# Review of Korean SBT Fishery of 2006/2007

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## 1. Introduction

Southern bluefin tuna (SBT) fishery is the most recently developed tuna fishery by Korean distant-water fishing industry. The SBT catch made by Korean longline fleet reached a maximum in 1998, followed by continuous decrease until recent years. Species composition of the catch shows that SBT accounted for 21.8% in 2006 and 19.3% in 2007 of the total catch and remaining consisted of tunas, billfishes, sharks and other fish species. Korean longline fleet has voluntarily deployed a tori line and other several on-board measures to reduce seabird bycatch by longline fishing.

## 2. Review of SBT Fisheries

### *Fleet size and distribution*

Korean SBT fishery commenced in 1991 with a few longliners shifted from tropical waters where they targeted bigeye and yellowfin tuna. Thus, in the early years of this fishery, SBT did not attract Korean fishing industry, but because of higher market price number of longliners rapidly increased to reach a maximum fleet size of 19 longliners in 1998. However, by the voluntary regulation of fleet size among fishing industries, annual fleet size for SBT fishery never exceeded 18 registered numbers since then and number of longline vessels active was 9 in 2006 and 12 in 2007. Annual number of fishing vessels for SBT largely depends on Japanese market price for SBT and fishing condition on the fishing grounds.

### *Distribution of catch and effort*

Typically fishing season of Korean SBT longline fishery usually started in March and ends by November or December. In the first half of fishing season from March to July or August, usually Korean longliners are fishing on the high seas of the western Indian Ocean off South Africa, with occasional expanded operation to the southeastern Atlantic, while in the second half they move to the eastern Indian Ocean off the western Australia. This fishing pattern and fishing grounds have rarely been changed for the past 16 years of fishing history for SBT except for

1991, but in 2006 and 2007, some catches were also taken from the western and central fishing grounds from March to December.

In 2006, 9 out of 16 registered longliners fished for SBT and made a catch of 130 mt (reported as processed weight), showing an increase by about 394% from 2005. In 2007, 12 out of 17 registered longliners fished for SBT and made a catch of 453 mt. SBT catches in 2007 by Korean longliners were mainly caught from April to December (Table 1) and the fishing was formed in the eastern South Africa (Fig 1). The reason why the Korean fishing ground was formed in the area periodically was that the Korean longliners were mainly operated targeting the yellowfin and bigeye tunas recently in the Indian Ocean near the South Africa and Mozambique.

Catch per unit effort of Korean longline fishery for SBT has shown a decreasing trend from a peak at 8.4 fish/1,000 hooks in 1994. However, CPUE appeared to be more or less stable between 2.4 and 3.9 fish/1,000 hooks in recent years. CPUE in 2005, 2006 and 2007 were 0.6 fish/1,000 hooks, 3.9 fish/1,000 hooks and 2.4 fish/1,000 hooks, respectively.

Table 1. Monthly catch of SBT by Korean tuna longliners in 2006-2007.

| Month<br>Year | Tot | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2006 | 130 | 1 | 2 | 3 | 6 | 9 | 8 | 19 | 81 | 37 | 18 | 11 | 13 |
| 2007 | 453 | 0 | 0 | 14 | 75 | 33 | 37 | 34 | 49 | 56 | 94 | 28 | 33 |

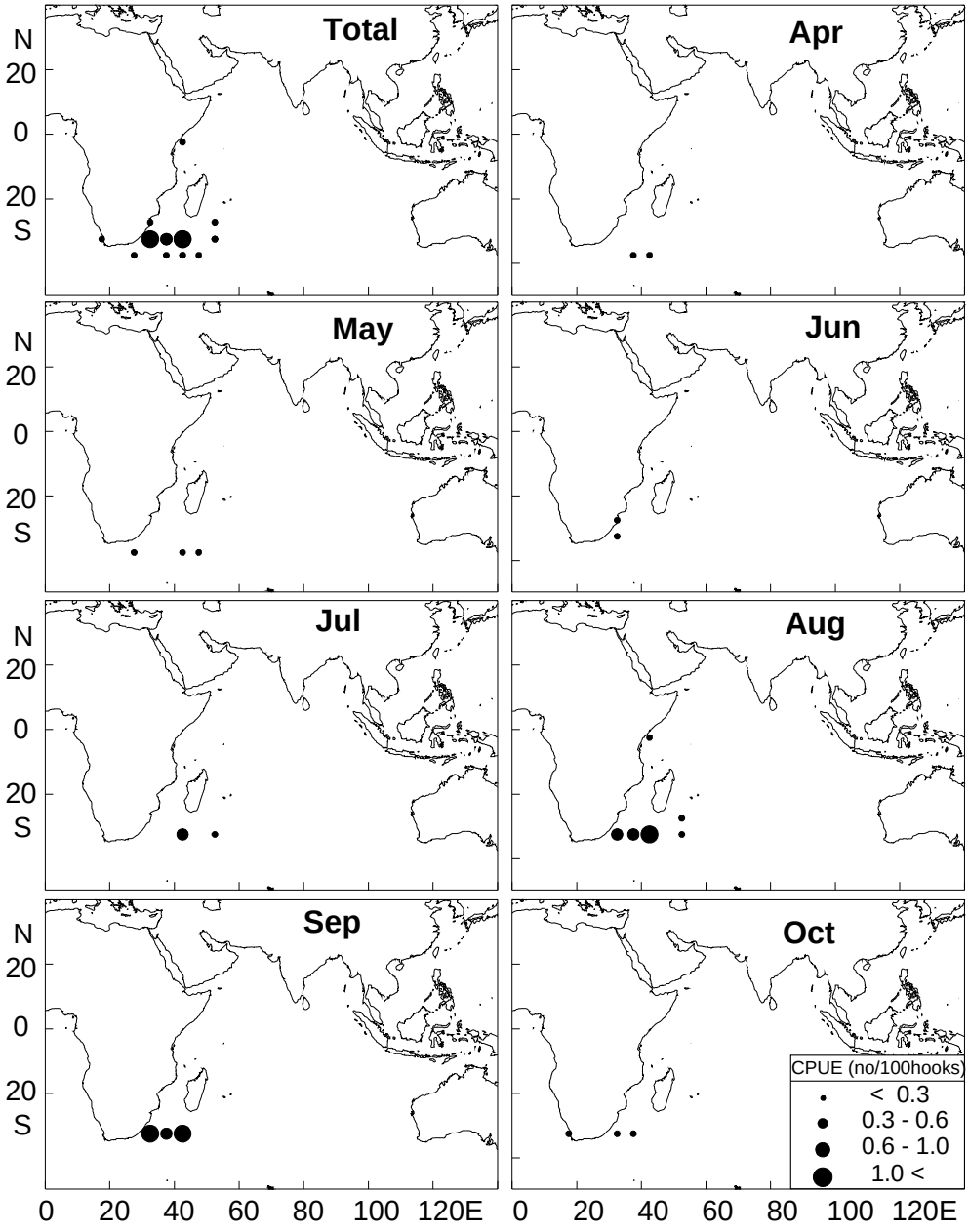


Fig. 1. CPUE (No./100 hooks) distribution of SBT by Korean tuna longliners in 2006.

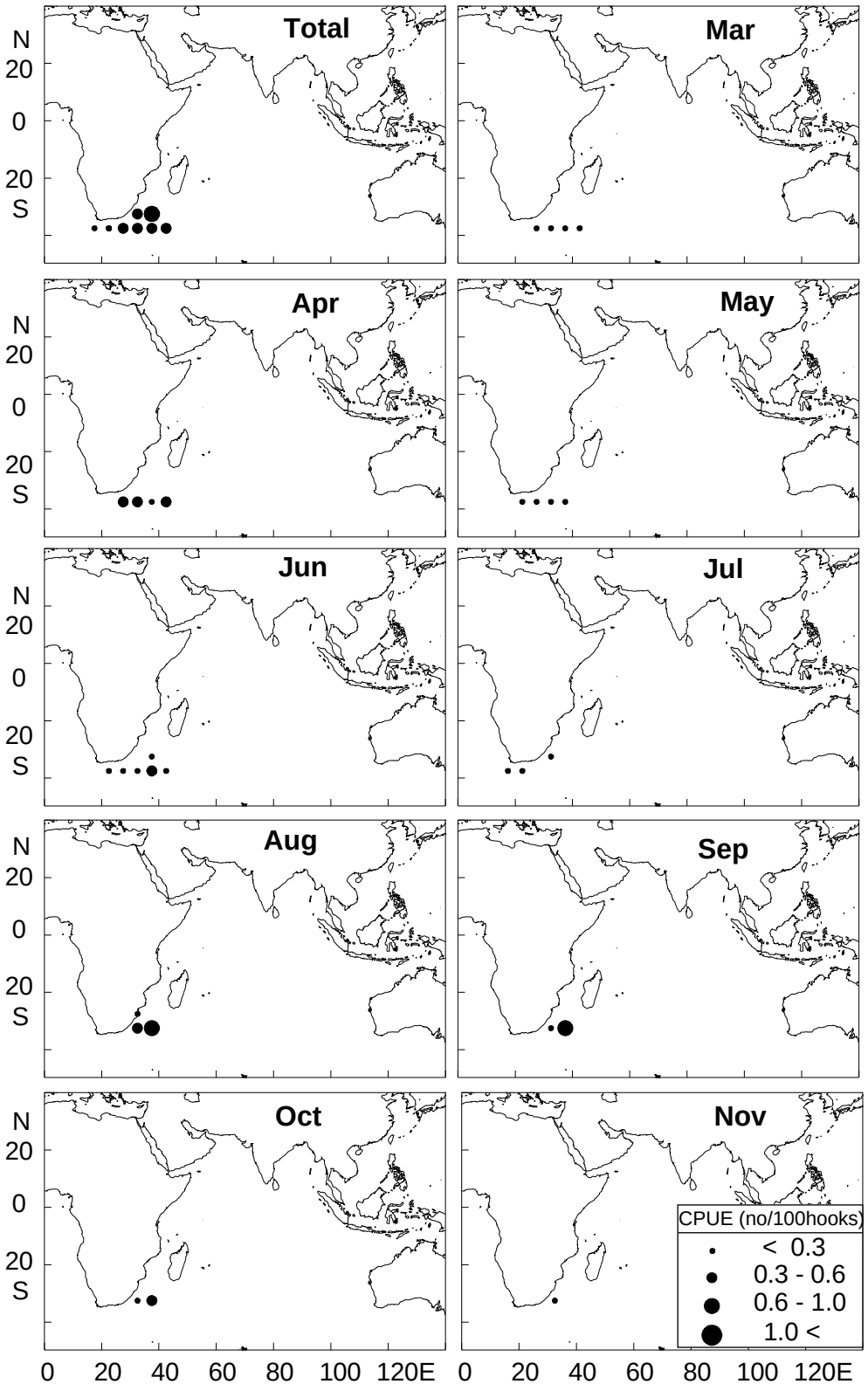


Fig. 2. CPUE (No./100 hooks) distribution of SBT by Korean tuna longliners in 2007.

## 3. Fisheries Monitoring for each fleet

Fisheries statistics are collected and reported for a calendar year. Catch and effort data based on the logbooks are routinely collected through a fisheries data collection system which was lawful in 1977. According to this domestic regulation, distant-water fishing vessels have to submit the reports of their fishing operations within 30 days (home-based) or 60 days (foreign-based) after completion of their operations to the National Fisheries Research and Development Institute (NFRDI).

Korea initiated a fisheries observer program for distant-water fisheries including tuna fisheries in 2002. The purpose of this program is to meet the requirements of relevant regional fishery bodies and therefore the mission of trained observers is similar to those set out in the convention of the fishery bodies.

In 2006-2007, two observers were initially deployed on Korean SBT longline fishing vessel operating in adjacent waters of Seychelles and high seas of South Africa. Scientific observation continued for about two or three months starting from August 2006 and 2007. During the trip, observers monitored catch of target and by-catch species. In 2006, one observer was deployed to monitor tuna longline fishery in the central Indian Ocean, between 5°-8°S and 49°-55°E for a month during September. The observer recorded a total catch of 11.6 mt of yellowfin and bigeye tunas during 24 days of observation period. No SBT catch was reported in the central Indian region. In 2007, one observer was deployed to monitor tuna longline fishery including by-catch species in the southwestern Indian Ocean, between 27°-39°S and 40°-48°E for three months starting from the end of August to early December. The observer recorded a total catch of 36.3mt of yellowfin and bigeye tunas, and a total catch of 11.7mt of SBT during 95 days of observation period.

Table 2. Summary of observed catch and effort coverage by Korea in 2004-2007.

| Year | Sector | Observers Deployed | Sea Days | Sets/Tows Observed | Observed Vessels | Observed Effort (%, units) | Observed Catch (%, units) | Total Cost (Won) |
|---|---|---|---|---|---|---|---|---|
| 2004 | Longline | 1 | 39 | 38 | 9% | 2% (hooks) | 0.2% | 7,050,000 |
| 2005 | Longline | 1 | 29 | 20 | 9% | 2% (hooks) | - | 6,459,000 |
| 2006 | Longline | 1 | 24 | 21 | 9% | 2% (hooks) | - | 8,400,000 |
| 2007 | Longline | 1 | 95 | 76 | 9% | 2% (hooks) | 27.5% | 16,350,000 |

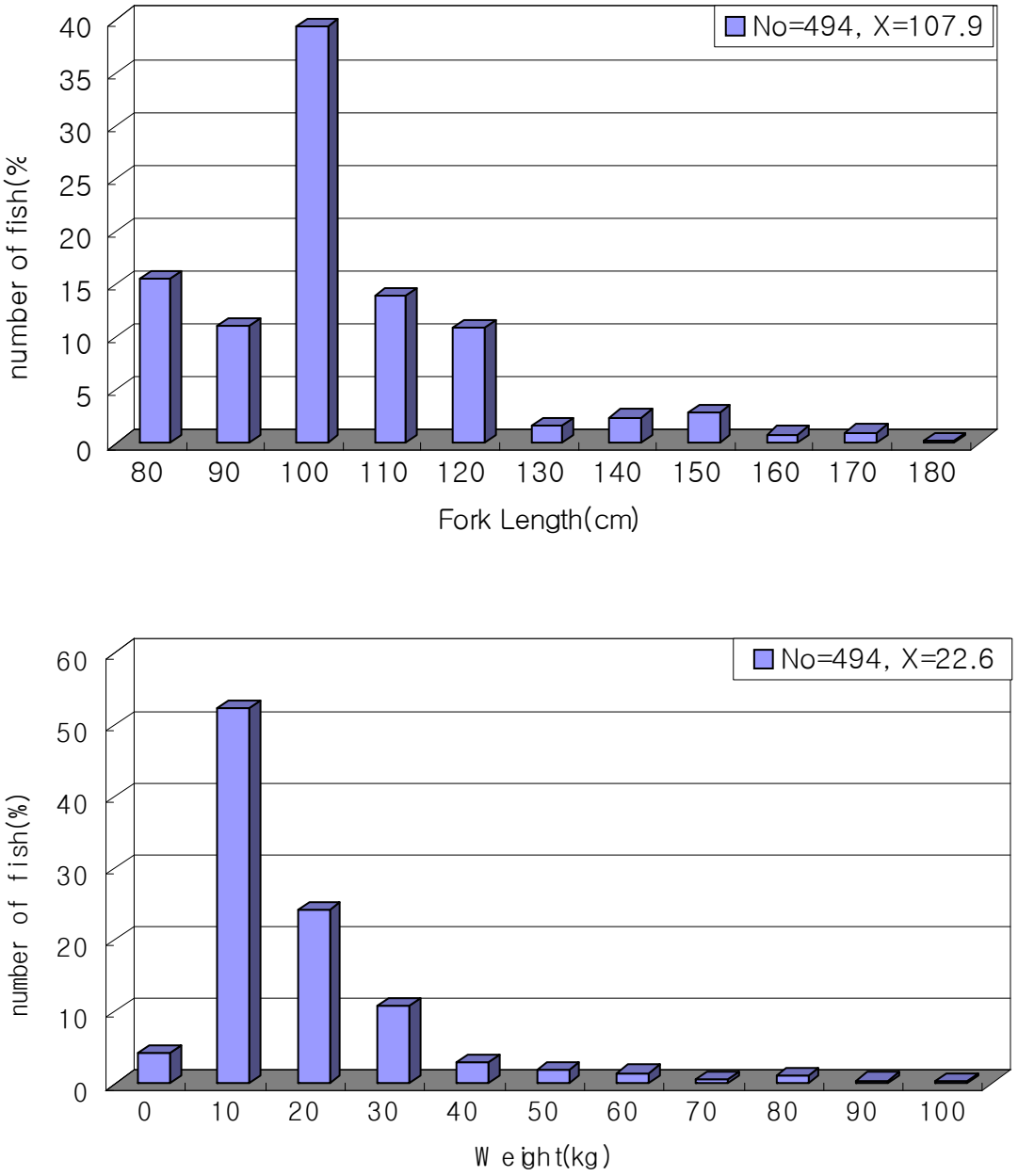


Fig. 3. Size and weight distribution of SBT by Korean tuna longliners in 2007.

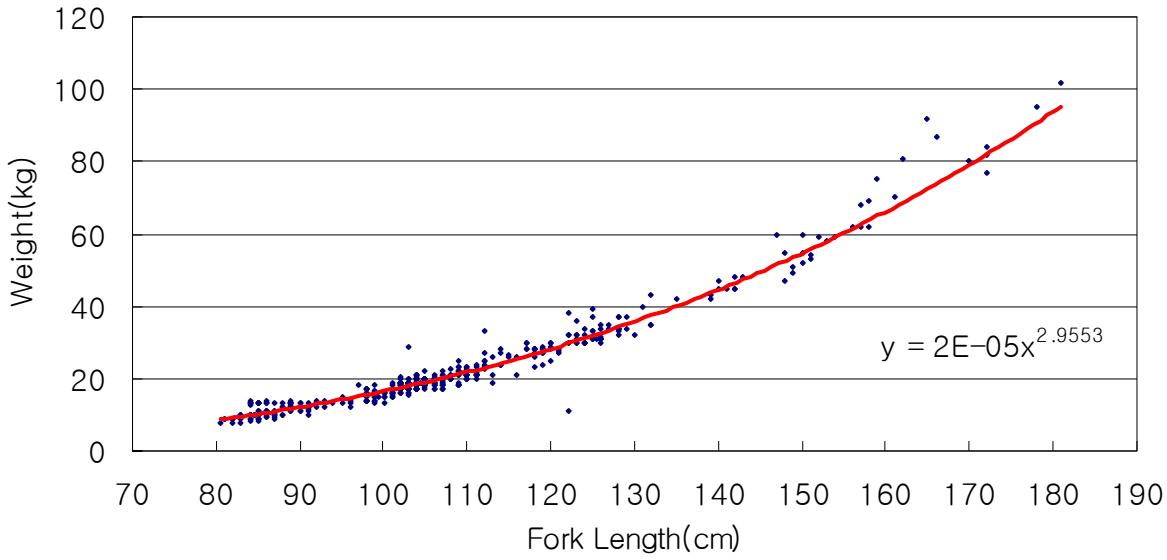


Fig. 4. Relationship between fork length and weight of SBT in 2007.

**4. Seabird**

According to fishermen, some seabird species (unidentified) are usually encountered as they set longlines. However, no documentation on seabird bycatch has been available. During the scientific observation trip from August to December in 2007, observer reported that there was 2 incidental catches of seabirds although fishermen used several on-board voluntary measures to avoid seabird bites such as hook-casting before dawn, tori line installing, using heavy weight and defrozen baits, etc.

**5. Other Non-target Fish**

During the scientific observation of central Indian Ocean in 2007, a total of 76 longline sets (one set per day) with total 245,641 hooks were monitored. A total of 21 species (1,741 in number) were observed, among which sharks (78.3%), escolar (17.8%), oilfish (14.0%) and wahoo (6.5%) were dominant. Sharks data are usually collected into a “sharks” category because detailed on-board identification was difficult to fishermen without a good guide and knowledge in biology. According to fishermen’s identification, it seems that blue sharks and shortfin mako sharks are dominant species among shark bycatch in 2006-2007. During the scientific observation trip in 2007, incidental catches of sharks caught by 245,641 size-4.0 traditional J

hooks in Indian Ocean were 749, comprising 7 species. The dominant species were blue shark (81.8% of the total catch in number), shortfin mako shark (8.8%), and salmon shark (7.0%). These species were composed of dominant sharks species and mostly taken in surface layer. Overall catch rates of sharks were 3.0 sharks/1,000 hooks in the Indian Ocean. The fins comprised, on average, 3.4% in wet weight of the total body weight in Indian Ocean. So, we could estimate the round weight of certain sharks species used for fin production (Table 3).

Table 3. Species composition (%) of the Korean longline fishery targeting southern bluefin tuna, 2006-2007

| Year | Unit | SBT | ALB | YFT | BET | BUM | STM | SWO | BLM | SHA | OTH | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2006 | Weight (mt) | 87.8 | 123.9 | 104.2 | 57.4 | 2.6 | 1.0 | 17.0 | 1.4 | 6.6 | 1.1 | 402.8 |
| | % | 21.8 | 30.7 | 25.8 | 14.2 | 0.7 | 0.3 | 4.2 | 0.3 | 1.7 | 0.2 | 100 |
| 2007 | Weight (mt) | 88.1 | 90.9 | 179.5 | 65.7 | 1.5 | 0.2 | 21.1 | 0.5 | 2.5 | 7.1 | 457.1 |
| | % | 19.3 | 19.9 | 39.2 | 14.4 | 0.3 | 0.1 | 4.6 | 0.1 | 0.6 | 1.5 | 100 |

SBT : southern bluefin tuna ALB : albacore tuna YFT : yellowfin tuna BFT : bigeye tuna BUM : blue marlin STM : striped marlin SWO : swordfish BLM : black marlin SHA : sharks OTH : other fishes

## 6. Marine Mammal and Marine Reptiles

No data is available for marine mammals or reptiles incidentally caught by Korean SBT longline fishery. During the scientific observation trip in 2007, sighting of whales were recorded in 5 times of false killer whale and common dolphin. There was no incidental catch of sea turtle.

## 7. Mitigation Measures

Current Measures

*Mandatory Measures for Each Fleet*

Currently there are no mandatory measures taken by Korean Government to reduce the

incidental catch of seabird by its tuna longline fishery. However, the Ministry of Food, Agriculture, Forestry and Fisheries (MIFAFF) is developing the National Plans of Action for the reduction of seabird and shark bycatch from longline fisheries and the preliminary NPOA-seabird and sharks is under compilation. It completed the NPOA-IUU fishing and reported to FAO in 2005.

*Voluntary Measures for Each Fleet*

While no mandatory measures to reduce seabird bycatch was taken by the Korean Government, fishermen voluntarily adopted seabird deterrent device called tori line. Based on fishermen's interview, it was around 1990s when Korean longliners voluntarily began to deploy tori line to deter seabirds from baited hooks. Fishermen recognize from their experiences that deterring seabirds from contacting baits during SBT longline sets is beneficial not only to reduce seabird mortality but to their fishery by reducing bait and effort loss.

In 2006 and 2007, MIFFAF and NFRDI published guidebooks, information booklets and posters to educate fisherman through recent information and identification key for bycatch species in tuna fisheries.

## 8. Public Relations and Education Activities

To avoid or reduce mortality of seabird and sea turtle by tuna longline vessels, guidebooks, information booklets and posters for the information and release manual of these species were distributed to fishing boats including tuna longliners in 2006 and 2007.

NFRDI opens a training session for fishing vessel captains as they make a visit to Korean Tuna Longline Fishing Association before they begin their fishing trip. Last year, 5 training sessions were taken for fishing captains. The session largely includes reporting of fishing activity, target species and implementation of international regulation. However, the importance of bycatch reporting is also emphasized and encouraged.

## 9. Other Research Activities

Comparison of circle hooks and J hooks catch rates for target and bycatch species was conducted in the Korean tuna longline fishery in Pacific Ocean in 2005-2007. The results of circle hooks test were already reported to the Scientific Committee of WCPFC in 2008.