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Analysis of Purse Seine/Ring Net Fishing Operations in Philippine EEZ

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Abstract

Philippine flagged purse seine and ringnet vessels operating in country's EEZ were boarded by Fisheries Observer for a period of 20 days in connection with the implementation of Fisheries Administrative Order (FAO) 236, 236-1 and 236-2 "Rules and Regulations on the Operations of Purse Seine and Ring Net Vessels Using Fish Aggregating Devices (FADs) locally known as Payaos during the FAD Closure Period as Compatible Measures to WCPFC CMM 2008-01, 2011-01 and 2012-01."

This study updates the preliminary assessment made on data in 2010-2012. Analysis was made on catch rates, species and size composition and catch variations in relation to fishing grounds, depth of nets and gear type. This study will serve as the basis to recommend workable measure/s to improve and amend the existing Fisheries Administrative Order and formulate other compatible measures/national regulations to WCPFC CMMs.

I. BACKGROUND

Being one of the major tuna fishing nations in the West Central Pacific Ocean (WCPO), the Philippines has been a Chief Party to the negotiation and adoption of the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean that subsequently established the Western and Central Pacific Fisheries Commission (WCPFC). In the performance of its mandate to manage migratory fish stocks in the WCPO, the Commission implements various Conservation and Management Measures (CMMs) covering the Convention area. Conservation and Management Measure (CMM) 2008-01, 2011-01 and 2012-01 seeks to implement compatible measures for the high seas and EEZs to maintain bigeye and yellowfin tuna stocks at levels capable of producing MSY.

Among the prescribed measures is for purse seine fishery in the area bounded by 20ºN and 20ºS closed to fishing on FADs (August 1-Sept 30, 2009 and July 1- September 30 in 2010-2012 and July 1-October 31, 2013 in 2013. During these periods, all purse seine vessels were also required to carry an observer from the Regional Observer Program.

The Philippines being a non-PNA country implemented Fisheries Administrative Order (FAO) 236/236-1/2 which provided the Rules and Regulations on the Operations of Purse Seine and Ring Net Vessels Using Fish Aggregating Devices (FADs) locally known as Payaos during the FAD Closure Period as Compatible Measures to WCFPC CMM 2008-01, CMM 2011-01 and CMM 2012-01. The Order applied to all Philippine registered and licensed commercial purse seine and ring net catcher vessels that fish on FAD within Philippine EEZ during the above periods. It also required registration with BFAR for authorization to fish on FADs during the period and reduce depth of net to not more than 115 fathoms stretched to reduce the catch of bigeye tuna. It also entails vessels to carry on board Monitors/Observers to gather data and recommend further improvements of the measure. In addition, CMM 2007-01 also obliged the Commission to develop a Regional Observer Programme to, among others, collect verified catch data, and to monitor the implementation of the conservation and management measures adopted by the Commission.

This report analyses reports from Observers on board purse seines and ringnets operating within the Philippine EEZ during the above periods of FADs closures in 2010-2014.

II. OBSERVER COVERAGE AND DEPLOYMENT

The deployment of observers covered the FAD fishing closure periods in 2010-2013 involving purse seine and ring net catcher boats based in General Santos City. It was implemented in consultation with boat owners and affiliated Organizations particularly the SOCSKSARGEN Federation of Fishing and Allied Industry, Inc. (SAFAII). One Observer trip involved one catcher vessel for a period of 20 days inclusive of travel to and from fishing ground to port of fishing landing. Each trip was designated with a unique Observer trip number. Each registered vessel was required with at least one observer trip during the entire.

Table 1. Observer coverage by gear type, July-Sept, 2010-1013

YEAR	PS	RN	TOTAL
2010	138	293	431
2011	78	165	243
2012	140	146	286
2013	124	279	403
TOTAL	480	**883**	**1363**

Covered in this report were 1,363 fishing days for both purse seines and ringnets (Table 1). Observers recorded set and catch information, vessel activity, and other data using WCPFC standard Observer forms.

III. METHODS

A. Sampling

Mixed samples were taken randomly from the catch. Samples were collected by using plastic tubs as the brail was poured in wells or were scooped directly from the bunt. Samples were set aside in a secured area until the last brail. Sub-sampling was also conducted when necessary.

Samples were segregated according to species and group-weight. The lengths of all tunas and mackerel scad from the sample were measured to nearest cm (fork length for tuna and large pelagic species and total length for mackerel scad). Species identification was conducted using species ID manuals and more detailed identification was done on yellowfin and big-eye tuna based on their distinctive morphological characteristics.

B. Catch estimation

Observers total catch estimates were derived from two methods. The main procedure was made by counting and estimating the capacity of brails as fish catch was transferred from the bunt to wells or fish holds of awaiting carriers. The other method was based on capacity and fullness of wells/fish holds. Catch rate was estimated as tons/fishing day.

Brail capacity was approximately 80% of its volume (dela Cruz, 2010) to account air and water space. Billfishes and large size tuna were normally landed on deck and separately measured and added to the total catch.

C. Data analysis

Data processing was done using MS Excel. Fishing operations were grouped according to fishing grounds which included Moro Gulf and Mindanao Sea in the Celebes (CEL), Southern Philippine Pacific seaboard (PAC), Sulu Sea (SUL) and the vicinities of Kalayaan Group of Islands and waters off Balabac Is. in West Philippine Sea (WPS).

Analysis focused on the 4 major species caught: skipjack tuna (SKJ), yellowfin tuna (YFT), bigeye tuna (BET) and mackerel scad (MSD). Average catch was computed as tons/fishing day. Catch variation by fishing ground, depth of gear and gear type was also described.

IV. RESULTS AND DISCUSSION

A. CATCH, SPECIES AND SIZE COMPOSITION

Figure 1 shows the catch for the 4-year period. Total catch was 9.895 mt, composed of 49.6% SKJ, 18.2% YFT, 1.9% BET, 18.4% MSD and 11.8% other species. Noticeably the fraction of BET is comparatively low compared to similar fisheries in the WCPO and EPO. For example, observer data on associated sets from the PNG vessels for years 2004-2006 averaged 59% SKJ, 34% YFT and 6% BET (Kumoru, 2007) while the WCPO provisional purse seine-catch estimate for 2011 indicated 4.5% BET (Williams, P and P.Terawasi, 2012). The EPO purse seine catch in 2011 was 52%:37%:10% SKJ:YFT:BET proportion (IATTC, 2012). BET was also 3.6% of the catch of Philippine group seine fisheries in HSP1.

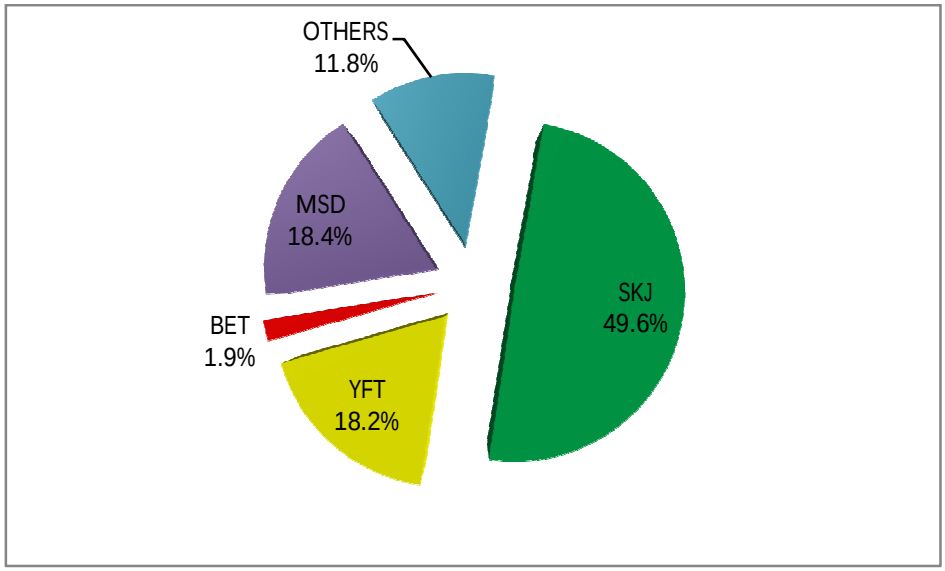


Figure 1 . Catch composition of purse seine/ringnet, July-Sept, 2010-2012; July-Oct, 2013

Overall average catch rate for the period was 7.26t/fishing day. Highest was in 2012 at 9.2 t/fishing day mainly due to increase on SKJ and YFT. SKJ dominated and influenced the level of catch. BET was almost even at 0.14t/fishing day (Fig. 2).

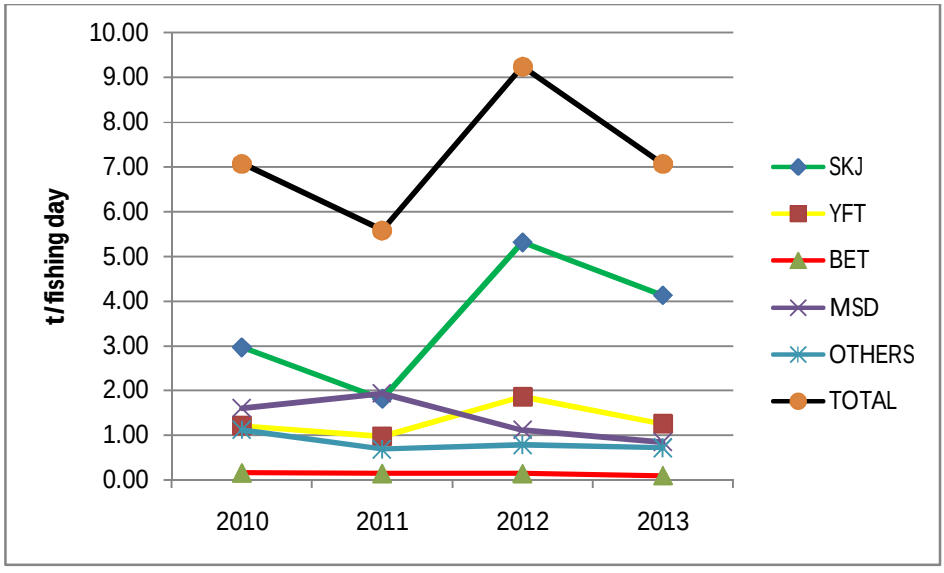


Figure 2. Catch rate, July-Sept, 2010-2012; Jul-Oct, 2013

The length frequency distribution of SKJ, YFT, BET and MSD are shown in Fig. 3. For SKJ, size ranged from 10 to 87 cm with average length of 27 cm. The equivalent size ranges and average lengths for YFT, BET and MSD were 11-159 and 29 cm, 15-78 cm and 28 cm, and 9-40 cm and 24 cm respectively. These only emphasize that bulk of tunas caught by the fleet were essentially small and of comparable sizes.

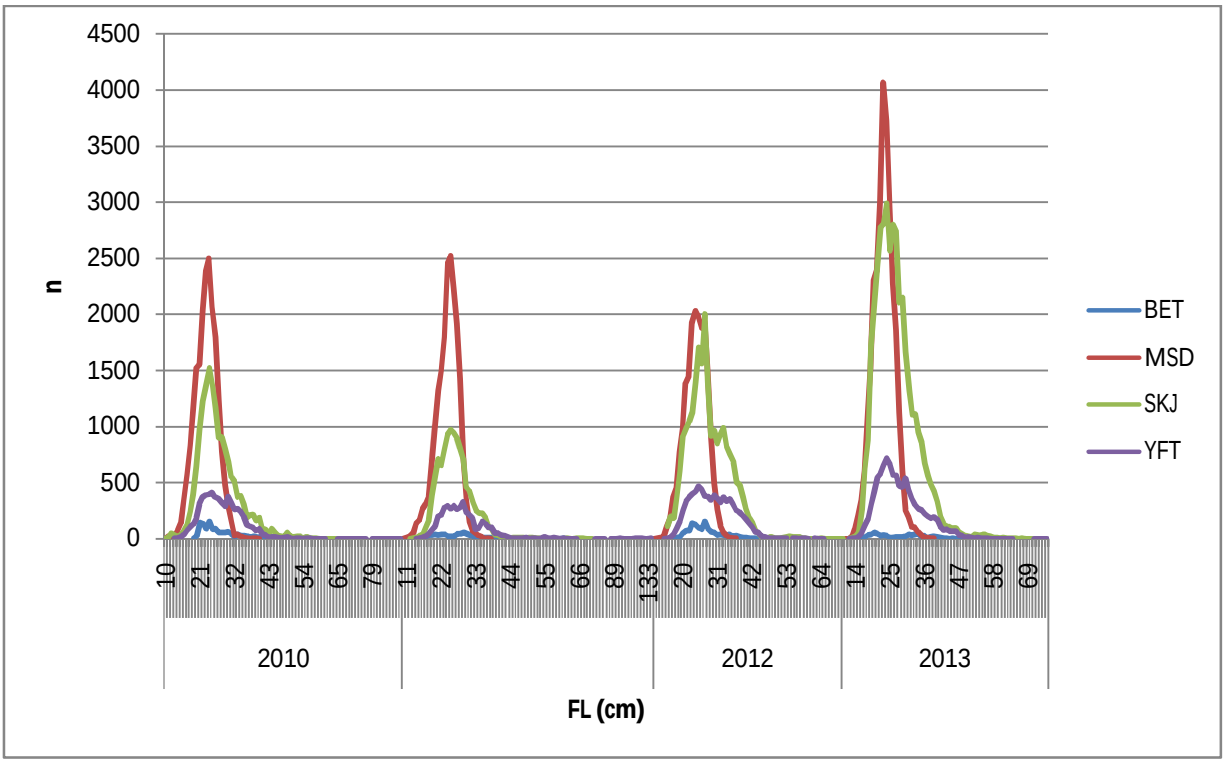


Figure 3. Length frequency distribution of major species caught

B. CATCH VARIATION BY FISHING GROUND

The fleet operated in four (4) fishing grounds, namely the Mindanao Sea in the Celebes (CEL), the southern portion of the Philippine Sea in the Pacific Seaboard (PAC), central-south Sulu Sea (SUL) and the West Philippine Sea (WPS) particularly in the Kalayaan Group of Islands. There was a total of 960 fishing days observed within the 4-year period and CEL and PAC were the most frequented, obviously

because of their proximity from the fleet's homeport in General Santos. Observation was not possible in the WPS in 2011 as a result of then ongoing seismic survey & reported harassment from poaching boats and the ongoing seismic surveys in the area. The fleet infrequently fished in Sulu Sea. (Table 2).

Table 2. Numbers of fishing days and catch by fishing ground, 2010-2013

YEAR / FGROUND	CEL		PAC		WPS		SUL		TOTAL	
	Fishing days	Total catch	Fishing days	Total catch	Fishing days	Total catch	Fishing days	Total catch	Fishing days	Total catch
2010	293	2,086	119	739	15	174	4	45	431	3,045
2011	143	773	96	575			4	8	243	1,356
2012	141	1,133	114	1,106	31	405			286	2,644
2013	269	1,995	100	563	25	244	9	49	403	2,851
TOTAL	**846**	**5,987**	**429**	**2,983**	**71**	**824**	**17**	**102**	**1363**	**9,895**

The average catch rate by fishing ground by year is illustrated in Fig. 5 where decline in 2011 and significant increase in 2012 was significant and a general decline for all fishing grounds in 2013 over the previous year.

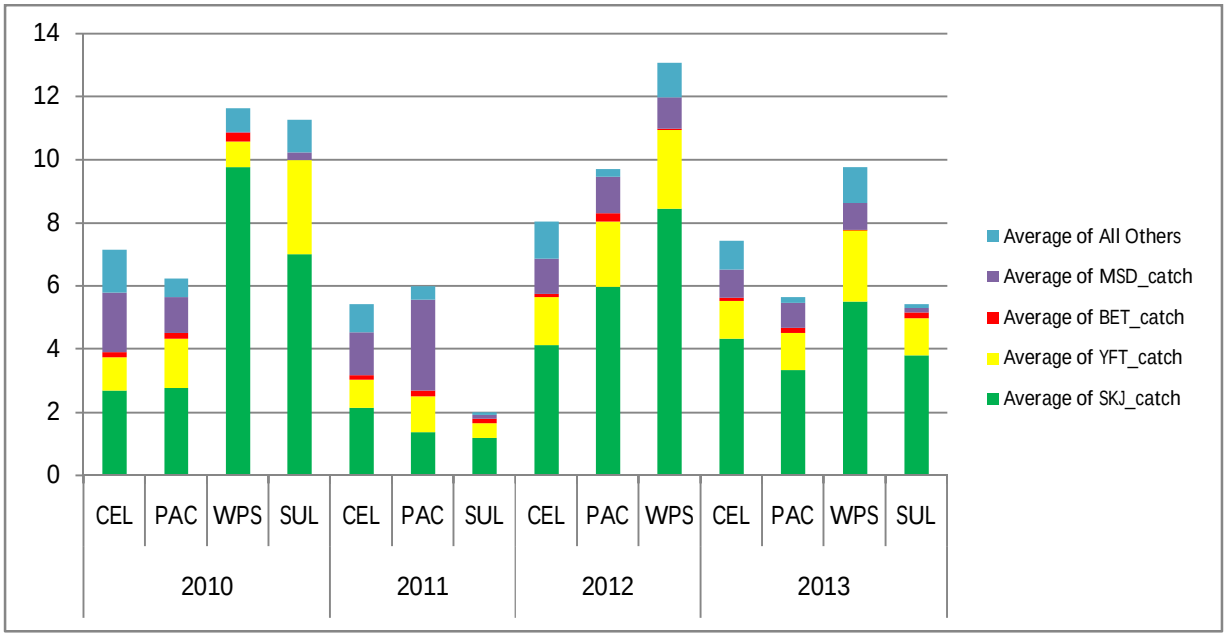


Figure 4. Catch rate of major species by fishing ground

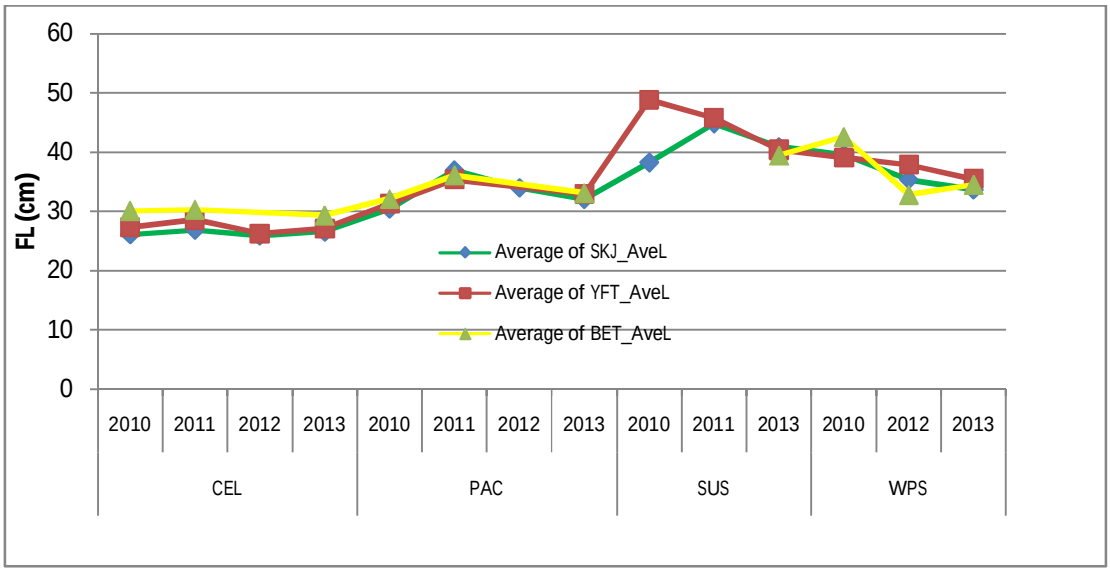


Figure 5. Average length of SKJ, YFT and BET by fishing ground

The variation on the average size of fish caught was likewise distinct across fishing ground (Fig. 5) with significantly smaller size of SKJ, YFT and BET in the Celebes Sea compared to the Pacific seaboard as well as the other fishing grounds. The average lengths of SKJ caught from CEL, PAC, SUL and WPS were 26.3cm, 33.2cm, 41.2cm and 35.7

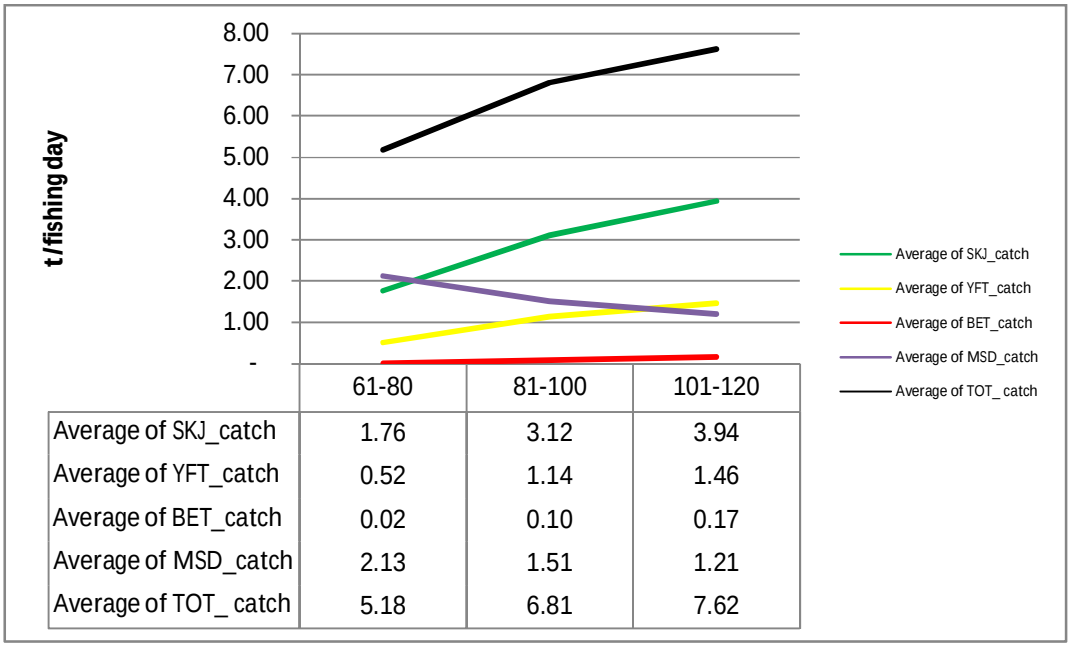
cm while YFT were 27.3cm, 33.2, 43.7 and 37.2 respectively. The average lengths of BET were 29.9cm in the CEL, 33.8 cm in the PAC, 39.4cm in SUL and 42.6 in the WPS.

C. CATCH VARIATION BY DEPTH OF NET

Analysis on the variation of catch with depth of net was focused on sets made in the Celebes and Pacific. The actual depth of nets ranged from 64 to 115 fathoms. The nets were classed by 20 fathoms, in particular 101-120 fm (Class 1), 81-100 fm (Class 2) and 61- 80 fm (Class 3). The distribution of observations by depth class is shown in Table 3.

Table 3. Number of observations by neth depth by fishing ground, 2010-2012

Fground / NDepth	2010	2011	2012	2013	TOTAL
CEL	**293**	**143**	**141**	**251**	**828**
61-80	23			5	28
81-100	151	78	64	107	400
101-120	119	65	77	139	400
PAC	119	96	114	94	423
81-100	31	9	13	16	69
101-120	88	87	101	78	354
WPS	**15**		**31**	**26**	**72**
81-100			10	7	17
101-120	15		21	19	55
TOTAL	**427**	**239**	**286**	**371**	**1323**



	61-80	81-100	101-120
Average of SKJ_catch	1.76	3.12	3.94
Average of YFT_catch	0.52	1.14	1.46
Average of BET_catch	0.02	0.10	0.17
Average of MSD_catch	2.13	1.51	1.21
Average of TOT_ catch	5.18	6.81	7.62

Figure 6. Average catch by species by net depth

Catch variation across gear depths is shown in Fig. 6, indicating decline on the average catch of SKJ, YFT and BET and increasing MSD with decreasing depth of net.

Attempt was made to calculate reduction by forecasting (linear regression). Reduction of nets from depths of 125-130 fathoms to the maximum of 115 fathoms requirement of FAO 236 may indicate 31% catch reduction of bigeye tuna (Table 4). Further reduction of bigeye is possible with further cuts in net depth but may as well reduce catch of other tunas and the overall catch (Fig 6).

Table 4 . BET catch reduction by linear regression (forecast)

NDEPTH_range (fm)	NDEPTH _Midpoint	Mean Catch (t/set)	% Reduction
121-140	130	0.2515*	
101-120	110	0.1735	31.03
81-100	90	0.1021	41.15
61-80	70	0.0207	79.73

*Predicted value by linear regression (forecast)

D. CATCH VARIATION BY TYPE OF GEAR

The distribution of fishing days by gear type in 3 fishing grounds is shown in Table 5. Observations are consistent with previous reports. The association of catch rate and size composition with the type of gear was indistinct (Fig. 7 and 8). This may indicate that gear type (purse seine or ringnet) for the fleet is not an important factor on catch efficiency. The only distinction is the use of power block or mechanized hauling in purse seine, but the size of boats and nets are generally similar.

Table 5. Distribution of fishing days by gear type and fishing ground.

Year / FGround/ Gear	PURSE SEINE	RINGNET	TOTAL
2010	138	293	431
CEL	46	247	293
PAC	73	46	119
SUL	4		4
WPS	15		**15**
2011	78	165	243
CEL	27	116	143
PAC	47	49	96
SUL	4		4
2012	140	146	286
CEL	22	119	141
PAC	94	20	114
WPS	24	7	31
2013	124	279	403
CEL	34	235	269
PAC	56	44	100
SUL	9		9
WPS	25		25
TOTAL	**480**	**883**	**1363**

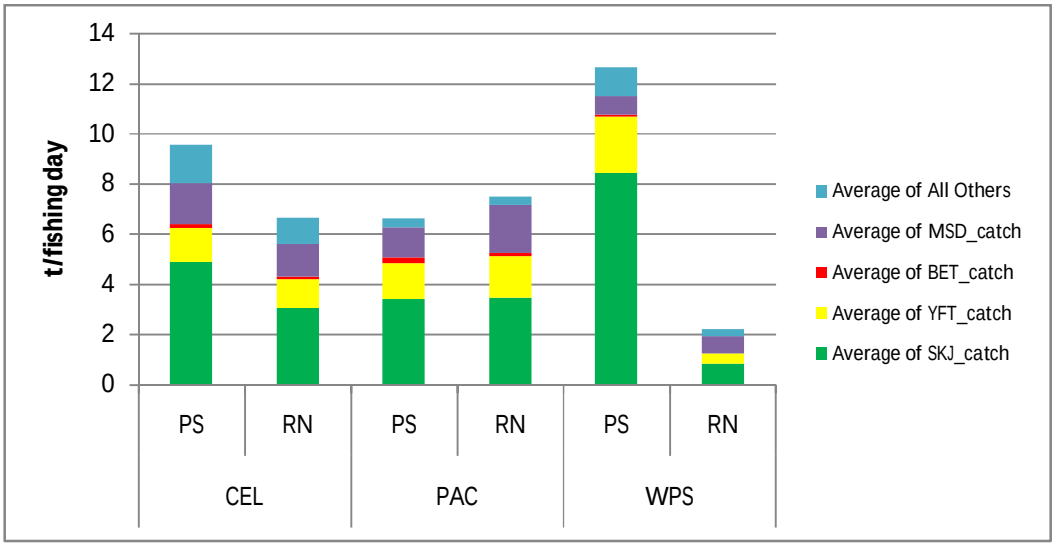


Figure 7. Average catch by gear type by fishing ground, Jul-Sep, 2010-2012; Jul-Oct, 2013)

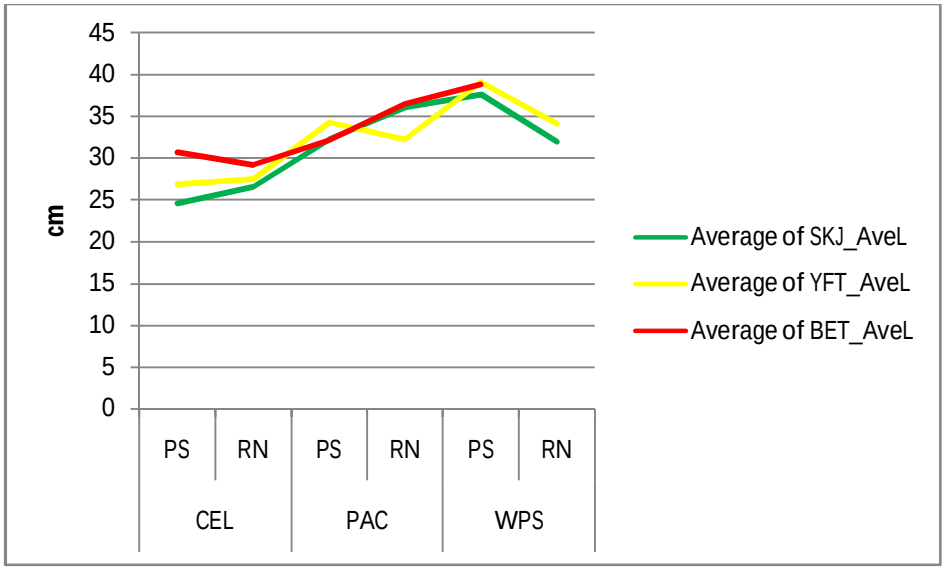


Figure 8. Average length of SKJ, YFT and BET by gear type

V. SUMMARY

1. The FADs closure and the resulting implementation of FAO 236 that required deployment of Fisheries Observers onboard provided the opportunity to collect information as foundation to the current measures and its succeeding improvement. Information on catch, species, size composition and their variations according to fishing ground, depth of nets and type of gear/operation can be drawn to devise control measures including closed areal/seasonal regulations well as gear and operational controls.

2. This progress report on Observer data within EEZ and during the FADs closure period is consistent with earlier reports as follows:

    a. The proportion of BET in catch of the fleet is around 2%.

    b. The size of SKJ, YFT and BET are comparatively smaller than fish caught beyond EEZ.

    c. The size composition varies by fishing ground, with Celebes sea as having the smallest average size of the 3 oceanic tunas.

    d. The reduction of net depth potentially reduce catch of BET, however total catch is also reduced.

3. The study supports FAO 236 that reduction of net depths decreases catch of BET and such technical measure can be applied to attain the objective of reducing catch of BET and YFT. It is however important to take into consideration that reduction of the depth of net may not only decrease catch of BET and YFT but also SKJ that may impact on the economics of operations. Special attention should be made also on Celebes Sea where smallest size of offshore tunas is being caught by the fleet.

4. With the above observation, there is a need to adopt appropriate management measures to sustainably manage the tuna resources into its matures stages and regulate fishing efforts.

5. The implementation of FAO 236 and the Fisheries Observer Program have resulted in better working relations between BFAR and the industry that improved application and compliance to agreed measures and policies.

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