Group Seine Operations of Philippine Flagged Vessels in High Seas Pocket Number 1 (HSP1)

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ABSTRACT

This paper presents an analysis of the Philippine-flagged vessels engaged in group seine operations in High Seas Pocket Number 1, based on fisheries observer reports in 2023. The study encompasses the activities of nineteen (19) operational catcher vessels from January to December 2023. It details the catch, effort, and operational metrics, including catch-per-unit-effort (CPUE), species and size composition, number of sets, and fishing days. Additionally, it compares species catch rates at varying net depths, providing insights into the operational efficiency and ecological impact of the fleet.

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I.   Introduction

High Seas Pocket No. 1 (HSP1) was closed to purse seine fishing for two years starting January 1, 2010, due to the implementation of Conservation and Management Measure 2008-01 (CMM 2008-01) adopted by the Western and Central Pacific Fisheries Commission (WCPFC). This measure aimed to reduce the fishing mortality of bigeye and yellowfin tunas. HSP1 is bounded by the exclusive economic zones (EEZs) of the Federated States of Micronesia, the Republic of Palau, Indonesia, and Papua New Guinea.

In March 2012, during the 8th Regular Session, the WCPFC adopted CMM 2011-01 as a temporary extension of CMM 2008-01, allowing Philippine traditional fresh/ice-chilled seining vessels to operate as a group in HSP1 until February 2013. Subsequently, CMM 2012-01 provided measures for this fleet in the high seas until February 2014. This was followed by CMM 2013-01 for 2014-2017, CMM 2017-01 for 2018, CMM 2018-01 for 2019-2021 and CMM 2021-01 for 2022-2024. These measures included several conditions, such as a limit of 36 catcher fishing vessels, mandatory use of automatic location communicators (ALC), and the requirement to have regional observers onboard.

Consequently, Fisheries Administrative Order 245 (FAO 245, along with its amendments 245-1, 245-2, 245-3, and 245-4) was issued by the Department of Agriculture through the Bureau of Fisheries and Aquatic Resources (BFAR) to establish regulations and guidelines for the operations of 36 fishing vessels in HSP1. Additionally, Fisheries Administrative Order 240 (FAO 240) was adopted to implement the National Fisheries Observer Program (NFOP) covering high seas operations. Further, Fisheries Administrative Order 241 (FAO 241) was issued to strengthen VMS (Vessel Monitoring System) operations in the high seas.

This report is based on the observations and reports from observers, covering the catch of nineteen (19) vessels that conducted fishing in HSP1 in 2023. The majority of the fleet opted to operate only for 9 months (January-June; October-December) in adherence to paragraph 14 of CMM 2021-01.

II.   Methods

A.   Catch Estimation

Observers' total catch estimates were derived using two methods. The primary procedure involved counting and estimating the capacity of brails as the fish catch was transferred from the bunt to wells or fish holds of awaiting carriers. The secondary method was based on assessing the capacity and fullness of wells/fish holds. Catch rate was estimated as metric tons (mT) per fishing day, with typically only one set made per fishing day. Using the brail count/capacity method, the total catch was estimated as follows:

Volume (V) = $\pi r^2 h$
Brail capacity = Volume x 80%
Where;
π = 3.14
h= Brail height
r = Brail diameter (d)/ 2

The volume of fish catch was estimated at 80% of the volume of the brail to account for empty/water space. Using this method, a margin of error of +/- 2% was observed (Dela Cruz, 2010).

B. Catch Sampling

Spill sampling using the sampling bin specified by the Secretariat of the Pacific Community (SPC) was employed as the sampling protocol. The bin has a capacity of around 300-500 kilograms, depending on the size and species of fish caught. Samples were sorted according to species whenever possible and weighed to the nearest 0.1 kg. The lengths of all tunas and mackerel scad in the sample were measured to the nearest centimeter (fork length for tuna and large pelagic species, and total length for mackerel scad).

Large tunas, billfish, and other species that were separated as brails were emptied into the wells. These were weighed and measured separately.

C. Species identification

Species identification was conducted by observers using available identification guides. Special attention was given to the distinctive characteristics of small yellowfin and bigeye tunas.

D. Analysis

The data were analyzed using descriptive statistics and presented in tables and charts to illustrate the overall status of operations in High Seas Pocket No. 1 (HSP1). The analysis included species composition, fishing effort, catch per unit effort (CPUE), and length frequency distributions. Information on the number of days the vessels stayed in HSP1 was derived from Vessel Monitoring System (VMS) data, which recorded the time and date of entry and exit from the area.

III. Results

A. Catch and fishing effort

The group seine fleets operating in HSP1 in 2023 consisted of nineteen purse seine catcher vessels. They chose to operate for only nine months (January-June; October-December) in accordance with paragraph 14 of CMM 2021-01. During the Fish Aggregating Device (FAD) closure period, the Philippines allowed one vessel with free school fishing capacity to conduct free school operations. This vessel made six sets in September, resulting in a total catch of 87 metric tons.

Overall, the 19 vessels spent a total of 3,989 days in HSP1, with 1,962 of those being actual fishing days, averaging about one fishing day for every two days spent in HSP1. FAO 245, which regulates Philippine group seine operations, set an annual catch limit not to exceed the equivalent of 9,846 fishing days for the 36 vessels, corresponding to 273 fishing days per vessel.

Out of the 1,962 fishing days, 1,764 sets were successful, resulting in an efficiency rate of 90%. Unsuccessful fishing days were attributed to damaged gear, machinery malfunctions, unfavorable sea conditions, and other factors, which resulted in no catch being retained in whole weight.

Table 1. Summary of catch and effort of Philippine group seine operation in HSP1, 2023

| Month	No. of Catchers	Days @ HSP1	Fishing days	Set/HSP1 days	Total catch (t)	Catch rate (t/set)	Catch rate (t/HSP1 day)
JAN	17	509	227	2.24	2,085.38	9.2	4.1
FEB	17	435	236	1.84	2,798.16	11.9	6.4
MAR	15	466	252	1.85	2,737.78	10.9	5.9
APR	16	480	197	2.44	1,631.60	8.3	3.4
MAY	16	496	225	2.20	1,788.20	7.9	3.6
JUN	15	408	207	1.97	2,743.83	13.3	6.7
SEP[3]	1	23	6	3.83	87.30	14.6	3.8
OCT	14	340	190	1.79	2,533.13	13.3	7.5
NOV	15	399	204	1.96	2,759.59	13.5	6.9
DEC	16	433	218	1.99	4,934.67	22.6	11.4
TOTAL		**3,989**	**1,962**	**2.03**	**24,099.63**	**12.3**	**6.0**
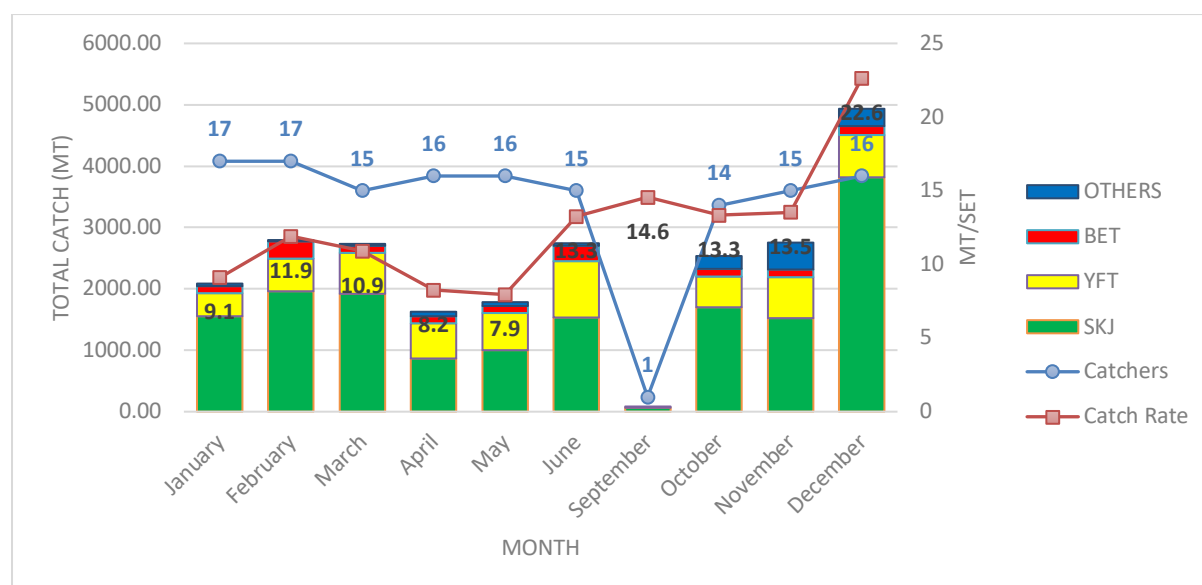
Figure 1. Catch and effort of Philippine group seine operations in HSP1, 2023

B.   Catch and species composition

A total of 24,100 tons of fish was caught in HSP1 in 2023, resulting in a catch-per-unit effort of 12.3 tons per vessel per fishing day, or 6.0 tons per vessel per day. The majority of the catch consisted of skipjack (66.20%) and yellowfin (23.03%). Bigeye accounted for 5.79%, while the remaining 4.98% was made up of other species,

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[3] 1 vessel allowed for free school operation

including mackerel scad, kawakawa, frigate and bullet tuna, bigeye scad, dolphin fish, and triggerfish (Table 2, Fig. 1).

Sharks and other species of special interest were also incidentally encircled during the operation, including 27 sharks, 136 dolphins, 6 sea turtles, and 5 Mobula species. These species were handled in accordance with the relevant Conservation and Management Measures (CMM-2022-04, CMM 2011-03, CMM 2018-04, and CMM 2019-05).

Table 2. Catch of major species by month

| Month	SKJ (MT)	YFT (MT)	BET (MT)	OTHERS (MT)	TOTAL (MT)
JAN	1,552.19	376.71	121.68	34.79	2,085.38
FEB	1,958.69	534.84	280.54	24.09	2,798.16
MAR	1,918.58	670.57	114.66	33.97	2,737.78
APR	865.87	575.82	117.18	72.74	1,631.60
MAY	1,003.50	598.84	117.66	68.19	1,788.20
JUN	1,532.40	923.01	251.75	36.67	2,743.83
SEP	66.78	20.53	-	-	87.30
OCT	1,704.53	500.26	126.37	201.97	2,533.13
NOV	1,527.62	666.79	121.51	443.67	2,759.59
DEC	3,823.95	683.17	143.31	284.24	4,934.67
TOTAL	**15,954.10**	**5,550.53**	**1,394.66**	**1,200.34**	**24,099.63**
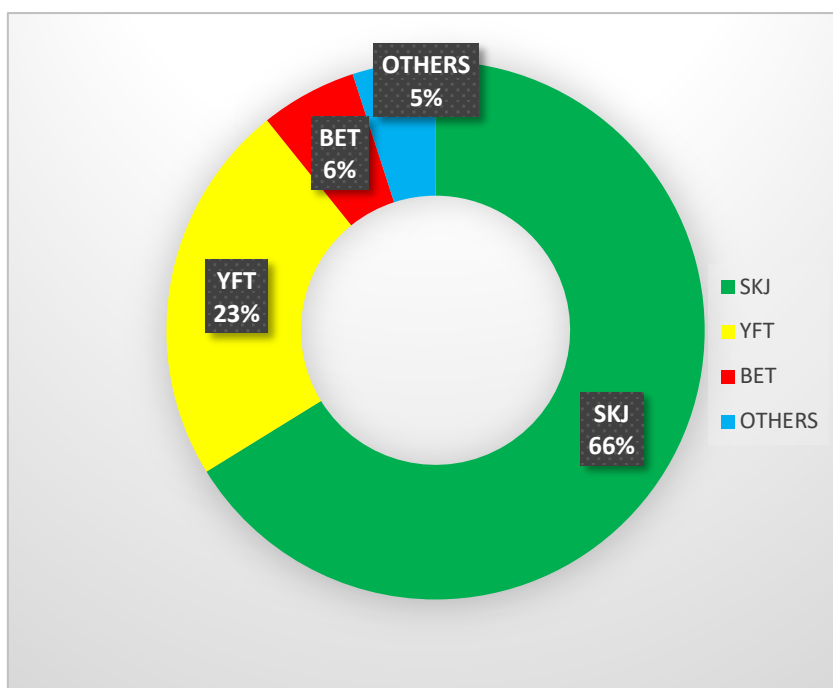
Figure 2. Catch composition of Philippine group seine in HSP1, 2023

C. Size composition

Table 3 illustrates the length frequency of skipjack, yellowfin, and bigeye tuna, indicating average lengths of 39.80, 47.96, and 56.63 centimeters, respectively. Yellowfin and bigeye tuna show an upward trend in length from January to June (Fig. 4), with all three species exhibiting an upward trend from October to December. Skipjack, yellowfin, and bigeye tuna also indicated modal peaks at 33 and 47, 49, and 50 centimeters, respectively (Fig. 3, Table 3).

The average size of skipjack and yellowfin tuna was smallest in November, at under 32 and 40 centimeters, respectively, while bigeye tuna was smallest in October, at 48 centimeters (Fig. 4). Conversely, yellowfin and bigeye tuna reached their highest average sizes in June, at 53 and 61 centimeters, respectively, while skipjack tuna peaked at an average length of 49 centimeters in March. Notably, the September catches had the largest sizes for skipjack and yellowfin tuna, likely because the sets were made on free schools

Table 3. Average length of SKJ, YFT, BET and MSD caught in HSP1

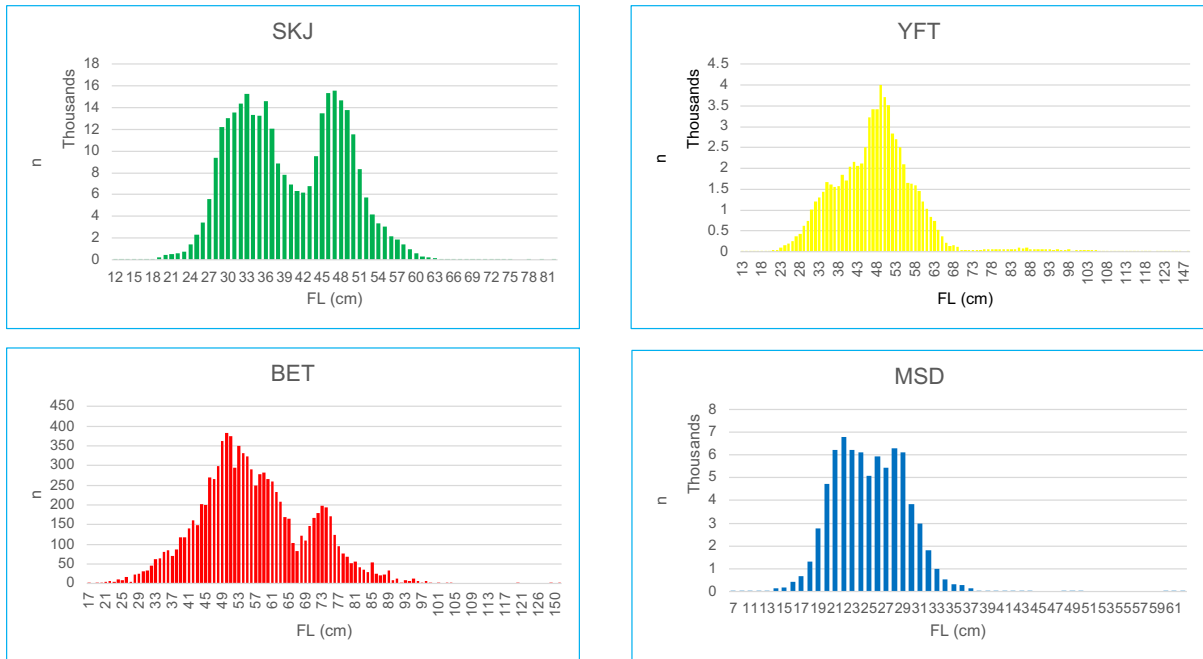| Species	SKJ	YFT	BET	MSD
n	315,617	74,036	9,721	75,725
Ave (cm)	**39.80**	**47.96**	**56.63**	**25.07**
Min (cm)	12	13	17	7
Max (cm)	82	150	154	62
Mode(cm)	**33,47**	**49**	**50**	**22**

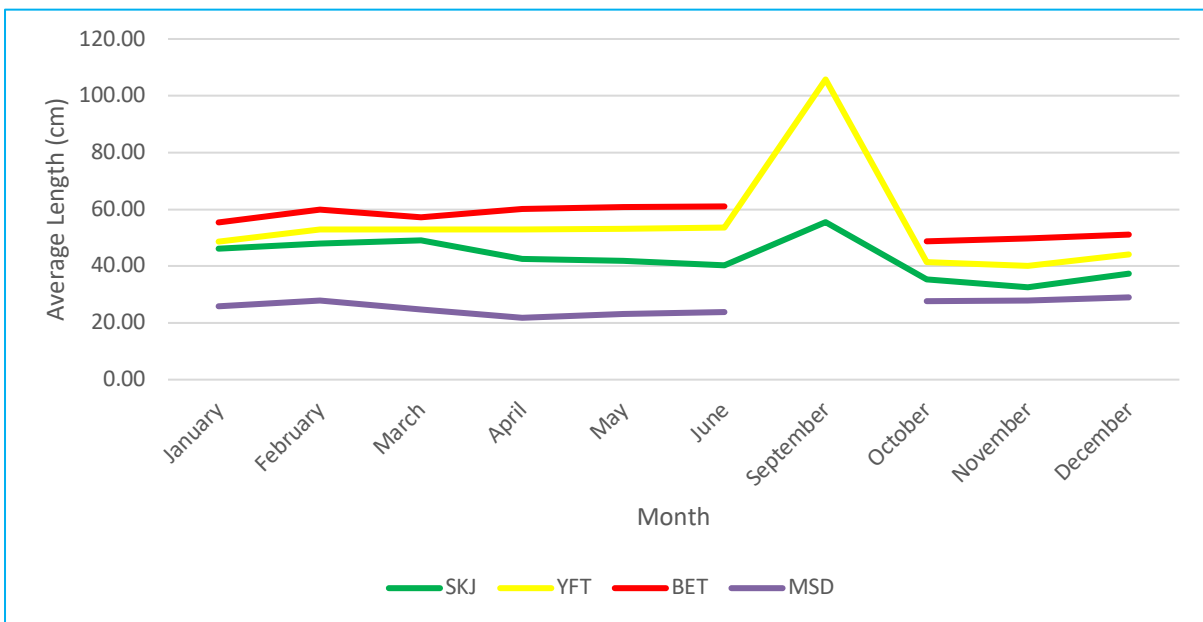**Figure 3. Size composition of SKJ, YFT, BET and MSD caught in HSP1**

Figure 4. Average size of SKJ, YFT, BET and MSD caught in HSP1

In contrast to the fish caught within the Philippine EEZ in 2023, the lengths of the three tuna species (skipjack, yellowfin, and bigeye) were relatively smaller. The modal lengths were 29, 30, and 30 centimeters, respectively, with average lengths of 28.70, 30.19, and 29.77 centimeters, respectively (Fig. 5, Table 4).

Table 4. Range and size of SKJ, YFT, BET and MSD caught in Philippine EEZ (FAD Closure, 2023)

Species	SKJ	YFT	BET	MSD
n	42,808	20,587	1,820	93,684
Ave (cm)	28.70	30.19	29.77	24.73
Min (cm)	10	13	16	9
Max (cm)	63	140	53	56
Mode (cm	29	30	30	25

Table 5. Comparative Summary of HSP1 and Philippine EEZ Catch in 2023

Species	HSP1 Catch Composition(%)	PHIL EEZ Catch Composition(%)*	HSP1 Average Size (cm)	PHIL EEZ Average Size (cm)*
SKJ	66.20	29.76	39.80	28.70
YFT	23.03	22.64	47.96	30.19
BET	5.79	1.56	56.63	29.77
MSD(OTHERS)	4.98	46.04	25.07	24.73

*based on observer estimate during FAD Closure

D. Catch variation by depth of net

An initial analysis of the variation in catch relative to the depth of the net was conducted. The actual stretched depths of the nets were measured during inspections, a condition for obtaining a license to fish in HSP1. The depths of the nets ranged from 103 to 201 fathoms (Table 6) and were categorized into classes by 20-fathom intervals: ≥161, 141-160, 121-140, and 101-120 fathoms.

Table 6. Number of observations by depth of net (class)

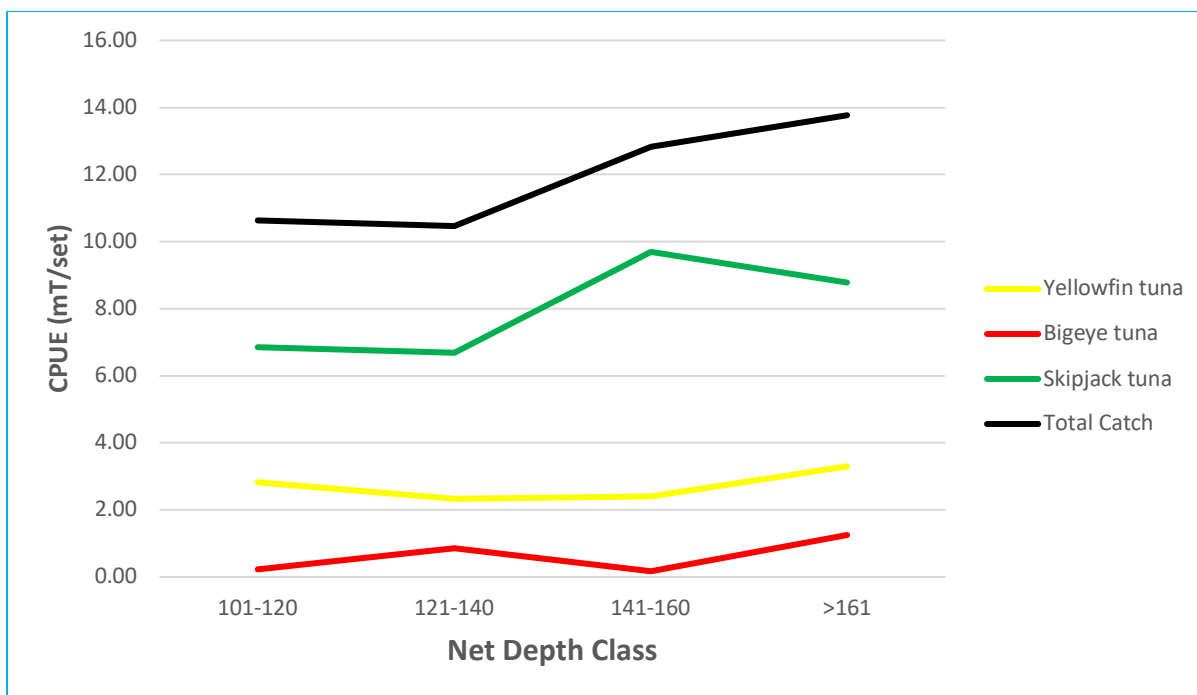| Depth of net (Class)	No. of sets
101-120	443
121-140	352
141-160	384
≥161	783
Grand Total	1,962

Figure 5. Average catch by species by net depth

Catch variation across gear depths is shown in Fig. 5, indicating an increase in the average catch of bigeye tuna and yellowfin tuna with increasing net depth. For skipjack tuna, the catch decreases from the net depth class of 101-120 fathoms to 121-140 fathoms but abruptly increases for nets deeper than 140 fathoms.

For bigeye tuna, Table 7 shows a decrease of about 73% to 86% for every 20-fathom decrease in net depth, except for the net depth range of 141-160 fathoms to 121-140 fathoms, where there is an increase of 402% in the average bigeye tuna catch.

Table 7. BET catch reduction

Net depth range (fm)	Average catch (t/set)	% BET Decrease
≥161	1.249	
141-160	0.169	86%
121-140	0.848	-402%
101-120	0.231	73%

IV. Summary / Recommendations

1. The catch in 2023 of the Philippine group seine fleet in HSP1 totaled to 24,100 metric tons of which 22,899 mt were skipjack, yellowfin and bigeye tuna or comprised about 14% of the production of these tuna species that were caught within Philippine EEZ.

2. The average catch was catch-per-unit effort of 12.3 tons/vessel/fishing day or 6.0 tons/vessel/day in HSP1.

3. The average length of skipjack, yellowfin and bigeye tuna caught in HSP1 were relatively bigger than tunas caught from Philippine EEZ.

4. Reduction of net depth to reduce the catch of bigeye tuna should be evaluated and considered as an alternative measure to reduce bigeye and yellowfin tuna catch in purse seine fishery.

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