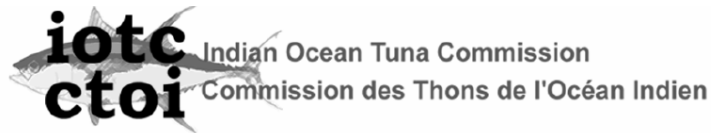




**The catch of SBT by the Indonesian longline fishery  
operating out of Benoa, Bali in 2004**

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**Prepared for the CCSBT 6<sup>th</sup> Meeting of the Stock Assessment Group (SAG6)  
and the 10<sup>th</sup> Meeting of the Extended Scientific Committee (SC10)  
29 August-3 September, and 5-8 September 2005, Taipei, Taiwan**



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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 Port of Benoa, Bali in 2004. The total landings estimated by IOTC in 2004 for southern bluefin, bigeye and yellowfin tuna were 653, 4,475 and 4,696 tonnes, respectively. An additional catch of 23.8 tonnes of SBT was landed at Cilacap in 2004. The total catch of SBT landed in Indonesia is up from 564.34 tonnes in 2003 to 676.89 tonnes in 2004. The total catch of tunas and billfish landed in Benoa dropped from 19,751 tonnes in 2003 to 15,028 tonnes in 2004. However, the percentage of SBT in the catch increased from 2.8% in 2003 to 4.3% in 2004. A shift in the fishing operations of some companies to targeting SBT south of the spawning grounds was detected in late 2004. This also flagged problems in the level of monitoring coverage at one processor which was rectified by February 2005. It is likely that these southern fishing operations will result in increased catches of SBT in 2005.

## **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, DAFF, ACIAR, IOTC and OFCF has established an integrated monitoring program at three major 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 of Benoa which services longline vessels fishing on the SBT spawning grounds south and east of Central Java. A small quantity of SBT is also landed at Cilacap and occasionally SBT is landed at Muara Baru. The current monitoring program started in July 2002, expanding on the previous RCCF/RIMF/CSIRO catch monitoring that has operated since 1993. This paper reports on monitoring activities in Benoa and presents the IOTC catch estimation for SBT, other tuna, and billfish landed in Benoa in 2004, and SBT landed in Cilacap and Muara Baru.

## **Methods**

The Indonesian SBT catch monitoring is centered on the Port of Benoa where the majority of SBT landings in Indonesia occur. A small amount of SBT is also landed at the Port of Cilacap and Muara Baru which is covered by IOTC monitoring but without additional targeted sampling of SBT.

### ***Monitoring at Benoa***

Catches are monitored by seven enumerators at the fourteen processing plants at Benoa where tuna and billfish landings are processed for export. A target of >30% coverage of landings at each processor each month is maintained. The information is entered on to IOTC's FINSS (formerly "WinTuna") database by staff at the Gondol Research Institute of Mariculture, Bali. The resulting data are sent to IOTC through the Research Centre for Capture Fisheries after each month's data entry is complete. After data checking, the total catch by species and month is estimated by IOTC. The procedure for estimating total catch was detailed in Andamari et al. 2004.

The IOTC sampling protocol calls for balanced 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 on the RIMF/CSIRO database and used for biological analysis.

## **Results**

### ***Benoa Catch Monitoring***

A summary of monitoring activities during 2004 and 2005 are presented in Tables 1 and 2, respectively. A 44% monitoring coverage was achieved in 2004 and 147,933 individual fish weights have been recorded, and 9,434 lengths measured. While the target of 25% coverage was greatly exceeded, the coverage of one processing plant in 2004 was much lower (11.8%) over the same period (Table 3). This was due to restrictions placed on the days monitoring could take place at that processor. The remaining thirteen processors allow unrestricted access to enumerators. This was not considered to be too much of a problem as long as longliners supplying the processor operated in the same way as other sectors of the longline fleet.

However, in late 2004 we became aware that the undersampled processor was processing fish caught in fishing operations that differed from those used by most other fishing companies. These fishing operations were targeting SBT beyond the southern limits of the SBT spawning ground and well south of the traditional areas fished on the spawning ground by the Indonesian longline fleet. This had come about in response to the low catch rates for tuna generally (yellowfin, bigeye and SBT) and aggressive competition between companies accessing the traditional fishing grounds closer to Indonesia (including line cutting tactics). Our enumerators had determined that this processor had been landing unusually large catches of SBT. When this problem was detected, steps were taken to improve coverage at the processor and the level of coverage has exceeded the IOTC targets from February 2005 onwards (Table 4). However, the low coverage of this processor in late 2004 and January 2005 (Table 3 and 4), highlights the possibility that the IOTC catch estimation may not reflect the extent of the SBT catch in southern regions and therefore the 2004 SBT catch may be underestimated.

**Table 1. Summary of IOTC monitoring activities at Benoa in 2004.**

Month	Landings	Sampled landings	Coverage (%)	No. of fish* weighed	No. of fish length/weights
January	320	134	41.9	13,772	925
February	206	94	45.6	6,398	619
March	274	113	41.2	11,596	772
April	234	93	39.7	9,116	1,038
May	234	93	39.7	10,179	462
June	273	113	41.4	17,163	815
July	242	98	40.5	15,791	930
August	249	90	36.1	15,798	896
September	231	102	44.2	14,835	874
October	210	95	45.2	9,884	770
November	235	152	64.7	11,163	449
December	214	109	50.9	12,238	884
<b>Total</b>	<b>2,922</b>	<b>1,286</b>	<b>44.0</b>	<b>147,933</b>	<b>9,434</b>

\*This includes tuna, billfish and sharks.

**Table 2. Summary of IOTC monitoring activities at Benoa in 2005 up until June.**

Month	Landings	Sampled landings	Coverage (%)	No. of fish weighed	No. of fish length/weights
January	257	130	50.6	14,533	1,577
February	227	128	56.4	16,565	911
March	211	107	50.7	18,099	1,383
April	219	108	49.3	14,469	1,047
May	211	94	44.5	17,482	846
June	259	124	47.9	24,037	1,105

**Table 3. Monitoring coverage at undersampled processor in 2004.**

Month	Landings	Sampled landings	Coverage (%)
January	25	5	20.0
February	11	2	18.2
March	14	0	0.0
April	14	0	0.0
May	13	2	15.4
June	19	2	10.5
July	14	3	21.4
August	12	2	16.7
September	17	2	11.8
October	15	0	0.0
November	11	1	9.1
December	13	2	15.4
<b>Total</b>	<b>178</b>	<b>21</b>	<b>11.8</b>

**Table 4. Monitoring coverage at the undersampled processor in 2005.**

Month	Landings	Sampled landings	Coverage (%)
January	23	5	21.7
February	14	5	35.7
March	16	8	50.0
April	9	3	33.3
May	11	4	36.4
June	11	6	54.5

### ***IOTC Catch Estimates for 2004***

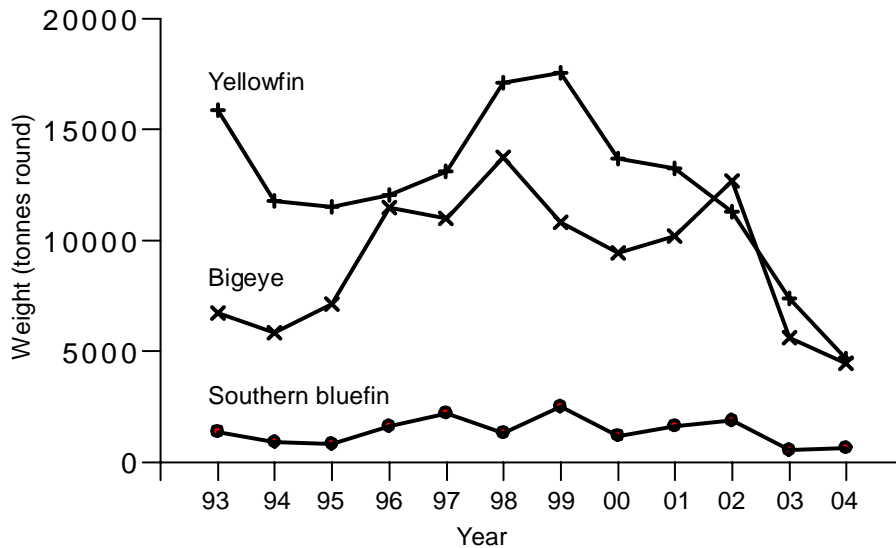
IOTC have provided the catch estimates for 2004 data which are summarized in Table 5. In 2004 there were 653.12 tonnes of SBT landed at Benoa and an additional 23.78 tonnes landed at Cilicap. The total catch of SBT landed in Indonesia is up from 564.34 tonnes in 2003 to 676.89 tonnes in 2004. The total catch of tunas and billfish landed in Benoa dropped from 19,751 tonnes in 2003 to 15,028 tonnes in 2004. The percentage of SBT in the catch increased from 2.8% in 2003 to 4.3% in 2004.

**Table 5. IOTC estimated catch (tonnes) of tuna by species landed at Benoa in 2003 and 2004.**

YEAR	BET	YFT	SBT	ALB	TUN*	SKJ	BILL	Total	%SBT
2003	5,616	7,422	557	3,420	116	39	2,582	19,751	2.8
2004	4,475	4,696	653	2,323	116	21	2,744	15,028	4.3

\* This category is unidentified tuna usually from aggregated landings which are frozen.

The catch of bigeye and yellowfin tuna has exhibited a continuous decline since 2002 (Fig. 1). Southern bluefin tuna on the overhand, declined markedly between 2002 and 2004, but have shown a slight recovery in 2004. IOTC have not been able to provide catch estimates for the period Jan-April 2005 to complete the second half of the 2005 SBT spawning season in time to be incorporated in this report. However it is likely that catches of SBT in the first half of 2005 have greatly increased compared to 2004. Based on information obtained during supplementary biological sampling and otolith collection, information provided by the fishing industry, and from the routine IOTC monitoring we expect the SBT catch for the first half of 2005 to exceed 1000 tonnes. A large part of this catch appears to be taken immediately south of the spawning grounds and is a consequence of the changes in fisheries operations of some of fishing companies. This will result in an increased catch of SBT in 2005 and fishing pressure on a different sector of the population which includes pre- and post- spawning and immature fish.



**Figure 1. The estimated catch of southern bluefin, bigeye and yellowfin tuna landed at Benoa in the years 1993 to 2004.**

This fishery continues to develop and change fishing strategies so as to remain profitable. It is necessary that the monitoring program be ever vigilant and adaptable in order to capture changes in fishing behaviours. The recent establishment of a 6 man long line observer program at Benoa (supported by RCCF, CSIRO and ACIAR) will hopefully provide a better understanding of the fishing strategies and the resultant CPUE on the main tuna and billfish species in this fishery.

## Acknowledgements

The success of the catch monitoring was only possible due to the dedicated effort of the enumerators at Benoa – Faridatul Aisyah, Noor Muhamad, Paulos Yudha Irawan, Ririk Kartika S., Jumariadi, Nalin K. Wardhani and Kiroan Siregar who maintained a consistent and a high level of coverage at all processors, and the data entry staff – Bambang Teguh Trihandoyo and Made Miniarti. The cooperation of the tuna industry (coordinated through Asosiasi Tuna Longline Indonesia and previously 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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