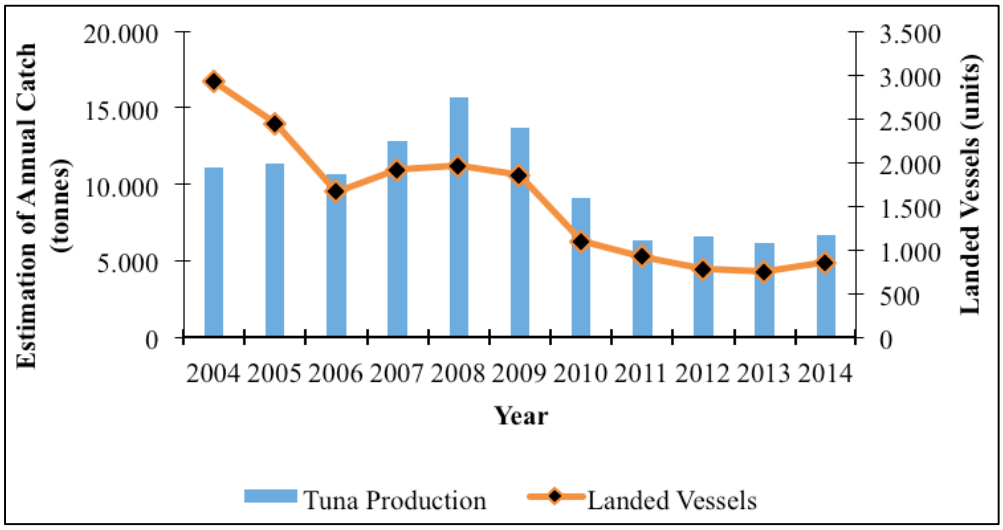


Figure 3. The number of tuna production and longliner landed at Benoa Fishing Port during 2004-2014.

### 3.2. Catch Data of tuna from Scientific Observer

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 2005-2014.

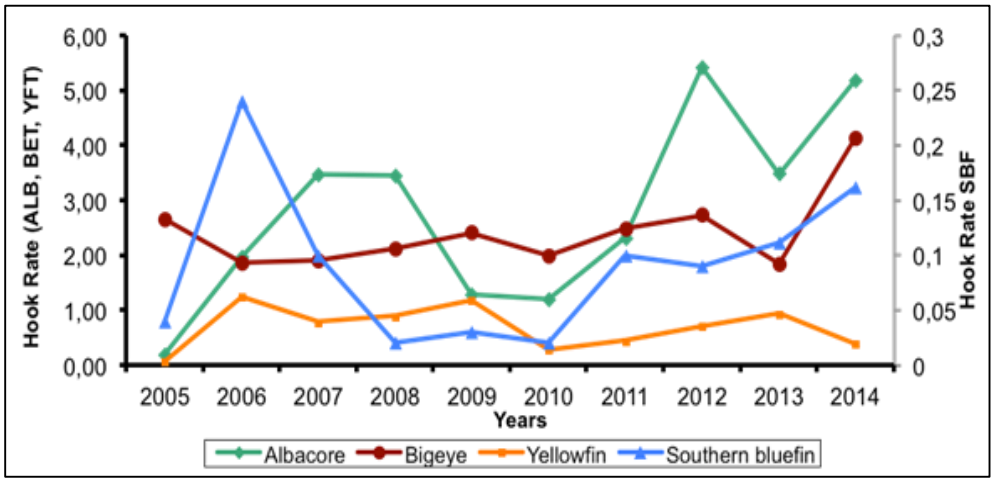


Figure 4. Fluctuation of average hook rate (fish/1000 hooks) for tuna (ALB, BET, YFT and SBF) based on RITF scientific observer data in the Indian Ocean (2005-2014).

Hook rate of tuna longliner for yellowfin tuna shows decrease from 1.23 fish/1,000 hooks in 2006 become 0.27 fish/1,000 hooks in 2010, however in 2013 the hook rate of yellowfin tend to slightly increase recorded 1.04 fish/1,000 hooks. In 2014, the hook rate of albacore, bigeye and southern bluefin tuna increased while yellowfin tuna tend to decrease from previous year (Figure 4).

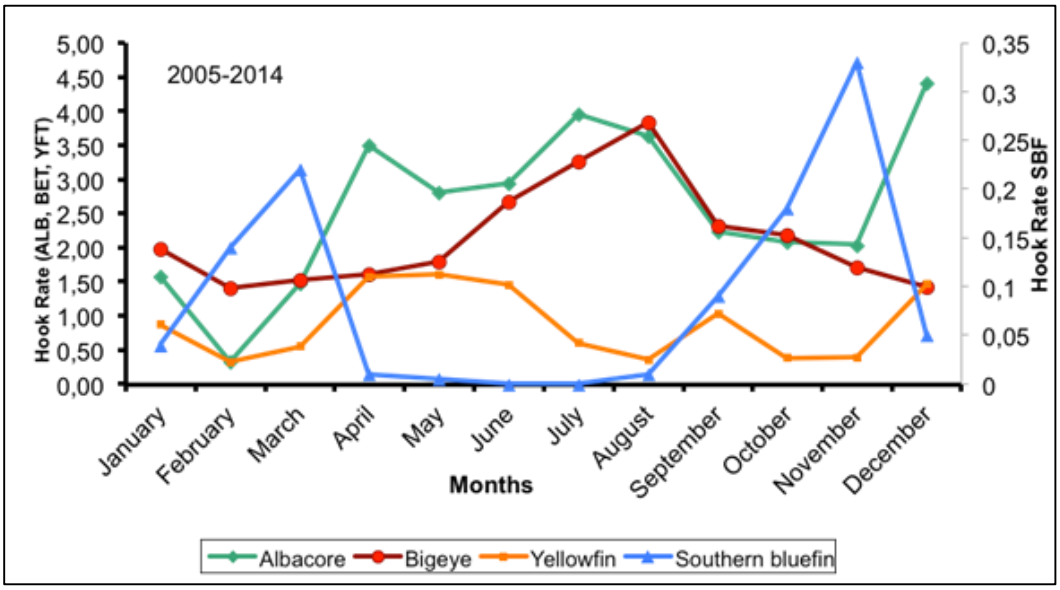


Figure 5. Monthly average of hook rate (fish/1,000 hooks) for ALB, BET, YFT and SBF based on scientific observer data in 2005-2014.

There was also shown the fluctuation of the average of hook rate for ALB, BET, YFT and SBF by monthly as illustrated in Figure 5. The highest hook rate (2.88-3.77 fish/1,000 hooks) occurred on June to August for bigeye (BET) and (1.5-1.72/1,000 hooks) recorded on April-June for yellowfin tuna (YFT). In the average of hook rate by monthly shown that bigeye tuna (BET) are commonly higher compare to yellowfin tuna (YFT) especially on July-August.

## 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), 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 regulate a management and conservation of bycatch and ecological related species on tuna fisheries, Several activities in 2012 is raising the fishers awareness on the important of sharks resource sustainability through workshops, seminars and producing and distribute posters which prohibit several keys species of sharks to catch,Due to budget constraint, implementation of the key actions isbeing focussed in Tanjung Luar Fish Landing Center (East Lombok), since this place is considered as a main place where sharks is landed,however, it is still difficult to change the tradition for the sharks fisher to not target the sharks particularly in Tanjung Luar (East Timor).Recently in October 2013 a workshop attended by stake holder of sharks was conducted in Jakarta and continue with initiation to set national quota for (*Charcharhinus longimanus, Sphyrna zygaena, sphyrna mokaran, Sphyrna lewini*) it was agree by the WS to limit the catch with a certain quota for selected sharks however the WS also noted the difficulties to estimate sharks quota with limited data available while also consider a highly migratory nature of the species,

In 2014 scientific observer from RITF Benoa reported 191 individuals were caught by tuna longliner, comprised of 8 shark species during 371 days trip operation with 281,143 hooks observed as presented in Table 4.

Table 4. Catch composition of shark caught by longliner during on board observer in 2014.

| Indonesian Name | English Name | Scientific Name | Code | Number | Percentage (%) | Hook Rate (fish/1000 hooks) |
|---|---|---|---|---|---|---|
| Hiu Buaya | Crocodille shark | *Pseudocarcharias kamoharai* | PSK | 91 | 47.64 | 0.324 |
| Hiu Selendang Biru | Blue shark | *Prionace glauca* | BSH | 67 | 35.08 | 0.238 |
| Hiu Lanjaman | Spinner shark | *Carcharhinus brevepinna* | CCB | 17 | 8.90 | 0.060 |
| Hiu Moro | Shortfin mako shark | *Isurus oxyrinchus* | SMA | 2 | 1.05 | 0.007 |
| Hiu Koboy | Oceanic whitetip shark | *Carcharhinus longimanus* | OCS | 9 | 4.71 | 0.032 |
| Hiu Tikus | Thresher shark nei | *Alopias spp* | THR | 2 | 1.05 | 0.007 |
| Hiu Tikus | Bigeye thresher shark | *Alopias superciliosus* | BTH | 1 | 0.52 | 0.004 |
| Hiu Tenggiri | Longfin mako shark | *Isurus paucus* | LMA | 2 | 1.05 | 0.007 |

Based on scientific observers of the Research Institute for Tuna Fisheries reported during 2005 - 2013 the total shark was caught 3,421 individuals comprised of 19 species. The most abundant species are blue shark and crocodile shark catched in all survey locations except west off Sumatra for of blue shark. CPUE average of blue shark is 1.55 (SD±1.62) with values ranging between 0.37 and 13.83 sharks/1000 hooks. Highest CPUE of blue shark were caught in latitude of $30^0$-$35^0$ S. Length frequency distribution of blue shark showes 60–312 cmFL (SD±32.41) males and 70-258 cmFL (SD±31.03) females, with a domination of 195 cm and 205 cm sizes, respectively. Sex ratio of males and females of blue shark during this period is 1: 0.46, with a significant difference from the expected ratio is 1 : 1 ($\chi^2$ = 27.5871, P <0.05). CPUE average of crocodile shark is 1.60 (SD ± 1.71) with values ranging between 0.37 and 20.13 sharks / 1000 hooks, and highest. CPUE were caught in latitude of $12^0$–$15^0$ S. Length frequency distribution of crocodile shark shows 39-103 cmFL (SD±13.32) males and 37-106 cmFL (SD±17.08) females. It is dominated by 90 cmFL size, with sex ratio of males and females during this period is 1: 0,67, while a significant difference from the expected ratio is 1:1 ($\chi^2$ = 24,9958, P<0.05).

Regarding the Manta Rays, the Indonesian Government made the new regulation through the Ministerial Decree Number 4 Year 2014 on the full protection status of Manta Rays in Indonesia (*Manta birostris* and *Manta alfredi)* and published the Development of Manta Rays Identification Guideline (2014).

### 5.2 Seabirds

RITF Scientific observer program also include seabirds on their data record and since 2005 to 2012, in 2012 observed reported within 638 setting were incidentally caught 8 seabirds, 6 were released alive while 2 seabirds already dead,In 2013 there is no trip oberver in frozen tuna fleets wich operated at 15 - $35^0$ S, observer just follow fresh tuna fleets and no interaction with seabirds,Indonesia currently do not has national plan of action for seabird mitigation**.**

### 5.3 Marine Turtle

Recent update on marine turtle In 2014 observer of RITF benoa reported 12 Olive ridley turtle caught by longliner. All of them were released in live condition.Currently Indonesia does not have NPOA for marine turtles but progressing to have one under Directorate General of Coastal and Small Islands-MMAF. 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.

### 5.4 Billfish

RITF reported that the catch proportion of billfishes contribute 6.3 % from the total catch of tuna longliner. Six species of billfishes were caught by longline vessels in Benoa Port from 2005 to 2012 i.e.: 973 swordfish (*X. gladius*) range: 50-280 cm; mean ± SE: 128±1.48 cm. 310 black marlin (*I. indica*) range: 60-307 cm; mean ± SE: 184±1.92 cm , 252 shortbill spearfish (*T. angustirostris*) range: 82-221 cm; mean ± SE: 151±1.05 cm, 222 blue marlin (*M. mazara*) range: 110-298 cm; mean ± SE: 192±2.39 cm, 109 striped marlin (*K. audax*) range: 69-270 cm; mean ± SE: 177±3.23 cm, and 94

sailfish (*I. platypterus*) range: 98-259 cm; mean ± SE: 165±3.51 cm (Jatmiko *et al* 2013). Swordfish 49.67 % was a dominant by catch followed by (15.82 %) black marlin (*I. indica*), (12.86 %) shortbill spearfish (11.31 %) blue marlin (*M. mazara*), (5.54 %) striped marlin (*K. audax*) and 94 (4.8 %) sailfish (*I. platypterus*).

The sex ratio (proportion of female to total of male and female) for swordfish and black marlin was 0,51 and 0,55 respectively (equal with 1:1) while for blue marlin was 0,62 where proportion of female was higher than male.

### 5.5 Neritic Tuna

RITF reported kawakawa/eastern little tuna (Euthynnus affinis) from 4,225 fish were collected with ranged from 23.5 – 61.5 cm, the Von Bertalanffy growth function estimates were $L\infty$ = 64.58 cm, K = 1 $year^{-1}$ and $t_0$ = -0.12872 years. The annual instantaneous rate of total mortality (Z) was 6.47 $year^{-1}$, the natural mortality (M) was 1.44 $year^{-1}$ and the fishing mortality (F) was 5.03 $year^{-1}$. The exploitation rate (E = 0.78) is almost same with the predicted value ($E_{max}$ = 0.799) indicating that Euthynnus affinis was fully exploited in the Indian Ocean.

### 5.6 Southern Bluefin Tuna

SBT Fisheries-Indonesia, in 2014 approximately 191 longliners caught 11,573 individual SBT and about 1,063 t. CDS data for 2014 indicated that the main catch was taken from statistical area 1 (75.3%) with length ranges of 40 to 300 cm FL, followed by area 2 (23.4%) with 80 to 188 cm FL, and then area 8 (1.3%) with 121 to 175 cm FL. While catch by size of vessel indicated that 25% of SBT were caught by large vessels with a size of ≥ 200 GT which operated in area 2 and 8, 18% (<30GT), 33% (30-100 GT) and 25% (100- 200 GT) operated in area 1 (as presented in Nugroho *et al* 2015).

The catch monitoring activities on Southern Bluefin Tuna (SBT) in Benoa during September 2013 to April 2014 revealed that size distribution of SBT ranged from 70 to 225cmFL,Regular length measurements during period of 1998-2013 showed that the mean length in 2013 tend to decline to162 cm FL. Monthly landing occurred in a similar pattern with higher volume compared previous landings, and its contributes at around 93% of the national catch data. Enumeration data on length frequency measurements indicated that a significant portion of smaller size (<120 cm) caught during December 2013, this data indicated that there some fishing vessels operated in the area off spawning ground. Number of active vessels in the port of Benoa in 2013 is relatively the

similar as in 2011 and 2012, Onboard observer carried out on CCSBT authorized fishing vessels for 170 days which $13^0$ South latitude was the highest latitude and $113^0$ East in the far west longitude, CDS data shows the estimate total catches in 2013 at about 18005individual SBT with total weight of 1,383 tons (DGCF, 2014 *in prep*),

## 6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

### 6.1 Log-sheet 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) type of logbooks 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 2013, for three FMA's (571-573), there is differences number of logbook number for each of it. During 2013, total number of vessel which filling logbook for FMA 571, 572 and 573 are 222, 70 and 70 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.

### 6.2 Vessel Monitoring System

Vessel Monitoring System **(**VMS) for fishing vessels has been started to be implemented in Indonesia since 2003, Currently, trough Ministrial Regulation No,10/2013, all fishing vessel above 30 GT mandatory to be equipped by 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 combate of 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.

### 6.3. Observer programme

Indonesia fishing vessels have joined Regional Observer Programme for Transhipment 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 transhipment by large-scale fishing vessels stated that "*Each CPC shall ensure that all carrier vessels transhipping 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 2014 the observer was also include purse seine and hand line to be observed onboard (Table 5). Recently ministerial regulation of MMAF no 01 year 2013 formally regulate an observer onboard for fishing and carrier vessel, a positive progress to secure government budget for observer program in the future.

Table 7. Activity summary of observer based at Benoa Fishing Port (RITF) 2005-2014.

| 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 | 50 |
| 2011 | 5 | 6 | 3 | 210 | 30-50 | 40 |
| 2012 | 6 | 7 | 5 | 496 | 12-90 | 82.7 |
| 2013 | 9 | 7 | 3 | 604 | 48-60 | 86.3 |
| 2013 PS-Small Scale | 1 | 2 | 2 | 21 | 9-12 | 10.5 |
| 2013 HL-Small Scale | 1 | 2 | 2 | 19 | 9-10 | 9.5 |
| 2014 | 8 | 6 | 4 | 371 | 29 - 90 | 61.8 |
| HL-Small Scale | 10 | 70 | 10 | 70 | 1 | 1 |

The spatial distribution of observed effort is presented by 5-degree blocks (5° latitude x 5° longitude) (Figure 6), More than 50% of the total number of hooks recorded were concentrated between 110° and 120°E and 10° and 20° (Figure 6), 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.

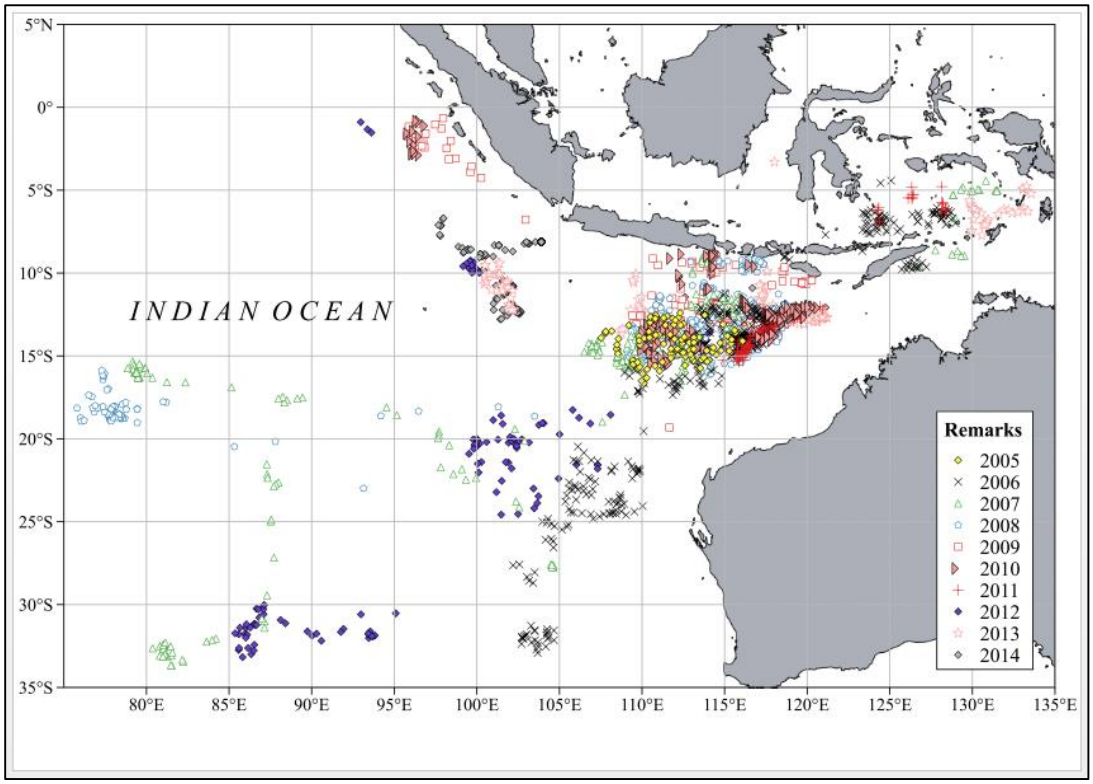


Figure 6. Spatial distribution of the observed sets from 2005 to 2014 (source: Observer Program data RITF, Benoa).

The observed longline sets from 2005 to 2014 covered the Eastern Indian Ocean between latitudes 0° and 34°S and longitudes 75° and 135°E, but also the Banda Sea (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.

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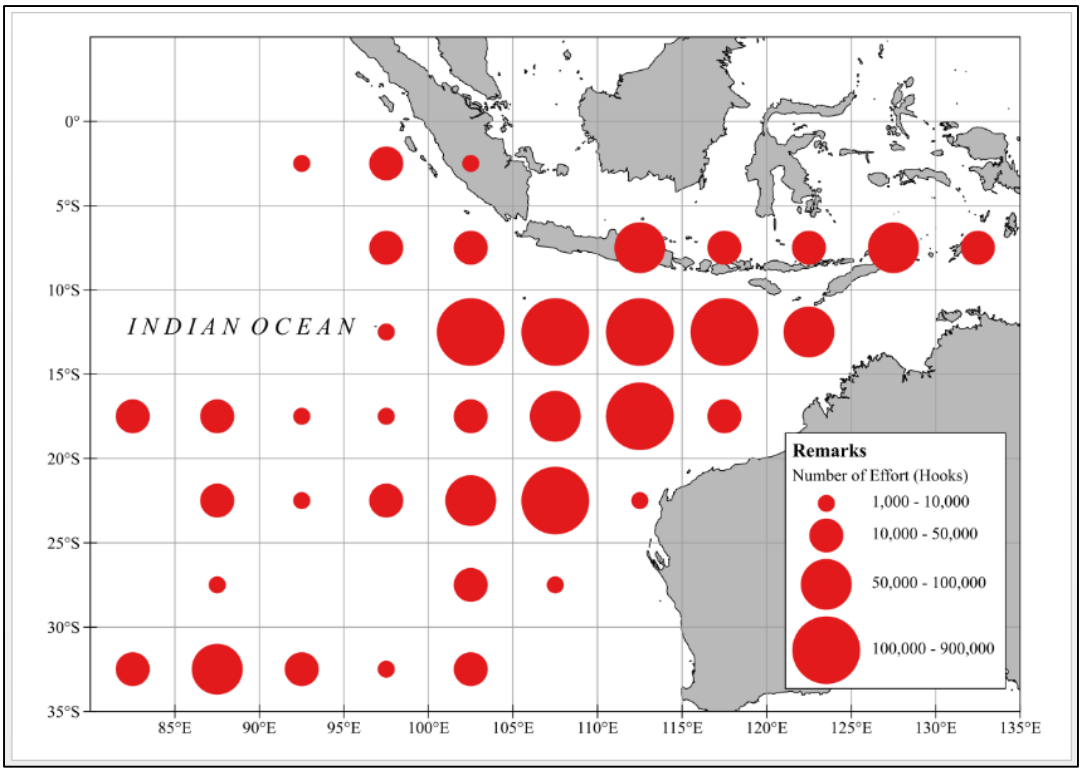


Figure 7. Spatial distribution of observed longline effort (hooks) by 5-degree blocks, aggregated from 2005 to 2014 (source: RITF Observer Program data).

The spatial distribution of observed effort is presented by 5-degree blocks (5° latitude x 5° longitude) (Figure 7). More than 50% of the total number of hooks recorded were concentrated between 110° and 120°E and 10° and 20° (Figure 8). 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.

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 Programme

Port sampling program at three major Indonesian ports, NizamZahman 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 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). 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 2009-2012 was above 50%, continuing in 2014 the monthly monitoring of ports sampling were range from 45 – 72% coverage (Table 8).

Table 8. Summary of RITF Monitoring activities at Benoa Fishing Port in 2014.

| Month | Number Landing | Number Sample | % Covered | Number of Weight Recorded | Number of Length Measured |
|---|---|---|---|---|---|
| January | 68 | 40 | 58.82 | 7,903 | 1,087 |
| February | 43 | 28 | 65.12 | 5,920 | 786 |
| March | 76 | 45 | 59.21 | 6,209 | 1,475 |
| April | 66 | 39 | 59.09 | 7,134 | 1,578 |
| May | 72 | 33 | 45.83 | 8,764 | 1,094 |
| June | 83 | 53 | 63.86 | 15,128 | 2,134 |
| July | 128 | 86 | 67.19 | 16,261 | 1,702 |
| August | 49 | 32 | 65.31 | 14,928 | 776 |
| September | 57 | 36 | 63.16 | 11,408 | 1,080 |
| October | 59 | 43 | 72.88 | 7,083 | 1,289 |
| November | 88 | 42 | 47.73 | 11,630 | 1,942 |
| December | 69 | 44 | 63.77 | 6,786 | 1,737 |

### 6.5 Catch Documentation scheme (CDS)-SBT

Catch Documentation scheme (CDS) for SBF has been implemented by Indonesia since 1 January 2010 in two fishing ports i.e. Benoa Port, Bali and Nizam Zachman Oceanic Fishing Port, Jakarta. All activities in export of SBT shall complete three forms such as Catch Tagging Form, Catch Monitoring Form, Re-Export/Export after Landing of Domestic Product Form. These three forms have to be validated by DGCF-DFRM officer. DGCF-DRFM will compile CDS data and submitted to CCSBT secretariat in spreadsheet format. During three years implementation of CDS we found that the validation and supervision in filling the CDS forms should be regularly monitored in order to minimize the possible error. Information on Indonesia CDS could be found in (Satria *et all* 2013). In 2014, Indonesia initiates to develop an application system of CDS to provide online service of CDS validation (port based). This online system has been running on 1 January 2015.

## 7. NATIONAL RESEARCH PROGRAMS

(1) Project title: Indian Ocean Pelagic fisheries research through Port sampling and observer program, Project Duration: 2010-2015.
(2) Project title: Catch monitoring and biological observation for tuna species caught by small scale fisheries in West Sumatera, Project Duration: 2014-2016
(3) 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 fisheriesto improve Indonesia's pelagic fisheries research capacity. The project also address population structure of Bigeye tuna and yellowfin tuna through genetic and parasites analysis.

Implementing Unit: Center for Fisheries Research and Development (CFRD) (previously known as RCFMC) –collaboration with ACIAR.
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 8. Scientific requirements contained in Resolutions of the Commission, adopted between 2005 and 2014.

| Res. No. | Resolution | Scientific requirement | CPC progress |
|---|---|---|---|
| 13/03 | On the recording of catch and effort by fishing vessels in the IOTC area of competence | Paragraphs 1–11 | Indonesia has issued Ministerial Decree number 48/PERMENKP /2014 regarding logbook. |
| 13/04 | On the conservation of cetaceans | Paragraphs 7– 9 | - Indonesia has been implementing Resolution 13/04 through Government Regulation No 7/1999.<br>- Ministerial Regulation number 12/PERMENKP/2012 regarding capture fisheries fishing business on high-seas. |
| 13/05 | On the conservation of whale sharks (*Rhincodontypus*) | 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 |

| Res. No. | Resolution | Scientific requirement | CPC progress |
|---|---|---|---|
| | | | capture 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 capture 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 |
| 10/02 | Mandatory statistical requirements for IOTC members and cooperating non contracting parties | Paragraphs 1–7 | • Nominal catch data has been submitted<br>• Logbook program started<br>• Tuna size data of longline-fleet have been submitted |
| 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<br>• NPOA shark and ray |

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