2023 Annual National Report of Korean SBT Fishery

Republic of Korea

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1. Introduction

Korean longline fleets have engaged in fishing for southern bluefin tuna, *Thunnus maccoyii* (SBT) in the CCSBT convention area. This fishery commenced with a small experimental operation in the Indian Ocean in 1957, mainly fishing for bigeye tuna, yellowfin tuna and albacore tuna but shifted targeting SBT in 1991. In 2022, SBT catch in calendar year of Korean tuna longline fishery was 1,173 t (1,173 t in fishing year) with 9 vessels in active. In general, fishing occurs between 35°S-45°S and 10°E-120°E, in the western Indian Ocean (Area 9) from April to July/August and in the eastern Indian Ocean (Area 8) from July/August to December. However, since 2014 SBT fishing vessels have moved westward than previous years, and mainly operated in the western Indian Ocean and eastern Atlantic Ocean between 20°W-35°E (Area 9). Until the early 2010s the CPUE was low and since 2012 it has increased. In general, the CPUE in Area 9 is higher than in Area 8. In particular, during 2017-2019 there has been no fishing in Area 8.

2. Catch and Effort

The annual SBT catches were low with less than 400 t at the beginning during 1991-1995 and increased up to 1,796 t in 1998 but largely decreased to below 200 t in the mid-2000s. Korea became the member of the CCSBT Commission in 2001 and was allocated to 1,140 t of annual catch limit as membership, while Korean SBT catches were much lower than the national catch until 2007. It was mostly attributed to the availability of vessels as well as low market price and high fuel price. Since 2008 the annual catch ranged from 705 t to 1,268 t, which was well commensurate with the national catch limit. In 2022, 1,173 t of SBT were caught by Korean tuna longline fishery, which was comparable with the level of last year (Table 1, Fig. 1).

The historical distribution of SBT catch and effort of Korean tuna longline fishery by area is shown in Table 2. Until 2013, Korean SBT fishing vessels generally operated between 10°E-120°E of 35°S-45°S, in the western Indian Ocean (10°E-50°E) of Area 9 from April to July/August and in the eastern Indian Ocean (90°E-120°E) of Area 8 from July/August to December. It is noted that there were less fishing efforts in the eastern Indian Ocean (Area 8) during 2003-2007 but replenished after 2008. Since 2014, however, SBT catch and effort has decreased in Area 8, while has increased in Area 9. During 2017-2019, Korean longline

vessels targeting SBT were operated only in Area 9 and they were recently operated again in the eastern Indian Ocean from 2020.

3. Nominal CPUE

The nominal CPUE prior to 2008 was at below 3.0 except 2002, 2003 and 2006, but increased to above 3.0 in 2008 and maintained until 2011. It further increased to 5.3 in 2012, and recorded the second highest of 7.8 in 2015. In 2016, it showed somewhat of decreasing, but again increased in 2017 and showed the highest of 8.7 in 2019 (Fig. 2). In general, the CPUE in Area 9 was higher than in Area 2 and 8. In particular, the CPUE in Area 9 sharply increased after 2011 but decreased in 2016, which was similar to that of Area 8, and is again showing an increase after 2017. In 2022, total CPUE increased slightly compared to last year, whereas the CPUE in Area 9 was lower than the previous year (Table 2).

4. Size composition

The size composition data of SBT have collected from the logbooks and the observer programs. From 2010 to 2012 the mean of fork length (FL) was below 130 cm, but it got larger to 130 cm in 2013 and showed the largest of 147 cm in 2014 with a main mode of 150 cm. The mean length in 2015 was similar to that of 2014, but the size class of 120-130 cm was higher. In 2016 and 2017, the mean length was 139 cm and 140 cm, respectively, and the main mode became smaller to around 130 cm class than in 2014 and 2015. This might be because fishing vessels kept almost SBT caught with few discarding/releasing. And the mean length in 2018 was 142 cm, which was similar to that of 2017, and the main mode was 130-140 cm class. And the mean length in 2019 was 138 cm, which was smaller than that of 2018, and the proportion of less 130 cm class was higher, however, in 2020 the mean length became lager to the level of 2014. In 2022, the mean length was 137.6 cm and the main mode become slightly smaller to 135 cm class than the last year (Fig. 3).

5. Fleet size and distribution

Korean longline vessels fishing for SBT are all deep freezers with a range from 200 to 500 gross tonnage. The annual number of vessels was fluctuated from 8 in 1996 to 19 in 1998, 2008 and 2009. Since 2010, annually 7 to 12 vessels have operated in active fishing for SBT so as to be equivalent to the national quota, and 9 vessels operated to fish for SBT from 2020 (Table 1 and Fig. 1).

The geographical distribution of nominal CPUE (no. of fishes/1,000 hooks) showed two fishing grounds, of which one was located in the western Indian Ocean off South Africa with an occasional expansion to the eastern Atlantic Ocean, and the other was in the eastern Indian Ocean off the Western Australia (Fig. 4). The CPUE was higher in the western Indian Ocean (Area 9) than in the eastern Indian Ocean (Area 8). In general, fishing occurred from April to July/August in the western Indian Ocean and from July/August to December in the eastern Indian Ocean. From 2000 to 2013, the distributions of fishing ground have rarely changed throughout the history, except in 2005 when some catches were taken in the central and southern Indian Ocean. However, since 2014 fishing vessels have moved westward than previous years and mainly operated in the western Indian Ocean and in the eastern Atlantic

Ocean between 20ºW-35ºE. During 2017-2019, fishing vessels operated only in the western Indian Ocean and the eastern Atlantic Ocean, which were quite similar. From 2020, some fishing vessels operated again in the eastern Indian Ocean.

6. Research and monitoring to improve estimates of components of attributable catch

A. Releases and/or discards

Since 1st September 2015, Korea has implemented the Electronic Reporting (ER) system, and it includes releases/discards information of not only SBT but also other species. In 2022, 25 SBT were released and 107 SBT were discarded by the Korean tuna longline fisheries.

B. Recreational fishing, Customary and/or traditional and Artisanal

N/A

7. Development and implementation of scientific observer programs

A. Observer Training

National Institute of Fisheries Science (NIFS) is responsible for implementing and developing the observer programs. Observer training programs include basic safety for seafaring, necessary handling of navigation devices, collection of fishing operational data, and biological knowledge and sampling for target, non-target species and ecologically related species (ERS), including interaction information and tagging project. In the end of the training, they have to pass two tests. One is for fisheries and biology, and the other is for species identification. The person who scores 70% overall from the two tests and completes 100% attendance of the training course can be qualified as a scientific observer. At present, Korea has 67 persons being able to be deployed onboard as an active scientific observer.

B. Scientific Observer Program Design and Coverage

Due to the worldwide spread of the COVID-19, observers were not placed onboard Korean longline vessels targeting SBT during 2020-2021. In 2022, 2 observers were placed onboard 2 longline vessels targeting SBT (Table 3). They observed the SBT catch of 168 t and the effort of 543×10^3 hooks in 187 sets in fishing area, which the observer coverage was estimated to be 23% in fishing efforts (Table 3). Table 4 shows the amount of SBT catch and effort compiled from the Korean observer programs by area in 2022.

C. Observer Data Collected and Tag Return Monitoring

N/A

8. Other relevant information (Data collection and reporting)

The progress was made in terms of data collection and reporting requirements. The Act on Fisheries Information and Data Reporting was revised and put into effect from December 2012. It includes data collection and reporting requirements recently adopted by the tuna RFMOs regarding especially ecologically important species, discard/release and bycatch mitigation, etc. Since 1st September 2015, the Act on Fisheries Information and Data Reporting has obliged fishers to report the catch statistics every day to National Institute of

Fisheries Science (NIFS) through the Electronic Reporting (ER) system in order to manage/cross-check the data in real time.

SBT catch statistics of Korea are obtained from two sources of data reporting. Korea Overseas Fisheries Association (KOFA) collects total SBT catch by month and vessel through Catch Documentation Scheme (CDS) issued by National Fishery Products Quality Management Service (NFQS). As mentioned above, NIFS collects logbook data through ER system filled out by captain onboard. The data collected are verified and confirmed through cross-checking between NIFS and KOFA.

9. Catch data verification

Korea established the Fisheries Monitoring Center (FMC) in March 2014 to monitor/manage the Vessel Monitoring System (VMS) data so that the data are cross-checked with fishing position from logbook. And also SBT catch data are cross-checked between those of NIFS from logbook and NFQS from CDS before issuing CDS. In 2022, there are few difference (0.8%) among NIFS (1,182 t from logbook), NFQS (1,173 t from CDS) and Secretariat (1,173 t) in the total catch (calendar year).

10. Research activities

Since 2015 we have collected SBT otolith and ovary through the observer program in order to contribute to the SRP proposal for estimating size/age at maturity of SBT. In addition, since 2017 we have carried out pop-up tagging program to investigate the post-release survival rate of SBT. During 2020-2021, observer and tagging program were not conducted due to the COVID-19. From 2022, the pop-up tagging program was carried out again.

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2022

Year	Number of longline vessel	Catch (t)	Year	Number of longline vessel	Catch (t)
1991	3	246	2007	12	521
1992	1	41	2008	19	1,134
1993	1	92	2009	19	1,117
1994	1	137	2010	9	867
1995	3	365	2011	7	705
1996	8	1,320	2012	7	922
1997	14	1,424	2013	9	918
1998	19	1,796	2014	9	1,044
1999	16	1,462	2015	10	1,051
2000	13	1,135	2016	11	1,121
2001	10	845	2017	12	1,080
2002	10	746	2018	10	1,268
2003	4	254	2019	11	1,238
2004	7	131	2020	9	1,231
2005	7	38	2021	9	1,241
2006	9	150	2022	9	1,173

Table 2. The catch of SBT and the effort of Korean longline vessels targeting SBT by year and area, 2000-2022

Year	Total			Area 2			Area 8			Area 9			Others		
	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE	No. of inds.	No. of hooks ($\times 10^3$)	CPUE
2000	21,840	9,689	2.25	85	18	4.83	10,909	5,770	1.89	10,077	3,315	3.04	768	586	1.31
2001	15,974	6,816	2.34	16	12	1.30	7,118	3,756	1.89	8,776	3,028	2.90	65	21	3.14
2002	17,136	5,467	3.13	27	17	1.61	1,768	1,322	1.34	15,201	4,054	3.75	140	74	1.88
2003	5,770	1,287	4.48				130	110	1.18	5,640	1,177	4.79			
2004	2,486	1,562	1.59							2,477	1,552	1.60	9	11	0.84
2005	1,047	430	2.43	490	165	2.97	16	11	1.49	347	119	2.91	194	135	1.44
2006	5,548	1,117	4.97							5,491	1,094	5.02	58	23	2.45
2007	16,544	5,811	2.85							16,373	5,706	2.87	171	105	1.64
2008	25,826	6,932	3.73	919	296	3.10	10,494	3,939	2.66	14,383	2,674	5.38	30	23	1.32
2009	26,584	6,769	3.93	2	4	0.65	6,394	3,083	2.07	19,990	3,641	5.49	198	42	4.71
2010	14,818	4,104	3.61	99	111	0.89	5,249	2,022	2.60	9,470	1,971	4.80			
2011	13,474	4,048	3.33	52	76	0.68	8,315	3,252	2.56	5,107	720	7.10			
2012	19,257	3,635	5.30	19	10	1.86	5,680	1,695	3.35	13,558	1,930	7.03			
2013	15,904	2,688	5.92	14	39	0.36	5,969	1,537	3.88	9,921	1,111	8.93			
2014	19,129	3,274	5.84	216	369	0.58	4,923	1,169	4.21	13,990	1,736	8.06			
2015	18,649	2,387	7.81	0	104	0.00	3,643	755	4.82	15,006	1,528	9.82			
2016	19,110	3,482	5.49				1,588	268	5.92	17,522	3,214	5.45			
2017	18,375	2,805	6.55							18,375	2,805	6.55			
2018	20,280	2,738	7.41							20,280	2,738	7.41			
2019	21,119	2,427	8.70							21,119	2,427	8.70			
2020	17,931	2,395	7.49				4,322	490	8.82	13,609	1,905	7.14			
2021	20,531	2,608	7.87				2,683	353	7.59	17,848	2,255	7.92			
2022	19,255	2,413	7.98				1,657	113	14.64	17,598	2,300	7.65			

* Catch and effort data compiled from logbook.

Table 3. Observer coverage for the Korean SBT fishery through the Korean observer program, 2018-2022

Year	Trips observed	Effort observed (X1,000)	Total effort (X1,000)	Catch observed of SBT (t)	Coverage (%)
2018	3	573	2,738	243	21
2019	4	530	2,427	208	22
2020*	-	-	2,395	-	-
2021*	-	-	2,608	-	-
2022	2	543	2,413	168	23

* During 2020-2021, observers were not placed onboard Korean longline vessels targeting SBT due to the spread of the COVID-19.

Table 4. Amount of SBT catch and effort observed by area, 2022

Year	Stratum	Catch (t)			Effort (X 1,000)		
		Total estimate	Total observed	Coverage (%)	Total estimate	Total observed	Coverage (%)
2022	8	150	-	-	113	-	-
2022	9	1,023	168	16	2,300	543	24

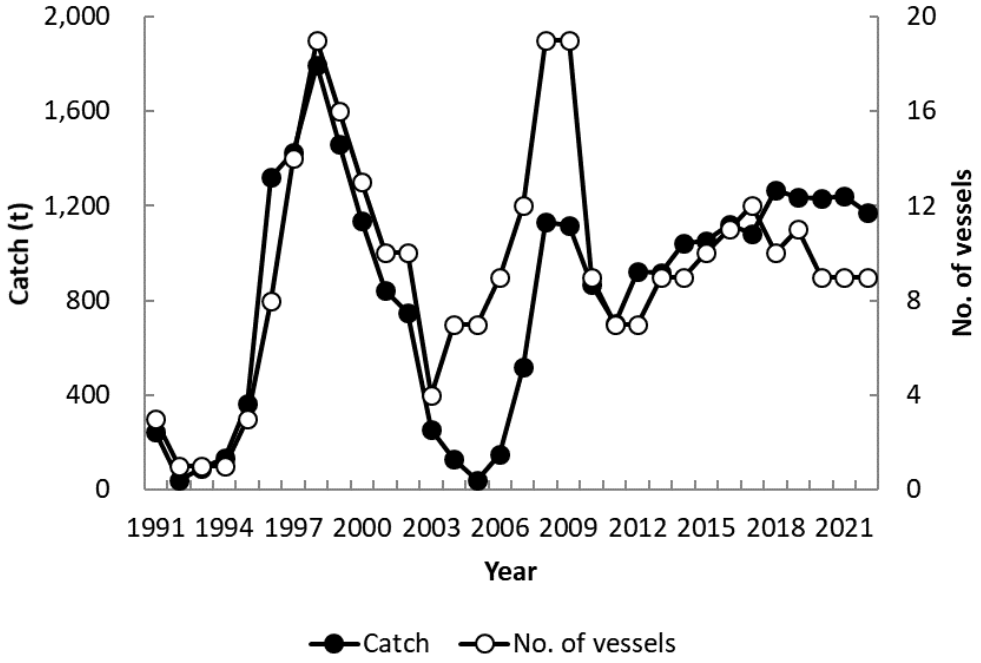


Fig. 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2022.

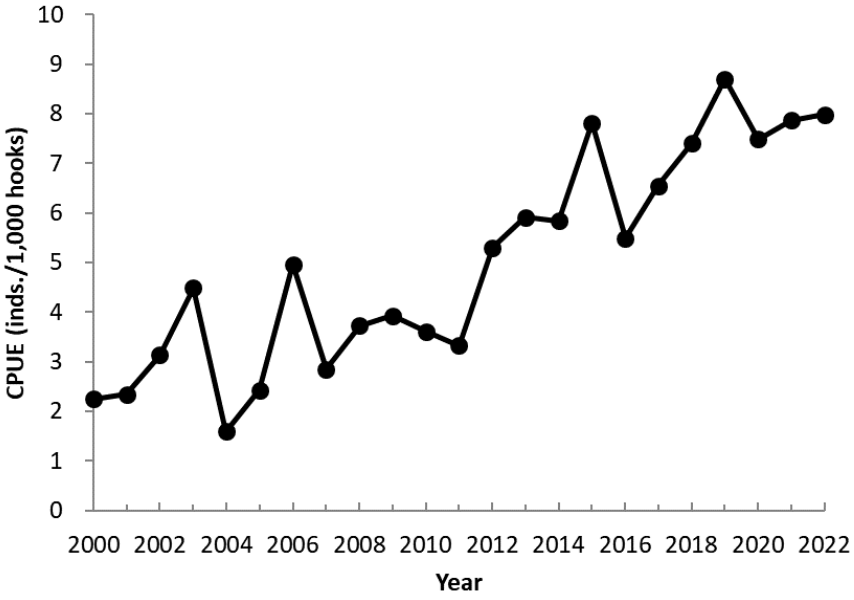


Fig. 2. The nominal CPUE series of Korean tuna longline vessels targeting SBT, 2000-2022.

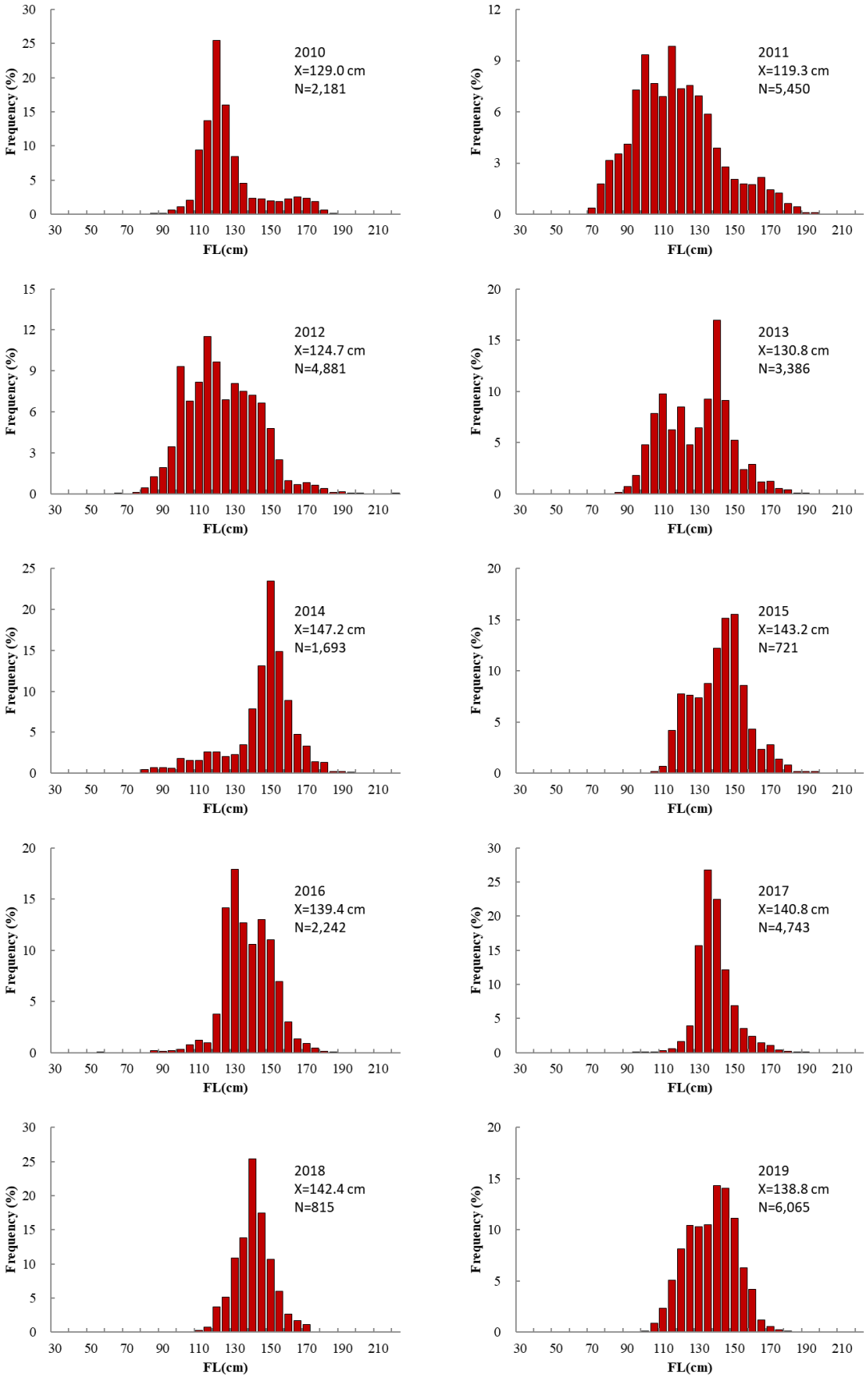


Fig. 3. Length frequency distribution of SBT caught by Korean tuna longline fishery, 2010-2022.

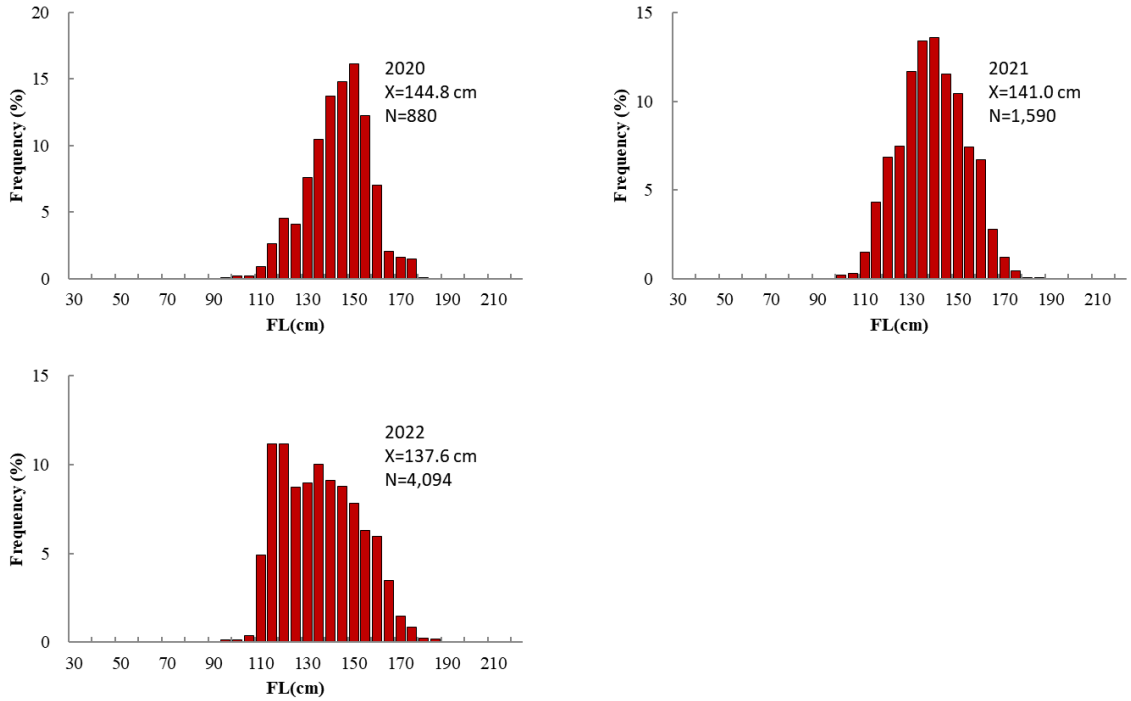


Fig. 3. Continued.

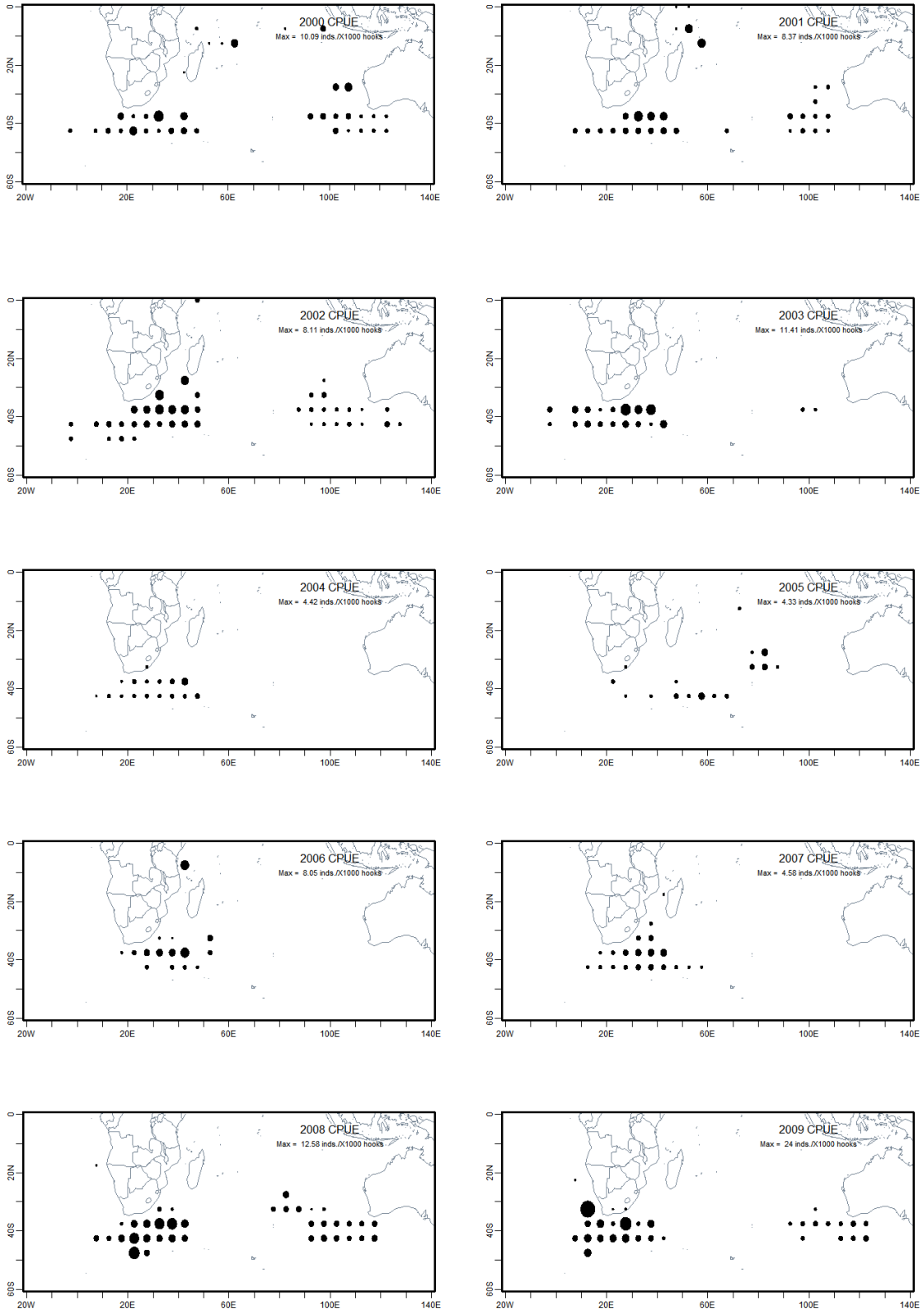
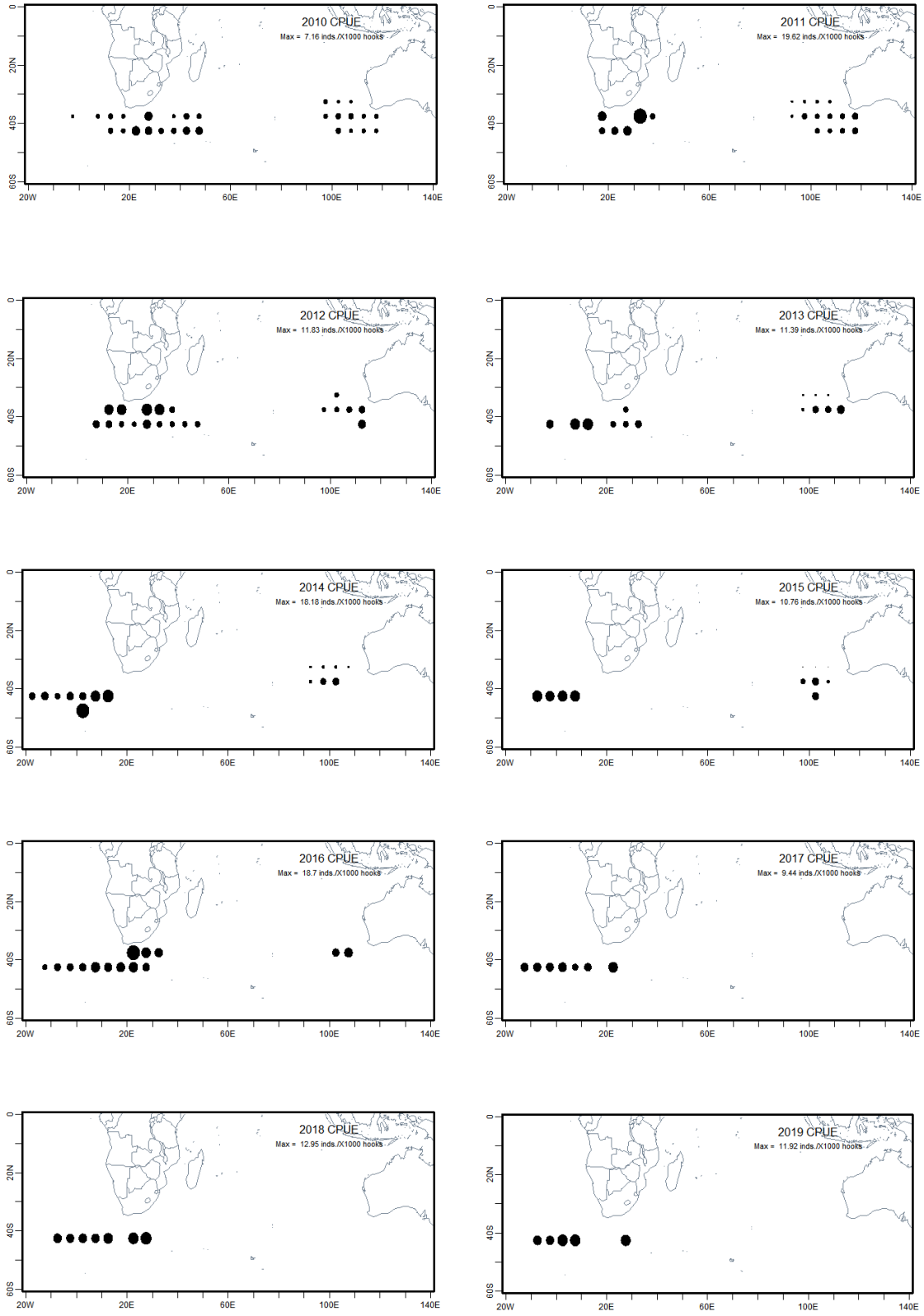


Fig. 4. The CPUE distribution of Korean tuna longline vessels targeting SBT by year and by area, 2000-2022.



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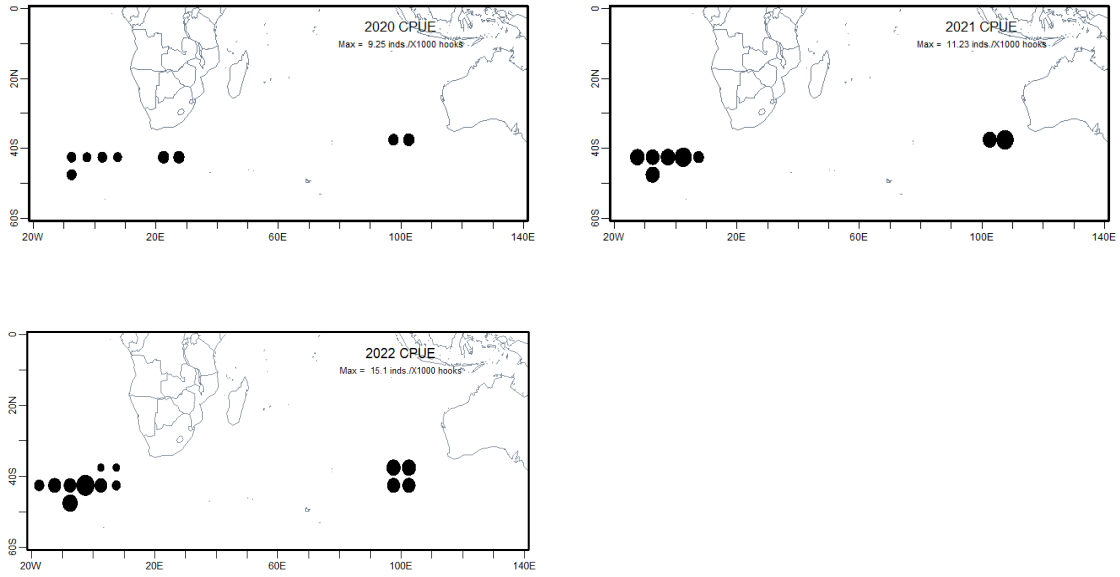

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