SCIENTIFIC COMMITTEE
THIRTEENTH REGULAR SESSION

Rarotonga, Cook Islands
9-17 August 2017

ANNUAL REPORT TO THE COMMISSION
PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS

WCPFC-SC13-AR/CCM-12 (Rev01)

REPUBLIC OF KOREA

SCIENTIFIC COMMITTEE
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Republic of Korea

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Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by 30 April 2017	**YES**

1. SUMMARY

Korea has two types of fishing gears, purse seine and longline, that engage in fishing for tuna and tuna-like species in the WCPFC Convention Area. These fisheries are managed by the Distant Water fisheries Development Act of Korea. Total catch in the WCPFC convention area by the Korean fisheries in 2016 was 302,715 mt, which accounted for 5% and 3% greater than that of average for recent 5 years (2012-2016) and 2015, respectively. The catch of purse seine fishery with 25 vessels active was 278,514 mt in 2016, which was 7% and 4% greater than that of average for recent 5 years and 2015. The catch of longline fishery with 96 vessels active in 2016 was 24,201 mt, which was 9% lower than that of average for recent 5 years and similar to 2015. In purse seine fishery, skipjack, yellowfin and bigeye catches in 2016 were 1%, 18% and 137% greater than those of 2015, respectively. In longline fishery, bigeye catch in 2016 was 3% greater than that of 2015, but yellowfin catch was 14% lower than that of 2015. Purse seine fishing efforts ranged from 5,790 to 7,552 sets during 5 recent years, which showed the highest in 2013 and the lowest in 2016. Longline fishing efforts ranged from 47,157 to 75,060 thousand hooks during 5 recent years, which showed the highest in 2012 and the lowest in 2015. Purse seine fishing efforts in 2016 were concentrated on the western and central areas of WCPO that were similar to those of 2013, and longline

fishing efforts in 2016 were relatively higher in the centaral PO. The logsheet coverages in 2016 were 100% for both purse seine and longline, and the observer coverage in 2016 was 100% for purse seine and 6.9% for longline.

2. Tabular Annual Fisheries Information

Table 1(a). Annual catch and effort estimates for the Korean purse seine fishery by primary species in the WCPFC Convention Area, 2012-2016

Year	No. of sets	Catch (mt)				
		Total	SKJ	BET	YFT	OTH
2012	7,337	262,192	210,613	900	50,677	2
2013	7,552	225,642	190,251	1,684	33,697	10
2014	6,882	270,048	222,825	1,366	45,856	1
2015	6,113	268,277	231,695	1,857	34,695	30
2016	5,790	278,514	233,014	4,401	41,040	59

* Data for 2016 are preliminary.

Table 1(b). Annual catch and effort estimates for the Korean longline fishery by primary species in the WCPFC Convention Area, 2012-2016

Year	No. of hooks ($\times 10^3$)	Catch (mt)										
		Total	ALB	YFT	BET	BFT	SKJ	BLM	BUM	MLS	SWO	OTH
2012	75,060	33,457	1,264	7,832	18,823	0	14	148	1,486	43	1,267	2,579
2013	62,852	24,429	1,155	5,716	12,818	0	51	90	1,727	90	1,214	1,568
2014	55,759	26,265	714	8,371	12,779	0	100	82	1,887	56	1,048	1,229
2015	47,157	24,437	1,042	9,352	10,689	0	104	137	1,782	50	724	557
2016	55,238	24,201	1,481	8,054	11,018	0	166	100	2,235	89	697	363

* Data for 2016 are preliminary.

Table 1(c). Annual catch and effort of north Pacific albacore by the Korean longline fishery, 2013-2016

Year	Catch (mt)	Effort (days fished)
2013	167	1,746
2014	116	1,224
2015	51	857
2016	56	934

* Korea does not have any fishing vessels that fish for north Pacific albacore, and any north Pacific albacore catch is bycatch.

Table 1(d). Annual catch and effort of southwest striped marlin by the Korean longline fishery in the south of 15°S, 2015-2016

Year	Catch (mt)	Effort (number of fishing vessels)
2015	-	-
2016	-	-

* Korea does not have any fishing vessels that fish for southwest striped marlin, and any southwest striped marlin catch is bycatch.

Table 1(e). Annual catch of swordfish by the Korean longline fishery in the south of 20°S, 2012-2016

Year	CMM-flagged vessels south of 20°S		Chartered vessels		Other vessels fishing within the CCM's waters south of 20°S		
	Catch (mt)	Vessel numbers	Catch (mt)	Vessel numbers	Flag	Catch (mt)	Vessel numbers
2012	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	<1	2	-	-	-	-	-
2016	-	-	-	-	-	-	-

* Korea does not have any fishing vessels that fish for swordfish in the Convention Area south of 20°S, and any swordfish catch is bycatch.

Table 1(f). Annual catch and effort of south Pacific albacore by the Korean longline fishery in the south of 20°S, 2012-2016

Year	Catch (mt)	Effort (number of fishing vessels)
2012	-	-
2013	-	-
2014	-	-
2015	<1	2
2016	-	-

* Korea does not have any fishing vessels that fish for south Pacific albacore in the Convention Area south of 20°S, and any south Pacific albacore catch is bycatch.

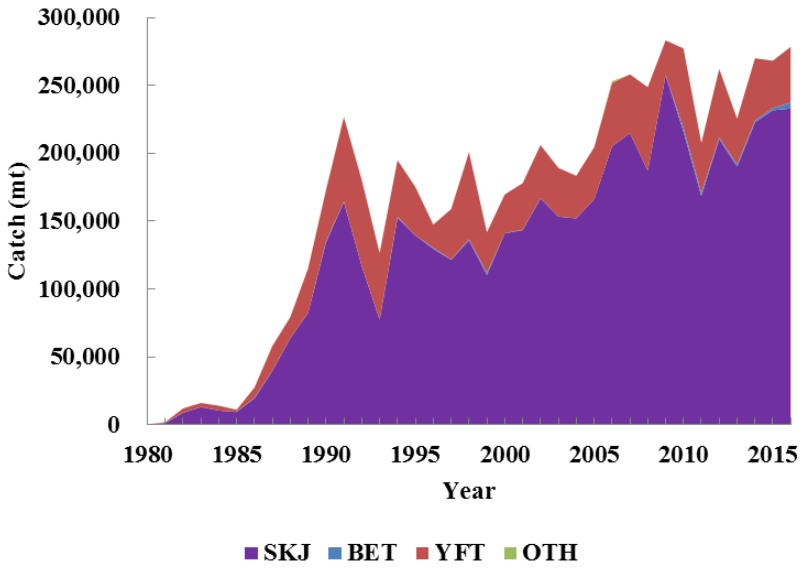

Fig. 1(a). Historical annual catch for the Korean purse seine fishery by primary species in the WCPFC Convention Area during 1980-2016.

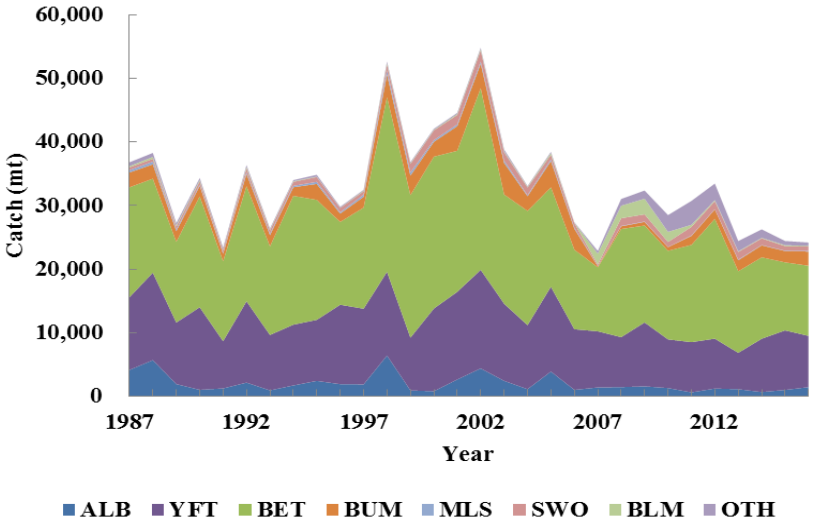

Fig. 1(b). Historical annual catch for the Korean longline fishery by primary species in the WCPFC Convention Area during 1987-2016.

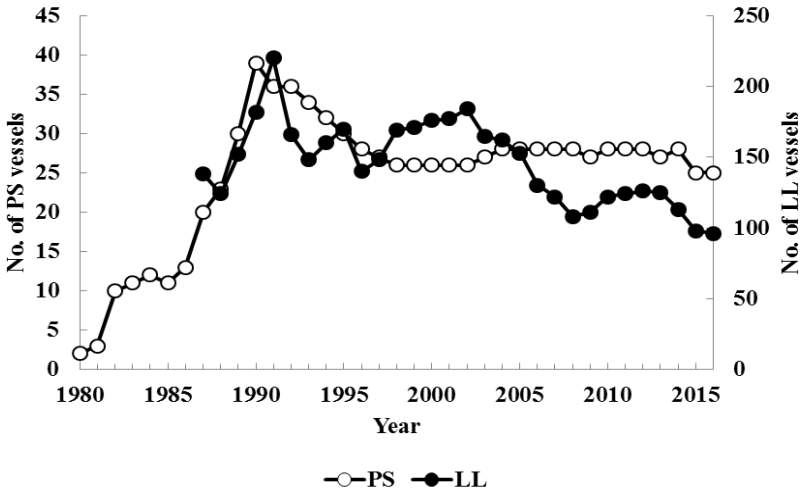

Fig. 2. Historical annual vessel numbers for the Korean tuna fisheries by gear in the WCPFC Convention Area during 1980-2016.

Table 2. Number of Korean vessels by gear and size, active in the WCPFC Convention Area, 2012-2016

Year	GRT class by gear									
	Longline					Purse seine				
	Total	0-50	51-200	201-500	500+	Total	0-500	501-1,000	1,001-1,500	1,500+
2012	126	-	-	126	-	28	-	12	11	5
2013	125	-	1	124	-	27	-	12	10	5
2014	110	-	1	112	-	28	-	10	13	5
2015	98	-	1	97	-	25	-	7	13	5
2016	96	-	1	95	-	25	-	7	14	4

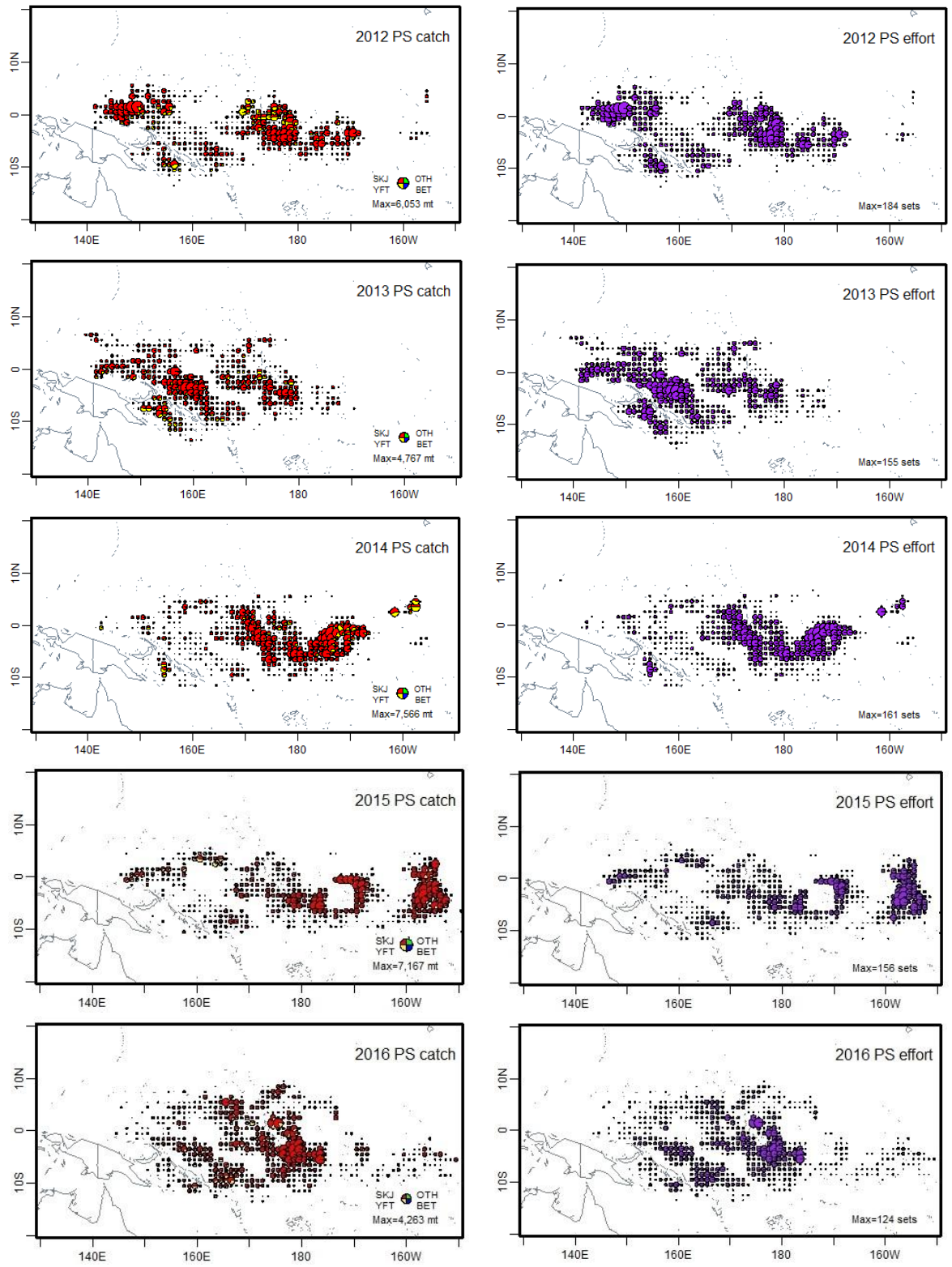

Fig. 3(a). Annual catch and effort distributions of target species by the Korean purse seine fishery active in the WCPFC Convention Area, 2012-2016.

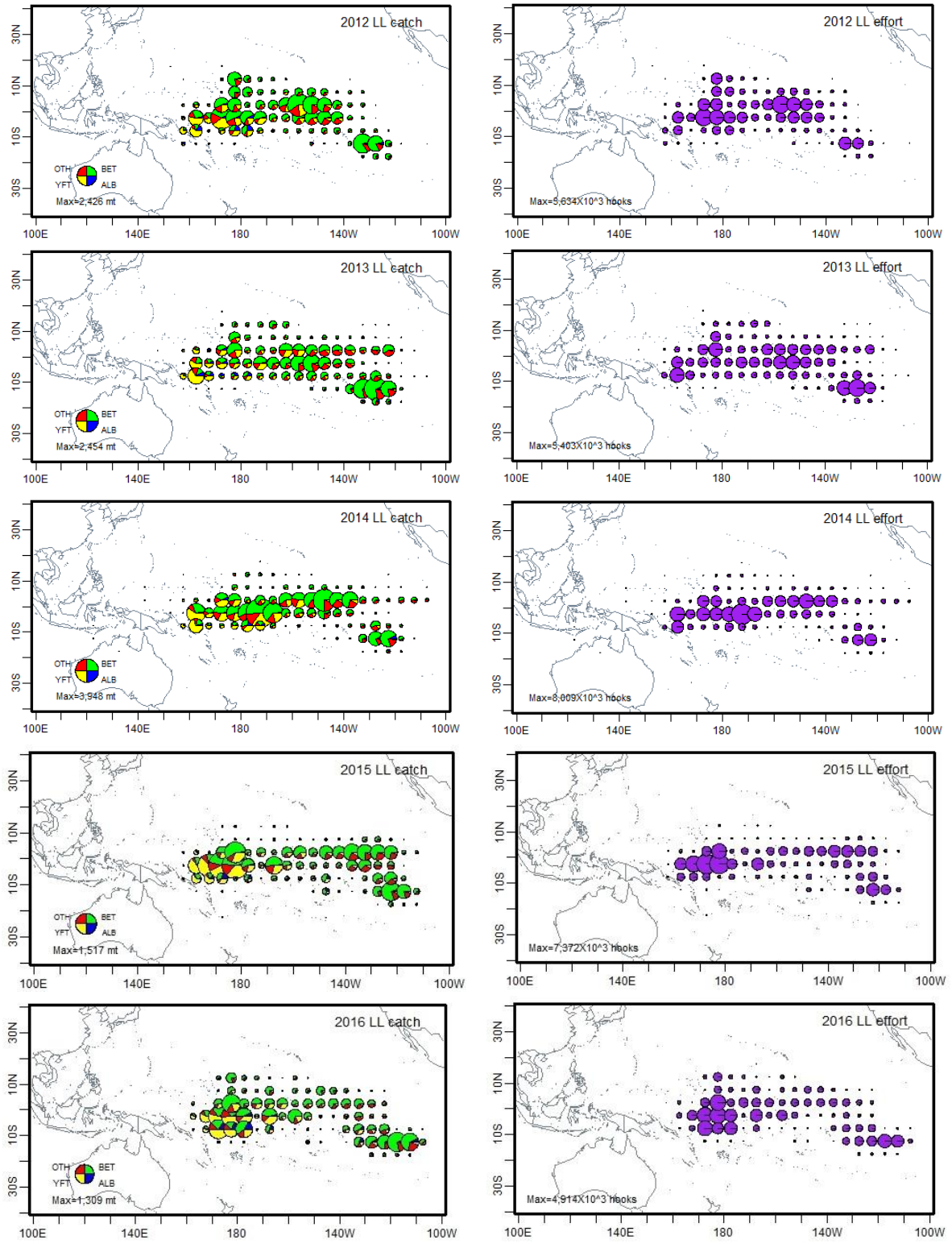

Fig. 3(b). Annual catch and effort distributions of target species by the Korean longline fishery active in the Pacific Ocean, 2012-2016.

Table 3(a). Annual estimated catch of species of special interest (seabird, turtle, marine mammals, etc.) by the Korean fisheries in the WCPFC Convention Area, 2013-2016

Fishery	Year	Catch (number) by species						
		Whale shark	Leather-back turtle	Olive ridley turtle	Logger-head turtle	Green turtle	Other marine turtles	False killer whale
Purse seine	2013	30	1	1	10		27	-
	2014	8	-	-	5		-	-
	2015	21	-	-	12		-	-
	2016	D:0, A:1	-	-	-	D:0, A: 1	D:1, A: 7	D:0, A: 1**
Longline	2013	-	-	-	-		-	
	2014	-	-	-	-		-	
	2015	-	34	9	-		5	
	2016	-	D:0, A: 1	D: 27, A: 5	-	D: 9, A: 1	D: 3, A: 1	

* D and A indicate “dead” and “alive”, respectively.

** Date/Location: ’16.4.23 / 4°N 154°E

Table 3(b). Effort, observed and estimated seabird captures by fishing year for Korean longline fishery in the area between 23°N - 30°S

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	-	-	-	-	-	-
2016	-	-	-	-	-	-

* No seabird was bycaught.

** Korea has no fishing in north of 23°N and south of 30°S.

Table 4(a). Annual estimates of retained and discarded catch of key sharks by the Korean longline fishery in the WPCFC Convention Area, 2012-2016

Year	Retained catch (mt) by key shark species						
	Blue shark	Thresher sharks	Hammerhead sharks	Mako sharks	Silky shark	Oceanic whitetip shark	Others
2012	68	33	4	6	4	1	640
2013	194	98	21	17	33	-	688
2014	201	124	13	11	33	-	457
2015	85	55	3	4	-	-	220
2016	<1	1	-	<1	-	-	<1

* No shark catch retained by the Korean purse seine fishery.

Fishery	Year	Discard catch (number) by key shark species				
		Blue shark	Thresher sharks	Hammerhead sharks	Mako sharks	Others
Purse seine	2016	-	-	2	-	36
Longline	2016	1,000	423	8	39	2,556

* These data include all of status of “dead” and “alive”.
** See Table 4(b) for oceanic whitetip shark and silky shark.

Table 4(b). Annual number of releases of oceanic whitetip shark and silky shark by the Korean fishery in the WPCFC Convention Area, 2013-2016

Fishery	Year	Number of releases	
		Oceanic whitetip shark	Silky shark
Purse seine	2013	19	25*
	2014	2	5.7*
	2015	-	13*
	2016	D: 7, A: 96	D: 977, A: 327
Longline	2013	299	26
	2014	173	58
	2015	356	942
	2016	D: 44, A: 65	D: 897, A: 1,095

* indicates that the unit is weight (mt).
** D and A indicate “dead” and “alive”, respectively.

Table 5. Estimated annual coverage of operational catch/effort and observer data for the Korean fisheries by gear, active in the WCPFC Convention Area, 2012-2016

Year	Gear	Logsheet coverage (%)	Observer coverage (%)
2012	Purse seine	100	100
	Longline	85	>5
2013	Purse seine	100	100
	Longline	100	5.4
2014	Purse seine	100	100
	Longline	100	7.2
2015	Purse seine	100	100
	Longline	100	6.6
2016	Purse seine	100	100
	Longline	100	6.9

∗ 2016 observer coverage for Korean longline fishery

Fishery	No. of Hooks			Days Fished			Days at Sea			No. of Trips		
	Total Estimated	Observer	%	Total Estimated	Observer	%	Total Estimated	Observer	%	Total Estimated	Observer	%
Longline							21,306	1,460	6.85			

Table 6. Information on the transhipment of Korean fleets in 2016

A. Longliners

(1) Amount (kg) of transshipped fish

Species	Transhipment of catches caught in WCPFC area	Transhipment of catches caught outside of WCPFC area	Total
Bigeye tuna	6,399,761	2,151,415	8,551,176
Yellowfin tuna	4,986,850	346,781	5,333,631
Striped marlin	45,643	27,889	73,532
Swordfish	421,161	325,400	746,561
Blue marlin	1,218,905	220,399	1,439,304
White marlin	1,101	-	1,101
Albacore tuna	1,014,327	108,749	1,123,076
Spearfish	3,619	-	3,619
Skipjack tuna	85,776	9,738	95,514
Sharks	-	-	-
Shark fin	-	-	-
Others	248,369	133,935	382,304
Total	14,425,512	3,324,306	17,749,818

Species	Location of transhipment : WCPFC area															Total
	In port transhipment					At sea transhipment in EEZ					At sea transhipment in high seas					
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	567,616	-	-	-	567,616	2,406,836	-	-	-	2,406,836	3,760,427	-	-	-	3,760,427	6,734,879
Yellowfin tuna	534,194	-	-	-	534,194	1,324,284	-	-	-	1,324,284	3,097,560	-	-	-	3,097,560	4,956,038
Striped marlin	2,403	-	-	-	2,403	13,606	4,562	-	-	18,168	15,197	16,206	-	-	31,403	51,974
Swordfish	-	45,366	-	-	45,366	-	207,092	-	-	207,092	-	242,774	-	-	242,774	495,232
Blue marlin	-	98,532	-	-	98,532	-	374,946	-	-	374,946	-	774,873	-	-	774,873	1,248,351
White marlin	-	500	-	-	500	-	390	-	-	390	-	211	-	-	211	1,101

Albacore tuna	-	-	85,904	-	85,904	-	-	235,629	-	235,629	-	-	634,800	-	634,800	956,333
Spearfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skipjack tuna	-	-	4,230	-	4,230	-	-	29,484	-	29,484	-	-	50,071	-	50,071	83,785
Sharks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shark fin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Others	-	8,395	-	18,626	27,021	-	41,992	-	43,636	85,628	-	108,748	11,440	29,645	149,833	262,482
Total	1,104,213	152,793	90,134	18,626	1,365,766	3,744,726	628,982	265,113	43,636	4,682,457	6,873,184	1,142,812	696,311	29,645	8,741,952	14,790,175

Species	Location of transhipment : outside of WCPFC area										
	In port transhipment					At sea transhipment					Total
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	-	-	-	-	-	1,816,297	-	-	-	1,816,297	1,816,297
Yellowfin tuna	-	-	-	-	-	377,593	-	-	-	377,593	377,593
Striped marlin	-	-	-	-	-	9,141	12,417	-	-	21,558	21,558
Swordfish	-	-	-	-	-	-	251,329	-	-	251,329	251,329
Blue marlin	-	-	-	-	-	-	190,953	-	-	190,953	190,953
White marlin	-	-	-	-	-	-	-	-	-	-	-
Albacore tuna	-	-	-	-	-	-	-	170,362	-	170,362	170,362
Spearfish	-	-	-	-	-	-	-	-	-	-	-
Skipjack tuna	-	-	-	-	-	-	-	11,729	-	11,729	11,729
Sharks	-	-	-	-	-	-	-	-	-	-	-
Shark fin	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	4,950	84,667	-	30,205	119,822	119,822
Total	-	-	-	-	-	2,207,981	539,366	182,091	30,205	2,959,643	2,959,643

(2) Number of transshipments

Number of transhipment by location of catches		Number of transhipment by location				
		WCPFC area			Outside of WCPFC area	
Catches in WCPFC area	Catches outside of WCPFC area	In port	EEZ	High seas	In port	At sea
104	11	8	29	58	0	20

B. Purse seiners

(1) Amount (kg) of transhipped fish

Species	Transhipment of catches caught in WCPFC area	Transhipment of catches caught outside of WCPFC area	Total
Bigeye tuna	4,258,300	-	4,258,300
Yellowfin tuna	44,955,900	-	44,955,900
Skipjack tuna	223,649,300	-	223,649,300
Total	272,863,500	-	272,863,500

Species	Location of transhipment : WCPFC area															
	In port transhipment					At sea transhipment in EEZ					At sea transhipment in high seas					Total
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	3.3	-	4,258,296.7	-	4,258,300	-	-	-	-	-	-	-	-	-	-	4,258,300
Yellowfin tuna	269.6	-	44,955,630.4	-	44,955,900	-	-	-	-	-	-	-	-	-	-	44,955,900
Skipjack tuna	-	-	223,649,300	-	223,649,300	-	-	-	-	-	-	-	-	-	-	223,649,300
Total	272.9	-	272,863,227.1		272,863,500	-	-	-	-	-	-	-	-	-	-	272,863,500

Species	Location of transhipment : outside of WCPFC area										
	In port transhipment					At sea transhipment in EEZ					Total
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	-	-	-	-	-	-	-	-	-	-	-

Yellowfin tuna	-	-	-	-	-	-	-	-	-	-	-
Skipjack tuna	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-	-	-

(2) Number of transshipments

Number of transhipment by location of catches		Number of transhipment by location				
		WCPFC area			Outside of WCPFC area	
Catches in WCPFC area	Catches outside of WCPFC area	In port	EEZ	High seas	In port	At sea
346	0	346	0	0	0	0

C. Carriers

(1) Amount (kg) of transhipped fish

Species	Location of transhipment : WCPFC area															
	In port transhipment					At sea transhipment in EEZ					At sea transhipment in high seas					Total
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	235,068	-	3,267,636	-	3,502,704	1,754,567	-	-	-	1,754,567	3,541,448	-	-	-	3,541,448	8,798,719
Yellowfin tuna	298,636	-	43,202,741	-	43,501,376	974,821	-	-	-	974,821	2,001,090	-	-	-	2,001,090	46,477,287
Striped marlin	1,127	-	-	-	1,127	10,537	2,290	-	-	12,827	36,257	1,836	-	-	38,093	52,047
Swordfish	-	12,285	-	-	12,285	-	128,990	-	-	128,990	-	239,735	-	-	239,735	381,010
Blue marlin	-	46,095	-	-	46,095	-	266,444	-	-	266,444	-	495,190	-	-	495,190	807,729
White marlin	-	500	-	-	500	-	236	-	-	236	-	135	6,769	-	6,904	7,640
Albacore tuna	-	-	92,258	-	92,258	-	-	216,666	-	216,666	1,700	-	1,114,990	980,914	2,097,604	2,406,528
Spearfish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skipjack tuna	-	-	237,693,604	-	237,693,604	-	-	13,243	-	13,243	-	-	21,913	-	21,913	237,728,760
Sharks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shark fin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Others	-	7,695	1,238,526	3,800	1,250,021	4,950	33,933	3,853	30,825	73,561	-	251,906	4,128	43,213	299,247	1,622,829
Total	534,831	66,575	285,494,764	3,800	286,099,970	2,744,875	431,893	233,762	30,825	3,441,355	5,580,495	988,802	1,147,800	1,024,127	8,741,224	298,282,549

Species	Location of transhipment : outside of WCPFC area									
	In port transhipment					At sea transhipment				Total
	G.G	Dress	Round	Other	Sub total	G.G	Dress	Round	Other	Sub total	
Bigeye tuna	-	-	-	-	-	1,788,327	-	-	-	1,788,327	1,788,327
Yellowfin tuna	-	-	-	-	-	318,942	-	-	-	318,942	318,942
Striped marlin	-	-	-	-	-	10,363	9,649	-	-	20,012	20,012
Swordfish	-	-	-	-	-	-	248,058	-	-	248,058	248,058
Blue marlin	-	-	-	-	-	-	188,909	-	-	188,909	188,909
White marlin	-	-	-	-	-	-	-	1,877	-	1,877	1,877
Albacore tuna	-	-	-	-	-	-	-	87,419	-	87,419	87,419
Spearfish						-	-	-	-	-	-
Skipjack tuna	-	-	-	-	-	-	-	5,960	-	5,960	5,960
Sharks	-	-	-	-	-	-	-	-	-	-	-
Shark fin	-	-	-	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	86,325	10,201	2,575	99,101	99,101
Total	-	-	-	-	-	2,117,632	532,941	105,457	2,575	2,758,605	2,758,605

(2) Number of transshipment

Number of Transhipments by location of transhipments				
WCPFC area			Outside of WCPFC area	
In port	EEZ	High seas	In port	At sea
119	21	79	-	16

3. Background

About 60 year-old Korean distant water tuna longline fishery that stepped up the first fishing in the Indian Ocean in 1957, has explored the Pacific Ocean since 1958 and the Atlantic Ocean since 1967. The high seas and the waters within coastal states in the South Pacific Ocean have been the main fishing grounds for Korean longline fishery. There was a change in the longline fishing operation types. Longline vessels used foreign ports for fishing base near the fishing grounds from the beginning but they has gradually equipped with deep freezing facilities and used home ports for fishing base since 1972. All longline vessels have based domestic ports since 1999. This change gave advantages in exporting the products to Japanese markets and others. In domestic markets, tuna sashimi demands have been increasing year by year.

The Korean purse seine fishery was initiated by accessing into the Eastern Pacific fishing ground with 3 vessels in 1971. Helicopter-aided mass operations were introduced in 1979 for the first time, and the number of active vessels was the highest of 39 in 1990, but has decreased up to 25 in 2015. Most of the catches are supplied to the packers for domestic consumption, and are exported to foreign canneries.

These fisheries are managed by the Distant Water Fisheries Development Act put into effect on the 4 February, 2008, and the Act was revised for improving the data collection on 5 December, 2012 and the data reporting system on 7 July, 2015. Currently, over 80% of Korean catch of tuna and tuna-like species has occurred in the western and central Pacific ocean (WCPO) area.

4. Flag State Reporting

4.1. Annual catch and effort

Annual catch and effort for Korean tuna fisheries by gear and primary species are shown in Table 1(a)-(f) and Fig. 1(a)-(b). The average of total catch in the WCPO by Koran tuna fisheries was 287,492 mt in recent 5 years (2012-2016). Total catch in 2016 was 302,715 mt, which accounted for 5% and 3% greater than that of average for 5 recent years and 2015, respectively.

The average catch of purse seine fishery was 260,935 mt during 5 recent years (2012-2016). The purse seine catch in 2016 was 278,514 mt with 25 vessels active, which was 7% and 4% greater than that of average for 5 recent years and 2015. In purse seine fishery, skipjack, yellowfin and bigeye catches in 2016 were 233,014 mt, 41,040 mt and 4,401 mt, respectively. The catches of skipjack, yellowfin and bigeye were 1%, 18% and 137% greater than those of 2015, respectively. Purse seine fishing efforts ranged from 5,790 to 7,552 sets during 5 recent years, which showed the highest in 2013, and the lowest in 2016.

The average catch of longline fishery was 26,558 mt during recent 5 years (2012-2016). The longline catch in 2016 was 24,201 mt with 96 vessels active, which was 9% lower than that of average for 5 recent years and similar to 2015. Catches of bigeye and yellowfin caught

by longline in 2016, which are target species by the Korean tuna longline fishery, were 11,018 mt and 8,054 mt, respectively. Longline fishing efforts ranged from 47,157 to 75,060 thousand hooks, which showed the highest in 2012, and the lowest in 2015.

Catches of north Pacific albacore, southwest striped marlin, south swordfish and south albacore are shown in Table 1(c)-(f).

4.2. Fleet structure

The number of vessels active by gear and size is presented in Fig. 2 and Table 2. The number of purse seine vessels, once peaked at 39 in 1990, reduced to 28 in 1996, and after that maintained around 26-28 to recent years. Since 2015, it has been to 25, of which 7 vessels were of 501-1,000 class, 14 vessels of 1,001-1,500 class and 4 vessels of over 1,500 class in 2016. The number of longline vessels reduced from 220 in 1991 to 108 in 2008, and slightly increased and ranged from 111 to 126 thereafter. Since 2015 it has decreased up to less than 100. In 2016, the number of active fishing vessels was 96, of which 1 vessel was of 51-200 class and 95 vessels of 201-500 class.

4.3. Fishing patterns

The distributions of catch and effort of target species by gear are shown in Fig. 3(a)-(b). Korean tuna purse seine fishery has generally been operating throughout the year in the tropical area of the WCPO between 140^{o}E-170^{o}W and from time to time extended to the east subject to oceanographic conditions. Purse seine fishing efforts in 2013 were concentrated on the western areas, while concentrated relatively higher on the central areas in 2012 and 2014. In 2015 the effort distributions moved eastward further and concentrated on the eastern areas than in previous years, and again moved to the western and central areas in 2016. Longline fishery efforts were normally higher in both the central and eastern Pacific Ocean. The efforts in 2014 and 2016 concentrated in the WCPO, but those of 2015 were relatively higher in the EPO.

4.4. Annual estimated catches of species of special interest

The species of special interest (seabird, turtle, marine mammal, etc.) caught incidentally by Korean purse seine and longline fisheries are presented in Table 3. The data were compiled from logsheet recorded by captain onboard. In 2016, 1 individual of whale shark, 1 green turtle, 8 other marine turtles (unidentified), and 1 false killer whale were encircled by purse seine nets, and 1 individual of leatherback turtle, 32 olive ridley turtles, 10 green turtles and 4 other marine turtles (unidentified) were caught by longline fishery, respectively. All these species were encircled by purse seine nets or caught incidentally by fisheries and released promptly. Especially, when false killer whale and whale shark were observed during fishing operation of purse seine, the vessels stopped rolling net until they had been released safely. As most of Korean vessels operated the areas between 15^{o}N and 20^{o}S (Fig. 3), there was no bycatch of seabird in 2016.

4.5. Annual estimated catches of non-target, associated and dependent

The shark species caught by longline fishery are presented in Table 4(a). These data were compiled from logsheet recorded by captain onboard. As key shark species, the catches in 2016 were <1 mt for blue shark, thresher sharks 1 mt, mako sharks <1 mt, and other sharks <1 mt, respectively. In accordance with CMM 2011-04 and 2013-08, the number of releases of oceanic whitetip shark and silky shark are presented in Table 4(b). All these bycaught were released promptly in a manner that results in as little harm to the shark as possible.

4.6. Estimated annual coverage of catch and effort and observer data

Estimated annual coverages of logsheet (catch and effort data) and observer data are shown in Table 5. The coverage of logsheet data has been 100% for both purse seine and longline since 2013. The observer coverage in 2016 was 100% for purse seine and 6.9% for longline.

5. Coastal State Reporting

N/A

6. Onshore developments

Korea consistently promotes investment plans on land facility in the coastal states where its distant waters fleets are operating.

7. Future Prospects of the fishery

The fleet power of purse seine and longline is expected to keep the current level, and production seems to be affected by fisheries resources trend in the oceans, conservation and management measures of RFMOs and permission policy of the coastal states. Meanwhile recognizing that demand at international and domestic market is increasing on production caught from responsible and sustainable fishing activity, Korea strives to strengthen on MCS, scientific survey and education relating to bycatch for fishermen.

8. Status of tuna fishery data collection systems

8.1. Logsheet data collection and verification

Tuna catch statistics of Korea are obtained from two sources of data reporting. The Korea Overseas Fisheries Association (KOSFA) collects monthly catch by gear and species from the Korean tuna industries. National Institute of Fisheries Science (NIFS) collects logsheet data from vessels filled out by captain onboard. In accordance with data reporting and submission requirement by the RFMOs, necessary improvements have been continuously made in logbook coverage, accuracy and verification through cross-checking between NIFS

and KOSFA. To improve fisheries database management system and data cross-checking, NIFS has monitored the state of being submitted from fishing vessel in real time through the electronic reporting system since 2015.

8.2. Observer programme

The scientific observer program of distant-water fisheries of Korea was started in 2002. National Institute of Fisheries Science (NIFS) is responsible for implementing and developing the program. The basic requirement for observers is college graduated with the major field of nature science or fisheries high school graduated with at least 1-year experience on board and certificate of qualification to deck officer. Candidates for observer who have passed the paper review (including medical check) and oral interview have to take training programs for 3 weeks. Observer training programs include basic safety training for seafaring, operations of navigation devices, biological information training for target and non-target species and data collecting/reporting method for fishing activities. During the training program they have two kinds of test. First is the test for a technical term of fisheries and biology, and the other is the test for species identification. The person who scored 70% overall in the two tests and attended 100% of the course timetable can be qualified for a scientific observer and deployed on board. Korea has a total of 31 scientific observers at present.

8.3. Port sampling programme

In Korea, there are 4 domestic landing ports for tunas caught in WCPO, which are Busan, Masan, Tonyeong and Mokpo, all located along the southern coast of Korea, nearby the landing port, there are 5 canneries owned by 4 companies in which about 100,000 tons of tunas from WCPO are landing.

National Institute of Fisheries Science (NIFS) used to conduct biological sampling in the domestic cannery of Dongwon industry from 1997 to 2006. A preliminary study for species identification from the catch of purse seine was conducted in a cannery of Korea in 2011 and the result was provided to the WCPFC SC7 (ST-IP-09).

8.4. Unloading/Transhipment

In accordance with Article 13 of the Distant Water Fisheries Development Act, all distant water fishermen shall comply with procedures and regulations established by Regional Fisheries Management Organizations. Therefore, all transhipments by Korean vessels fishing all high migratory fish stocks covered by the WCPFC Convention take place in accordance with WCPFC CMM 2009-06. Also, vessel operators are encouraged to assist the WCPFC ROP observers in having full access to both the unloading and the receiving vessels to verify that the transhipped quantities of fish are consistent with other information available to observers. After the completion of transhipment, the transhipment declaration is subject to verification against fishing vessel’s monthly catch report, logsheets and observer reports (if available). The information on the transhipment of Korean fleets in 2016 is summarized in Table 6.

9. Research activities covering target and non-target species

Korea carried out a sea trial to mitigate bycatch of seabird in the Korean tuna longline fisheries with BirdLife International for 4 years, 2013-2016, and since 2016 has conducted a project for developing FAD to the extent possible minimize the capture of small bigeye and yellowfin and to reduce the entanglement of sharks, marine turtle, etc.