



## **Trial observer program for Indonesia's tuna longline fishery in the Indian Ocean**

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**Prepared for the CCSBT 8<sup>th</sup> Meeting of the Stock Assessment Group (SAG8) and the 12<sup>th</sup> Meeting of the Extended Scientific Committee (ESC12) 4-8 September, and 12-14 September 2007, Hobart, Australia**

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## **Abstract**

Indonesia has the largest fleet of commercial longline tuna fishing vessels operating in the Eastern Indian Ocean. It is estimated there are currently 1500 to 1800 vessels in the fleet, although a large rise in national fuel price in 2005 has had a major impact on vessel activity and brought about changes in operating behaviour by some companies. Primary target species are yellowfin, bigeye, albacore, and southern bluefin tunas. To address a lack of CPUE data available from this fishery, a trial observer program was developed – a collaboration between Ministry of Marine Affairs and Fisheries (Indonesia) and CSIRO Marine and Atmospheric Research (Australia), with funding from Australian Centre for International Agricultural Research. The observer trials are part of a larger program to further develop Indonesia's capacity to monitor, analyse and report on its tuna fisheries – primary goals being better understanding of catch trends and improved assessments of the tuna stocks and bycatch species. The trials commenced in July 2005 and will run till December 2008, with focus on vessels operating from port of Benoa in Bali. Six observers were recruited and trained in species identification, safety, data management and report writing. At time of writing the team had completed a total of 41 trips to sea, with an average of 21 sets per trip. Observer datasheets and a database, tailored to the Indonesian fishery, were successfully implemented but are still 'evolving'. Development of a logbook/logsheets for the fishery is another key activity being run in parallel with the observer trials.

## **Fishery overview and context**

Commercial tuna longline fishing commenced in Indonesian waters during the 1930s with Japanese vessels conducting 'test fishing' (Proctor et al. 2003). Tuna longline fishing by Indonesian commercial vessels did not commence until 1952. Through the 1960s – 1980s there was gradual expansion of the Indonesian longline fleet, but in the late 1980s/early 1990s there was a dramatic, rapid expansion in vessel numbers (Fig. 1) with the development of export markets for fresh and frozen whole tuna to Japan and to other international markets.

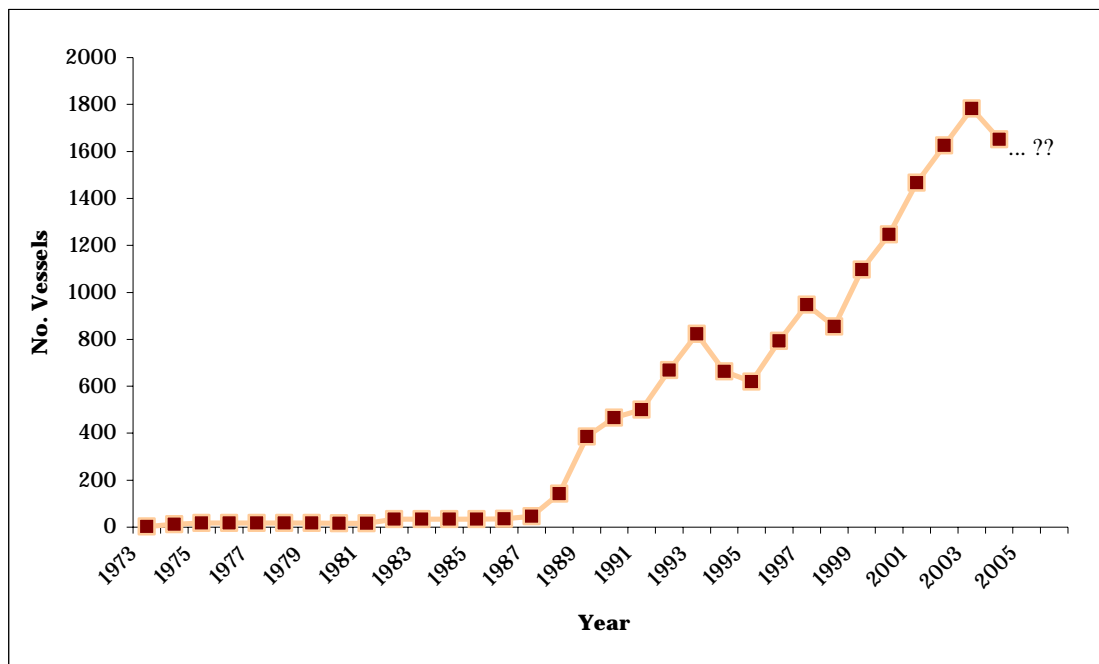


Figure 1. Number of Indonesian commercial tuna longline vessels operating in the Indian Ocean (mod. from Herrera, 2002). Part of the rapid increase in vessel numbers was the result of Indonesian Government regulations (introduced in 1998) requiring all foreign-owned vessels based in Indonesian ports to be Indonesian flagged.

Indonesia now has the largest fleet of commercial tuna longline vessels in the Eastern Indian Ocean, with an estimated 1500 – 1800 vessels operating from key ports in Java, Sumatera and Bali. Providing a more accurate number of current active vessels is difficult. A major fuel price rise (following a lowering of Indonesian Government subsidies) in early-October 2005 resulted in decreased vessel activity within many fishing companies. Marked changes in fishing behaviours have occurred since this price rise, with many vessels now fishing further from Indonesian shores in search of better catches and staying at sea for up to 3-5 months (compared to 1-2 months previously). Although the target species of Indonesia's longline fleet are primarily yellowfin (YFT) and bigeye (BET) tunas (Table 1), the catch of many of these vessels includes southern bluefin tuna (SBT). The amount of SBT catch is relatively small compared to that of YFT and BET, but is significant as the majority are caught from the only known spawning area for this species, south of Java and Bali (Fig. 3). Long term declines in average size and age of SBT caught by this fishery, and also declines in catches of YFT and BET (Fig. 2), are of serious concern. To better understand the reasons behind these trends, and to assist development of effective management strategies for fishery sustainability, obtaining catch and effort data was identified by all the collaborating organisations and stakeholders as an urgent priority.

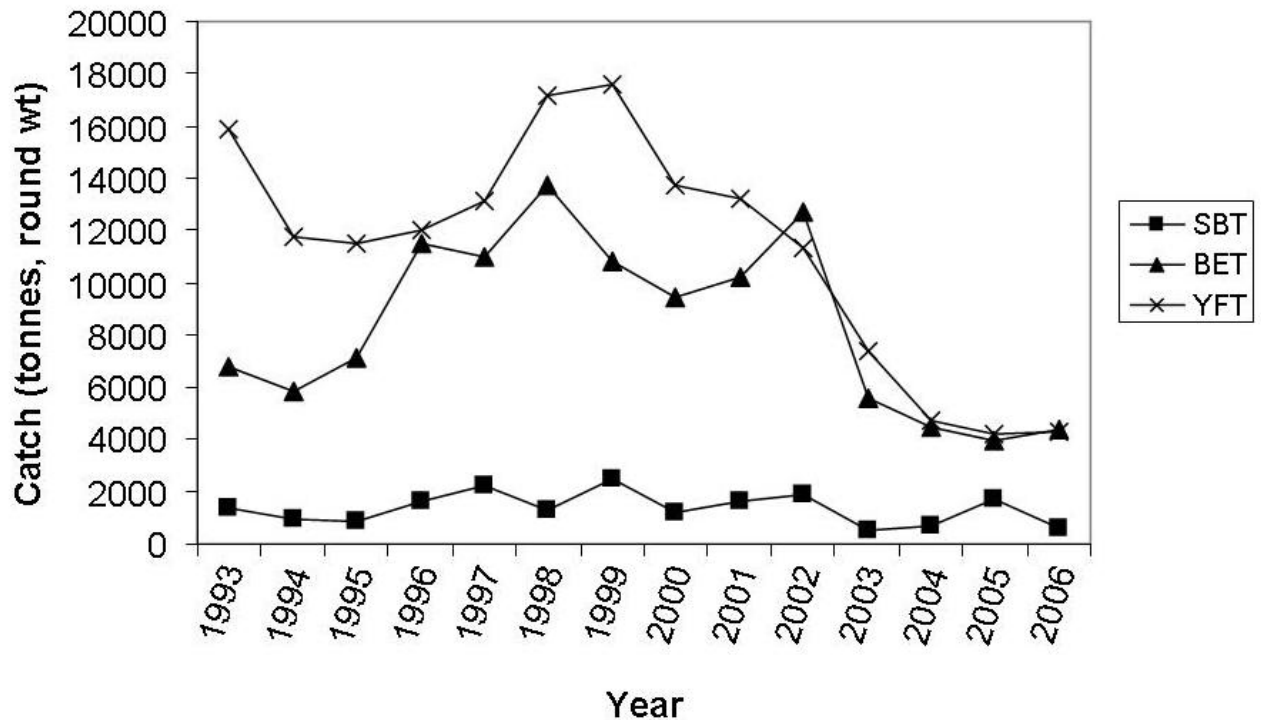
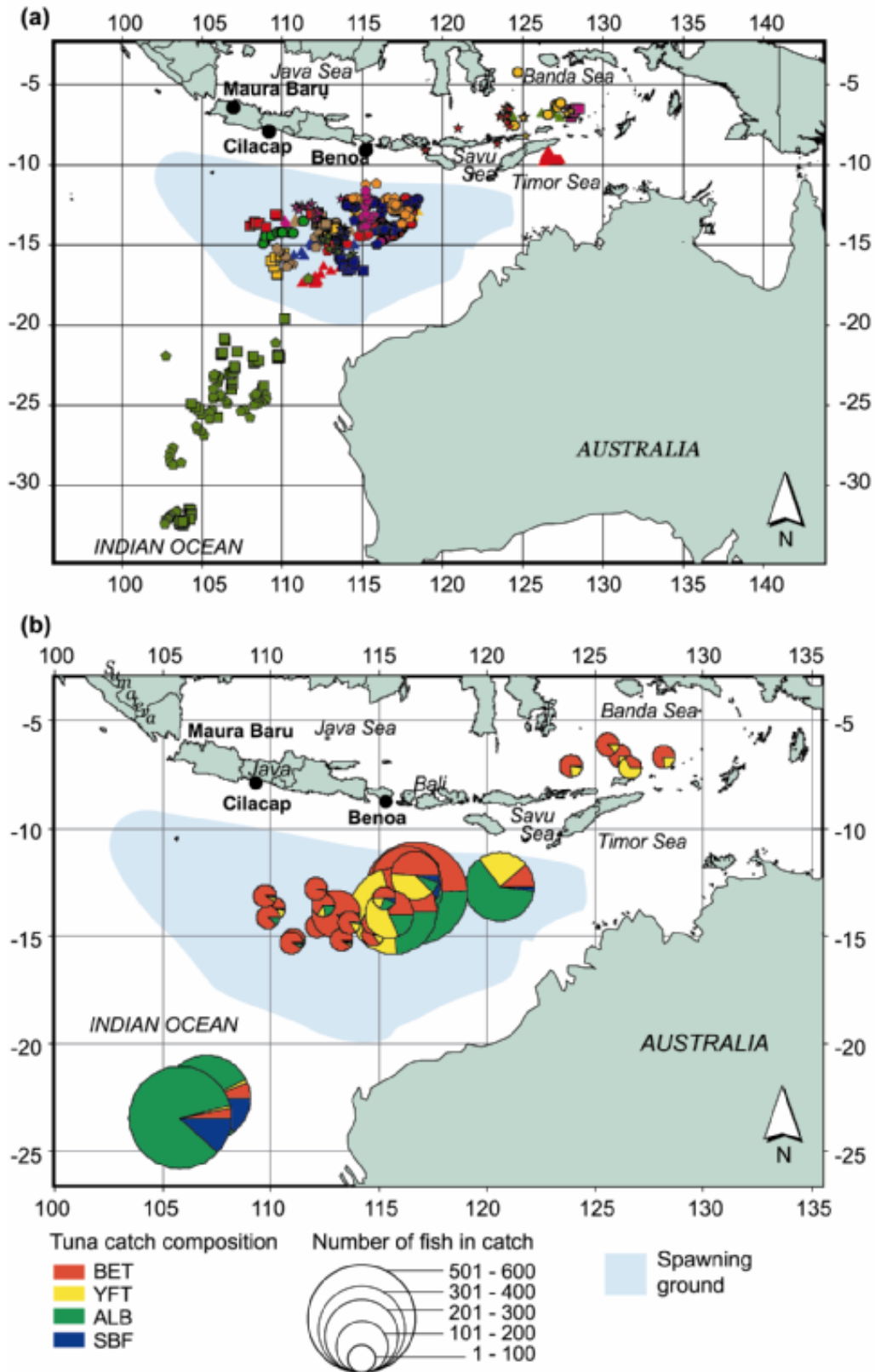


Figure 2. The estimated catch of southern bluefin, bigeye and yellowfin tuna landed at Benoa in the years 1993 to 2006.

### Overview of The Observer Program

To address the shortage of CPUE information, a trial scientific observer program for commercial longline vessels based at Port Benoa commenced in July 2005. This program is a collaboration between the Research Centre for Capture Fisheries, within Indonesia's Ministry of Marine Affairs and Fisheries (MMAF), and CSIRO Marine and Atmospheric Research, and is funded by the Australian Centre for International Agricultural Research. Six recruits were provided with observer training. This included fish, cetacean, turtle, and bird identification, data collection and reporting protocols, sea and climate conditions reporting, and guidelines for safety at sea. Data collection sheets and an observer database were developed, based on those of the Secretariat of the Pacific Community and Forum Fisheries Agency observer programs, but modified to suit the Indonesian situation and with Bahasa Indonesia as the working language.



**Figure 3:** Data from first 29 trips showing (a) set positions and (b) catch composition for the 4 target tuna species. “SBF” is the FAO code for southern bluefin tuna.

## Summary of Observer Data to Date

To date, Indonesian observers have each completed seven trips to sea (a total of 41 vessel trips). Data presented here are for the first 29 trips (data from more recent trips are still being processed). Average trip length was 34 days, on vessels ranging in size from 61 to 140 gross tonnes. The average number of sets/trip was 21, with averages of 1454 hooks/set, 14 hooks between floats, and 126 floats/set (Table 1). Fishing operation areas included Eastern Indian Ocean between latitude 7°S and 35°S and longitude 100°E and 130°E, but also the Banda Sea (Fig. 3a). Averaged across all trips, catch composition was 43 % tuna (the 4 primary target species), and 57 % bycatch (Fig. 3b).

**Table 1:** Summary of trip information from trial observer program for longline vessels based at port of Benoa, Bali.

Number of trips*	29	
	Mean	Range
Length of trip (days)	34	17 - 99
Number of sets/trip	21	8-59
Vessel sizes (GT)	94	61-140
Number of hooks/set	1454	380-1937
Number of hooks between floats	14	4-21
Number of floats/set	126	20-300
Primary target species	Bigeye tuna ( <i>Thunnus obesus</i> ), Yellowfin tuna ( <i>Thunnus albacares</i> ), Albacore ( <i>Thunnus alalunga</i> ), Southern bluefin tuna ( <i>Thunnus maccoyii</i> )	
Common bycatch species	Lancet fish ( <i>Alepisaurus brevirostris</i> ), Oil fish ( <i>Ruvettus pretiosus</i> ), Pelagic stingray ( <i>Dasyatis violacea</i> ), Blue shark ( <i>Prionace glauca</i> ), Black promfret ( <i>Parastromateus niger</i> ), Swordfish ( <i>Xiphias gladius</i> ), Crocodile shark ( <i>Pseudocarcharias kamoharai</i> ), Skipjack tuna ( <i>Katsuwonus pelamis</i> ), Black Marlin ( <i>Makaira indica</i> ), Shortbill Spearfish ( <i>Tetrapturus angustirostris</i> ), Common Dolphin ( <i>Corypahaena hippurus</i> ), Indo-Pacific blue marlin ( <i>Makaira mazara</i> ), Longnose chimaeras ( <i>Harriotta spp.</i> )	
Common Bait Used	Lemuru ( <i>Sardinella spp.</i> ), Milkfish ( <i>Chanos chanos</i> ), Scad mackerel ( <i>Decapterus spp.</i> ), Gizzard shad ( <i>Anodontostoma chacunda</i> ), Frgate Tuna ( <i>Auxis thazard</i> ), Squid ( <i>Loligo spp.</i> )	

## Further Development of the Observer Program

The trial observer program at Benoa will continue until the end of 2008. As they gain experience at sea, the observers are taking on more tasks. The deployment of hook-timers and temperature depth recorders has commenced, to obtain information that should assist in the analyses of CPUE and our understanding on factors that influence catch success. Also, the observers are now doing biological sampling at sea for genetics research projects, including one on stock structure of swordfish, *Xiphias gladius*. Development is currently underway within MMAF to expand the program (which currently relies entirely on voluntary participation by fishing companies) to become a more formal fisheries observer program, including other ports and other vessel gear types. Also planned is an upgraded log-sheet for vessel skippers, and it is hoped the observers will play an important role in training skippers in the completion of their logsheets. In recognising the importance of sustainability of the tuna stocks and, in turn, sustainability of the tuna industry to Indonesia, the nation's tuna fishing industry associations and the Indonesian Tuna Commission have expressed strong support for these initiatives.

This observer program will undoubtedly assist in the monitoring of Indonesia's annual catch of SBT. Among the 41 trips completed by the observers to date, several have been on vessels fishing in the area south of the spawning ground. As such, the observer database is rapidly growing into an important source of data that should enable a thorough comparison of population structure of SBT on these southern grounds and those on the spawning ground. Further observer trips to the southern area are required before a detailed comparison can be done, but it is hoped the results can be reported at the 2008 CCSBT Scientific Meeting.

## Acknowledgements

This Trial Tuna Observer Program in the Indian Ocean would not have been possible without the cooperation of tuna fishing companies and the skippers and crews of their vessels, based at Port Benoa, who have provided vessel placements for the observers and assisted in data collection. We wish to thank the Chairs of the longline tuna fishing associations, Mr Simorangkir (Asosiasi Tuna Longline Indonesia) and Mr Poernomo (Asosiasi Tuna Indonesia), who encouraged their association members to cooperate in the program, and to the Office of Fisheries and Marine Affairs for Province of Bali<sup>2</sup>, who assisted in the program's establishment. We are also grateful to the staff of WASKI (Office for the Supervision of Fishing Vessels) in Benoa, who have provided information on vessel activities to the observers and assisted in assigning the observers to vessels. Mr Luke Orell and Ms Jenny Giles, volunteers within the Australian Volunteer International program, are thanked for their valuable contributions to observer training during their time in Bali.

The success of the program relies heavily on the quality of the information collected at sea. The amount and quality of information collected to date demonstrates a high degree of professionalism and dedication by the observers and we extend our appreciation to all the observers who are currently or have been involved with this program.

The trial observer program is a key component of a broader capacity building project ("Capacity development to monitor, analyse and report on Indonesian tuna fisheries"), funded

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<sup>2</sup> Dinas Perikanan dan Kelautan Propinsi Bali



by Australian Centre for International Agricultural Research and by CSIRO Marine and Atmospheric Research.

## References

Proctor C.H., Merta G.S., Sondita M.F.A., Wahyu I. R., Davis T.L.O., Gunn J.S., and Andamari R. (2003). A review of Indonesia's Indian Ocean tuna fisheries. ACIAR Country Status Report.

Herrera, M. 2002. Catches of artisanal and industrial fleets in Indonesia: An update. WPTT02-02, IOTC Proceedings no. 5.