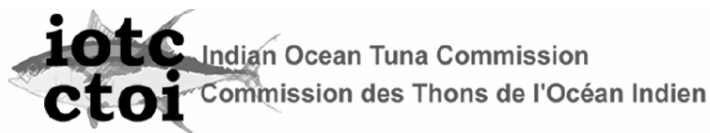




The catch of SBT by the Indonesian longline fishery operating out of Benoa, Bali in 2005

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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 2005. The total landings estimated by IOTC in 2005 for southern bluefin, bigeye and yellowfin tuna were 1707, 3937, and 4196 tonnes respectively. An additional catch of 33.7 tonnes of SBT were landed at the southern Java ports of Cilacap, Batere and Seleko in 2005. The total catch of SBT landed in Indonesia is up from 632 tonnes in 2004 to 1741 tonnes in 2005. The total catch of tunas and billfish landed in Benoa, at 13,342 tonnes, remained relatively unchanged from the 2004 total of 13,572 tonnes. However, the percentage of SBT in the catch increased from 4.5% in 2004 to 12.8% in 2005. The majority of this increase is attributed to companies targeting SBT south of the spawning grounds. Fuel price rises in Indonesia in October 2005 and the associated rise in operational costs have had a very significant impact on fishing operations and are likely to result in further changes in fishing behaviours. Preliminary IOTC estimates of tuna production at Benoa in first quarter of 2006 suggest a likely lower total of SBT catch by Indonesia's longline fleets in 2006 compared to 2005.

Introduction

In 2002 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, Australian Centre for International Agricultural Research (ACIAR), Indian Ocean Tuna Commission (IOTC) and Overseas Fisheries Cooperation Foundation-Japan (OFCF), 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 (south Bali) which services longline vessels fishing on the SBT spawning grounds south and east of Central and Eastern Java. A small quantity of SBT is also landed at Cilacap (south coast, Central Java) and very occasionally SBT is landed at Muara Baru (North Jakarta). This expanded monitoring program built on the earlier RCCF/RIMF/CSIRO catch monitoring that operated since 1993. This paper reports on monitoring activities in Benoa and presents the IOTC catch estimation for SBT, other tuna, and billfish landed at this port during 2005, but includes information on SBT landings at other Indonesian ports.

Methods

The Indonesian SBT catch monitoring is focused on the Port of Benoa in South Bali where the majority of SBT landings in Indonesia occur. A small amount of SBT is also landed at the Fishing Port of Cilacap, the nearby ports of Batere and Seleko, and Muara Baru which are covered by the 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 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 into the SBT Biologicals Database at RIMF and regular updates of the database are provided to CSIRO in Hobart.

Results

Benoa Catch Monitoring

A summary of monitoring activities during 2005 and first half of 2006 are presented in Tables 1 and 2, respectively, and in Figure 1. The target of 30% coverage of landings at each processor each month was well exceeded during this 18 month period, with an overall coverage of 49% of landings for year 2005. In addition, 190,928 individual fish weights were recorded, and 10,154 lengths measured during 2005.

In the paper we submitted to last year's CCSBT Scientific Meetings (Andamari et al. 2005) we reported the problems associated with the coverage of landings at one processing plant, due to restrictions the company placed on the days monitoring could take place in their processing rooms. This was considered a significant problem as the under-sampled processor was processing large numbers of fish caught in fishing operations that differed from those used by most other fishing companies. Their 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. Following negotiations between our Benoa Monitoring Program Manager, Ms Andamari, and the company, during 2005 and up to present time the company relaxed their restriction to allow sampling on 4 days per month, and the selection of the 4 days was at the enumerators' discretion. This enabled the enumerators to choose days when they knew significant landings were occurring at that processor and thus were able to achieve the 30% target.

Table 1. Summary of IOTC monitoring activities at Benoa in 2005.

Month	No. Landings	No. Sampled	% Coverage	No.weights recorded*	No.length/weight measured
January	248	132	53.2	14533	1577
February	218	126	57.8	16565	911
March	198	104	52.5	18099	1383
April	205	105	51.2	14469	1047
May	212	98	46.2	17482	846
June	236	122	51.7	24037	1105
July	218	97	44.5	20998	789
August	193	85	44.0	15179	576
September	194	88	45.4	16110	731
October	237	102	43.0	12795	389
November	113	58	51.3	8505	402
December	167	83	49.7	12156	398
Total	2439	1200	49.2	190928	10154

*This includes tuna, billfish and sharks.

Table 2. Summary of IOTC monitoring activities at Benoa in 2006 up until June.

Month	No. Landings	No. Sampled	% Coverage	No.weights recorded*	No.length/weight measured
January	193	97	50.26	10464	329
February	111	53	47.75	7491	170
March	130	65	50.00	8073	147
April	129	61	47.29	17010	248
May	157	76	48.41	11753	192
June	170	83	48.82	12749	297

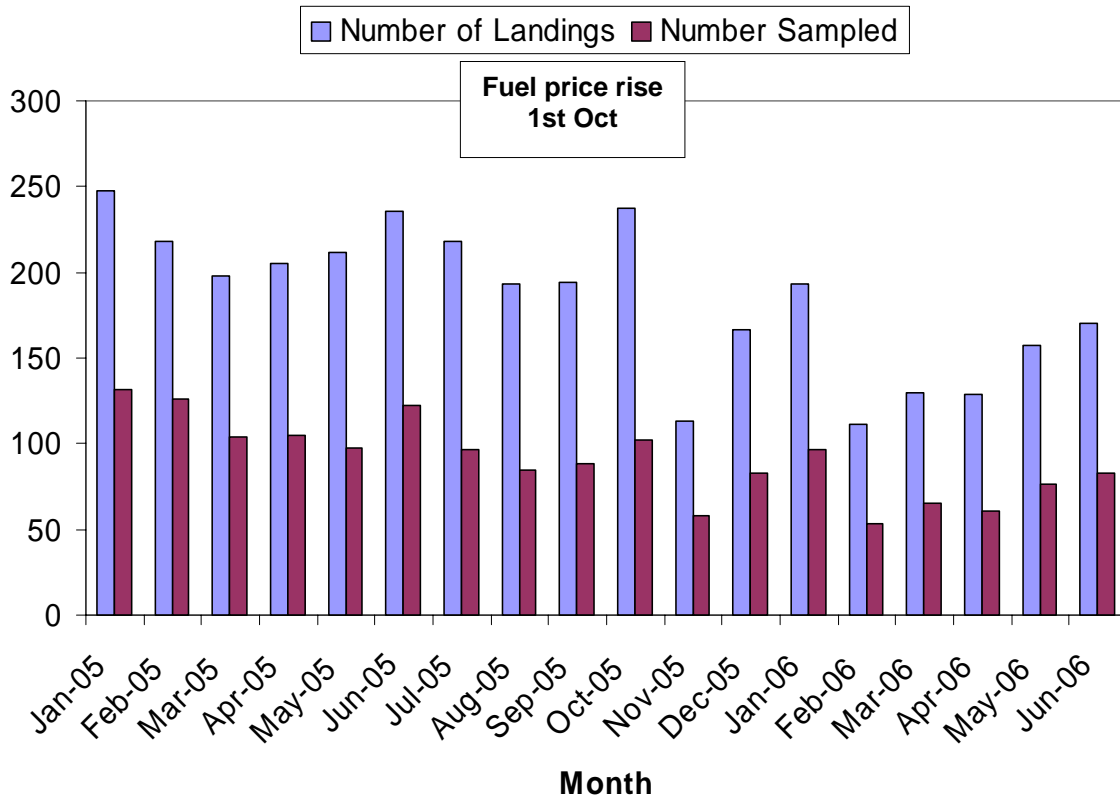


Figure 1. Number of landings and number of samplings at Benoa by month, January 2005 to June 2006.

The most striking feature in the pattern of landings (Fig. 1) during 2005/2006 is that there were only 113 landings at Benoa during November 2005, which was a dramatic reduction on the 190-260 per month that had been 'the norm' up until that point. All available evidence suggests this decline was the result of the more than doubling in the price of fuel that followed the Indonesian Government's cutting of fuel subsidies at the beginning of October. There was a very significant reduction in vessel activity during October, with many vessels remaining berthed in port. Landings increased to higher levels during December and January (but still below 200 landings/month), but February was another very quiet month with only 111 landings. Landings at Benoa during March-June 2006 remained below the level of previous years for this period, and the fuel price impacts are believed to be the underlying reason.

Although the number of landings during November was low, the landings of SBT that month were by far the highest for the first 6 months of the 2005/2006 spawning season. During this

month there were some very large landings of SBT by one particular fishing/processing company (name withheld for confidentiality reasons). In common with the 2004/2005 spawning season, this company used some of its longline vessels as carrier vessels to bring in catch from many 'sister' longline vessels that had been fishing in a region south of SBT spawning grounds. In response to the large rise in fuel price on 1st October, most of the company's fleet returned to port for catch unloading during November, and remained in port (Fig. 2) through Dec05-March06, only resuming activity to sea during recent months. The impacts of the fuel price-rise have already resulted in the closure of at least two of the fourteen tuna processing companies at Benoa, and further closures are anticipated (Soetomo, pers. comm.).

The impacts are of course not confined to fleets operating out of Benoa, and all available information suggests fishing vessel activity across both commercial and artisanal sectors in all regions of the Indonesian archipelago has decreased significantly and also generated new fishing behaviours among fleets. Adding to the current difficulties experienced by some of the Benoa processing and vessel owner companies has been the closure of the Japanese markets to imports of Indonesian caught SBT, in response to CCSBT resolutions that followed Indonesia's decision during 2005 not to join the Commission, even as Cooperating Non-Member.



Figure 2. Longliners tied-up in fishing port of Benoa for several months following fuel-price rise in early October 2005 (Photo – C. Proctor)

Catch Estimates for 2005

IOTC have provided the catch estimates for 2005, based on the data collected by the enumerator team at Benoa (Tables 3 & 4, and Fig. 3). In 2005 there were 1707 tonnes of SBT landed at Benoa and an additional 18.8 tonnes landed at Cilacap, and 14.9 tonnes at the minor ports of Seleko and Batere. Therefore, the estimate of total catch of SBT landed in Indonesia in 2005 is 1741 tonnes. This is a very substantial increase on the 632 tonnes estimate for 2004. The estimates of total catch of tunas and billfish landed in Benoa in 2005 (13,342 tonnes) is very similar to that for 2004 (13,572), but the percentage of SBT in the catch increased from 4.5% in 2004 to 12.8% in 2005.

Table 3. IOTC estimated catch (tonnes) of tuna by species landed at Benoa in 2004 and 2005.

YEAR	BET	YFT	SBT	ALB	SKJ	SWO	OBILL	Total	%SBT
2004	4,183	4,413	614	1,906	21	1,245	1,190	13,572	4.5
2005	3,937	4,196	1,707	1,610	22	816	1,054	13,342	12.8

Table 4. Estimates by IOTC of the total numbers of specimens caught, total catches (tonnes), and the catches per species by month, at Benoa for 2005.

Month	Dest	Number	Catch (t)	SBT	YFT	BET	SKJ	ALB	SWO	OBIL	SKH	OTHR
1	E-R	24,207	1351	542	331	452	-	0	5	21	-	-
1	ByC	21,853	575	20	2	2	0	89	166	153	55	88
2	E-R	20,856	1111	411	299	379	-	-	7	15	-	-
2	ByC	11,724	313	1	8	1	0	125	39	89	21	29
3	E-R	19,854	1004	288	318	360	-	0	17	21	-	-
3	ByC	15,282	329	12	7	7	0	121	32	60	36	54
4	E-R	14,863	637	22	301	285	-	0	11	18	-	-
4	ByC	14,881	431	69	24	16	0	101	41	114	30	36
5	E-R	24,880	953	2	501	403	-	4	35	8	-	-
5	ByC	23,814	430	0	7	5	7	196	35	72	40	68
6	E-R	21,997	745	-	409	314	-	3	13	6	0	0
6	ByC	30,585	629	1	5	5	5	323	46	82	80	82
7	E-R	23,756	832	-	470	333	-	0	19	9	-	1
7	ByC	20,616	396	0	7	3	5	208	36	39	52	46
8	E-R	14,516	525	0	236	248	-	1	36	4	-	0
8	ByC	17,041	332	0	3	3	1	185	32	21	33	54
9	E-R	14,154	559	24	264	240	-	0	23	8	-	-
9	ByC	17,108	332	-	4	6	1	144	52	38	32	55
10	E-R	16,928	819	98	302	361	-	1	33	24	-	0
10	ByC	16,023	377	0	1	5	2	79	57	130	51	52
11	E-R	13,839	652	139	210	277	-	-	16	10	0	-
11	ByC	3,539	82	-	0	0	1	9	18	32	6	16
12	E-R	21,314	826	78	484	231	-	-	14	19	-	-
12	ByC	5,998	171	0	3	1	0	21	33	61	29	23
Total		429,628	14411	1707	4196	3937	22	1610	816	1054	465	604

E-R = Export or Reject, **ByC** = Bycatch, **SBT** = southern bluefin tuna, **YFT** = yellowfin tuna, **BET** = bigeye tuna, **SKJ** = skipjack tuna, **ALB** = albacore, **SWO** = swordfish, **OBIL** = other billfish, **SKH** = sharks, **OTHR** = other IOTC species.

The catch of bigeye and yellowfin tuna has exhibited a continuous decline since 2002 (Fig. 3). On the other-hand, landings of SBT declined markedly between 2002 and 2003, showed a slight recovery in 2004, and then the significant rise in 2005.

We have some concerns (see below) that the monitoring program may not have fully captured the level of SBT landings during the 2004/2005 spawning season (Sept'04-April'05) and similarly during November 2005, and that the estimate of 614 tonnes of SBT landed at Benoa in 2004 may be significant underestimation of the true catch. Collaborative efforts between IOTC, RCCF/RIMF, DGCF, CSIRO and industry are ongoing in attempts to determine the degree of underestimation, if in fact there is any.

Most of the significant increase in catch of SBT in 2005 can be attributed to the changes in fishing operations of one particular fishing company (name withheld for reasons of confidentiality), with large numbers of SBT caught on grounds to the south of the spawning

ground (Andamari et al. 2005, Farley et al. 2006), reflecting fishing pressure on a different sector of the population that includes pre- and post- spawning and possibly immature fish.

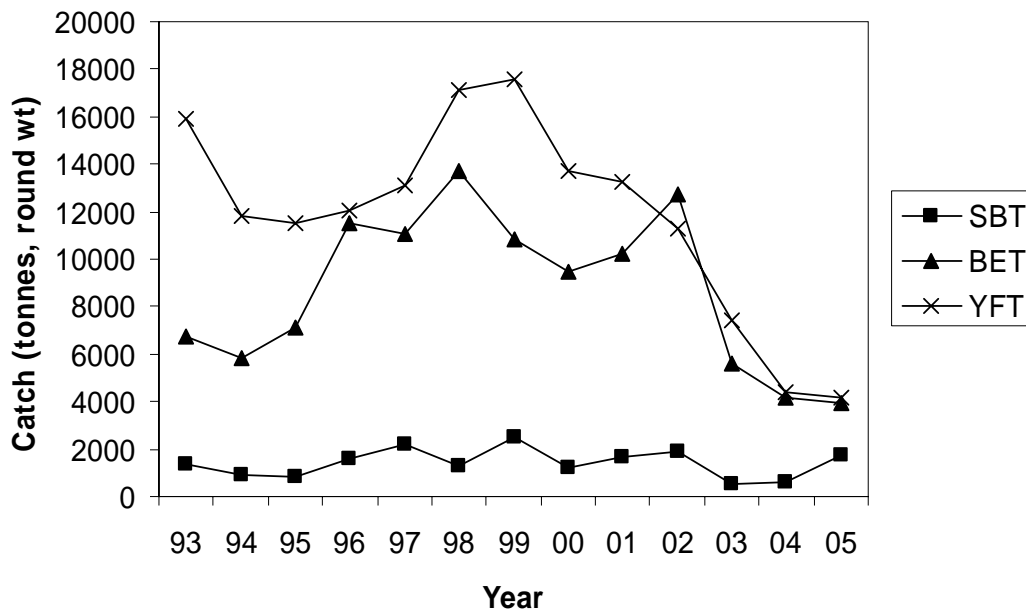


Figure 3. The estimated catch of southern bluefin, bigeye and yellowfin tuna landed at Bena in the years 1993 to 2005.

As we also commented in last year's paper, the Bena-based longline 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 establishment of a trial RCCF/CSIRO 6 man observer program at Bena (funded by ACIAR), in August 2005, has begun to yield data and information that will hopefully lead to a better understanding of the fishing strategies and the resultant CPUE on the main tuna and billfish species in this fishery.

Preliminary catch estimates for 2006

IOTC has very recently provided preliminary estimates of tuna and billfish production (dressed weight) at Bena for the first quarter (Jan – Mar) of 2006 (Table 5). We emphasise that these data are preliminary and further verification and analysis is required. However, if we assume these data approximate final estimates, the landings of SBT at Bena in the first quarter of 2006 (140 tonnes) were well below the landings of SBT for the same quarter of 2005 (1274 tonnes), and this suggests that total SBT catch by the Indonesia longline fleet for calendar year 2006 is likely to be significantly lower than for calendar year 2005.

Table 5. Estimates by IOTC of production of tunas and billfish at Benoa for first quarter of 2006.

Comp.	BET	YFT	SBT	ALB	SKJ	TUN	SWO	MARL	SFA	Total (t)	%SBT
E - R	613,052	708,087	136,969	82	-	-	21,172	43,348	-	1,523	9.0
ByC	39,502	22,387	2,884	248,559	190	10,727	27,905	76,516	2,051	430	0.7
Total	652,554	730,474	139,853	248,641	190	10,727	49,077	119,864	2,051	1,953	7.2

E-R = Export or Reject, ByC = Bycatch, SBT = southern bluefin tuna, YFT = yellowfin tuna, BET = bigeye tuna, SKJ = skipjack tuna, ALB = albacore, TUN= Unidentified tuna usually from aggregated landings which are frozen SWO = swordfish, MARL = marlin, SFA = sailfish

Considerations for Future Monitoring/Sampling

A Need for Revised Strategy for Monitoring of SBT

The Benoa SBT monitoring program has undergone many significant changes since its beginning's in 1992, although the core objective has remained the same – to monitor the level of SBT landings in Indonesia and collect biological information that will assist scientific assessment of the spawning stock and CCSBT in formulating management decisions for the fishery. During the past two spawning seasons there have been periods of abnormally large landings of SBT that we have associated with fishing activity south of the spawning grounds (Andamari et al. 2005, Farley et al. 2006).

We feel the monitoring program was sufficiently effective in capturing the occurrence of these landings and the reasons underlying them, but we recognize there may have been times when the level of landing activity was so high that the monitoring program struggled to capture their full extent. One indication of this is the number of SBT that IOTC estimated (based on the raising of sampling that was done by the RCCF/IOTC/CSIRO enumerator team) to have been landed during November 2005 (= 1518 fish) compared to the significantly higher number of SBT documented by our RCCF otolith sampler, Kiroan Siregar, for that month (= 2115 fish). As Kiroan's sampling is largely independent of the RCCF/IOTC/CSIRO sampling schedule, and he can target his activity on any one day to concentrate on processing companies that are receiving large numbers of SBT, his records are likely to give a more accurate account of the true number of SBT landed. However, from information provided by Kiroan only recently, it appears even his records may be an underestimate of the true SBT landings, as he is not able to cover all landings during the extreme periods of landing/processing activity, that may stretch from early morning into late afternoon or even evening (cf. 'normal' hours of processing that are confined to morning and early afternoon). The above has led us to consider, in collaboration with IOTC, what modifications can be made to the monitoring protocols to better capture the full extent of SBT landings during those extreme periods. Given the impacts of the fuel price rise on fishing vessel activity in Indonesia, such extreme periods of landings may not feature in the future, but we recognize the need to have a strategy ready to implement if they do occur. Discussions on this issue are continuing between RCCF, IOTC, and CSIRO in the lead up to the 2006/2007 SBT season.

Information recently gathered by the Benoa monitoring/sampling and observer teams suggests that one or more of the Benoa based companies will be changing their fishing operations further to combat the impacts of higher fuel prices and higher operating costs in general. These changes include the upgrade of processing and storage facilities on-board vessels to enable the freezing of catch and landing of SBT in port as frozen bycatch. The information gathered also suggests the vessels will be spending much longer periods at sea – periods of 4

to 6 months. These changing operations carry significant implications for the current SBT sampling program, and we are now giving thought to how we ensure continued adequate coverage of SBT landings by vessels at Benoa and elsewhere.

Development of a Memorandum of Understanding for the Benoa Monitoring Program

The multilateral, multi-agency, port-based monitoring across the three key landing ports - Benoa, Muara Baru, and Cilacap - has continued successfully since mid-2002, but has relied heavily on external funding, both from OFCF (in collaboration with IOTC), and from Australia. The contributions from Australia were initially provided by ACIAR and DAFF (AFFA at that time), but since September 2004, the majority of funding has been from DAFF with some contributions from CSIRO. The monitoring operations at Muara Baru and Cilacap have been funded by OFCF, while Australia has continued to provide the operating funds for the Benoa monitoring program. Over the past several years, and in particular at the annual Steering Committee Meetings for "Monitoring Indonesia's Indian Ocean Tuna Fisheries", there has been regular discussion among all participating parties about the goal of eventual transition of full fiscal and managerial responsibility to Indonesia for these monitoring programs. During the past year a significant step forward was made towards achieving this goal when a Memorandum of Understanding (MoU) was achieved between OFCF/IOTC and Indonesia's Ministry of Marine Affairs and Fisheries (MMAF) that will hopefully see Indonesia take up full fiscal responsibility for the monitoring programs at Muara Baru and Cilacap on 1 January 2007.

At this year's Steering Committee Meeting (held on 25th April at RCCF), MMAF indicated they were currently not able to also take up funding responsibility for the monitoring program at Benoa in early 2007. However, there was general agreement among all participating parties that a MoU should be developed for Benoa along the lines of that developed for the other two ports, to at least define a strategy for transition of responsibility for that port. Discussions have commenced between RCCF/RIMF, Directorate General of Capture Fisheries, CSIRO and DAFF about how best to progress that MoU development. These discussions will obviously require inputs from CCSBT, and to some extent IOTC, to ensure that whatever plans are developed for monitoring at Benoa, there is continuation of the biological sampling program that contributes essential information for both stock assessments and the development of effective management strategies for the SBT fishery.

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