The Catch of SBT by the Indonesian Longline Fishery Operating Out of Benoa, Bali in 2008

Budi Iskandar Prisantoso[1]
Retno Andamari[2]
Craig Proctor[3]

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[1] Research Centre for Capture Fisheries, Jakarta, Indonesia
[2] Research Institute of Mariculture, Gondol, Bali, Indonesia
[3] CSIRO Marine and Atmospheric Research, Hobart, Australia

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Abstract

This paper reports on the longline catch of southern bluefin tuna and other tuna and billfish species landed at the Benoa Fishing Port, Bali in 2008. There were 1,980 landings by tuna vessels at Benoa during 2008 which is not significant different compared to the 1,916 landings in 2007.. The average number of landings per month for the year was 165, compared to 160 in 2007. The 2008 level of landings activity is still well below what was observed in 2003 and 2004. The estimates of landings for 2008 at Benoa, for southern bluefin, bigeye, yellowfin, and albacore tunas were 873, 5390, 7390 and 2913 tonnes respectively. The total landings of tunas, billfish and other species at Benoa in 2008 are estimated to be 17,882 tonnes. SBT comprised 5.6% of total tuna landings which is down from 8.4% in 2007. Large rises in fuel prices in Indonesia in October 2005 and in May 2008 continue to have significant impacts on fleet operations and fishing behaviours. Estimates for landings of SBT and other tunas at Indonesian ports other than Benoa are not yet available from Directorate General of Capture Fisheries, but hopefully will be for reporting to the Extended Scientific Committee Meeting in September. The preliminary catch estimate for SBT landings and processings at Benoa during January to May 2009 is 529 tonnes, which is higher than for the same period in 2008. The Tuna Monitoring Station at Benoa has moved to a new location during past year and is being developed as a fisheries research and monitoring centre within the Agency of Marine and Fisheries Research.

Introduction

A collaborative project 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) commenced in the mid-2002 to establish an integrated monitoring program at three major Indonesian ports where tuna and billfish caught by longline fleets operating in the Indian Ocean are landed and processed. SBT are mainly landed in the most eastern port, Benoa (south Bali), which services longline vessels fishing on the SBT spawning grounds south and east of Central and Eastern Java. This expanded monitoring program built on the earlier RCCF/RIMF/CSIRO catch monitoring initiated in 1993. This paper focuses on monitoring activities at Benoa and presents the Indonesian catch estimates for SBT, other tunas, and billfish landed at this port during 2008.

Methods

The SBT catch monitoring in Indonesia is focused on the Port of Benoa in South Bali where the majority of SBT landings in Indonesia occur. In previous years, small amounts of SBT have been reported as landed at Cilacap Fishing Port, and very occasionally at Muara Baru and Palabuhanratu. Landings at these pots are covered by the IOTC monitoring program coordinated by Directorate General of Capture Fisheries (Jakarta), but without additional targeted sampling of SBT landings. These 'non-Benoa' landings amounted to 33.7 tonnes in 2005 and 39.8 tonnes in 2006; 1.94% and 6.66% of the total SBT landings in those years, respectively. Since 2007 DGCF have not reported any SBT landings at any of those three ports.

Monitoring at Benoa

In Benoa the tuna catches and landed are monitored by seven enumerators at the fourteen processing plants at Benoa where tuna and billfish landings are processed. A target of minimum 30% coverage of landings at each processor each month is maintained throughout the reporting period. The information is entered on to IOTC's FINSS database by staff at the Benoa Tuna Research and Monitoring Station (BTRMS), Bali. The resulting data are sent to the Research Centre for Capture Fisheries (RCCF) in Jakarta after each month's data entry is complete. After data checking, the total catch by species and month is estimated by RCCF. Prior to 2007, the catch estimations were made by IOTC using the data provided by RCCF. However, following the handover of responsibility by IOTC/OFCF to Indonesia for the fiscal and operational management of the monitoring programs in Muara Baru and Cilacap at the end of 2006, Indonesia, through RCCF, has also taken up full responsibility for providing the monthly catch estimates to CCSBT.

The procedure for estimating total catch was detailed in Andamari *et al.* 2004. This procedure has been the routine since the IOTC/OFCF/RCCF/DGCF/CSIRO monitoring program commenced in mid-2002. The sampling protocol calls for sub-sampling of 10% of all tuna landed for length measurement. This is insufficient for determining the biological characteristics of the SBT spawning population as less than 5% of these measurements would be on SBT. By directed targeting of landings that have SBT in them, it is possible to measure a much greater number of SBT. These additional data, as well as biological data from IOTC monitored landings, are entered into the SBT Biologicals Database at BTRMS and regular updates of the database are provided to CSIRO in Hobart.

Results

Benoa Catch Monitoring

A summary of monitoring activities during 2008 and first six months of 2009 are presented in Table 1 and Figure 1. The target of minimum 30% coverage of landings at each processor each month was exceeded during this 18 month period, with an overall coverage of 50.70% of landings for the 2008 year. In addition, 228,875 individual fish weights (tunas, billfish, and sharks) were recorded, and 8,438 lengths measured during 2008.

The number of landings by tuna longline vessels (either fishing vessel or carrier vessel) at Benoa during 2008 was slightly higher than during 2007. There were 1980 landings (of which 1,007 were sampled) compared to a total of 1916 landings in 2007

(Table 2 and Fig. 2). October was the quietest month for SBT landings during 2008 and April was the busiest month, with 92 and 208 landings respectively. The average number of landings per month for the year was 165, compared to 160 in 2007. Overall there was not a significant increase in landings activity for 2008, compared to 2007 (Table 2 and Fig.2). However, the 2008 level of landings activity is still well below what was observed in 2003 and 2004.

As discussed in last year's paper to CCSBT (Prisantoso *et al.* 2008) there are several reasons that may explain the reduced level of landings activity:

1. The ongoing impacts of the fuel-price rise of October 2005 – fewer vessels going to sea but also more vessels staying out for longer periods (up to 3 – 5 months at sea compared to 1 – 3 months previously)

2. Directly related to 1 above, the increase frequency and use of carrier vessel activity, or at least fishing vessels operating as carriers

3. The expanded severe weather conditions during some months resulting in many vessels remaining in port.

Table 1. Summary of RCCF/CSIRO monitoring activities at Benoa during 2008 and first six months of 2009.

Year	Month	No. Landings	No. Sampled	% Coverage	No. weights recorded	No. of length/weight measured
2008	January	168	86	51.19	14,575	591
	February	177	96	54.24	10,097	359
	March	190	93	48.95	26,519	775
	April	208	102	49.04	19,857	1,208
	May	174	89	51.15	22,950	769
	June	186	90	48.39	22,012	981
	July	136	72	52.94	14,087	839
	August	117	64	54.70	17,409	722
	September	183	103	56.28	24,572	521
	October	92	39	42.39	13,590	568
	November	175	88	50.29	24,166	679
	December	174	85	48.85	19,041	426
	Total	**1,980**	**1,007**	**50.70**	**228,875**	**8,438**
2009	January	211	108	51.18	18,199	695
	February	89	47	52.81	11,291	619
	March	156	71	45.51	16,399	445
	April	210	100	47.62	26,187	681
	May	157	71	45.22	14,132	389
	June	189	90	47.62	21,805	503
	Total	**1,012**	**487**	**48.33**	**108,013**	**3,332**

[+]Mean monthly coverage. *This includes tuna, billfish and sharks.

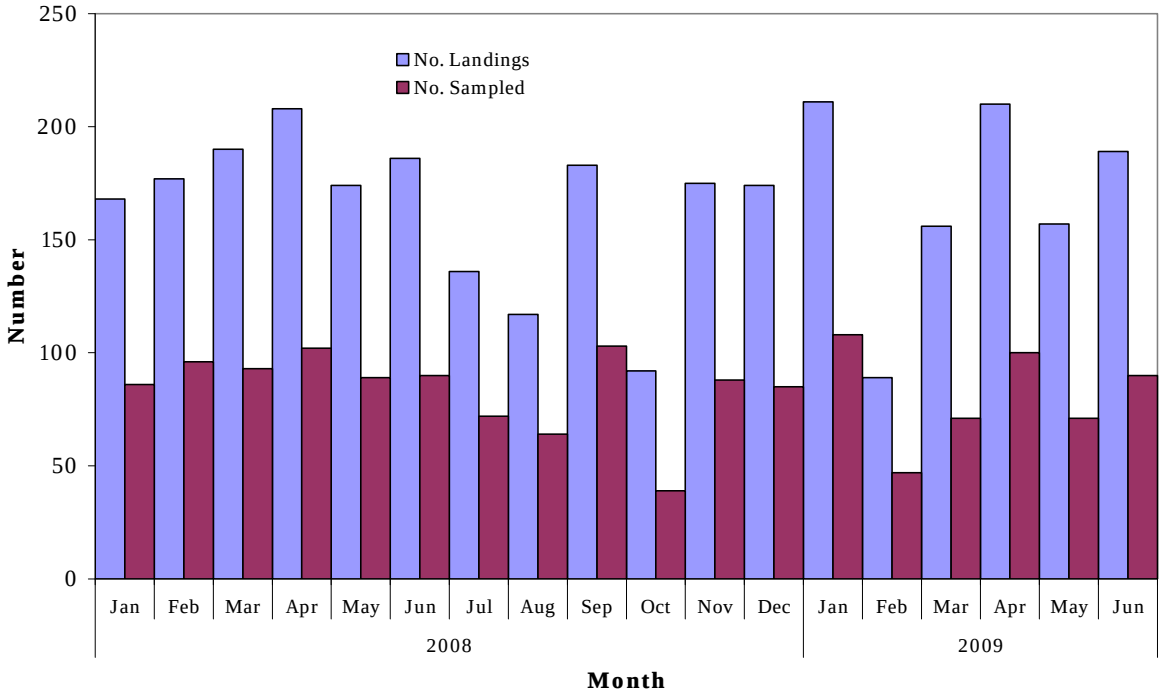

Figure 1. Number of landings and number of samplings at Benoa by month, January 2008 to June 2009.

Table 2. Number of vessel landings by month at Benoa, for period 2003 to 2008.

Month	Year					
	2003	2004	2005	2006	2007	2008
January	325	320	248	193	145	168
February	310	206	218	111	165	177
March	265	274	198	130	159	190
April	296	234	205	129	168	208
May	265	234	212	157	195	174
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September	286	231	194	119	119	183
October	291	210	237	160	164	92
November	305	235	113	104	129	175
December	268	214	167	159	220	174
Total	**3505**	**2922**	**2439**	**1664**	**1916**	**1980**
Mean	**292.1**	**243.5**	**203.3**	**138.7**	**159.7**	**165.0**

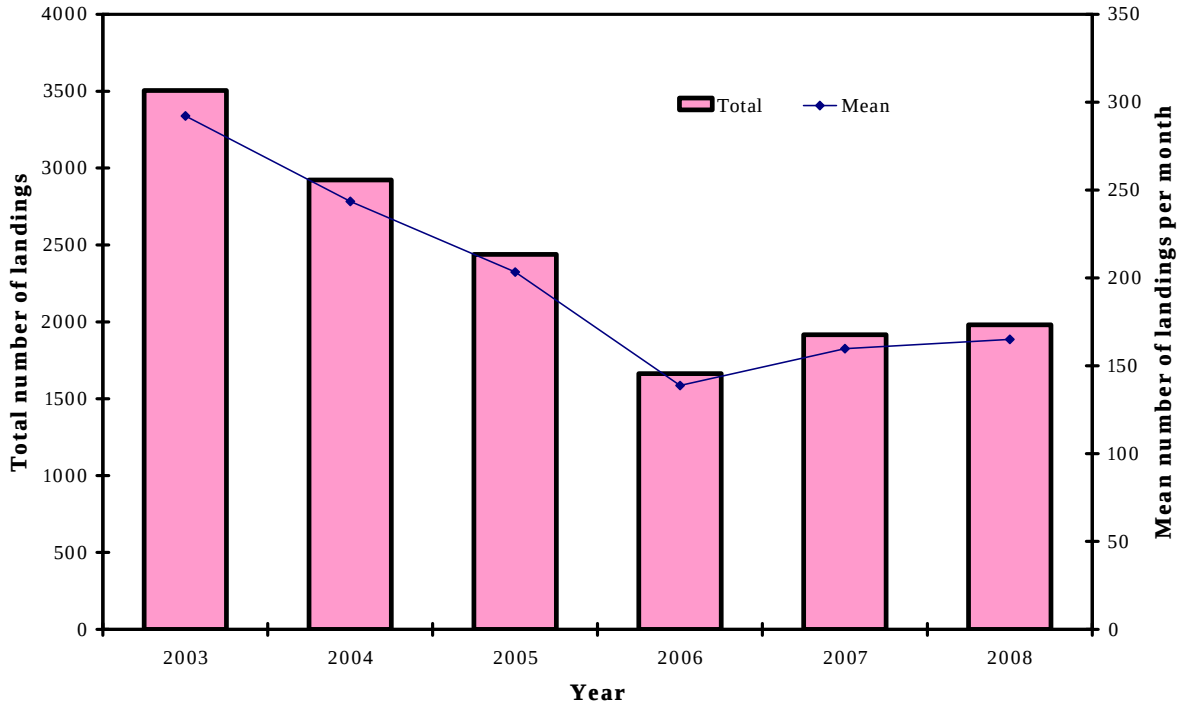

Figure 2. Total number of landings by year (left y-axis and histogram) and mean number of landings per month (right y-axis and blue line) at Benoa for period 2003 – 2008.

Catch Estimates for 2008

The estimate of total landings of SBT by the Indonesian longline fleet, during 2008, is 837 tonnes (Table 3). This estimate is only for SBT landed at Benoa, but as stated in the Introduction, this represents almost all of the Indonesian SBT catch. In previous years a small amount of SBT was landed by longliners operating out of Cilacap (and nearby landing places Batere and Seleko), and very occasionally by vessels landing at Pelabuhan Ratu and Muara Baru. At time of writing this paper the 2008 catch estimates for the non-Benoa ports were unavailable. Directorate General of Capture Fisheries have the reporting responsibility for those ports and it is hoped they will be able to submit their estimates to CCSBT either prior to the 2009 ESC Meeting or at the meeting itself.

During 2008, landings of SBT were highest during the months of February and October; 152.5 and 166 tonnes respectively (Table 3, Fig. 3). As per usual, only a small number of fish were landed during the months of June, July, and August, between the end of the 2007/2008 spawning season and the beginning of the 2008/2009 season.

In our paper submitted to the 2007 ESC CCSBT Meeting (Proctor *et al.* 2007) we predicted a higher level of landings of SBT for 2007 compared to 2006, based largely on the relatively high numbers of fish landed and processed during the second half of the 2006/2007 spawning season. Many of these fish were frozen having come from cold storage (either landed frozen from vessels that had freezer facilities or fresh reject quality fish that had been placed in cold storage). In that paper we also expressed some concern that the monitoring program may not have adequately 'captured' the full extent of landings during the first half of 2007. Subsequent discussions with the monitoring team gave us confidence that the program was providing an accurate measure of landings at Benoa, and that no 'double-counting'

had occurred. Frozen fish from cold storage, that came into the processing plants for thawing and subsequent filleting, were not recorded by the enumerators. Their recordings were only for fish directly unloaded from vessels into the processing rooms. The situation was unchanged through 2008 and our confidence with the monitoring procedures for both fresh and frozen SBT remains high.

Table 3. Estimated catch (kilograms, bottom line totals in metric tonnes) of tunas and other by species landed at Benoa in 2008. Estimates were produced from data collected in the port-based monitoring program, using IOTC protocols.

		Catch (kg)								
Year	Month	Total	ALB	BET	MLS	OTHR	SBF	SKH	SWO	YFT
2008	1	1,529,576	22,924	649,517	1,203	5,857	141,917	11,186	42,836	654,135
	2	990,722	9,986	356,085	717	19,559	152,550	2,760	26,734	422,331
	3	464,438	9,694	75,755	4,164	27,166	120,094	3,422	20,226	203,917
	4	2,184,899	645,526	507,963	3,079	70,640	34,811	67,355	75,565	779,959
	5	1,412,823	43,120	463,746	4,291	15,361	5,881	5,476	70,508	804,440
	6	1,459,211	266,150	367,853	1,823	2,540	0	5,749	158,113	656,983
	7	934,811	113,449	271,828	1,071	3,517	234	27,297	86,445	430,969
	8	1,958,576	1,149,980	254,517	883	22,128	2,415	17,585	54,120	456,949
	9	1,730,409	401,323	499,073	3,841	12,452	50,833	19,724	83,817	659,346
	10	1,374,043	77,039	550,552	5,460	19,197	165,961	16,255	36,659	502,919
	11	1,984,098	159,231	778,271	18,213	3,490	89,584	3,810	80,410	851,090
	12	1,858,088	14,823	614,655	6,561	10,517	108,782	49,244	78,224	975,282
Total (ton)		**17,882**	**2,913**	**5,390**	**51**	**212**	**873**	**230**	**814**	**7,398**

MLS = marlins, OTHR = fish nei, SKH = sharks, SWO = swordfish.

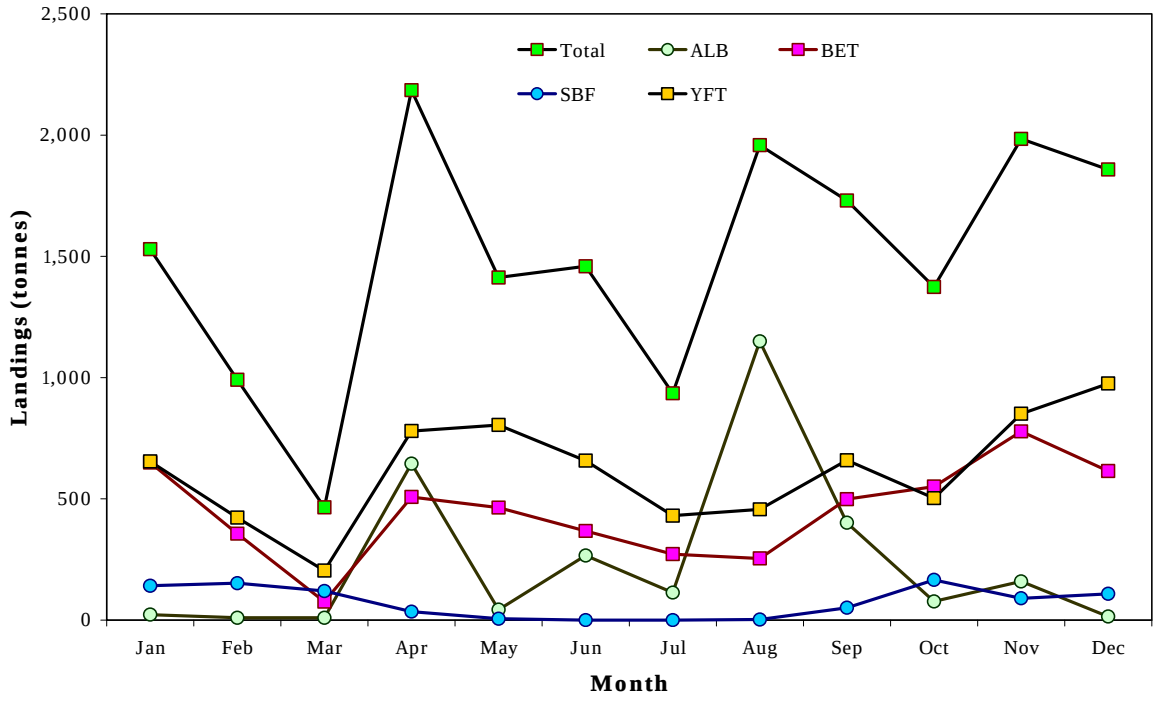

Figure 3. Estimated landings (tonnes) of tunas by month at Benoa for 2008 by total landings and by species.

The estimated catch of SBT as a proportion of total catch of the four target tuna species (YFT, BET, ALB, and SBT) was lower in 2008 compared to 2007; 5.6% of

total tuna catch in 2008 compared to 8.4% in 2007 (Table 4). The landings of yellowfin tuna in particular were also significantly higher in 2008 compared to years 2004 – 2007.

Table 4. Estimated catch (tonnes) of tuna by species landed at Benoa and % of total catch made up by SBT, by year (2004 to 2008).

Year	BET	YFT	**SBT**	ALB	Total	**%SBT**
2004	4,184	4,413	613	1,906	11,116	**5.5**
2005	3,939	4,196	1,690	1,494	11,319	**14.9**
2006	4,366	4,323	558	1,450	10,697	**5.2**
2007	5,292	5,354	1,077	1,132	12,855	**8.4**
2008	5,390	7,398	873	2,913	16,574	**5.6**

Preliminary Catch Estimates for 2009

The preliminary catch estimates for SBT and other species landed and processed at Benoa, for the first five months of 2009, are shown in Table 5. The landings of SBT follow the expected pattern, with January and February having the highest totals, March a moderately busy month, and then a significant decrease of amount landed through May following the end of the spawning season. The total of SBT landed and processed during this period is 529 tonnes. This is more than half the total amount of SBT landed and processed in Benoa during 2008 i.e. 837 tonnes. Therefore, it is possible that the catch estimate for full calendar year 2009 will be significantly higher than that for 2008 and may be closer to the 1077 tonnes reported for 2007 (Iskandar Prisantoso *et al*. 2008).

Table 5. Estimated catch (metric tonnes) of tunas and other by species landed at Benoa during period January – May 2008. Estimates were produced from data collected in the port-based monitoring program, using IOTC protocols.

Month	Total	ALB	BET	MLS	OTHR	SBF	SKH	SWO	YFT
Jan	1,400	101	381	2	37	195	37	53	595
Feb	1,002	4	369	1	1	157	3	28	438
Mar	1,489	59	342	2	19	121	27	88	831
Apr	2,351	110	580	2	8	52	11	135	1,454
May	1,359	57	453	1	3	4	6	64	772
Total	7,601	331	2,125	7	67	529	84	367	4,090

MLS = marlins, OTHR = fish nei, SKH = sharks, SWO = swordfish.

Developments for future monitoring

In late May 2008 the Indonesian Government agreed to a proposal by the Agency of Marine Affairs and Fisheries Research (AMFR) for the current Tuna Monitoring Station at Benoa to become a Research & Monitoring Station. During Jan – Feb 2009 new station was established at a new location within the Benoa Port precinct. Funds have already been allocated by Indonesia to ensure salary coverage for 14 staff (7 port-based enumerators, 6 on-board observers, and 1 data entry staff) at Benoa. This reflects the Ministry of Marine Affairs and Fisheries' strong commitment to the continuation of the Benoa monitoring program but also an indication of the desire to see the Station expand its activities to a broader fisheries research role. RCCF and CSIRO are currently developing a strategy for establishing a range of new research activities at Benoa, including age determination of tunas via analysis of otoliths (see Farley *et al*. 2009).

In last year's Catch Monitoring paper (Iskandar Prisantoso *et al.* 2008) we mentioned the plan of AMFR to establish a "Tuna Centre" (research and monitoring) close to Bitung, east of Manado in northern Sulawesi. This objective was part of the Indonesia and Philippines Data Collection Project, an initiative of Indonesia, Philippines, Western and Central Pacific Fisheries Commission, and Australia through ACIAR and CSIRO. The Tuna Centre is still planned but has yet to be established. However, port-based monitoring of tuna landings, for all gears (purse-seine, pole & line, longline, and hand/troll-line) was successfully achieved during the past year, at two key ports in Sulawesi – Bitung and Kendari. The monitoring is ongoing and is now operating within a Global Environment Facility project that includes capacity development for improved fisheries monitoring in Philippines, Vietnam, and Indonesia.

Acknowledgements

The success of the catch monitoring was only possible due to the dedicated effort of the Benoa enumerators – Kiroan Siregar, Ririk Kartika S., Noor Muhamad, Jumariadi, Hety Hartaty, Rusjas Mashar, Ade Yuliano who maintained a consistent and a high level of coverage at all processors, and the data entry staff – Rela F. Lupitasari and Ashari. The cooperation of the tuna industry (coordinated through Asosiasi Tuna Longline Indonesia and Asosiasi Tuna Indonesia), and the individual processing companies in providing access and facilities to carry out the monitoring is much appreciated.

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The Catch of Southern Blue Fin Tuna (SBF) by the Indonesian Longline Fishery Operating Landed at Benoa, Bali, Indonesia

Presented by : Subhat Nurhakim
Duto Nugroho

On Extended Scientific Committee Meeting,
CCSBT, Busan, 5-11 September 2009

The Fishery and data

- Indonesia's Capture Fisheries data based on estimated landing already recorded by Directorate General for Capture Fisheries (DGCF) since 1976.
- This expanded monitoring program built on the earlier RCCF/RIMF/CSIRO catch monitoring initiated in 1993.
- A collaborative project between (RCCF/RIMF) CSIRO Marine and Atmospheric Research, Australia's Department of Agriculture of Fisheries and Forestry (DAFF), Australian Centre for International Agricultural Research (ACIAR), IOTC and Overseas Fisheries Cooperation Foundation of Japan (OFCF) commenced in the mid-2002 to establish an integrated monitoring program at three major Indonesian ports where tuna and billfish caught by longline fleets operating in the Indian Ocean are landed and processed.
- There are 3 major landing places of Large Pelagic Species Fisheries ie : Benoa, Cilacap and Muara Baru
- SBT are mainly landed in the most eastern port, Benoa (south Bali), which services longline vessels fishing on the SBT spawning grounds south and east of Central and Eastern Java.
- This paper focuses on monitoring activities at Benoa and presents the Indonesian catch estimates for SBT, other tunas, and billfish landed at this port during 2008.

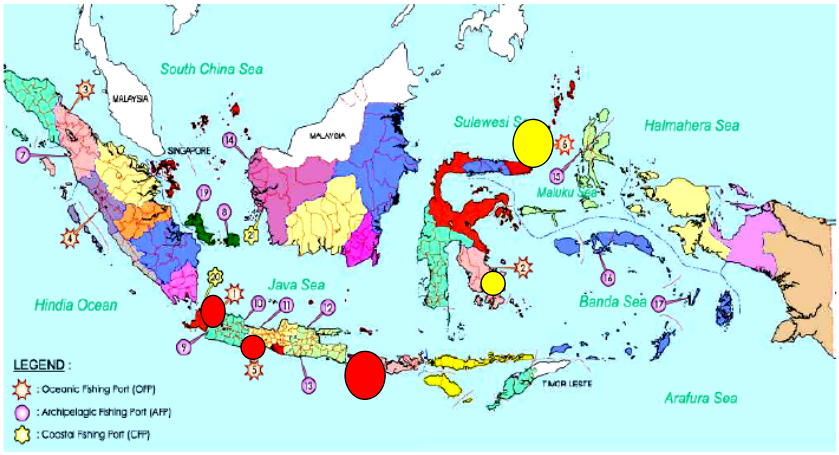

Figure : Geographical locations of fishing ports by categories.

Data collecting

- The SBT catch monitoring in Indonesia is focused on the Port of Benoa in South Bali where the majority of SBF landings in Indonesia occured.
- In previous years, small amounts of SBF have been reported as landed at Cilacap Fishing Port, and very occasionally at Muara Baru and Palabuhan ratu.
- Landings at these ports are covered by the IOTC monitoring program coordinated by Directorate General of Capture Fisheries (Jakarta), but without additional targeted sampling of SBT landings.
- These ‘non-Benoa’ landings amounted to 33.7 tonnes in 2005 and 39.8 tones in 2006; 1.94% and 6.66% of the total SBF landings in those years, respectively.

Benoa Catch Monitoring

- A summary of monitoring activities during 2008 and first six months of 2009 are presented.
- The target of minimum 30% coverage of landings at each processor each month was exceeded during this 18 month period, with an overall coverage of 50.70% of landings for the 2008 year.
- In addition, 228,875 individual fish weights (tunas, billfish, and sharks) were recorded, and 8,438 lengths measured during 2008.
- The number of landings by tuna longline vessels (either fishing vessel or carrier vessel) at Benoa during 2008 was slightly higher than during 2007. There were 1980 landings (of which 1,007 were sampled) compared to a total of 1916 landings in 2007 2

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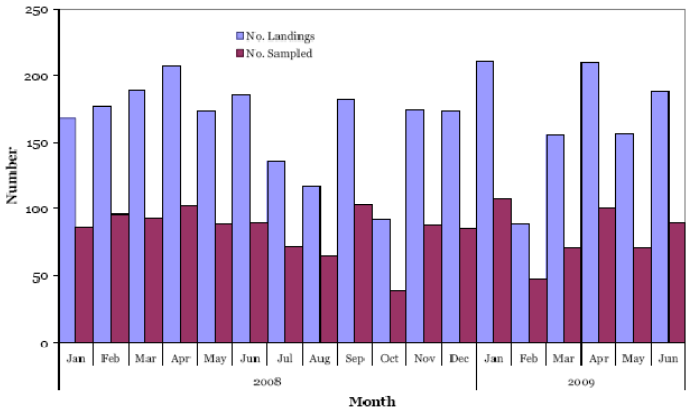

Figure 1. Number of landings and number of samplings at Benoa by month, January 2008 to June 2009.

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	2	990,722	9,986	356,085	717	19,559	152,550	2,760	26,734	422,331
	3	464,438	9,694	75,755	4,164	27,166	120,094	3,422	20,226	203,917
	4	2,184,899	645,526	507,963	3,079	70,640	34,811	67,355	75,565	779,959
	5	1,412,823	43,120	463,746	4,291	15,361	5,881	5,476	70,508	804,440
	6	1,459,211	266,150	367,853	1,823	2,540	0	5,749	158,113	656,983
	7	934,811	113,449	271,828	1,071	3,517	234	27,297	86,445	430,969
	8	1,958,576	1,149,980	254,517	883	22,128	2,415	17,585	54,120	456,949
	9	1,730,409	401,323	499,073	3,841	12,452	50,833	19,724	83,817	659,346
	10	1,374,043	77,039	550,552	5,460	19,197	165,961	16,255	36,659	502,919
	11	1,984,098	159,231	778,271	18,213	3,490	89,584	3,810	80,410	851,090
	12	1,858,088	14,823	614,655	6,561	10,517	108,782	49,244	78,224	975,282
Total (ton)		**17,882**	**2,913**	**5,390**	**51**	**212**	**873**	**230**	**814**	**7,398**

MLS = marlins, OTHR = fish nei, SKH = sharks, SWO = swordfish.

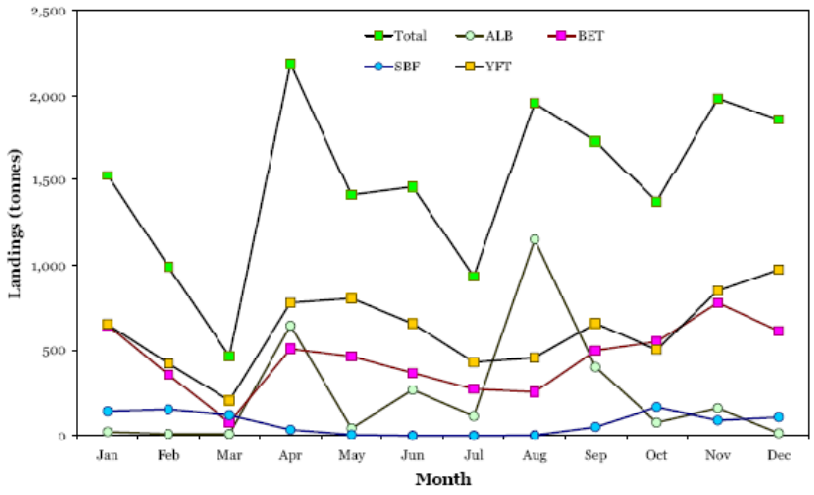


Figure 3. Estimated landings (tonnes) of tunas by month at Benoa for 2008 by total landings and by species.

Table 4. Estimated catch (tonnes) of tuna by species landed at Benoa and % of total catch made up by SBT, by year (2004 to 2008).

Year	BET	YFT	SBT	ALB	Total	%SBT
2004	4,184	4,413	613	1,906	11,116	5.5
2005	3,939	4,196	1,690	1,494	11,319	14.9
2006	4,366	4,323	558	1,450	10,697	5.2
2007	5,292	5,354	1,077	1,132	12,855	8.4
2008	5,390	7,398	873	2,913	16,574	5.6

Table 5. Estimated catch (metric tonnes) of tunas and other by species landed at Benoa during period January – May 2008. Estimates were produced from data collected in the port-based monitoring program, using IOTC protocols.

Month	Total	ALB	BET	MLS	OTHR	SBF	SKH	SWO	YFT
Jan	1,400	101	381	2	37	195	37	53	595
Feb	1,002	4	369	1	1	157	3	28	438
Mar	1,489	59	342	2	19	121	27	88	831
Apr	2,351	110	580	2	8	52	11	135	1,454
May	1,359	57	453	1	3	4	6	64	772
Total	7,601	331	2,125	7	67	529	84	367	4,090

MLS = marlins, OTHR = fish nei, SKH = sharks, SWO = swordfish.

Table 1. Number of length measurements and age estimates for SBT by spawning season.

Spawning season	Length data		Otolith/age data		
	Measured	Known sex	Otoliths collected	Age estimated[1]	Age with sex known
1993/94	676	-	-	-	-
1994/95	1610	-	549	486	-
1995/96	1107	-	225	-	-
1996/97	1615		602	475	
1997/98	1577	-	519	485	-
1998/99	936	59	660	474	88
1999/00	786	778	533	498	495
2000/01	762	757	720	481	478
2001/02	821	818	715	489	488
2002/03	1385	1374	1502	488	488
2003/04	1279	1276	1283	494	494
2004/05	1580	1555	1523	493	493
2005/06	1182	1178	1180	486	482
2006/07	1586	1577	1586	491	486
2007/08	1693	1691	1692	485	485
2008/09	1704	1702	1697	-	-
Total	20299	12765	14986	6325	4478

[1] A random sub-sample of 500 are selected for ageing

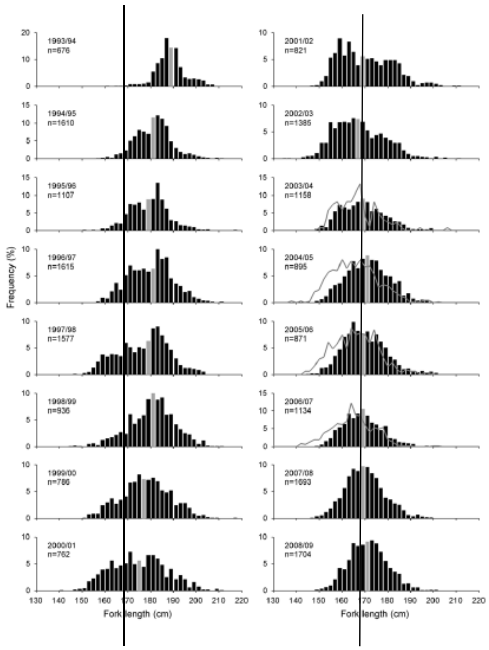
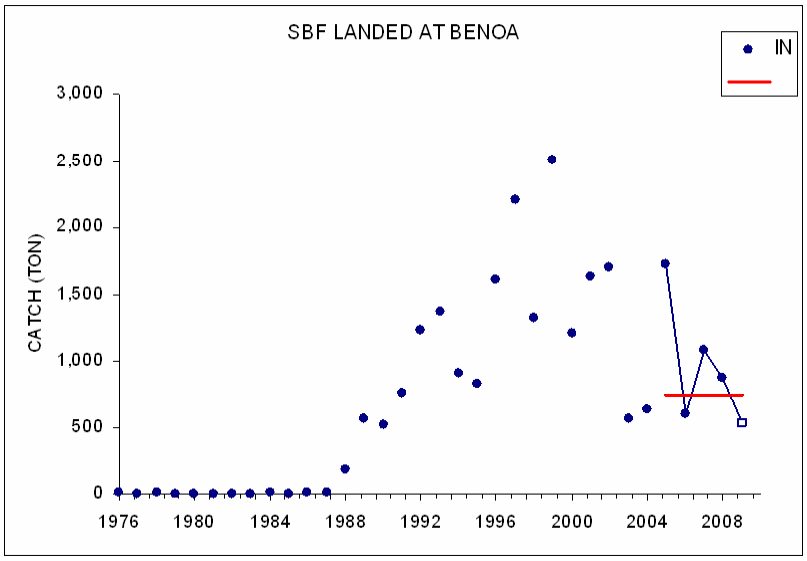


Figure 1. Length frequency (2 cm intervals) of SBT caught on the spawning ground (bars) by spawning season.

The grey bar shows the median size class. For comparison, the length distribution of SBT thought to be caught south of the spawning ground (Processor A) is shown for the 2003/04 (n=121), 2004/05 (n=685), 2005/06 (n=311) and 2006/07 (n=452) seasons (grey line) (see Farley et al., 2009).


SBF LANDED AT BENOA
IN
CATCH (TON)
3,000
2,500
2,000
1,500
1,000
500
0
1976
1980
1984
1988
1992
1996
2000
2004
2008

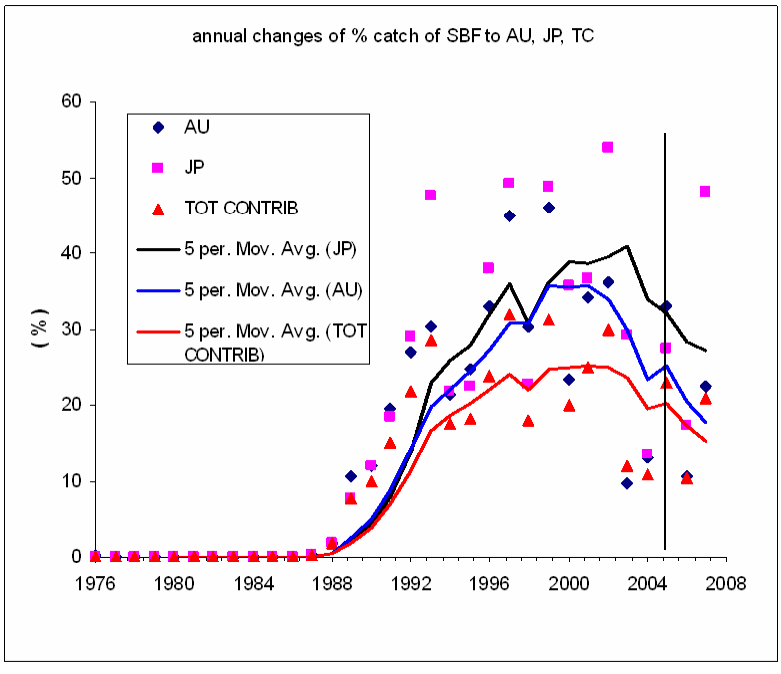
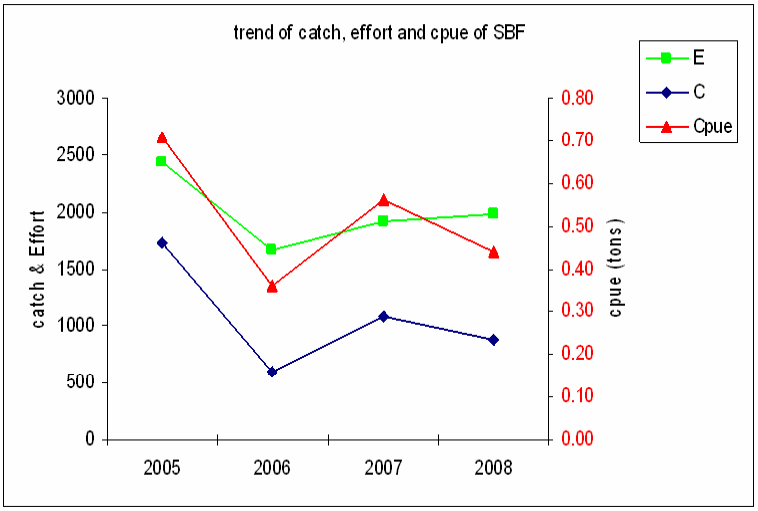
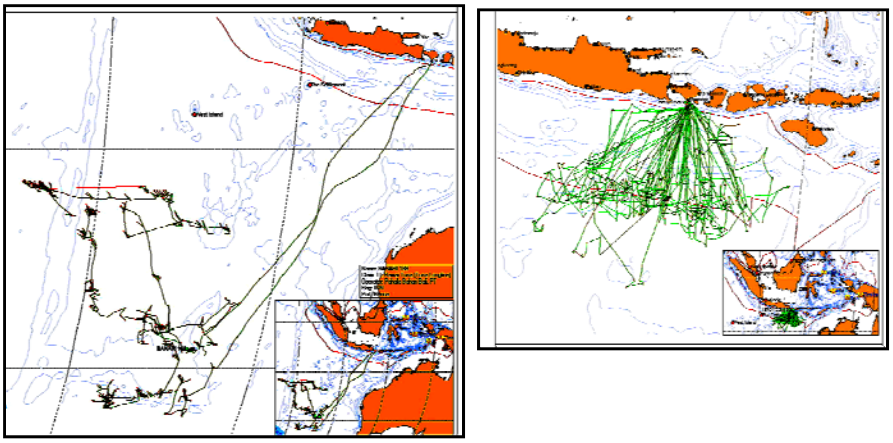

annual changes of % catch of SBF to AU, JP, TC
AU
JP
TOT CONTRIB
5 per. Mov. Avg. (JP)
5 per. Mov. Avg. (AU)
5 per. Mov. Avg. (TOT CONTRIB)
(%)
60
50
40
30
20
10
0
1976
1980
1984
1988
1992
1996
2000
2004
2008

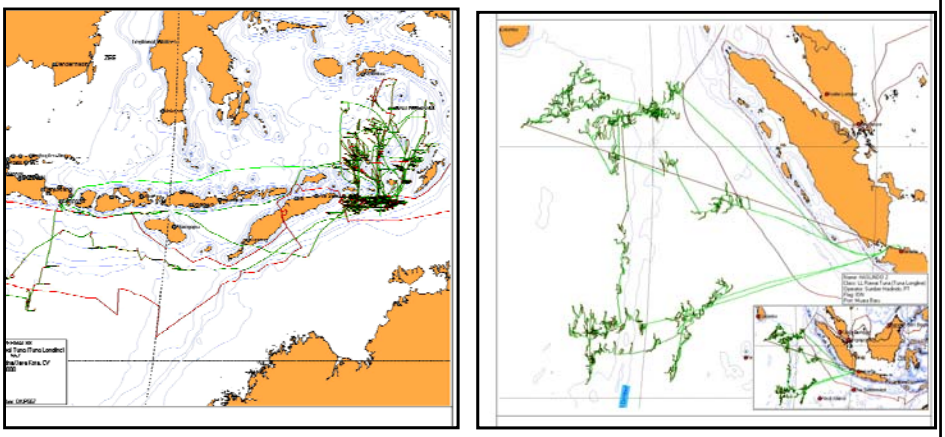
Table 2. Number of vessel landings by month at Benoa, for period 2003 to 2008.

Month	Year					
	2003	2004	2005	2006	2007	2008
January	325	320	248	193	145	168
February	310	206	218	111	165	177
March	265	274	198	130	159	190
April	296	234	205	129	168	208
May	265	234	212	157	195	174
June	323	273	236	170	179	186
July	292	242	218	130	141	136
August	279	249	193	102	132	117
September	286	231	194	119	119	183
October	291	210	237	160	164	92
November	305	235	113	104	129	175
December	268	214	167	159	220	174
Total	**3505**	**2922**	**2439**	**1664**	**1916**	**1980**
Mean	**292.1**	**243.5**	**203.3**	**138.7**	**159.7**	**165.0**





Source : DG of Surveillance MMAF



Source : DG of Surveillance MMAF

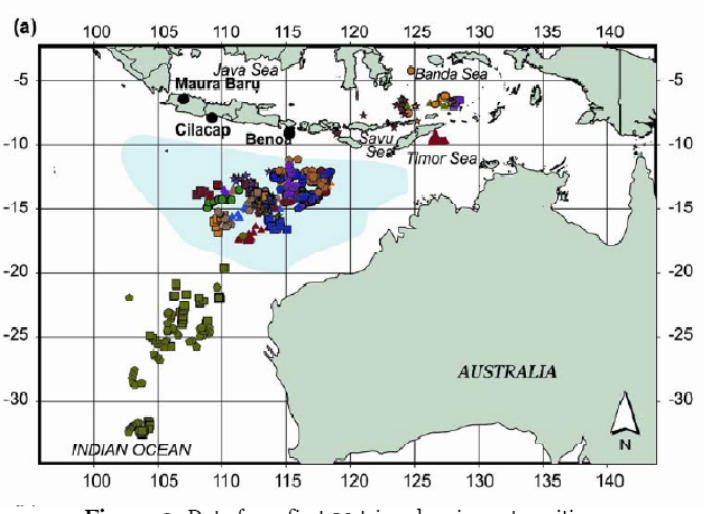


Figure 3: Data from first 29 trips showing set positions.

Source : Observer program

Developments for future monitoring

- In late May 2008 the Indonesian Government agreed to a proposal by the Agency of Marine Affairs and Fisheries Research (AMFR) for the current Tuna Monitoring Station at Benoa to become a Research & Monitoring Station. During Jan – Feb 2009 new station was established at a new location within the Benoa Port precinct. Funds have already been allocated by Indonesia to ensure salary coverage for 14 staff (7 port-based enumerators, 6 on-board observers, and 1 data entry staff) at Benoa.
- This reflects the Ministry of Marine Affairs and Fisheries' strong commitment to the continuation of the Benoa monitoring program but also an indication of the desire to see the Station expand its activities to a broader fisheries research role. RCCF and CSIRO are currently developing a strategy for establishing a range of new research activities at Benoa, including age determination of tunas via analysis of otoliths (see Farley *et al*. 2009).
- In last year's Catch Monitoring paper (Iskandar Prisantoso *et al*. 2008) we mentioned the plan of AMFR to establish a "Tuna Centre" (research and monitoring) close to Bitung, east of Manado in northern Sulawesi. This objective was part of the Indonesia and Philippines Data Collection Project, an initiative of Indonesia, Philippines, Western and Central Pacific Fisheries Commission, and Australia through ACIAR and CSIRO.
- The Tuna Centre is still planned but has yet to be established. However, port-based monitoring of tuna landings, for all gears (purse-seine, pole & line, longline, and hand/troll-line) was successfully achieved during the past year, at two key ports in Sulawesi – Bitung and Kendari. The monitoring is ongoing and is now operating within a Global Environment Facility project that includes capacity development for improved fisheries monitoring in Philippines, Vietnam, and Indonesia.