

INDONESIA SOUTHERN BLUEFIN TUNA FISHERIES <sup>1</sup>

A National Report Year 2012

Prepared by

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## 1. Summary

The number of registered tuna longliners in the port of Benoa (Bali) was 757. Indonesia tuna longliners authorized by CCSBT in 2012 increased 52% from 209 (2011) to 317 (2012). In fact the active fishing vessels decreased 27% from 172 to 125 <sup>2</sup>. Those tuna fishing boats were vary in size from 22-589 GT, mainly based in Benoa port Bali and about 85% of Indonesia's catch of SBT is landed in the port of Benoa. DGFC reported that total catch of SBT from CDS Bali and Jakarta in 2012 was 778,7 mt. The annual catch estimate from sampling on landing data in Benoa of SBT was 879 mt. The catch monitoring activities on fish size landed in Benoa revealed that size distribution of SBT was range from 82 to 214 cm FL, the mean length of SBT in 2010-2012 has fluctuated between 162 and 171 cm FL with tend of smaller size of specimens occurred in 2012. The nominal CPUE 2005-2012 showed higher catch rates in the temperate regions. The average hook rate was 0.1 per 1000 hooks. A higher hook rate of SBT in 2012 occurred on October, November for 0,1-0,3 per 1000 hooks. Lower hook rate occurred on April to August 0-0,01 per 1000 hooks. Indonesia and Australia (CSIRO) is continuing to work together to provide age composition data (based on direct ageing using otoliths) and close kin analysis. Scientific observer program activities in 2012 cover 496 days at sea with 9 observer for longliners and 1 observer for purse seiner.

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<sup>2</sup> Source : [www.ccsbt.org](http://www.ccsbt.org)

## 2. Introduction

Southern Bluefin Tuna (*Thunnus maccoyii*, SBT) is one of the important tuna species caught seasonally by the tuna longliners in southern of Java, Indonesia. There are several main landing sites in Indonesia for tuna longliner operating in the Indian Ocean that is Muara Baru Jakarta, Cilacap, Bungus Padang, Palabuhan Ratu and Benoa Bali. Mostly SBT are landed in Benoa port, Bali that recorded about 85 % from the total catch of SBT in Indonesia. Monitoring of Tuna including SBT catch is regularly conduct by RITF through enumerator sampling program in Benoa Port and scientific observer onboard. Since 2010 DGCF also monitor the SBT catch using CDS scheme under CCSBT framework beside the former capture fisheries statistical as national data. This report provides information of SBT landed mainly in Benoa port through enumerator and scientific observer data, including national capture fisheries statistic and CDS data.

## 3. Data Source

There are two sources of data collection available for SBT that is tuna catch monitoring by enumerators and Scientific Observers in Benoa (2005- July 2013), Catch Documentation Scheme (CDS) data (2011-2011) and Capture Fisheries Statistics of Indonesia (2004-2012).

## 4. Fleet size and distribution

The number of vessels that landed SBT in Benoa continuously decrease from just below 3000/year (2004) to just above 1500/year (2006) and tend to be stable in the following three years (2007-2009) and continuously decrease down to 750/year (2012). (Figure 3). The number of registered tuna longliners in the port of Benoa (Bali) increased from 757 in 2011 to 762 in 2012 (Station of Marine And Fisheries Resources Surveillance- Benoa 2012). Indonesia longliners authorized by CCSBT in 2012 increased 52% from 209 (2011) to 317 (2012). While the active fishing vessels decreased 27% from 172 to 125<sup>3</sup>. Those fishing boats vary in size from 22-589 GT ([http://www.ccsbt.org/site/authorised\\_vessels.php](http://www.ccsbt.org/site/authorised_vessels.php)). Most of the fishing boats were based in Benoa port Bali. Most of fishing vessels (47%) were between 50-100 GT and 7% of more than 200 GT. The fleet size distribution and total effort registered fishing vessels are shown in figure 1.

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<sup>3</sup> Source : [www.ccsbt.org](http://www.ccsbt.org)

## 5. Catch and Effort

The annual catches of SBT were about 633 mt (metric ton) in 2004 and has significantly increase in 2005 for about 1,700 mt, dropped again to just below 600 mt in 2006. The catches of SBT since 2007 were continuously decrease from 1,077 mt to 496 mt in 2010 and increase respectively up to 672 mt (2011) and 770 mt in 2012. Catch estimate in 2012 indicated that the landing was 817mt (table 1). Monthly catch of SBT during 2008-2012 showed a similar pattern. High catch generally occur during October to March coinciding with the west monsoon season. The highest catch in 2012 again occurred in October and steady decrease to the December 2011, It seems the trend of the monthly catch showed quite similar compare to the catch from previous year (figure 5), Other source of information from tuna association the monthly catch also presented a similar pattern (figure 6). This is constantly explained why SBT being more abundant on the fishing grounds and being a more significant proportion of the overall tuna catch during the SBT spawning season, which is generally September – March

## 6. Nominal CPUE

Spatial distribution of nominal catch rates for SBT aggregated from 2005 to 2012 (Figure 7). The area covered by the Benoa observers from 2005 to 2012 was between 0°-35°S and 75°-135°E. SBT had higher catch rates in the temperate regions. The maximum SBT catch rates (1-2 fish per 1000 hooks) occurred within 2 squares between 25°-35°S and 100°-105°E, whilst in other 5-degree blocks SBT catch rates were <1 fish per 1000 hooks, and even zero for several fished squares (Figure 7). Figure 8 a,b,c shows the spatial distribution of nominal catch rates for SBT per year, in 2012 the coverage of observer was wider to the south compare to the previous year. The SBT catch rates were <1 fish per 1000 hooks in every 5-degree blocks in 2010, 2011 and 2012 (Figure 8).

## 7. Hook rate

Scientific observer program has been started since 2005 based at Benoa port and still continuing. The average of hook rate was 0,4 per 1000 hooks in 2005 with a decreasing trend through year up to 0.02 per 1000 hooks in 2010, with slightly increase to 0,1 per 1000 hooks in 2011 and again down to just below 0,1 per 1000 hooks in 2012 (Figure 9). The highest hook rate occurred in March for 2 per 1000 hooks and sharply down 0-0,01 per 1000 hooks on April to August then increase again with a higher hook rate on October, November for 0,1-0,3 per 1000 hooks (Figure 10).

## 8. Size distribution

Port sampling program is continuing conducted at port Benoa including measurement of SBT, in 2012 the port sampling were sampled a total of 1503 individual and weighed. From those samples, fish fork lengths were measured to the nearest centimeter and weighed to the nearest kilograms for 1486 individuals. In the year of 2012 SBT fishing season showed a different figure compare to results of the last three years sampling. The size frequency measurements of SBT during period of January 2012 to December 2012 were range from 80 cm to 212 cm in length (FL) (Figure 11) while the minimum size from size frequency distribution in 2010-2011 was not smaller than 120 cm. Particularly in August sampling from Benoa enumerators showed that 24 Juvenile SBT size less than 120 cm (FL) were sampled (Figure 15) and It was also recorded from August's CDS data that 34 deep frozen SBT size 80-130 cm FL also landed by longliners in Benoa Bali. It seems that the longliners might be operated more to the south whilst the CDS data inform that the longliner was operated in the region 2. Farley *et. al.* (2010) reported that the mean of the size distribution declined from 188.1 to 166.8 cm between 1993/1994 and 2002/03, and fluctuated between 168.3 and 171.0 cm. From the port sampling program in Benoa in January-December 2012 showed main proportion of the catch was remaining has a range from 160 cm to 180 cm of FL with Lc at about 160,4 cm FL. From previous study the length at first maturity were range from 155-164 cm FL and the catch in 2012 also showed that more than 50 % SBT caught as mature fish. Proportion and size distribution between male and females of SBT was relatively proportional (Figure 13). 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 FL in the 90's to 169 cm FL in 2007 and the mean

size of SBT showed a relatively stable from 2008 to 2011 at about 175 cm FL and slightly decrease to 165 cm FL in 2012. (Figure 14).

## **9. Scientific Observer**

The scientific observer activities were recorded since 2005 and now still continuing. The number of scientific observer was decrease from 6 person in 2007 become 5 person in 2008 and recently in 2013 increase to 9 person for tuna longliners observer and 1 observer for purse seiner. The average day sea /trip was vary from 20 d/trip to 52 d/trip thus the total day at sea also vary from 21 days to 758 days /total number (Table 3). observer coverage in 2012 the days at sea was 496 d increase more than 50% compare to 2011 , and for 2013 the days at sea up August was 484 days. It is predicted that in 2013 scientific observer coverage will have better coverage than 2012. Indonesia and Australia is continuing to work together to provide age composition data (based on direct ageing using otoliths).

## **10. Catch Documentation scheme (CDS)**

Catch Documentation scheme (CDS) 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 both export and import of SBT shall complete three forms Catch Tagging Form, Catch Monitoring Form, Re-Export/Export after Landing of Domestic Product Form and submitted to DGCF-DRFM. DFRM 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 regularly monitor in order to minimize the possible error. Information on CDS should be found in table 2.

## **11. Acknowledgements**

We acknowledge the support of scientific enumerators and observers in Research institute for tuna Fisheries Benoa Bali for their significant work and data contribution for this report. We also thanks to ACIAR, CSIRO, IOTC and OFCF that had significant role and contribution in establishing port sampling and scientific observer based in Benoa. The cooperation of the Directorate Fisheries and Resource Management (DFRM) - Directorate General for Capture Fisheries DGCF for national fisheries and CDS data. We also thank to Craig Proctor (CSIRO) for his supervision on sampling activities, comment and

contribution and particularly thanks to Prof Dr. Hari Eko Irianto Head of research Center for fisheries management and Conservation for his direct and supporting to this report.

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Appendices.

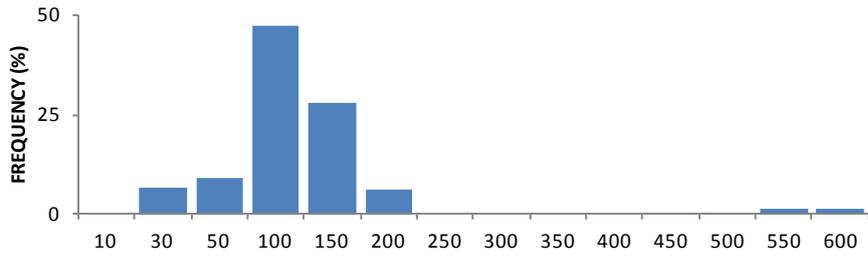


Figure 1. Fleet size distribution of tuna longline in 2012

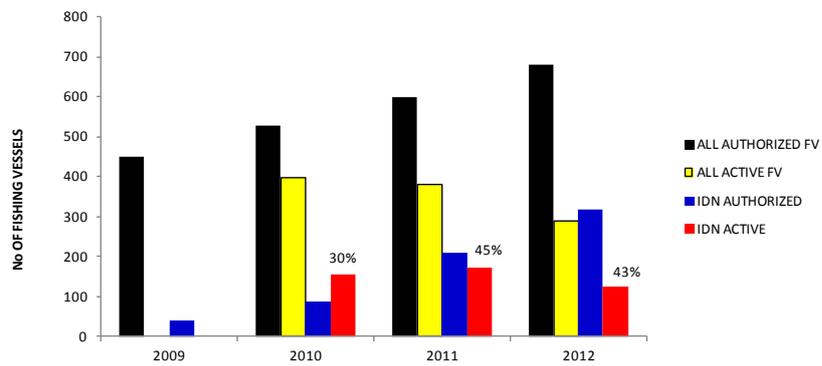


Figure 2. Number of authorized and active fishing vessel (Source : [http://www.ccsbt.org/site/authorised\\_vessels.php](http://www.ccsbt.org/site/authorised_vessels.php))

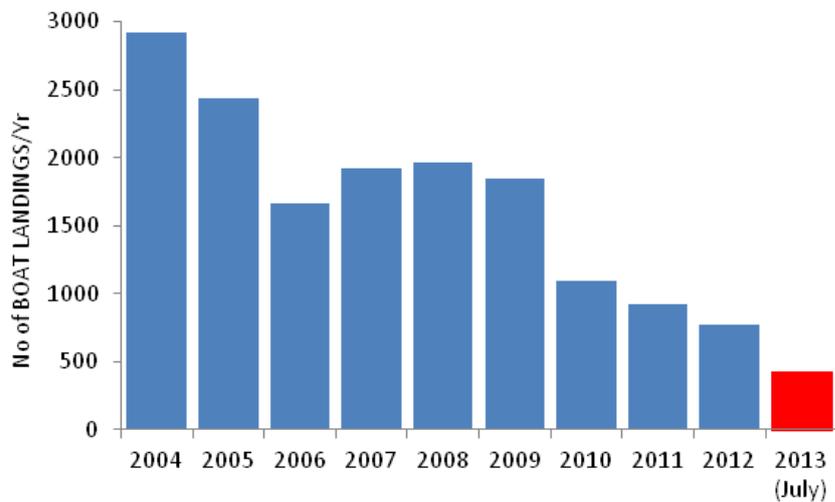


Figure 3. Number of Tuna Longliner landing at Bena Fishing Port (RITF 2013)

Table 1. Annual catches of SBT reported to CCSBT 2004-2012

Year	Indonesia total catch of SBT (tons)		
	Reported to CCSBT	National Fisheries Statistics	Catch estimate *
2004	633	665	613
2005	1726	1831	1690
2006	598	747	558
2007	1077	1079	1077
2008	926	891	905
2009	641	641	641
2010	496	474	580
2011	672	700	769
2012	**	875,7**	817
2013	NA	NA	536***

Note:

1. Catch estimate \* was based on port sampling activities landed only in Benoa port by RITF and updated in Anon (2013)
2. \*\* in the process of data validating.
3. \*\*\*Estimated up to July 2013

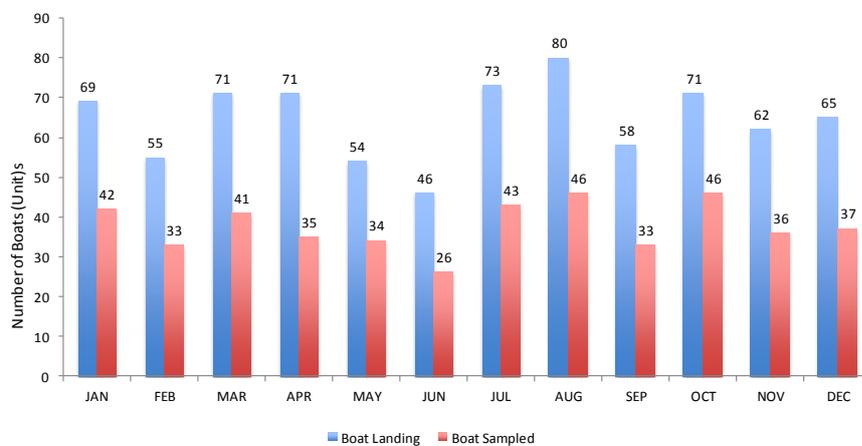


Figure 4. Monthly boat landings and sampling activities in 2012. Source : RITF (2013)

Table 2. Indonesia Monthly Catch Report of SBT (January- December 2012) under CDS Scheme (DRFM-DGCF 2012)

Month	Total			Bali-Benoa			Jakarta		
	Number	Net Weights (Kg)	Estimated Whole Weight (GG*1,15) (Kg)	Number	Net Weights (Kg)	Estimated Whole Weight (GG*1,15) (Kg)	Number	Net Weights (Kg)	Estimated Whole Weight (GG*1,15) (Kg)
January	672	58.763	67.577	514	53.808	61.879	158	4.955	5.698
February	665	65.247	75.034	647	63.378	72.885	18	1.869	2.149
March	455	46.028	52.932	425	42.967	49.412	30	3.061	3.520
April	523	38.005	43.706	410	34.115	39.232	113	3.890	4.474
May	158	10.171	11.697	93	7.810	8.982	65	2.361	2.715
June	260	17.667	20.318	165	14.850	17.078	95	2.817	3.240
July	796	42.693	49.097	343	29.756	34.219	453	12.937	14.878
August	1.185	86.324	99.272	816	75.752	87.114	369	10.572	12.158
September	1.653	128.120	147.338	1.484	123.286	141.779	169	4.834	5.559
October	1.558	112.540	129.421	1.558	112.540	129.421	-	-	-
November	1.291	85.687	98.540	1.291	85.687	98.540	-	-	-
December	1.201	87.505	100.631	1.201	87.505	100.631	-	-	-
TOTAL	10.417	778.750	895.563	8.947	731.454	841.172	1.470	47.296	54.391

Note:

- The data would be update in the near future
- The catch of SBT of 2012 is temporary figure

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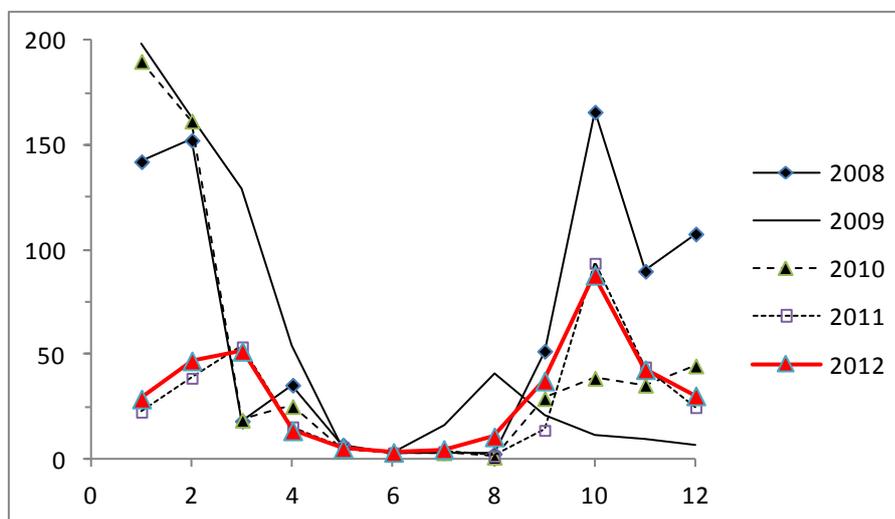


Figure 5. Monthly catch of SBT landed in Benoa in 2008-2012 (Source : RITF (2013))

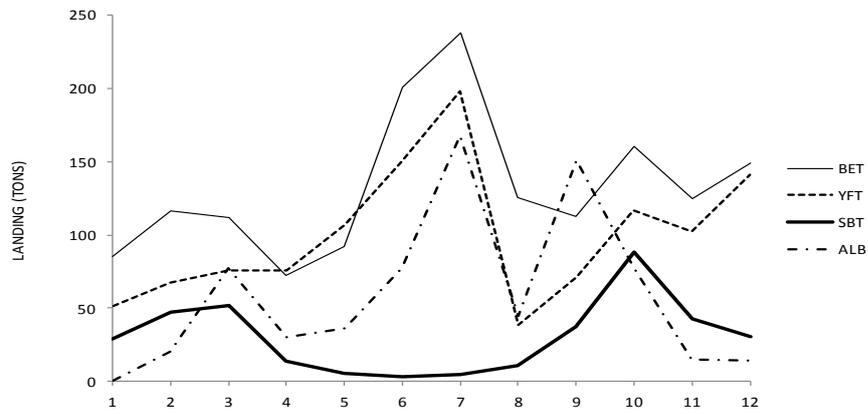


Figure 6 Monthly landing of SBT and other tuna species caught by Tuna longliners in 2012 Source : (ATLI 2013).

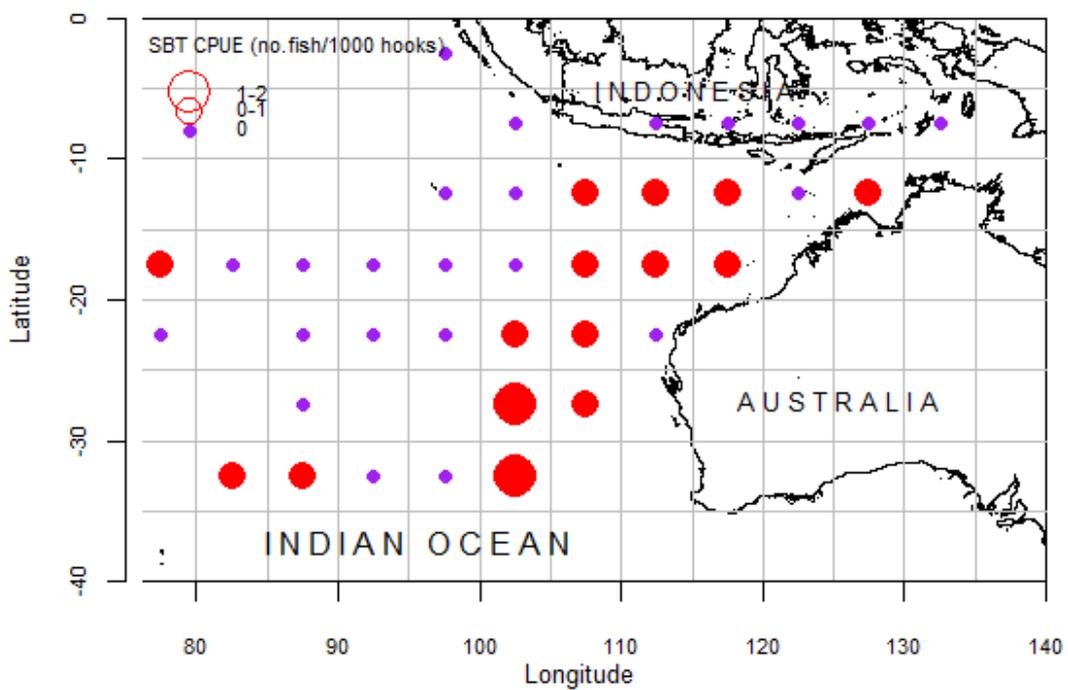
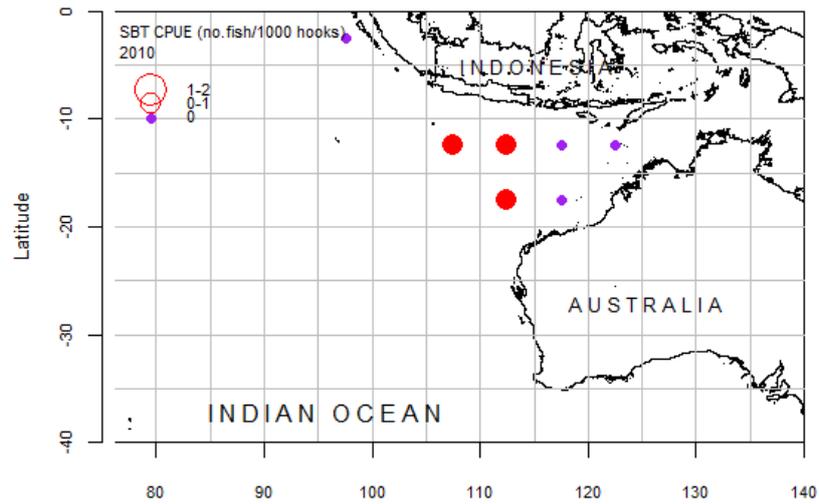
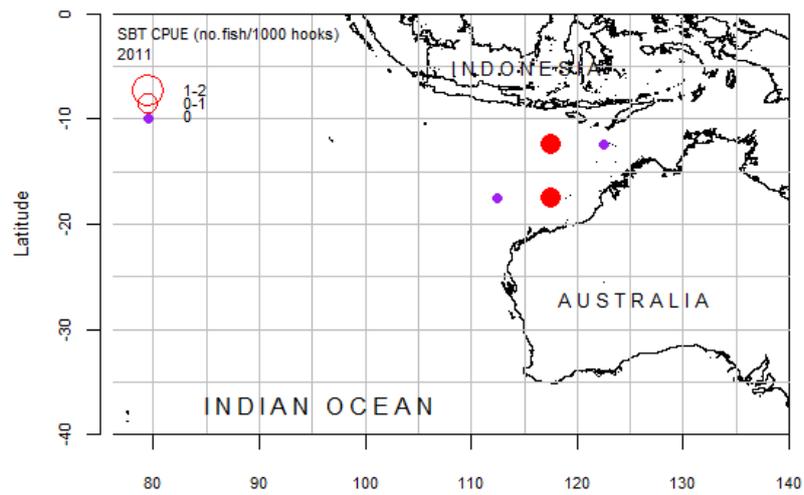


Figure 7. Spatial distribution of nominal CPUEs (no.fish/1000 hooks) for SBT recorded by Bena Observer, aggregated from 2005 to 2012 (RCFMC-RITF)

(a)



(b)



(c)

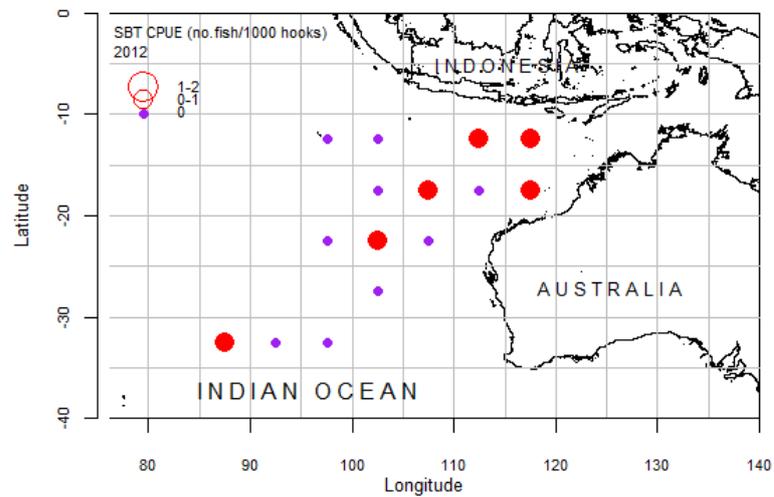


Figure 8 a,b,c. Spatial distribution of nominal CPUEs (no.fish/1000 hooks) for SBT recorded by Bena Observer in (a) 2010,(b) 2011 and (c) 2012 (RCFMC-RITF)

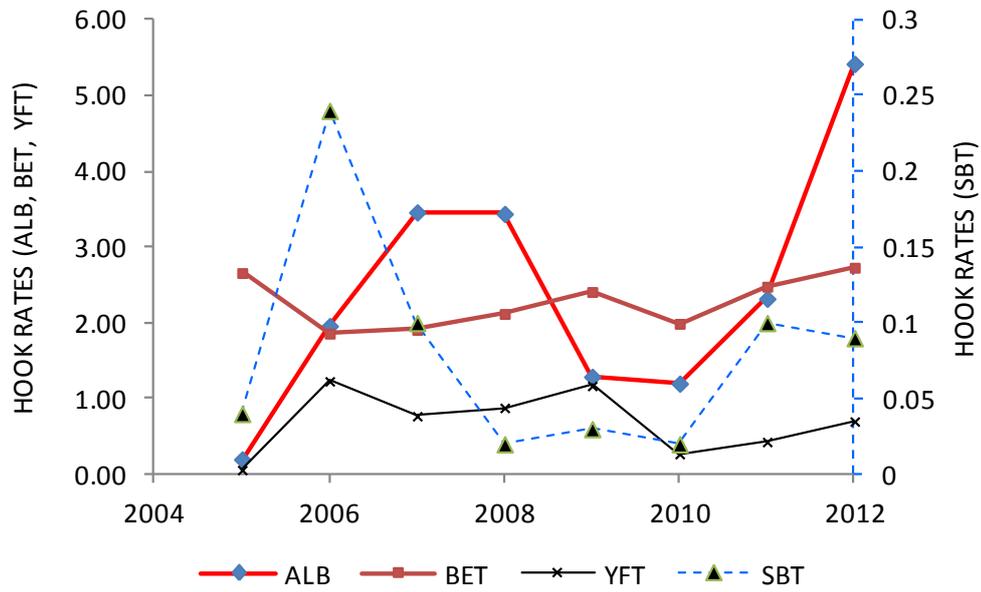


Figure 9. Fluctuation of average hook rate for tuna (ALB, BET, YFT and SBT) based on scientific observer data in the Indian Ocean. 2012.

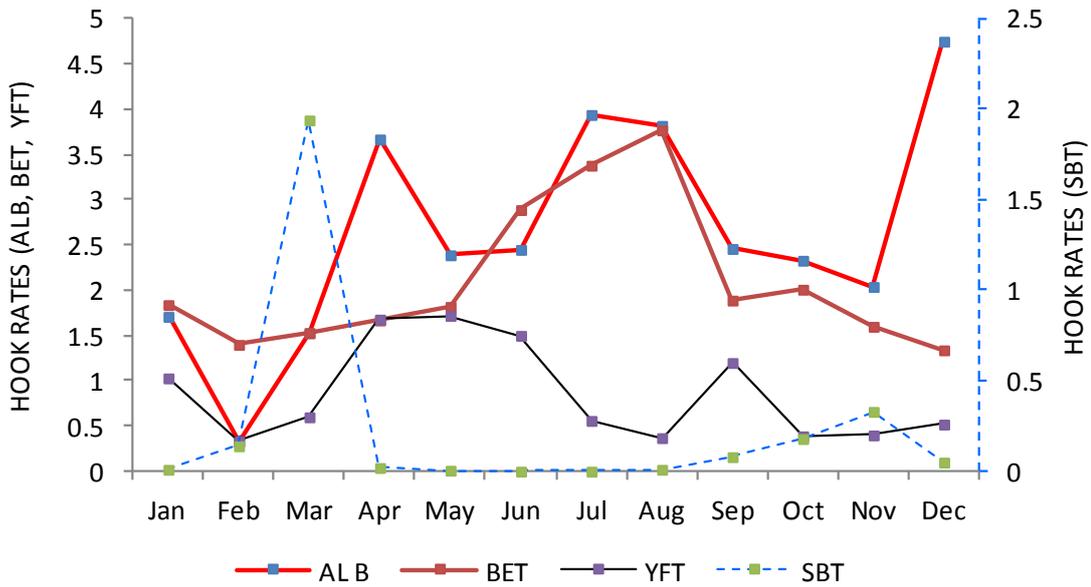


Figure 10. Average hook rate by month for ALB, BET, YFT and SBT based on scientific observer data in 2012

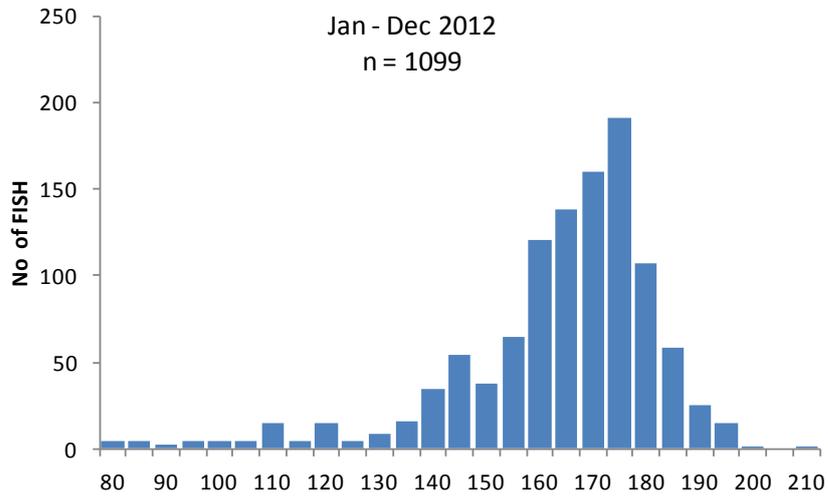


Figure 11 . Length frequency distribution of SBT during January– December 2012

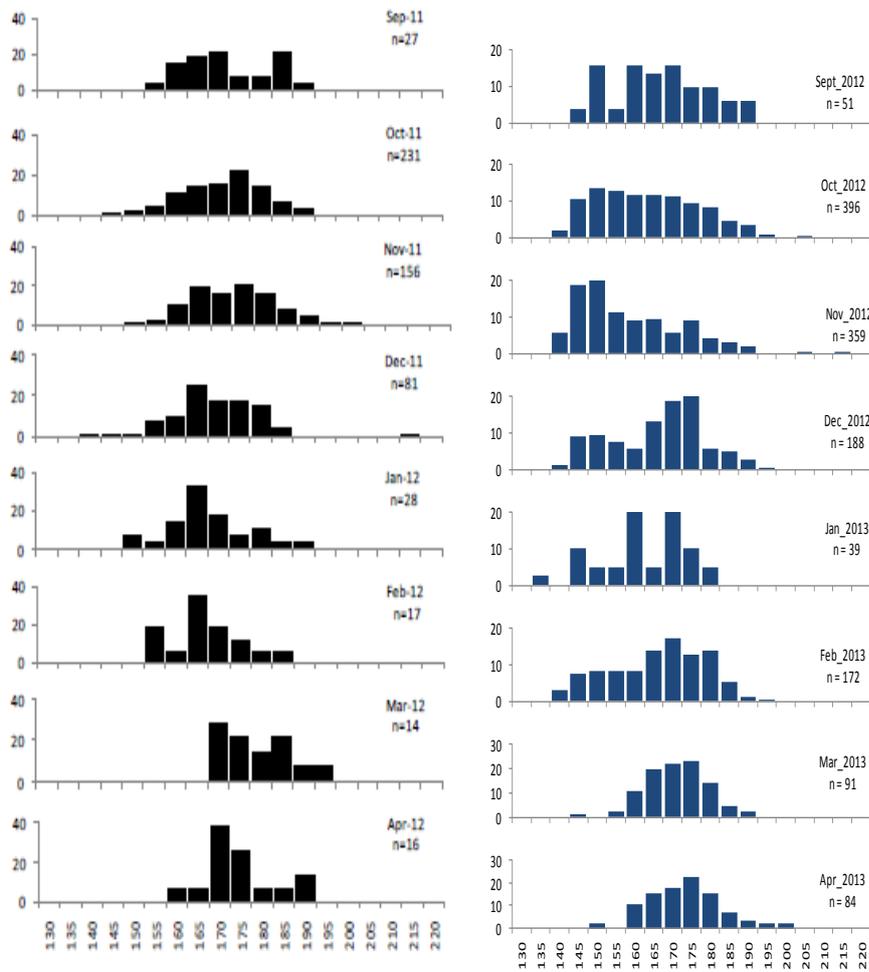


Figure 12. Updated Length frequency on SBT landed in Benoa September 2012-April 2013 compared with previous year. (source: data from otolith sampling)

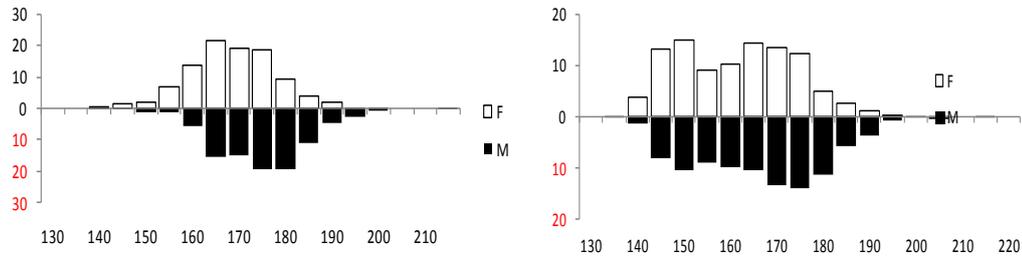


Figure 13. Length frequency distribution of landed SBT during observation September 2012 – April 2013 compared to September 2011- April 2012 in Benoa. with sex discrimination

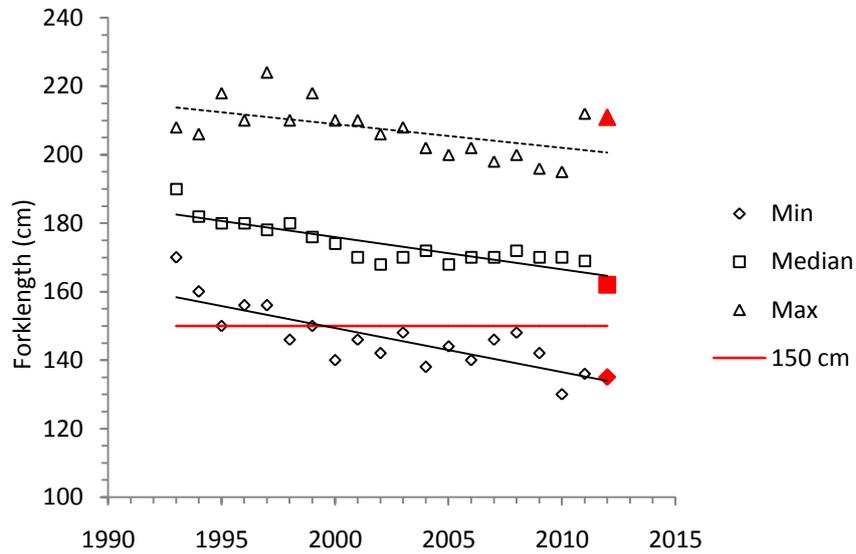


Figure 14. Updated Annual trend of average size of SBT landed in Benoa during September 2012-April 2013

. Table 3. Updated The annual activities of scientific observer based in Benoa Bali in 2005 and 2013 (July)

Year	No. Of Obs	No. Of Trips	No. Of Company	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	6	3	484	48-60	80.7
2013 PS*	1	2	2	21	9-12	10.5

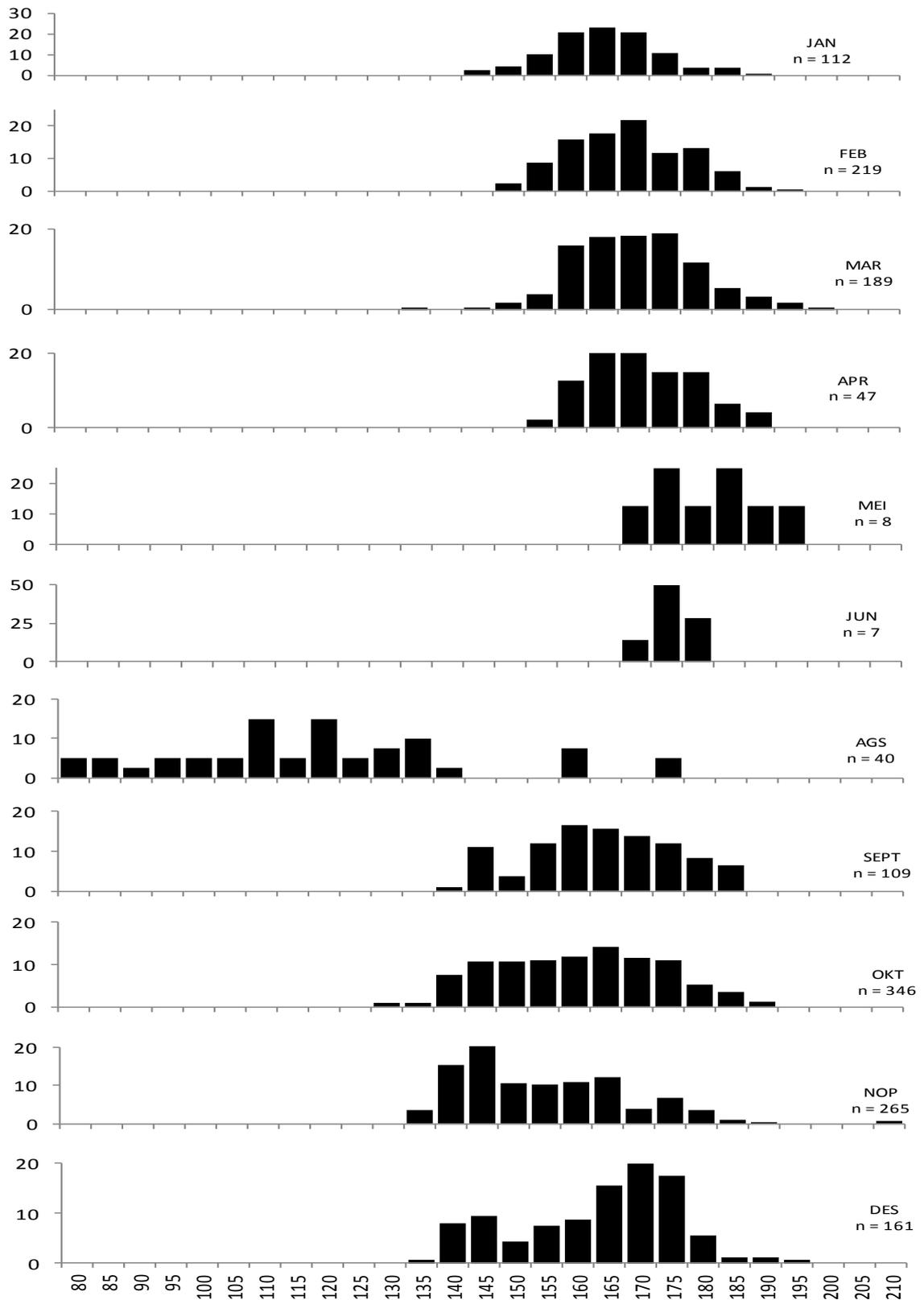


Figure 15. Length frequency distribution from Benoa port sampling activities (Jan – Dec 2012)