**SCIENTIFIC COMMITTEE**
**FOURTEENTH REGULAR SESSION**

**Busan, Republic of Korea**
**8-16 August 2018**

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

**WCPFC-SC14-AR/CCM-12**

**REPUBLIC OF KOREA**

**SCIENTIFIC COMMITTEE**
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**Republic of Korea**

**Doo Nam KIM[1], Sung Il LEE, Mi Kyung LEE and Du Hae AN**

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# 2018 ANNUAL REPORT TO THE COMMISSON

## Part 1. INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

## 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 2018** | **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 2017 was 268,489 mt, which accounted for 5% and 11% less than that of average for recent 5 years (2013-2017) and 2016, respectively. The catch of purse seine fishery with 26 vessels active was 246,849 mt in 2017, which was 4% and 11% less than that of average for recent 5 years (2013-2017) and 2016. The catch of longline fishery with 96 vessels active in 2017 was 21,639 mt, which was 11% less than that of average for recent 5 years (2013-2017) and that of 2016. In purse seine fishery, skipjack and bigeye catches in 2017 were 17% and 27% less, and yellowfin catch was 23% greater than those of 2016, respectively. In longline fishery, bigeye and yellowfin catches in 2017 were 7% and 13% less than those of 2016. Purse seine fishing efforts ranged from 5,790 to 7,552 sets during 5 recent years (2013-2017), which showed the highest in 2013 and the lowest in 2016. Longline fishing efforts ranged from 47,157 to 62,852 thousand hooks during 5 recent years (2013-2017), which showed the highest in 2013 and the lowest in 2015. Purse seine fishing efforts in 2017 were concentrated on the western and central areas of Pacific ocean. Longline fishing efforts were normally higher in both the central and eastern Pacific Ocean. The efforts in 2017 were relatively higher in the EPO than those of 2016. The logsheet coverages in 2017 were 100% for both purse seine and longline, and the observer coverage in 2017 was 100% for purse seine and 4.14% 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, 2013-2017

| Year | No. of sets | Catch (mt) | | | | |
|---|---|---|---|---|---|---|
| | | Total | SKJ | BET | YFT | OTH |
| 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 |
| 2017 | 6,796 | 246,849 | 192,922 | 3,235 | 50,675 | 18 |

* Data for 2017 are preliminary.

Table 1(b). Annual catch and effort estimates for the Korean longline fishery by primary species in the WCPFC Convention Area, 2013-2017

| Year | No. of hooks ($\times 10^3$) | Catch (mt) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | ALB | YFT | BET | BFT | SKJ | BLM | BUM | MLS | SWO | OTH |
| 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 |
| 2017 | 48,294 | 21,639 | 1,294 | 7,008 | 10,220 | 0 | 186 | 14 | 1,880 | 62 | 570 | 406 |

* Data for 2017 are preliminary.

Table 1(c). Annual catch and effort of north Pacific albacore by the Korean longline fishery, 2013-2017

| Year | Catch (mt) | Effort (days fished) |
|---|---|---|
| 2013 | 167 | 1,746 |
| 2014 | 116 | 1,224 |
| 2015 | 51 | 857 |
| 2016 | 56 | 943 |
| 2017 | 202 | 1,999 |

Table 1(d). Annual catch and effort of southwest striped marlin by the Korean longline fishery in the south of 15ºS, 2015-2017

| Year | Catch (mt) | Effort (number of fishing vessels) |
|---|---|---|
| 2015 | - | - |
| 2016 | - | - |
| 2017 | - | - |

* 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, 2013-2017

| 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 |
| 2013 | - | - | - | - | - | - | - |
| 2014 | - | - | - | - | - | - | - |
| 2015 | <1 | 2 | - | - | - | - | - |
| 2016 | - | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - | - |

* 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, 2013-2017

| Year | Catch (mt) | Effort (number of fishing vessels) |
|---|---|---|
| 2013 | - | - |
| 2014 | - | - |
| 2015 | <1 | 2 |
| 2016 | - | - |
| 2017 | - | - |

* 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.

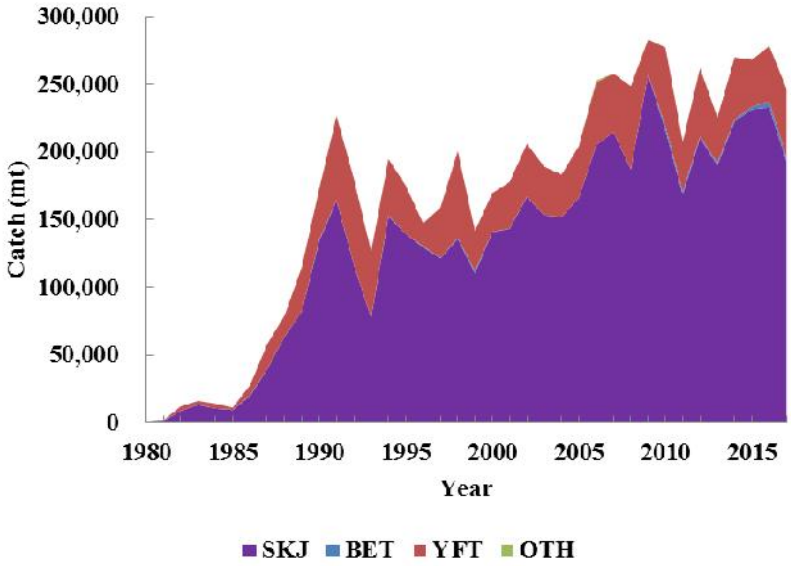


Fig. 1(a). Historical annual catch for the Korean purse seine fishery by primary species in the WCPFC Convention Area during 1980-2017.

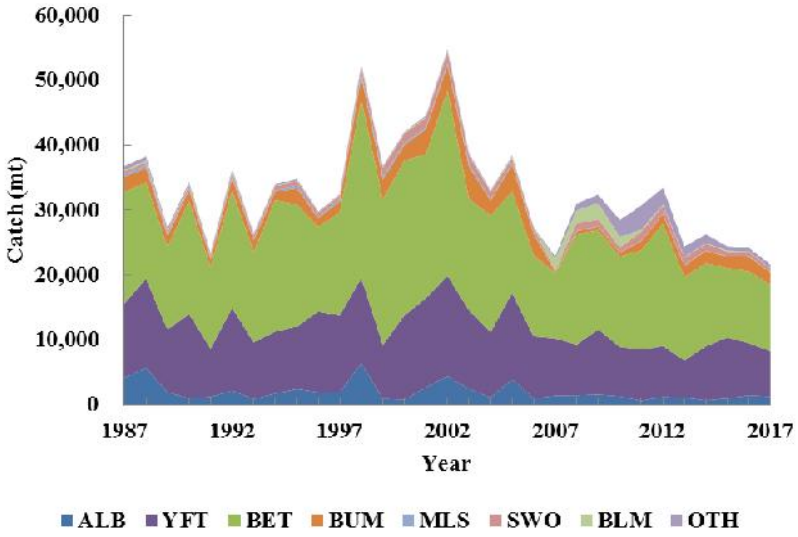


Fig. 1(b). Historical annual catch for the Korean longline fishery by primary species in the WCPFC Convention Area during 1987-2017.

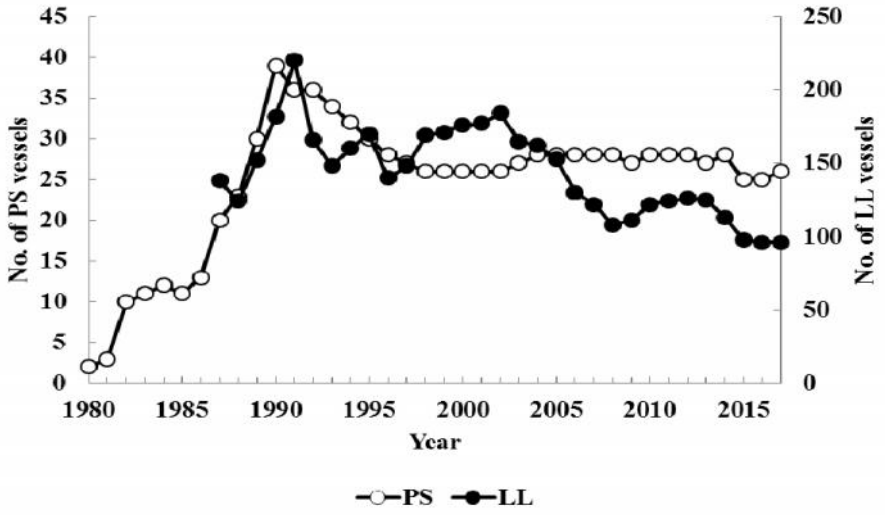


Fig. 2. Historical annual vessel numbers for the Korean tuna fisheries by gear in the WCPFC Convention Area during 1980-2017.

Table 2. Number of Korean vessels by gear and size, active in the WCPFC Convention Area, 2013-2017

| 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+ |
| 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 |
| 2017 | 96 | - | 1 | 95 | - | 26 | - | 7 | 15 | 4 |

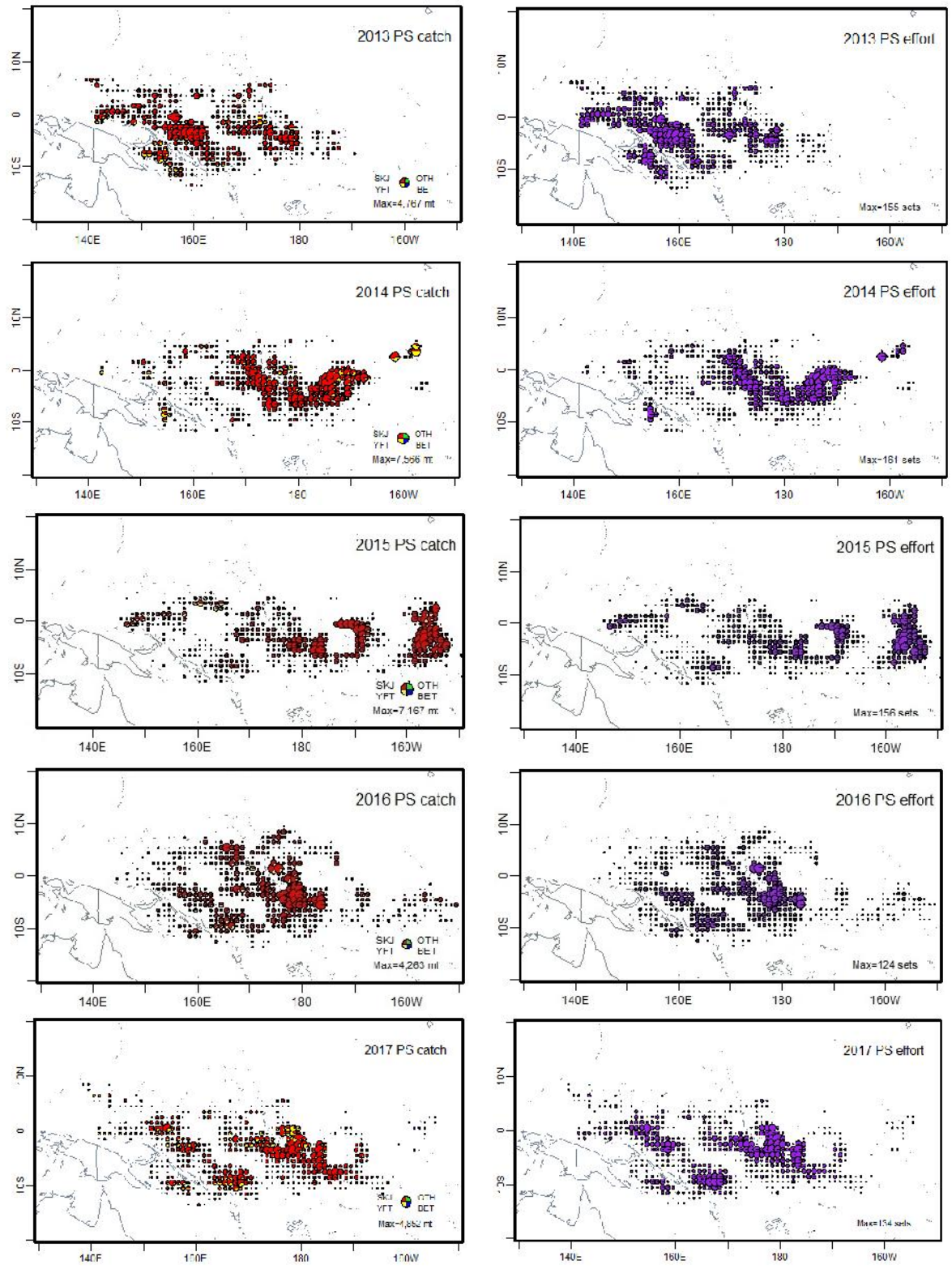


Fig. 3(a). Annual catch and effort distributions of target species by the Korean purse seine fishery active in the WCPFC Convention Area, 2013-2017.

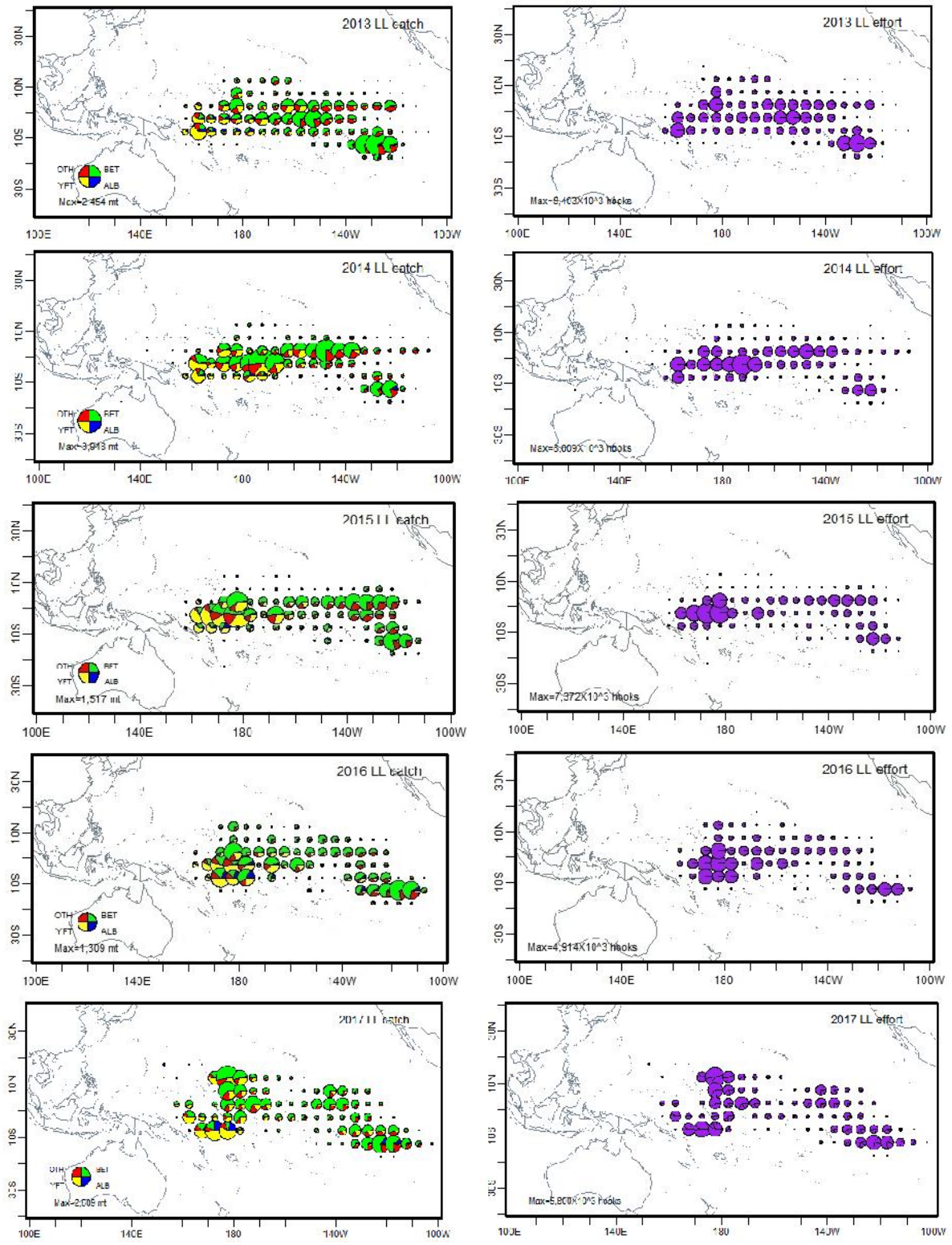


Fig. 3(b). Annual catch and effort distributions of target species by the Korean longline fishery active in the Pacific Ocean, 2013-2017.

Table 3(a). Annual estimated catch or encounter of species of special interest (seabird, turtle, marine mammals, etc.) by the Korean fisheries in the WCPFC Convention Area, 2013-2017

| Fishery | Year | Number by species | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Whale shark | Leather-back turtle | Olive ridley turtle | Logger-head turtle | Green turtle | Other marine turtles | False killer whale | Hump-back whale | Pygmy killer whale | Other whales |
| PS | 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[1)] | - | | |
| | 2017 | D:0, A:11 | - | D:0, A:1 | D:0, A:1 | - | D:1, A:1 | D:0, A:3[2)] | D:1, A:2[3)] | D:0, A:1[4)] | D:0, A:6[5)] |
| LL | 2013 | - | - | - | - | - | - | - | - | | |
| | 2014 | - | - | - | - | - | - | - | - | | |
| | 2015 | - | 34 | 9 | - | - | 5 | - | - | | |
| | 2016 | - | D:0, A:1 | D:27, A:5 | - | D:9, A:1 | D:3, A:1 | - | - | - | - |
| | 2017 | | - | - | - | - | D:0, A:3 | - | - | - | - |

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

** Date/Location: 1) ’16.4.23 / 4°N 154°E, 2) ’17.3.8 / 6°S 176°W, ’17.3.15 / 8°S 176°E, 3) ’17.3.21 / 8°S 166°E, ’17.3.18 / 8°S 166°W, ’17.3.21 / 8°S 166°W, 4) ’17.11.16 / 9°S 155°E, 5) ’17.7.17 / 0°S 154°E, ’17.5.16 / 2°S 175°W.

Table 3(b). Effort, observed and estimated seabird captures by fishing year for Korean longline fishery in the area between 23°N - 30°S, 2013-2017

| Year | Fishing effort | | | | Observed seabird captures | |
|---|---|---|---|---|---|---|
| | Number of vessels | Number of hooks | Observed hooks | % hooks observed | Number | Rate |
| 2013 | - | - | - | - | - | - |
| 2014 | - | - | - | - | - | - |
| 2015 | - | - | - | - | - | - |
| 2016 | - | - | - | - | - | - |
| 2017 | - | - | - | - | - | - |

* 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, 2013-2017

| Year | Retained catch (mt) by key shark species | | | | | | |
|---|---|---|---|---|---|---|---|
| | Blue shark | Thresher sharks | Hammerhead sharks | Mako sharks | Silky shark | Oceanic whitetip shark | Others |
| 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 |
| 2017 | <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 |
| | 2017 | - | 2 | 3 | 1 | 769 |
| Longline | 2016 | 1,000 | 423 | 8 | 39 | 2,556 |
| | 2017 | 2,826 | 1,050 | 1 | 13 | 4,323 |

* 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, 2013-2017

| 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 |
| | 2017 | D: 6, A: 1 | D: 1,683, A: 332 |
| Longline | 2013 | 299 | 26 |
| | 2014 | 173 | 58 |
| | 2015 | 356 | 942 |
| | 2016 | D: 44, A: 65 | D: 897, A: 1,095 |
| | 2017 | D: 48, A: 137 | D: 675, A: 615 |

* 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, 2013-2017

| Year | Gear | Logsheet coverage (%) | Observer coverage (%) |
|---|---|---|---|
| 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 |
| 2017 | Purse seine | 100 | 100 |
| | Longline | 100 | 4.14 |

∗ 2017 observer coverage for Korean longline fishery

| Fishery | No. of Hooks | | | Days Fished | | | Days at Sea | | | No. of Trips | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Estimated | Observed | % | Total Estimated | Observed | % | Total Estimated | Observed | % | Total Estimated | Observed | % |
| Longline | | | | 16,777 | 694 | 4.14 | | | | | | |

Table 6. Information on the transhipment of Korean fleets in 2017

A. Longliners

(1) Amount (kg) of transshipped fish

| Species | Transhipment of catches caught in WCPFC area | Transhipment of catches caught outside of WCPFC area |
|---|---|---|
| Bigeye tuna | 4,207,270 | 1,941,878 |
| Yellowfin tuna | 3,099,705 | 296,540 |
| Striped marlin | 29,448 | 16,140 |
| Swordfish | 173,927 | 232,645 |
| Blue marlin | 765,845 | 137,776 |
| White marlin | 155 | - |
| Albacore tuna | 727,767 | 119,278 |
| Spearfish | 2,477 | 798 |
| Skipjack tuna | 62,224 | 9,620 |
| Sharks | 69 | - |
| Others | 174,184 | 104,053 |
| Total | 9,243,071 | 2,858,728 |

| Speceis | Location of transhipment : WCPFC area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | In port transhipment | | | | At sea transhipment in EEZ | | | | At sea transhipment in high seas | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | 76,886 | - | - | - | - | - | - | - | 3,927,313 | - | - | - |
| Yellowfin tuna | 61,863 | - | - | - | - | - | - | - | 2,920,151 | - | - | - |
| Striped marlin | 153 | - | - | - | - | - | - | - | 25,228 | 3,353 | - | - |
| Swordfish | - | 1,472 | - | - | - | - | - | - | - | 156,227 | - | - |
| Blue marlin | - | 8,867 | - | - | - | - | - | - | - | 735,244 | - | - |
| White marlin | - | - | - | - | - | - | - | - | - | 155 | - | - |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albacore tuna | - | - | 3,595 | - | - | - | - | - | - | - | 707,896 | - |
| Spearfish | - | - | - | - | - | - | - | - | - | 2,172 | - | - |
| Skipjack tuna | - | - | 2,210 | - | - | - | - | - | - | - | 53,683 | - |
| Sharks | - | - | - | - | - | - | - | - | - | - | 69 | - |
| Others | - | 2,339 | - | - | - | - | - | - | - | 109,438 | 12,582 | 40,992 |
| Total | 138,902 | 12,678 | 5,805 | - | - | - | - | - | 6,632,496 | 964,330 | 754,146 | 343,531 |

| Species | Location of transhipment : outside of WCPFC area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | In port transhipment | | | | At sea transhipment | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | - | - | - | - | 2,144,949 | - | - | - |
| Yellowfin tuna | - | - | - | - | 414,231 | - | - | - |
| Striped marlin | - | - | - | - | 15,551 | 1,303 | - | - |
| Swordfish | - | - | - | - | - | 248,873 | - | - |
| Blue marlin | - | - | - | - | - | 159,510 | - | - |
| Albacore tuna | - | - | - | - | - | - | 135,554 | - |
| Spearfish | - | - | - | - | - | 1,103 | - | - |
| Skipjack tuna | - | - | - | - | - | - | 15,951 | - |
| Others | - | - | - | - | - | 83,077 | 9,816 | 19,993 |
| Total | - | - | - | - | 2,574,731 | 493,866 | 161,321 | 19,993 |

(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 |
| 72 | 19 | 1 | - | 65 | - | 25 |

## 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 |
|---|---|---|
| Bigeye tuna | 3,304,700 | - |
| Yellowfin tuna | 44,777,400 | - |
| Albacore tuna | 9,500 | - |
| Skipjack tuna | 183,803,500 | - |
| Total | 231,895,100 | - |

| Species | Location of transhipment : WCPFC area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | In port transhipment | | | | At sea transhipment in EEZ | | | | At sea transhipment in high seas | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | 17,700 | - | 3,287,000 | - | - | - | - | - | - | - | - | - |
| Yellowfin tuna | 2,806,900 | - | 41,970,500 | - | - | - | - | - | - | - | - | - |
| Albacore tuna | - | - | 9,500 | - | - | - | - | - | - | - | - | - |
| Skipjack tuna | 91,000 | - | 183,712,500 | - | - | - | - | - | - | - | - | - |
| Total | 2,915,600 | - | 228,979,500 | - | - | - | - | - | - | - | - | - |

| Species | Location of transhipment : outside of WCPFC area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | In port transhipment | | | | At sea transhipment in EEZ | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | - | - | - | - | - | - | - | - |
| Yellowfin tuna | - | - | - | - | - | - | - | - |
| Albacore 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 |
| 243 | - | 243 | - | - | - | - |

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 | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | 86,386 | - | 4,402,082 | - | - | - | - | - | 6,332,611 | - | - | - |
| Yellowfin tuna | 473,363 | - | 44,216,460 | - | - | - | - | - | 3,674,576 | 2,144 | - | - |
| Striped marlin | 153 | - | - | - | - | - | - | - | 67,937 | 3,371 | - | - |
| Swordfish | - | 1,472 | - | - | - | - | - | - | - | 586,288 | - | - |
| Blue marlin | - | 8,867 | - | - | - | - | - | - | - | 806,277 | - | - |
| White marlin | - | - | - | - | - | - | - | - | - | 1,645 | - | - |
| Albacore tuna | - | - | 5,596 | - | - | - | - | - | - | - | 3,412,053 | - |
| Spearfish | - | - | - | - | - | - | - | - | - | - | - | 4,182 |
| Skipjack tuna | 46,000 | - | 183,473,660 | - | - | - | - | - | - | - | 15,367 | - |
| Sharks | - | - | - | - | - | - | - | - | - | 507,673 | - | - |
| Others | - | 2,339 | 9,490 | - | - | - | - | - | - | 140,609 | 113,522 | 281,263 |
| Total | 605,902 | 12,678 | 232,107,287 | - | - | - | - | - | 10,075,124 | 2,048,007 | 3,540,942 | 285,445 |

| Species | Location of transhipment : outside of WCPFC area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | In port transhipment | | | | At sea transhipment | | | |
| | G.G | Dress | Round | Other | G.G | Dress | Round | Other |
| Bigeye tuna | - | - | - | - | 2,524,694 | - | - | - |
| Yellowfin tuna | - | - | - | - | 540,225 | - | - | - |
| Striped marlin | - | - | - | - | 20,459 | 1,303 | - | - |
| Swordfish | - | - | - | - | - | 293,990 | - | - |
| Blue marlin | - | - | - | - | - | 165,373 | - | - |
| White marlin | - | - | - | - | - | 120 | - | - |
| Albacore tuna | - | - | - | - | - | - | 140,280 | - |
| Spearfish | - | - | - | - | - | - | - | - |
| Skipjack tuna | - | - | - | - | - | - | 257 | - |
| Sharks | - | - | - | - | - | - | - | - |
| Others | - | - | - | - | - | 89,282 | 13,952 | 20,773 |
| Total | - | - | - | - | 3,085,378 | 550,068 | 154,489 | 20,773 |

(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 |
| 154 | - | 168 | - | 34 |

## 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 to 25-26 in recent years. 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.

## 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 282,060 mt in recent 5 years (2013-2017). Total catch in 2017 was 268,489 mt, which accounted for 5% and 11% less than that of average for 5 recent years and 2016, respectively.

The average catch of purse seine fishery was 257,866 mt during 5 recent years (2013-2017). The purse seine catch in 2017 was 246,849 mt with 26 vessels active, which was 4% and 11% less than that of average for 5 recent years and 2016. In purse seine fishery, skipjack, yellowfin and bigeye catches in 2017 were 192,922 mt, 50,675 mt and 3,235 mt, respectively. The catches of skipjack and bigeye were 17% and 27% less, and the catch of yellowfin was 23% greater than those of 2016, 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 effort in 2017 was 6,796 sets.

The average catch of longline fishery was 24,194 mt during recent 5 years (2013-2017). The longline catch in 2017 was 21,639 mt with 96 vessels active, which was 11% less than that of average for 5 recent years and that of 2016. Catches of bigeye and yellowfin caught by longline in 2017, which are target species by the Korean tuna longline fishery, were 10,220

mt and 7,008 mt, respectively. Longline fishing efforts ranged from 47,157 to 62,852 thousand hooks, which showed the highest in 2013, and the lowest in 2015. The effort in 2017 was 48,294 thousand hooks.

Catches of north Pacific albacore, southwest striped marlin, south swordfish and south Pacific 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 25-28 to recent years. In 2017, the number of fishing vessels was 26, of which 7 vessels were of 501-1,000 class, 15 vessels of 1,001-1,500 class and 4 vessels of over 1,500 class. 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 2017, 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 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 and in 2017. 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 and 2017 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.) encountered or 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 2017, 11 individuals of whale shark, 4 marine turtle, and 13 whale were encircled by purse seine nets, and 3 marine turtle were bycaught by longline fishery, respectively. All these species were encircled by purse seine nets or caught incidentally by fisheries and released promptly. Especially, when whale and whale shark were observed during fishing operation of purse seine, the vessels stopped rolling net until they had been released safely. All Korean fishing vessels operated the areas between 20$^{o}$N and 15$^{o}$S (Fig. 3), and there was no bycatch of seabird in 2017.

### 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 2017 were <1 mt for blue shark, thresher 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 2017 was 100% for purse seine and 4.14% 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

Catch statistics of Korean distant water fisheries are obtained from two sources of data reporting. The Korea Overseas Fisheries Association (KOFA) collects monthly catch by gear and species from the Korean tuna industries. The 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 data coverage, accuracy and verification through cross-checking between NIFS and KOFA. Since 1$^{st}$ September 2015, the Act on Fisheries Information and Data Reporting has obliged fishers of distant-water fisheries to report catch information to the National Institute of Fisheries Science (NIFS) in real time through the Electronic Reporting

(ER) system. The coverage of data reporting by ER is 100%. It includes data collection and reporting requirements recently adopted by the all tuna RFMOs regarding especially ecologically important species, discard/release and bycatch mitigation, etc. In 2018, Korea has a plan to develop the system that fishers can input individual size data measured onboard.

### 8.2. Observer programme

The scientific observer program of distant-water fisheries of Korea was started in 2002. The 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.

The 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 2017 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.