CCSBT – ESC/ /SBT FISHERIES – **Indonesia (Rev.1)**

**INDONESIA SOUTHERN BLUEFIN TUNA FISHERIES**[[1]](#footnote-1)

A National Report Year 2013

Prepared by

Duto Nugroho[[2]](#footnote-2),

Ali Suman[[3]](#footnote-3),

Fayakun Satria[[4]](#footnote-4),

 Budi Nugraha[[5]](#footnote-5),

Lilis Sadiyah2

Arif Puji5,

R. Kartika5

Kiroan Siregar5,

SUMMARY

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 225 cmFL. Regular length measurements during period of 1998-2013 showed that the mean length in 2013 tend to decline to 162 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 same as in 2011 and 2012. Onboard observer carried out on CCSBT authorized fishing vessels for 170 days which 130 South latitude was the highest latitude and 1130 East in the far west longitude. CDS data shows the estimate total catches in 2013 at about 18005 individual SBT with total weight of 1,383 tons (DGCF, 2014 *in prep*).

1. **Introduction**

Southern Bluefin Tuna (*Thunnus maccoyii*, SBT) is one of tuna species caught seasonally by the tuna longliners operated in Indian Ocean. Among the tuna fishing ports, this species mainly landed in Benoa. SBT catch monitoring catch is regularly conducted by RITF through enumerator and onboard observer program. 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 updated information of national estimation on catch of SBT mainly in Benoa port based on regular enumeration and onboard observer activities and including estimation on national capture fisheries statistic and CDS data during the year of 2013.

1. **Catch and Effort**

Port sampling and monitoring on catch of SBT were continuously applied and the result showed that the estimated monthly landing slightly shifted with previous years (see Satria *et al*., 2013). The highest landing IN 2013 occurred in February and September which much higher than the average catch of the last 5 years. The low landing was between May to July. The pattern of monthly fluctuation is similar with the 5 consecutive years (2008 – 2012) (Figure 1).



Figure 1. Monthly landing of SBT at Benoa in 2008 – 2013.

This figure constantly explained that SBT being more abundant on the fishing grounds and more significant proportion of the overall tuna catch during the SBT spawning season, which is generally occurred during September to April. The annual catch during 2004 – 2013 is listed in Appendix 1.

Fishing effort of tuna fishery represented by number of landing vessels showed that the number of vessels is relatively stable at low level (25% to 2004) since 2010 (Figure 2). These low numbers of active vessels probably due to the fishers use different fishing tactic and strategy. One common reason is fishers need longer days at sea to search fishing grounds. This would impact the arrival frequency or number of trip in recent years. Several factors could contribute to these phenomenon such moving fishing ground from one predicted to another fishing ground due to unsuccessful fishing. Or shifting fishing to the south – southwest tuna fishing grounds. Another issues arise to this fishery is transshipment system applied as part of increasing fishing efficiency. This also one should take into considered on this low number of trips of tuna longliner. Numbers of tuna longliner vessels that landing during 2013 were 753 units, while 431 units (57.24%) were enumerated. The monthly sampling vessels were shown in Appendix 1.



Figure 2. Number of tuna longliner landing at Benoa fishing port 2013

 Source: RITF (2014).

Detail observation on operational fishing aspects by trip through log-book or fishers daily notice could probably explain the phenomenon of stable at low level. In 2012, a number of 754 tuna longliner registered in Benoa. Vessel size ranged from 10 to > 200 GT with the highest number are within range of 20-30 GT (Figure 3).



Figure 3. Size distribution (GT) of tuna longliner based in Benoa.

 Source: DGSMFR (2013)

1. **Length frequency distribution**

Port sampling program during September 2013 to April 2014 measured a total of 6442 specimens weighted to the nearest kilograms.Among them 4493 individual (70%) were measured to the nearest centimeter for otolith measurements. During this fishing season, the length distribution shows slightly different compare to the last two years sampling (see: Satria *et al*., 2012; 2013). The frequency distribution is presented in Appendix 2.

The size frequency during period of September 2013 to March 2014 ranged between 70 cm to 225 cmFL while the minimum size from size frequency distribution in 2010-2011 no specimens with size of less than 100 cm. Particularly during September to December showed there were specimens of with size less than 100 cm (FL). Specimens withlength of 70 to 120 mm are perhaps the new record occurred during this fishing season. Special mention will be observed within this year.

The annual trend of fish size based on specific otolith measurements revealed that the mean size of SBT steady decrease through year from 182 cm FL in the 90’s decreased to 169 cmFL in 2007 then and the mean size a relatively stable during 2008 to 2011 at about 170 cm FL and slightly decrease to 162 cm FL in 2012 and 2013. (Figure 4).



Figure 4. Updated Annual trend of average size of SBT landed in Benoa during 1993 - 2013

1. **Scientific Observer**

Regular scientific observer activity in 2013 was deployed in three trips on authorized fishing vessels. Day at sea ranged from 52 to 60 fishing days per trip with total efforts of 90726 hooks. Geographically, observation covered the fishing ground from 8 to 130 South and 113 to 1200 East (Table 1). Due some technical difficulties, the ranges of coverage are available in lower latitude compare to previous years. The previous year showed that the highest latitude up to 400 S (see: Sadiyah *et al*., 2007; Satria *et al*, 2011; 2012; 2013).

Table 1. Observer activities in authorized Fishing Vessels in 2013.



**Hook rates**

Hook-rates were only available to estimate based on observer activity. As shown in Table 1, total number of 23 SBT was caught during the observations. The highest catch appeared in 3rd trip which carried out in September – October 2013. Data were obtained based on deploying of 90726 numbers of hooks. Even if the limited sample were observed during fishing season 2013, the data showed that hook rates of SBT ranging from 0.02 to 0.03 (Table 2).

Table 2. Estimated Hook-rates of SBT by trip of authorized fishing vessels

|  |
| --- |
| SBT |
| TRIP | n | HR | Length (cmTL) |
| Average | Min | Max |
| 1 | 6 | 0.02 | 174 | 168 | 180 |
| 2 | 2 | 0.01 | 181 | 178 | 186 |
| 3 | 15 | 0.03 | 162 | 146 | 203 |

**Ecological related species**

#### Eight ecological related species were caught during the observation. It comprises of Crocodile Shark (CSK; *Pseudocarcharias kamoharai*, Common Blacktip Shark, Silky Shark, Pelagic stingray (DAV; *Dasyatis violacea*), Lancet fish (NGA; *Alepisaurus sp.)*, Longnose chimaeras, (HAR; *Harriotta* spp.), Ocean sunfish (MOX; *Mola mola*), Tappertail ribbon fish (TRF: *Trachipterus fukuzakii*), Moon fish (MON, *Lampris guttatus*) and Escolar (LEC; *Lepidocybium flavobrunneum*). The species were different compared to previous year. Only Crocodile Shark is the same species caught. A number of 1425 specimens were noticed during the observation and there is no clear explanation of those different species during this season. List of ecological related species is listed in Appendix 3.

Numbers of incidental catch were also recorded with hook-rates by species and varied from 0.01 to 2.02 (Table 3). Hook rates of Lancet fish (*Alepisaurus* sp.) noticed in1st trip is the highest rates during observation. The estimate of mortalities of these species were also discussed within the tuna researcher (Nugraha & Satria, 2014). The result presented in Appendix 3. It needs more explanations to fulfill the estimate number of mortalities.

Table 3. Hook rates of some ecological related species

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TRIP | No of hooks | DAV | NGA | SBF | HAR | LKV | MOX | TRF | MON | CSK | LEC |
| 1 | 30,432 | 170 | 300 | 5 | 3 | 2 | 3 | 2 |  |  |  |
| 2 | 23,616 | 124 | 478 | 4 |  |  |  |  |  |  |  |
| 3 | 55,165 | 151 | 159 | 15 | 11 | 2 |   |   | 1 | 15 | 4 |
|  | Hook-rates  |  |  |  |  |  |  |  |  |  |  |
| 1 |  | 0.56 | 0.99 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |  |  |  |
| 2 |  | 0.53 | 2.02 | 0.02 |   |  |  |  |  |  |  |
| 3 |   | 0.27 | 0.29 | 0.03 | 0.02 | 0.004 |   |   | 0.002 | 0.03 | 0.01 |

Source: RITF (2014)

1. **Catch Documentation scheme (CDS)**

Catch Documentation scheme (CDS) in two major fishing ports of SBT were listed in table 4. SBT catch estimate in 2013 indicated that the landing was estimated at 1,202 tons and appeared the highest catch since 2006. The highest catch occurred in February (213 tons) and March (202 tons). The fish were all landed in Benoa during those periods. (Table 4). The lowest landing occurs during May and June. The SBT landed in Jakarta occurred during April to September, it appears those two main port has different fishing seasons and detail study will be prepared for the next meeting.

#### Table 4. CDS Report of SBT (January- December 2013).



Source: DGCF, 2014

#### Plotting annual data on mean weight by fish from total number and weight during 2011 – 2013 indicated that the size of SBT landed in Jakarta between 25 to 35 kg/fish is smaller than in Bali of 85 to 95 kg/fish (Appendix 4).

1. Research activities

#### Some research projects to strengthen scientific and technical basis of data base on tuna fisheries management are in ongoing activities. The project are as follows :

#### Gut weight ratio based on onboard observer were carried out to measure the gut-loss aspects since early this year. Limited number of specimens are available and still being updated up to the last fishing season of this year.

* Collecting SBT otolith in spawning ground is the major activity to provide data base. This regular activity is under supervised by CSIRO scientist.
* Small scale tuna fisheries in Indian Ocean with usually target species including tuna species. Several barriers related to geographical distribution of landing base occurred during data collection. Prioritizing sampling sites will be carried out to describe the contribution of annual tuna catch including probability of SBT landing. Recruit new certified observer as stated by Ministry regulation will be arranged to support this activity.
* Collecting sample to support close kin analysis will be developed in collaboration with CSIRO-Australia
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Appendix 1.



Figure 4. Monthly boat landings and sampling activities in 2013.

 Source: RITF (2014)

#### Table 5. Annual catches of SBT reported to CCSBT 2004-2012

|  |  |
| --- | --- |
| Year | Total catch of SBT (tons) - Indonesia |
| Reported to CCSBT  | National Fisheries Statistics | Catch estimate \* |
| 2004 | 633 | 665 | 613 |
| 2005 | 1,726 | 1,831 | 1,690 |
| 2006 | 598 | 747 | 558 |
| 2007 | 1,077 | 1,079 | 1,077 |
| 2008 | 926 | 891 | 905 |
| 2009 | 641 | 641 | 641 |
| 2010 | 496 | 474 | 580 |
| 2011 | 700 | 700 | 769 |
| 2012 | 910 | 910 | 817 |
| 2013 | ?? | 1,383\*\* | 722 |
|  |  |  |  |

 Note:

1. Catch estimate \* based on port sampling activities in Benoa (RITF)

#### \*\*temporary data.

Appendix 2. Length frequency distribution of all individual SBT during September 2011 to March 2014.



Appendix 3.

Table 6. Ecologically Related Spesies 2005 – 2013 (Scientific observer)

|  |  |
| --- | --- |
| **Species** | **Year** |
| **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| Black Albatross | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Seabirds | 0 | 0 | 7 | 25 | 1 | 0 | 1 | 2 | 0 |
| Leatherback Turtle | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Olive Ridley Turtle | 0 | 3 | 2 | 11 | 2 | 8 | 1 | 5 | 4 |
| Loggerhead Turtle | 1 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 |
| Hawksbill Turtle | 0 | 4 | 3 | 0 | 3 | 0 | 0 | 0 | 0 |
| Green Turtle | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Blue Shark | 79 | 473 | 433 | 236 | 91 | 76 | 3 | 702 | 0 |
| Pelagic Thresher Shark | 7 | 25 | 6 | 0 | 22 | 5 | 0 | 6 | 0 |
| Bigeye Thresher Shark | 5 | 15 | 12 | 13 | 4 | 5 | 2 | 2 | 0 |
| Tiger Shark | 0 | 0 | 3 | 4 | 1 | 0 | 0 | 0 | 0 |
| Hammerhead Shark | 1 | 1 | 9 | 0 | 6 | 1 | 2 | 2 | 0 |
| Spinner Shark | 0 | 16 | 35 | 4 | 10 | 0 | 0 | 1 | 0 |
| Sandbar Shark | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oceanic White tip Shark | 0 | 2 | 14 | 4 | 12 | 15 | 7 | 5 | 0 |
| Mako Shark | 5 | 22 | 39 | 31 | 24 | 2 | 0 | 13 | 0 |
| Shortnose Spurdog Shark | 9 | 35 | 63 | 34 | 22 | 0 | 0 | 0 | 0 |
| Crocodile Shark | 37 | 119 | 37 | 106 | 148 | 261 | 83 | 300 | 15 |
| Common Blacktip Shark | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Silky Shark | 0 | 35 | 8 | 1 | 22 | 9 | 0 | 1 | 0 |
| Pelagic stingray | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 445 |
| Lancet fish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 937 |
| Longnose chimaeras | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| Ocean sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Tapper tail ribbon fish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Moon fish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Escolar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| **Total** | **150** | **755** | **681** | **471** | **377** | **382** | **100** | **1039** | **1425** |

Appendix 4



Figure 5. Annual SBT landing by main fishing ports (left) and average weight of fish (right)

. Table 7. Updated annual activities of scientific observer based in Benoa Bali in 2005 and 2013

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 | 83 |
| 2013 | 5 | 3 | 3 | 170 | 52 - 60 | 57 |

Note: 2013 Observer on CCSBT record vessels

Appendix 3.

Table 8. Total fishing and observed effort, year, fishery and strata

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Country/ Fishing Entity | Calendar Year | Fishery | CCSBT Statistical Area | Species (*or group*) | Observed Captured (*number*) | Observed Capture Rate | Observed Mortalities (*number*) | Observed Mortality Rate | Observed Live Releases | Est. number of mortalities |  |
|  | Gear Code | Fleet Code |  |
|  | ID | 2013 | LL | IDD | 1 | DAV | 445 | 1.3574 | 441 | 99.10 | 4 |   |  |
|  | ID | 2013 | LL | IDD | 1 | NGA | 937 | 3.298 | 935 | 99.79 | 2 |   |  |
|  | ID | 2013 | LL | IDD | 1 | SBF | 24 | 0.061 | 0 | 0.00 | 0 |   |  |
|  | ID | 2013 | LL | IDD | 1 | HAR | 14 | 0.030 | 14 | 100.00 | 0 |   |  |
|  | ID | 2013 | LL | IDD | 1 | LKV | 4 | 0.010 | 3 | 75.00 | 1 |   |  |
|  | ID | 2013 | LL | IDD | 1 | MOX | 3 | 0.010 | 0 | 0.00 | 3 |   |  |
|  | ID | 2013 | LL | IDD | 1 | TRF | 2 | 0.007 | 2 | 100.00 | 0 |   |  |
|  | ID | 2013 | LL | IDD | 1 | MON | 1 | 0.002 | 1 | 100.00 | 0 |   |  |
|  | ID | 2013 | LL | IDD | 1 | CSK | 15 | 0.027 | 15 | 100.00 | 0 |   |  |
|  | ID | 2013 | LL | IDD | 1 | LEC | 4 | 0.007 | 4 | 100.00 | 0 |   |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Remarks: |  |  |  |  |  |  |  |  |  |
|  | COD | COMMON NAMES | Species |  | MOX | Ocean sunfish | *Mola mola* |
|  | DAV | Pelagic stingray | *Dasyatis violacea* |  | TRF | Tappertail ribbon fish | *Trachipterus fukuzakii* |
|  | NGA | Lancet fish | *Alepisaurus sp* |  | MON | Moon fish | *Lampris guttatus* |
|  | SBF | Southern bluefin tuna | *Thunnus maccoyii* |  | CSK | Crocodile shark | *Pseudocarcharias kamoharai* |
|  | HAR | Longnose chimaeras | *Harriotta spp* |  | LEC | Escolar | *Lepidocybium flavobrunneum* |

1. Prepared for the 19th Meeting of the Extended Scientific Committee. 1-6th Sept 2014, Auckland, New Zealand [↑](#footnote-ref-1)
2. Research Center for Fisheries Management and Conservation (RCFMC [↑](#footnote-ref-2)
3. Research Institute for Marine Fisheries (RIMF) [↑](#footnote-ref-3)
4. Research Institute for Fisheries Enhancement and Conservation (RIFEC) [↑](#footnote-ref-4)
5. Research Institute for Tuna Fisheries (RITF) [↑](#footnote-ref-5)