

# 2018 Annual National Report of Korean SBT Fishery

Republic of Korea

Doo Nam KIM, Sung Il LEE, Mi Kyung LEE and Du Hae AN

*National Institute of Fisheries Science (NIFS)*

*216 Gijanghaean-ro, Gijang-eup, Gijang-gun, Busan 46083, Republic of Korea*

## 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 2017, SBT catch in calendar year of Korean tuna longline fishery was 1,080 mt (1,102 mt in fishing year) with 12 vessels in active. In general, fishing occurs between 35°S-45°S and 10°E-120°E, especially in the western Indian Ocean from April to July/August and in the eastern Indian Ocean 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. Recently SBT catch and effort were relatively higher in the western part (area 9) than the eastern part (area 8), and the fishing season had finished earlier in August to October. In 2017, fishing vessels operated only in area 9 where was the western Indian Ocean and eastern Atlantic Ocean.

## 2. Catch and Effort

The catch was low with less than 400 mt at the beginning during 1991-1995 and increased up to 1,796 mt in 1998 but largely decreased to below 200 mt in the mid-2000s. Korea became the member of the CCSBT Commission in 2001 and was allocated to 1,140 mt 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 mt to 1,134 mt, which was well commensurate with the national catch limit (Table 1, Fig. 1). In 2017 fishing year, SBT catch by Korean longline fishery was 1,102 mt (1,080 mt in calendar year), from which Korean government set 1,140 mt for the yearly total allowable SBT catch.

The historical distribution of SBT catch and effort of Korean tuna longline fishery by area is shown in Table 2. Korean SBT fishing vessels have generally operated between 35°S-45°S and 10°E-120°E, especially 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 2002-2007 but replenished after 2008. Since 2014, however, SBT catch and effort has

decreased in area 8, while has increased in area 9. In 2015 and 2016, the catch and effort was relatively higher in the western Indian Ocean (area 9), and there was no fishing for SBT in area 2. In 2017 fishing vessels fishing for SBT were operated only in area 9.

### **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, recorded the second highest of 5.9 in 2013, the highest of 7.81 in 2015. In 2016 it showed somewhat of decreasing but again increased in 2017 (Fig. 2). In general, the CPUE by area was apparently higher in area 9 than in areas 2 and 8 throughout the whole period. In particular, the CPUE in area 9 sharply increased after 2011 but decreased in 2016, which was similar to that of area 8. And the CPUE of area 8 in 2017 was higher than that of 2016 (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 average 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 average length in 2015 was similar to that of 2014, but the size class of 120-130 cm was higher. In 2016 and 2017, the average length was 139 cm and 140 cm, respectively, and the main mode became smaller to around 130 cm than in 2014 and 2015. This might be because fishing vessels kept almost SBT caught with few discarding/releasing (Fig. 3).

### **5. Fleet size and distribution**

Korean longline vessels 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 12 vessels operated to fish for SBT in 2017 (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 generally 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. 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. 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 20°W-35°E. In 2017, fishing vessels operated only in the western Indian Ocean and the eastern Atlantic Ocean.

### **6. 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, fishing operational data collection, 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 technical term of 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 31 persons being able to be deployed onboard as an active scientific observer.

### **B. Scientific Observer Program Design and Coverage**

In 2017, 3 observers were placed onboard 3 longline vessels targeting SBT (Table 3). They observed the SBT catch of 181 mt and the effort of  $509 \times 10^3$  hooks in 216 sets during 310 days in fishing area, which the observer coverage was estimated to be 18% in fishing efforts (Table 3). Table 4 shows the amount of SBT catch and effort compiled from the Korean observer program by area in 2017.

### **C. Observer Data Collected**

The data collected by observer programs were vessel and gear attributes, setting and catch details (including discard/release), incidental catch and interaction of ecologically related species (ERS) and sighting of marine mammals. The biological measurements were conducted on all SBT, ERS and other species. In 2017, 3,777 individuals of SBT were observed and measured of length, weight and so on during the trips. The information of ERS and other species were collected as well (Table 5).

### **D. Tag Return Monitoring**

During the 2017 scientific observation, no SBT tagged was released and recaptured by Korean observer programs.

### **E. Problems Experienced**

Nothing

## **7. 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, discards/release and bycatch mitigation, etc. Since 1<sup>st</sup> 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 system in order to manage/cross-

## CCSBT-ESC/1809/SBT Fisheries – Korea (ESC Agenda item 4.1)

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). NIFS collects logbook data from vessels filled out by captain onboard. The data collected are verified and confirmed through cross-checking between NIFS and KOFA.

### **8. 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 2017, there are few difference (3.0%) among NIFS (1,113 mt from logbook), NFQS (1,080 mt from CDS) and Secretariat (1,080 mt) in the total catch.

### **9. Research activities**

Korea carried out a sea trial to mitigate bycatch of seabird in the Korean tuna longline fisheries in collaboration with BirdLife International for 4 year, 2013-2016. Since 2015 we have collected SBT otolith and ovary through the observer program in order to contribute to the SPR proposal for estimating size/age at maturity of southern bluefin tuna. In 2017, we are carrying out Pop-up tagging program to investigate the post-release survival rate of SBT.

**CCSBT-ESC/1809/SBT Fisheries – Korea  
(ESC Agenda item 4.1)**

Table 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2017

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

Table 2. The catch of SBT and the effort of Korean longline vessels targeting SBT by year and area, 2001-2017

| 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 |
| 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 |              |                                |      |

\* Catch and effort data compiled from logbook.

**CCSBT-ESC/1809/SBT Fisheries – Korea  
(ESC Agenda item 4.1)**

Table 3. Observer coverage for the Korean SBT fishery through the Korean observer program, 2013-2017

| Year | Trips observed | Effort observed (X1,000) | Total effort estimated (X1,000) | Catch observed of SBT (mt) | Coverage (%) |
|------|----------------|--------------------------|---------------------------------|----------------------------|--------------|
| 2013 | 3              | 654                      | 2,688                           | 170                        | 24           |
| 2014 | 2              | 219                      | 3,274                           | 92                         | 7            |
| 2015 | 3              | 349                      | 2,387                           | 223                        | 15           |
| 2016 | 3              | 660                      | 3,482                           | 178                        | 19           |
| 2017 | 3              | 509                      | 2,805                           | 181                        | 18           |

Table 4. Amount of SBT catch and effort observed by area, 2017

| Year | Stratum | Catch (mt)     |                |              | Effort (X1,000) |                |              |
|------|---------|----------------|----------------|--------------|-----------------|----------------|--------------|
|      |         | Total estimate | Total observed | Coverage (%) | Total estimate  | Total observed | Coverage (%) |
| 2017 | 8       | -              | -              | -            | -               | -              | -            |
|      | 9       | 1,080          | 181            | 17           | 2,805           | 509            | 18           |

Table 5. Number of fish measured or collected for biological information by species, 2017

| Species  | No. sampled | No. measured | No. weighted | No. sexed | No. maturity stage |
|----------|-------------|--------------|--------------|-----------|--------------------|
| SBT      | 3,777       | 3,754        | 3,753        | 3,753     | 3,747              |
| Sharks   | 1,699       | 1,493        | 906          | 1,660     | 182                |
| Seabirds | 1           | 1            | 1            | -         | -                  |
| Others   | 4,783       | 4,638        | 4,715        | 4,140     | 4,136              |
| Sum      | 10,260      | 9,886        | 9,375        | 9,553     | 8,065              |

CCSBT-ESC/1809/SBT Fisheries – Korea  
(ESC Agenda item 4.1)

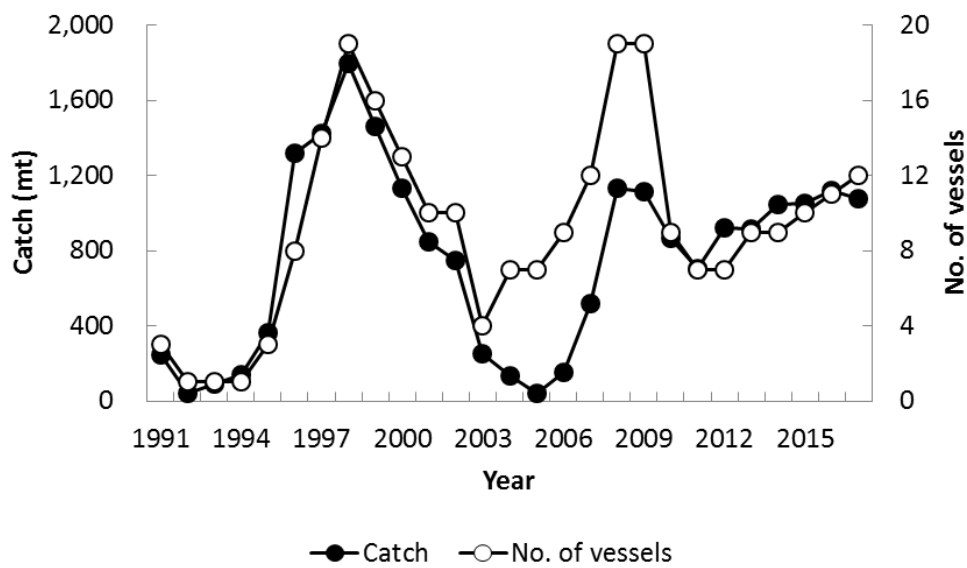


Fig. 1. The annual number of active Korean tuna longline vessels fishing for SBT and their annual SBT catches in the CCSBT convention area, 1991-2017.

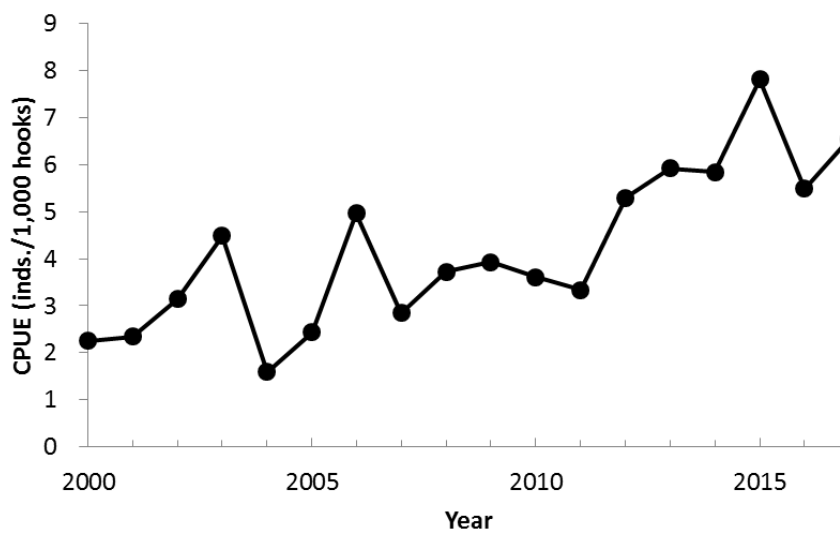


Fig. 2. The nominal CPUE series of Korean tuna longline vessels targeting SBT, 2000-2017.

CCSBT-ESC/1809/SBT Fisheries – Korea  
(ESC Agenda item 4.1)

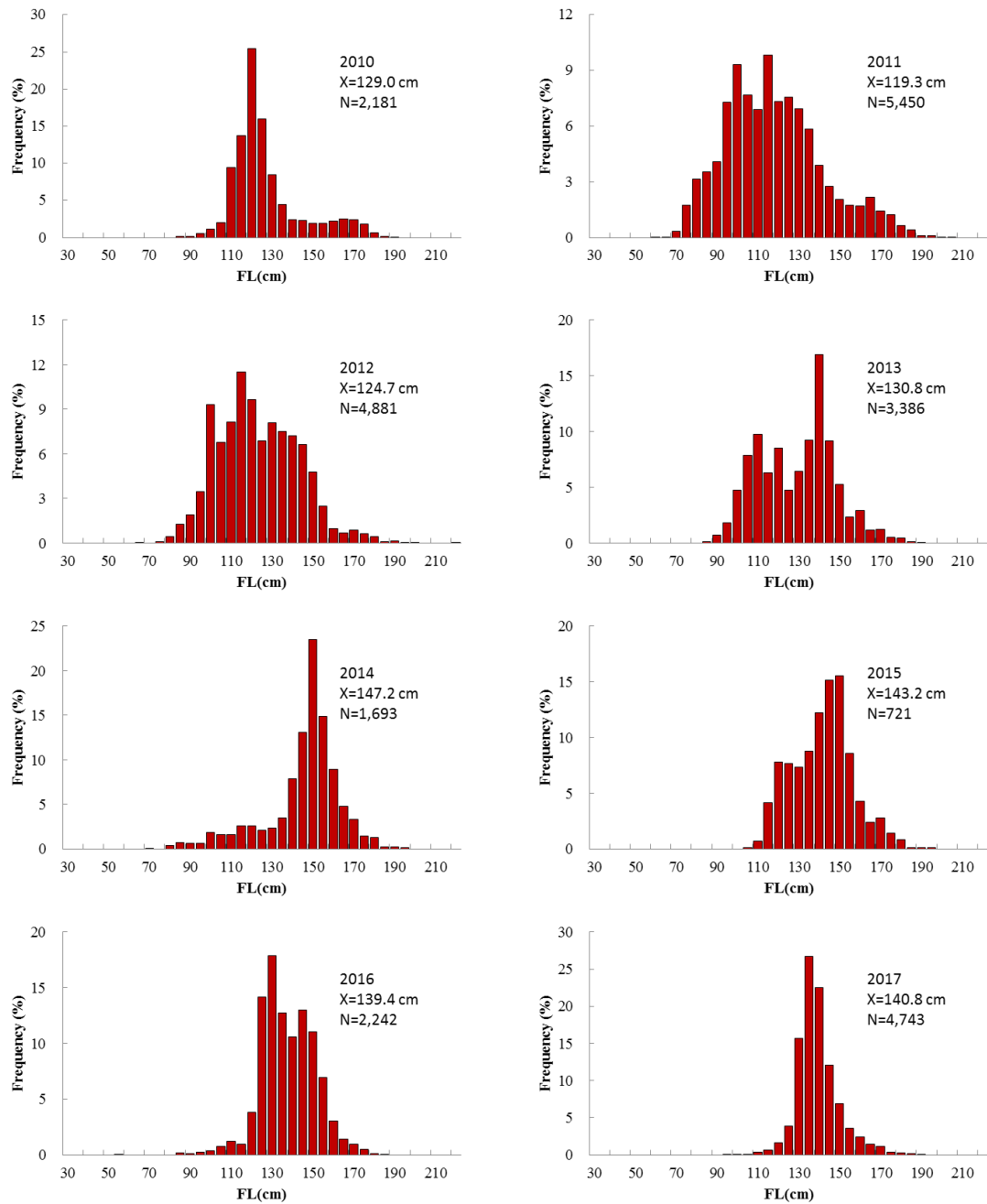


Fig. 3. Length frequency distribution of SBT caught by Korean tuna longline fishery, 2010-2017.



## CCSBT-ESC/1809/SBT Fisheries – Korea (ESC Agenda item 4.1)

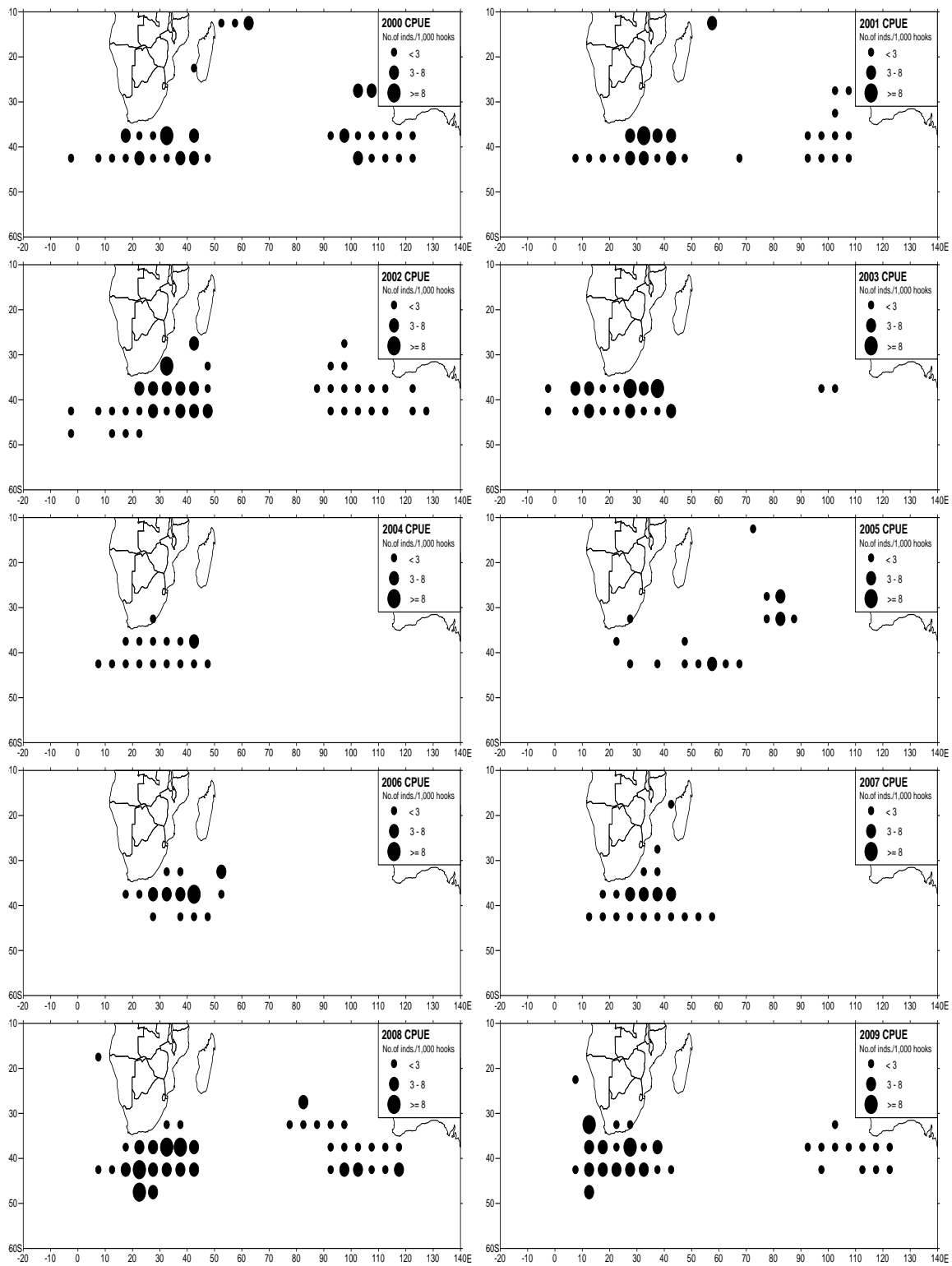


Fig. 4. The CPUE distribution of Korean tuna longline vessels targeting SBT by year and by area, 2000-2017.

# CCSBT-ESC/1809/SBT Fisheries – Korea (ESC Agenda item 4.1)

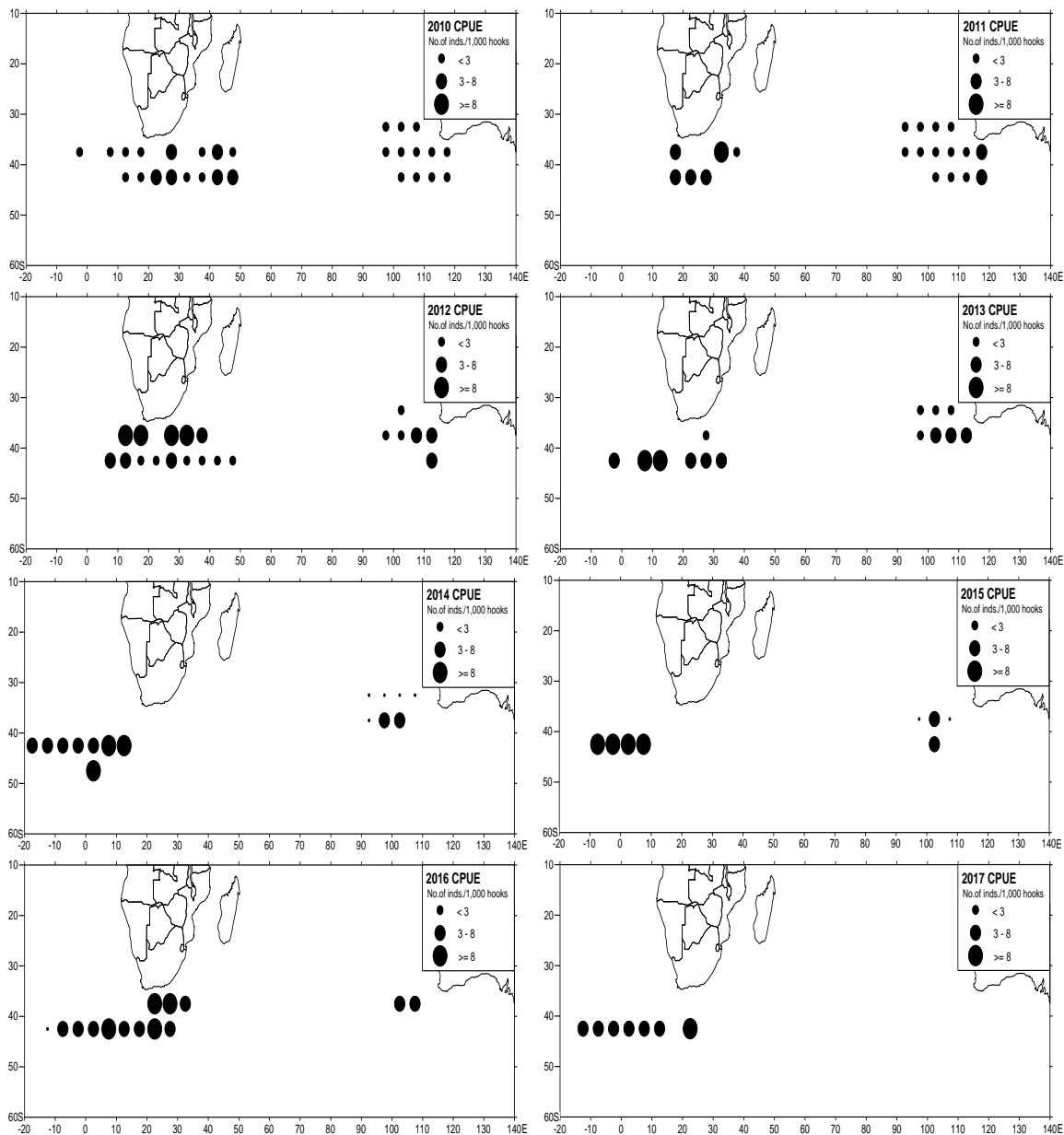


Fig. 4. Continued.