INDONESIAN SCIENTIFIC OBSERVER PROGRAM ACTIVITIES IN INDIAN OCEAN FROM 2015-2018

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Summary

This paper presents a progress summary of the Indonesian scientific observer program on the tuna fishing vessels operating in the Indian Ocean. The observer data is the most detailed information not only associated with catch and effort, but also information on fishing practices, gear configuration and environmental conditions. Only low fleet coverages were available from this data set. Hence this could higher the possibility to get robust abundance indices from the fishery.

Indonesian observer program in the Indian Ocean

There are two Indonesian observer programs currently operating in the Indian Ocean, namely national observer program and scientific observer program. The national observer program has been formally legalized by the MMAF since 2013 through Ministerial Decree No. 1/2013. Catch and effort data have been collected through the national observer program, however, issues on data entry and validity as well as the need for verification and validation prior analysis is remained (Irianto et al. 2016). The need to improve the capacity of the observers and related officers were highlighted (Irianto et al. 2016).

The scientific observer program has initiated since 2005 through a collaboration between RCCF-MMAF (Indonesia) and CSIRO (Australia) funded by ACIAR on a trial observer program. This program was then continued and funded by the Indonesian Government through the RCCF between 2009 and 2011. The Research Institute for Tuna Fisheries (under RCCF) was established in 2011 in order to conduct researches on tuna fisheries in the Indian Ocean including continuing the scientific observer program. The trial observer program (2005-2008) has been reported in the

13th Meeting of the Extended Scientific Committee in 2008, while the scientific observer data have been reported within the Indonesian National Report Scientific Meetings of the IOTC and CCSBT since 2010. This information paper provides an update of the Indonesian scientific observer program activities in the Indian Ocean during 2015-2018.

Design of the scientific observer program

There are 8 trained scientific observers at the RITF. The observers were not only deployed in the longline vessels operating out of Benoa, but also Muara Baru and Cilacap. A total of 6 scientific observer were deployed, for as long as 321 days-at-sea (53 days/trip in average) and 262,856 hooks observed during a period in 2018. The number of hooks observed increased 36.77% compared to previous years, a courtesy of some fishing companies based in Cilacap and Benoa. Geographically, the capacity of scientific observer covered the fishing ground of statistical area 1 and 2.

Table 1. Observer activities in authorized Fishing Vessels in 2018

Trip	Day at sea	No of Settings	No of Hooks	No of SBF	HR ($x10^3$)	CCSBT Area
1	26	11	16,770	65	3.875	2
2	60	40	44,960	0	0.000	1
3	41	30	35,530	3	0.084	1
4	56	27	31,605	0	0.000	EEZ
5	56	35	50,675	0	0.000	EEZ
6	83	52	79,916	89	1.113	1
		2	3,120	3	0.961	2

Spatial distribution of the observed sets and tuna catch composition

The observed tuna longline sets covered the area between 5º-35º S and 90º-115º E. Most of the observed sets were conducted in the area 1, and the other was either inside EEZ or inside area 2. Darker color indicates higher number of hooks observed (Figure 1). Southern bluefin tunas were caught in set within region CCSBT statistical area 2 (Figure 2)

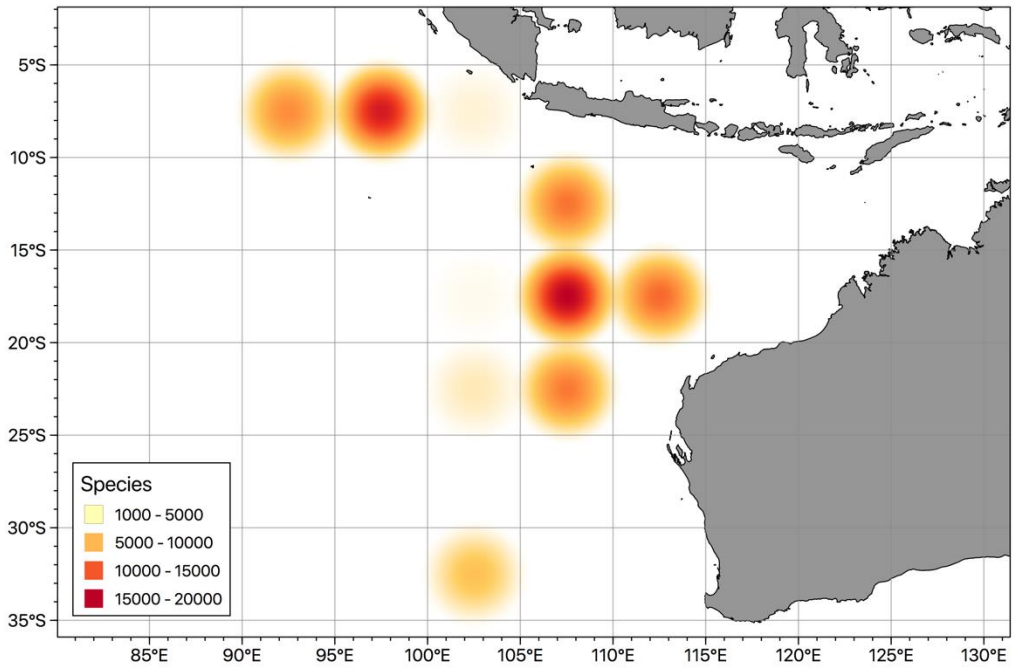

Figure 1. Map of the distribution of Indonesian tuna longline efforts year 2018, acquired from scientific observer data.

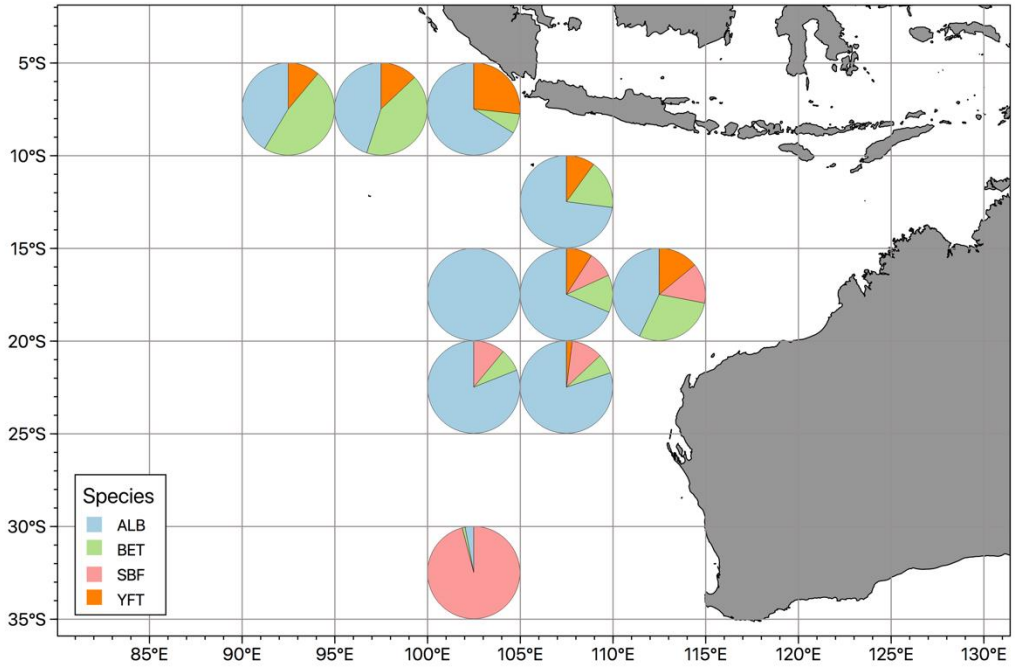

Figure 2. Spatial distribution of tuna catch composition in 2018, acquired from scientific observer data.

Trends of catch and effort recorded by the observers

Over the last five years, the effort observed by the scientific observers are declining. Mainly because technical issues related to some implementation on onboard observer's regulations recently. In 2018, only 6 trips were deployed (Table 2). Observed catch and effort from scientific observer data shown the hook rates for most tuna species were declining in the last 5 years (Figure 3.). In order to get a robust catch and effort data, Indonesia is currently improving the quality and quantity of logbook data.

Table 2. Estimated hook-rates of SBT on authorized fishing vessels

SBT					
TRIP	n	HR	Length (cmFL)		
			Average	Min	Max
1	92	1.12	159.4	117	187
2	3	0.08	167.0	157	185
3	65	3.88	157.0	139	195
4	0	0.00	na	na	na
5	0	0.00	na	na	na
6	0	0.00	na	na	na

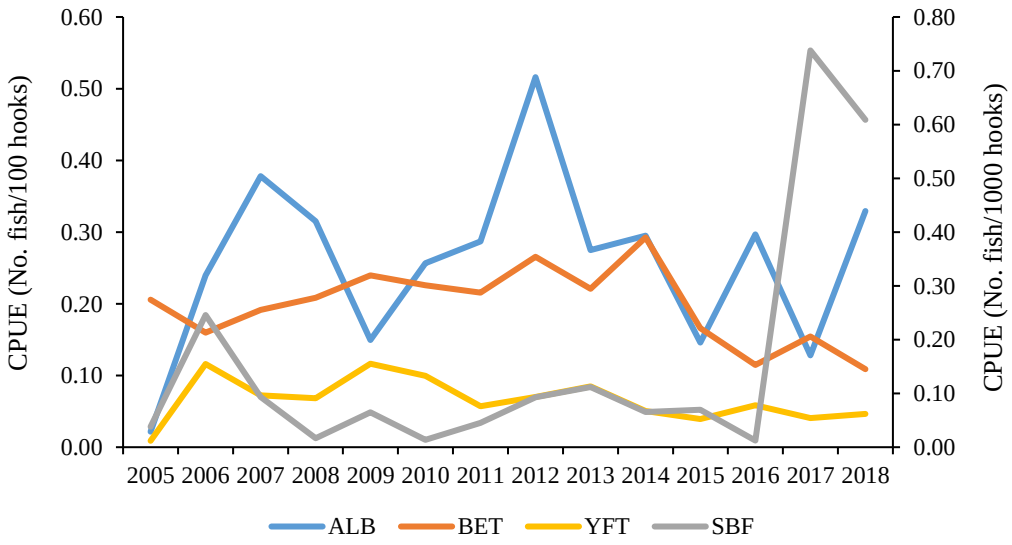

Figure 3. Nominal CPUE of longline catch from 2005-2018 based on scientific observer data

Challenges

Main challenge in term of improvement of the use of the scientific observer data are related to the following issues: low spatial and temporal coverages (region), low fleet coverage (gear types) and no replication for each observed vessel. The scarce dataset was cause by reluctance from tuna longline fishing company to be monitored by scientific observer, they still worry, some of the importance information, such as fishing ground would be exposed to the public.

Appendix 1. Annual activities of scientific observer based in Benoa Bali from 2005 to 2018

Year	No. Of Obs	No. Of Trips	No. Of Company	Number of Hooks	Total Day at Sea	Days/Trip	Avg (d/trip)
2005	6	6	1	140,406	251	19-22	20
2006	6	19	5	667,479	758	7-99	39
2007	6	14	5	396,952	648	21-108	34
2008	5	15	7	523,627	481	23-66	30
2009	5	14	8	321,591	535	15-59	38
2010	5	8	4	220,302	240	40-50	50
2011	5	6	3	131,644	210	30-50	40
2012	6	7	5	282,147	496	11-93	83
2013	5	3	3	251,774	170	52-60	57
2014	8	6	4	216,641	371	29-90	62
2015	4	5	5	172,463	241	31-61	48
2016	3	3	3	175,868	170	32-86	57
2017	5	5	5	192,188	241	31-61	48
2018	6	6	6	262,856	321	26-83	53

Appendix 2. Observed catch and effort data of ecologically related species (ERS) from scientific observer program in 2018.

Trip No.	Total Hooks	ALX	BSH	BTH	DOL	EIL	FAL	GES	ISB	LAG	LEC
1	82,316	5.13	0.89	0.00	0.01	0.00	0.00	0.16	0.00	0.27	2.17
2	36,530	13.17	2.11	0.05	0.11	0.00	0.00	0.30	0.00	0.27	4.87
3	44,960	6.14	0.93	0.02	0.11	0.02	0.20	0.33	0.07	0.36	0.78
4	31,605	8.57	0.95	0.16	0.00	0.00	0.03	0.00	0.13	0.09	3.07
5	50,675	6.12	1.54	0.14	0.02	0.00	0.04	0.51	0.04	0.12	2.45
6	16,770	0.78	0.83	0.00	0.06	0.00	0.00	0.00	0.00	0.18	0.24
Trip No.	Total Hooks	LKV	LMA	LOP	MOX	OCS	OIL	PDM	PFC	PLS	POR
1	82,316	0.01	0.06	0.02	0.00	0.00	0.05	0.00	0.09	0.30	0.00
2	36,530	0.03	0.00	0.00	0.03	0.05	0.08	0.00	0.00	0.49	0.00
3	44,960	0.04	0.00	0.09	0.04	0.11	0.13	0.00	0.00	2.11	0.00
4	31,605	0.03	0.00	0.03	0.00	0.00	0.13	0.00	0.00	0.28	0.03
5	50,675	0.14	0.00	0.00	0.00	0.06	0.04	0.00	0.02	1.64	0.00
6	16,770	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
Trip No.	Total Hooks	PSK	PTH	SMA	SPL	SPZ	TIG	TST	WAH		
1	82,316	1.06	0.02	0.05	0.00	0.00	0.00	0.13	0.15		
2	36,530	0.33	0.00	0.00	0.00	0.00	0.03	0.11	0.08		
3	44,960	0.98	0.00	0.02	0.00	0.00	0.04	0.85	0.22		

4	31,605	0.09	0.00	0.00	0.03	0.00	0.00	1.01	0.44		
5	50,675	0.04	0.00	0.16	0.00	0.02	0.00	0.91	0.69		
6	16,770	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

Appendix 3. List of ecologically related species incidentally caught by Indonesia tuna longliners in the last 5 years (2013-2018)

Code	Species	2013	2014	2015	2016	2017	2018
ALX	Long snouted lancetfish	1738	921	739	693	796	1773
ALZ	Albatrosses nei	0	0	7	0	0	0
BAR	Barracudas nei	0	4	5	6	0	0
BRZ	Pomfrets, ocean breams nei	194	232	121	0	0	0
BSH	Blue shark	37	63	137	105	184	314
BTH	Bigeye thresher	0	0	0	0	3	15
BTS	Hound needlefish	1	0	0	1	0	0
CCB	Spinner shark	4	17	1	3	0	0
CCE	Bull shark	0	0	0	0	1	0
CCL	Blacktip shark	0	0	1	0	0	0
CCP	Sandbar shark	0	0	0	0	0	0
DKK	Leatherback turtle	0	0	0	0	0	0
DOL	Common dolphinfish	11	15	7	13	33	12
EBS	Brilliant pomfret	5	0	0	0	1	0
FAL	Silky shark	0	0	26	0	2	12
GES	Snake mackerel	0	0	0	0	26	65
HAR	Longnose chimaeras	22	3	14	46	0	0
ISB	Cookie cutter shark	0	0	0	0	39	9
LAG	Opah	51	29	30	60	13	60
LEC	Escolar	284	666	490	353	240	617
LHX	Seagulls nei	0	1	0	0	0	0
LKV	Olive ridley turtle	6	12	1	15	5	12
LMA	Longfin mako	0	0	0	0	0	5
MOX	Ocean sunfish	11	3	2	1	0	3
MSK	Mackerel sharks, porbeagles nei	1	0	0	0	0	0
OCS	Oceanic whitetip shark	2	8	4	4	4	10
OIL	Oilfish	7	58	16	8	24	19
PDM	Great-winged petrel	0	0	0	0	0	1
PFC	Flesh-footed shearwater	0	0	0	0	0	8
PHU	Sooty albatross	0	0	0	0	1	0
PLS	Pelagic stingray	914	511	206	272	157	230
PSK	Crocodile shark	48	90	108	174	84	151
PTH	Pelagic thresher	0	0	0	0	2	2
RME	Longhorned mobula	0	1	1	0	0	0
RMJ	Spinetail mobula	1	1	0	0	0	0
SMA	Shortfin mako	2	2	1	5	35	13
SPL	Scalloped hammerhead	0	0	1	0	0	1
SPY	Hammerhead sharks, etc. nei	1	0	0	0	0	0
SSH	Scarlet shrimp	0	1	0	0	0	0
TCR	Keeltail pomfret	91	90	45	62	42	0
TIG	Tiger shark	1	0	0	0	0	3
TPA	Dealfish	0	0	0	0	7	0
TSK	Flapnose houndshark	1	2	6	1	6	0
TST	Sickle pomfret	60	110	29	117	105	131

Code	Species	2013	2014	2015	2016	2017	2018
TTH	Hawksbill turtle	0	0	0	0	0	0
TTX	Marine turtles nei	0	0	0	0	0	0
TUG	Green turtle	0	0	0	0	0	0
WAH	Wahoo	60	96	63	61	30	74