

**Taiwan National Report to the Scientific Committee of the Indian Ocean Tuna  
Commission, 2019**

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IOTC-2019-SC22-INF04

**INFORMATION ON FISHERIES, RESEARCH AND STATISTICS**

|   |                             |
|---|-----------------------------|
| <p>In accordance with IOTC Resolution 15/02, provisional longline data for the previous year was provided to the IOTC Secretariat by 30 June of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2019, preliminary data for the 2018 calendar year was provided to the IOTC Secretariat by 30 June 2019).</p> <p>REMINDER: Final longline data for the previous year is due to the IOTC Secretariat by 30 Dec of the current year [e.g. for a National Report submitted to the IOTC Secretariat in 2019, final data for the 2018 calendar year must be provided to the Secretariat by 30 December 2019).</p> | <p>YES<br/>28/June/2019</p> |
| <p>If no, please indicate the reason(s) and intended actions:</p>   |                             |

## Executive Summary

Two Taiwanese longline fishing fleets, the large scale longline fleet of above 100 GT and small scale longline fleet of below 100 GT, are operating in the Indian Ocean.. In 2018, the total catches were 43,132 tons for large scale longline fleet and 35,975 tons for small scale longline fleet, respectively. In 2018, there were 45 observers dispatched to the fishing vessels in the Indian Ocean. And there were 19 observers deployed on large-scale tuna longliners with 2,111 fishing days observed and 26 observers deployed on small-scale tuna longliners with 1,870 fishing days observed.

### 1. BACKGROUND/GENERAL FISHERY INFORMATION [MANDATORY]

There are two Taiwanese fleets, large-scale fleet and small-scale fleet, operating in the Indian Ocean. The large-scale tuna longline fleet mainly targeted albacore in the middle of 1970's, and after then some vessels have changed to target bigeye and yellowfin tuna since 1980's as ultra-low temperature freezers were developed and equipped in larger new-built vessels, and some fishing vessels shifted to the area south of 30°S for fishing southern bluefin tuna seasonally.

The small scale tuna longline fleet operated in the coastal and offshore areas of Taiwan before 1990s, after then some vessels expanded their fishing activities outside the EEZ of Taiwan to the high sea areas of the Pacific and Indian Oceans targeting tropical tuna. And from late 1990's, some small vessels have been operating in the Western Indian Ocean for albacore.

### 2. FLEET STRUCTURE [MANDATORY]

The number of longline vessel in 2018 are categorized by targeting species and size are shown in Table 1. The numbers of large-scale and small-scale tuna longline vessels operating in the Indian Ocean were 133 and 153. The numbers of the vessels for “tropical tuna” and for “albacore and swordfish” were 201 and 85. However, some of our vessels have the need to target both tropical tunas and albacore/swordfish in one fishing year due to their operating nature.

**Table 1.** The numbers of fishing vessels operating in the Indian Ocean by targeting species and by size, 2018.

| Target Species         | Size      | Gear          | 2018    |       |
|------------------------|-----------|---------------|---------|-------|
|                        |           |               | Vessels | Total |
| Tropical Tuna          | Above 24M | Above 100 GRT | 125     | 160   |
|                        |           | Below 100 GRT | 35      |       |
|                        | Below 24M | Below 100 GRT | 41      | 41    |
| Albacore and Swordfish | Above 24M | Above 100 GRT | 8       | 75    |
|                        |           | Below 100 GRT | 67      |       |
|                        | Below 24M | Below 100 GRT | 10      | 10    |

### 3. CATCH AND EFFORT

The annual catch by species and total number of hook of large and small scale longline fisheries from 2014 to 2018 are shown in Table 2.1 and Table 2.2, respectively. The historical annual catch of major species of large and small scale longline fleets are shown in Figure 1. The annual catch of large scale longline vessels has increased rapidly between 2001 and 2005, but declined significantly to about 60,000-80,000 tons during 2008-2012. The catch of bigeye tuna (BET) had increased steadily from 37,000 tons in 2001 to 56,000 tons in 2003, but decreased 20,000-30,000 tons from 2006 to 2011. In 2012, the catch of BET increased to 32,138 tons for the fishing vessels returning operation, then it was decrease rapidly from 2013-2018. In 2018, the catch of BET was 7,998 tons. For the yellowfin tuna (YFT) capture, it had increased significantly from 19,000 tons in 2001 to 58,000 tons in 2005, but has remained at the level of less than 10,000 tons since 2007. In 2017, the catch of YFT was decreased to 4,629 tons than in 2016 due to the adoption of the resolution 17/01. The catch of YFT increased to 6,030 tons for national quota allocation in 2018. From 2013, except the catch of albacore tuna (ALB), the catch of tropical tuna and tuna-like species decreased significantly from previous year was that most large scale fishing vessels laying off from the fishery due to the security guards make the raise of cost and the lower prices in market for frozen tuna. In addition, it would be not beneficial in foreign exchange from 2014-2018 for fisherman was exporting frozen tuna.

Regarding the catch of small scale longline fishery, there are two sub-fleets operating in the Indian Ocean; One is albacore targeting fleet operating in the West Indian Ocean with Port Luis, Mauritius as basements, and the other one is tropical tuna targeting fleet operating in the East Indian Ocean with Phuket, Thailand and Sri Lanka as basements. The amount of historical catch by species and the catch from 2014 to 2018 of small scale longline fleets are shown in Fig.1 and Table 2. Taiwanese small scale longliners started fishing albacore from early 2000's, and in the mid 2000's more vessels transferred to target yellowfin tuna. The albacore (ALB) catches reached the historical high in 2007 and then declined due to the high fuel price in 2008 and the pirate issue in 2009. Thereafter, the catch of albacore during 2009-2013, except for 2011, the catch of albacore showed an increasing trend, but the catch slightly decreased to 14,426 tons in 2015. Albacore catch in 2018 was 18,349 tons, which was slightly increased from the catch in 2015. The catch of bigeye tuna (BET) has fluctuated between 3,000 and 6,000 tons during 2000-2017, but the catch slightly decreased to 2,669 tons in 2018. Yellowfin tuna (YFT) catches peaked in 2006, compared to the catch of past 15 years. Since then, yellowfin tuna catches have fluctuated while

decreasing to 6,452 tons in 2012 and then increased to 9,340 tons in 2016. Yellowfin tuna catches gradually decreased to 4,486 t in 2018 due to catch limit of Yellowfin tuna implemented by the IOTC since 2017.

**Table 2.1** The annual catch by species (main) and effort of large scale longline fleets in the Indian Ocean from 2014 to 2018.

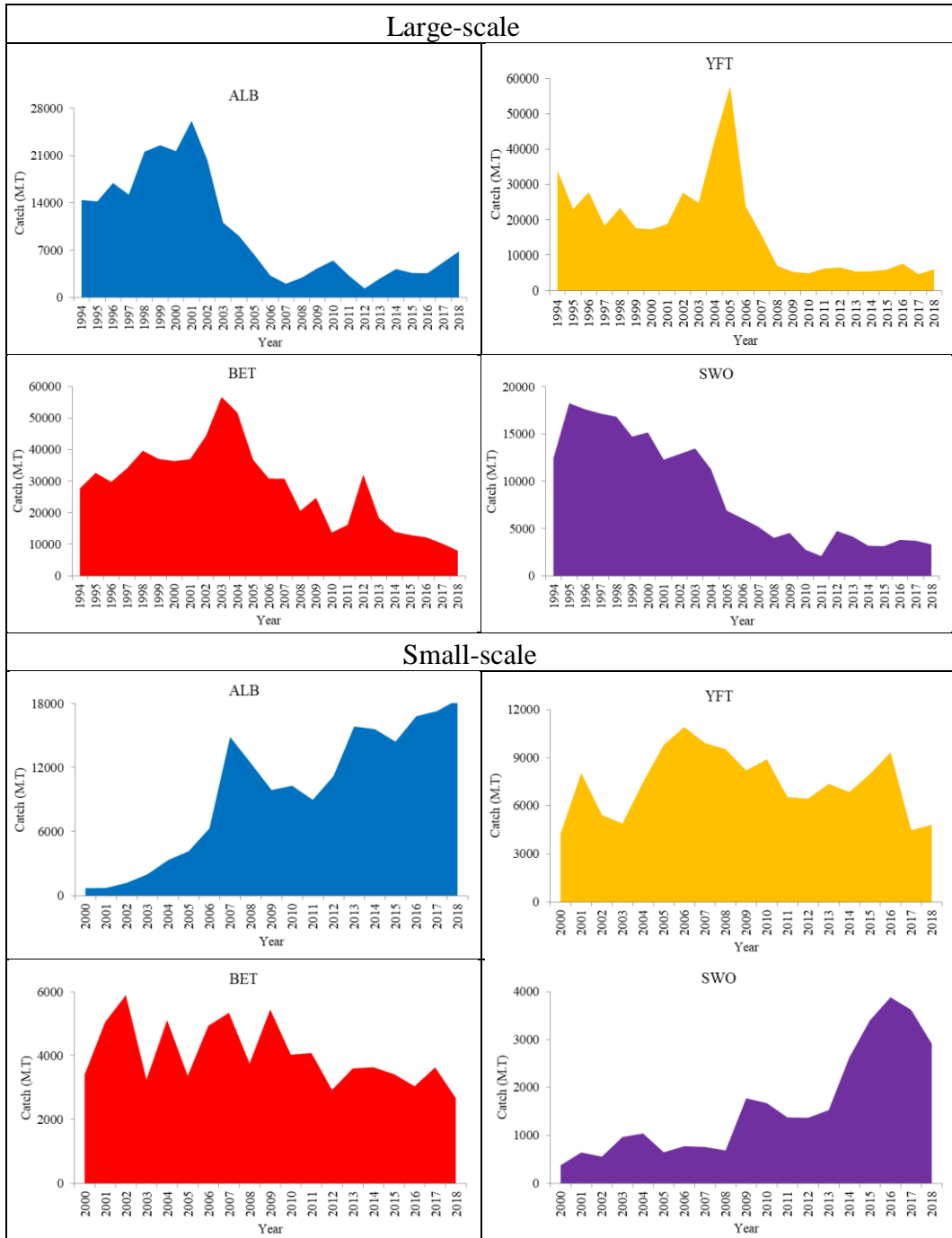
|                   |      | Unit: M.T |        |         |        |        |
|-------------------|------|-----------|--------|---------|--------|--------|
| Item \            | Year | 2014      | 2015   | 2016    | 2017   | 2018   |
| Hooks (thousands) |      | 79,894    | 74,963 | 101,592 | 99,408 | 93,071 |
| ALB               |      | 4,179     | 3,602  | 3,568   | 5,199  | 6,794  |
| BET               |      | 13,977    | 12,922 | 12,214  | 10,260 | 7,998  |
| YFT               |      | 5,425     | 5,930  | 7,618   | 4,629  | 6,030  |
| SBT               |      | 918       | 1,138  | 1,012   | 1,168  | 1,213  |
| SWO               |      | 3,180     | 3,143  | 3,801   | 3,713  | 3,332  |
| MLS               |      | 375       | 250    | 975     | 389    | 266    |
| BUM               |      | 2,445     | 3,317  | 2,881   | 1,934  | 1,396  |
| BLM               |      | 93        | 135    | 225     | 150    | 112    |
| SFA               |      | 94        | 115    | 206     | 159    | 146    |
| SKJ               |      | 29        | 29     | 21      | 46     | 35     |
| NEI*              |      | 11,641    | 12,294 | 21,398  | 19,792 | 15,808 |

\* NEI denotes species that are 'not elsewhere indicated'.

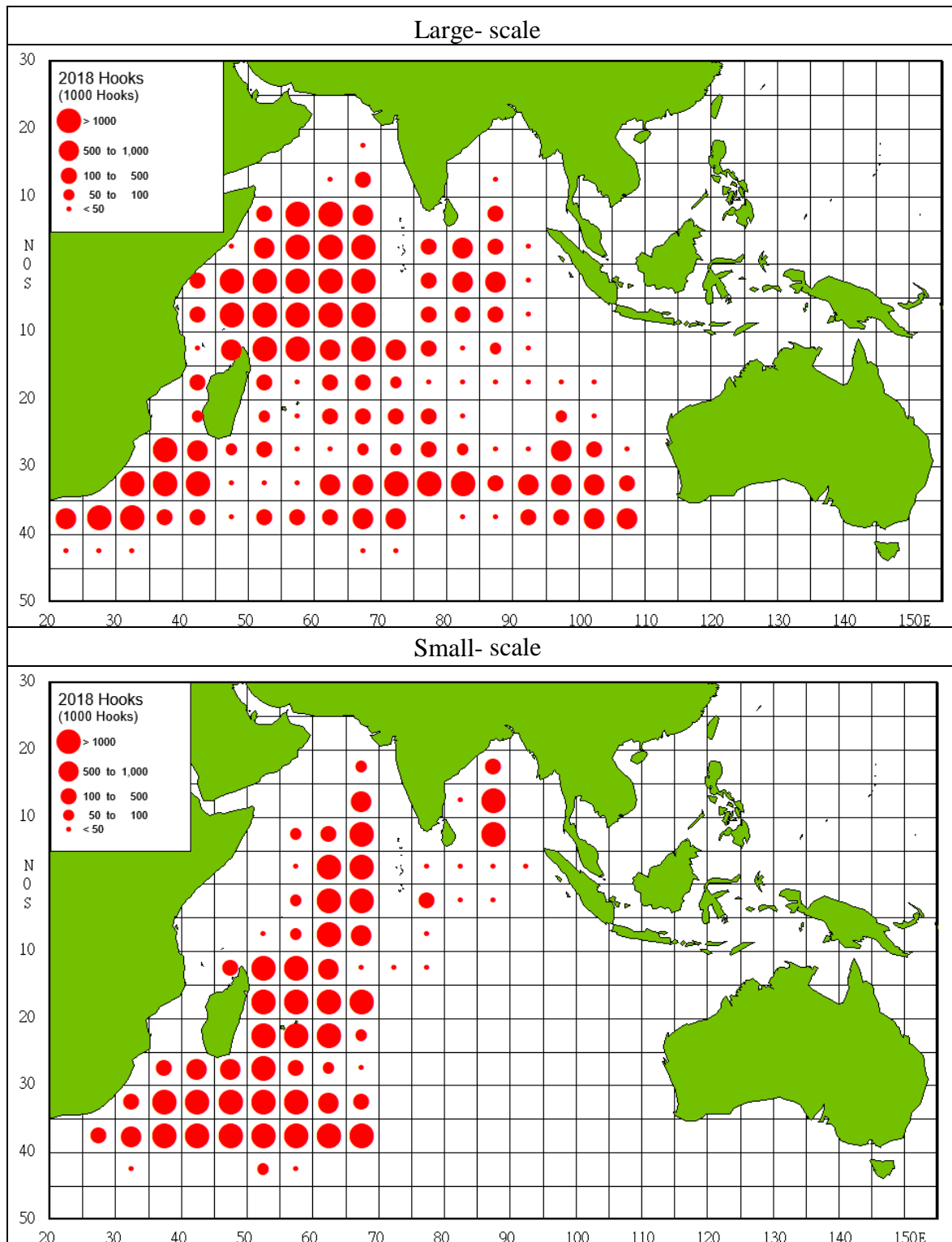
**Table 2.2** The annual catch by species (main) and effort of small scale longline fleets in the Indian Ocean from 2014 to 2018.

|                   |        | Unit: M.T |        |        |        |  |
|-------------------|--------|-----------|--------|--------|--------|--|
| Item \ Year       | 2014   | 2015      | 2016   | 2017   | 2018   |  |
| Hooks (thousands) | 64,867 | 51,438    | 50,546 | 79,468 | 85,985 |  |
| ALB               | 15,596 | 14,426    | 16,807 | 17,283 | 18,349 |  |
| BET               | 3,635  | 3,422     | 3,040  | 3,631  | 2,669  |  |
| YFT               | 6,860  | 7,991     | 9,340  | 4,486  | 4,815  |  |
| SBT               | 0      | 0         | 0      | 0      | 0      |  |
| SWO               | 2,629  | 3,405     | 3,885  | 3,622  | 2,914  |  |
| MLS               | 230    | 261       | 266    | 174    | 105    |  |
| BUM               | 1,979  | 1,891     | 2,486  | 1,760  | 1,343  |  |
| BLM               | 204    | 164       | 295    | 156    | 158    |  |
| SFA               | 361    | 175       | 281    | 340    | 358    |  |
| SKJ               | 18     | 42        | 210    | 162    | 187    |  |
| NEI*              | 7,000  | 6,144     | 6,808  | 5,784  | 5,077  |  |

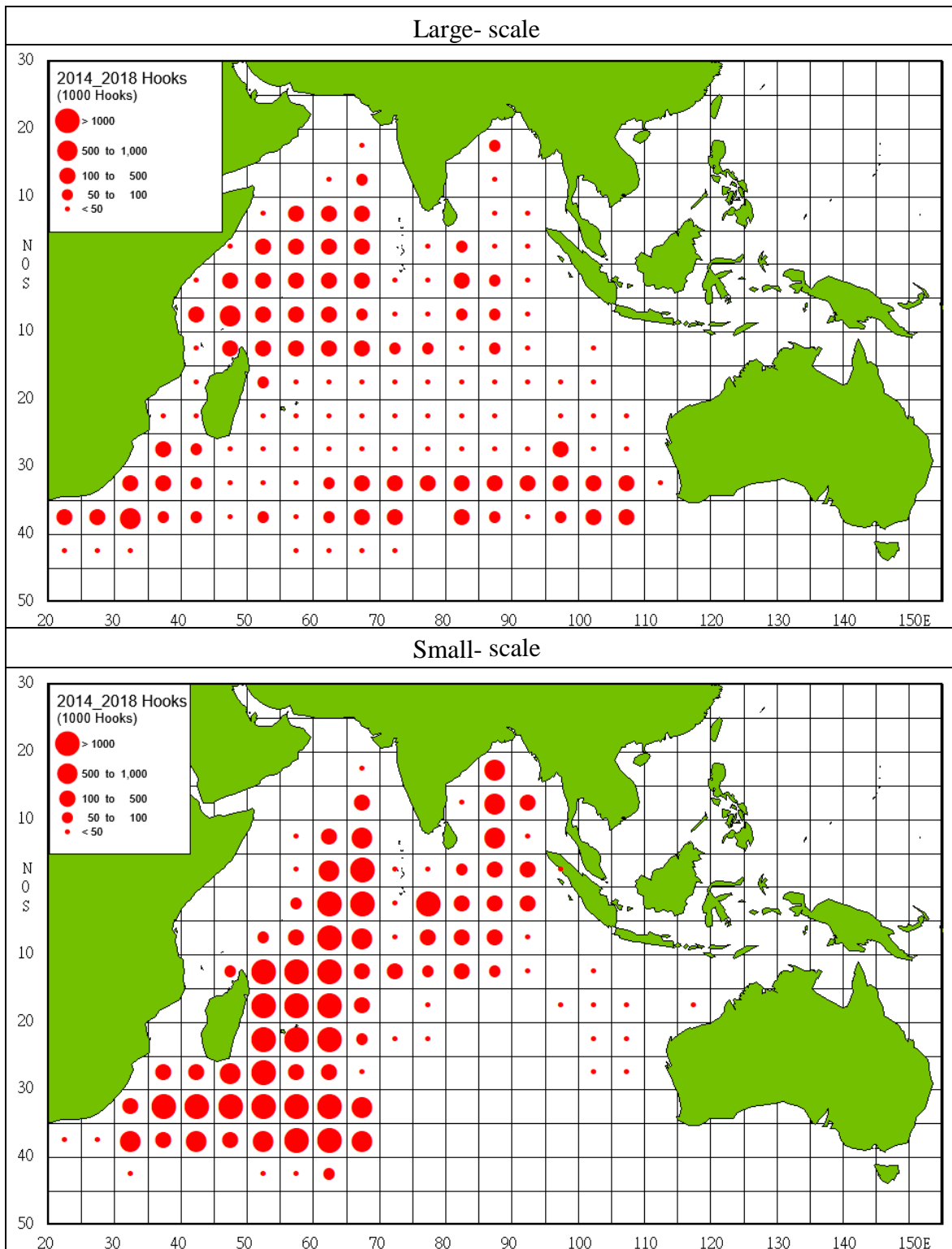
\* NEI denotes species that are 'not elsewhere indicated'.



**Fig. 1** The annual catch by major species of Taiwanese large and small scale longline fisheries in the Indian Ocean.

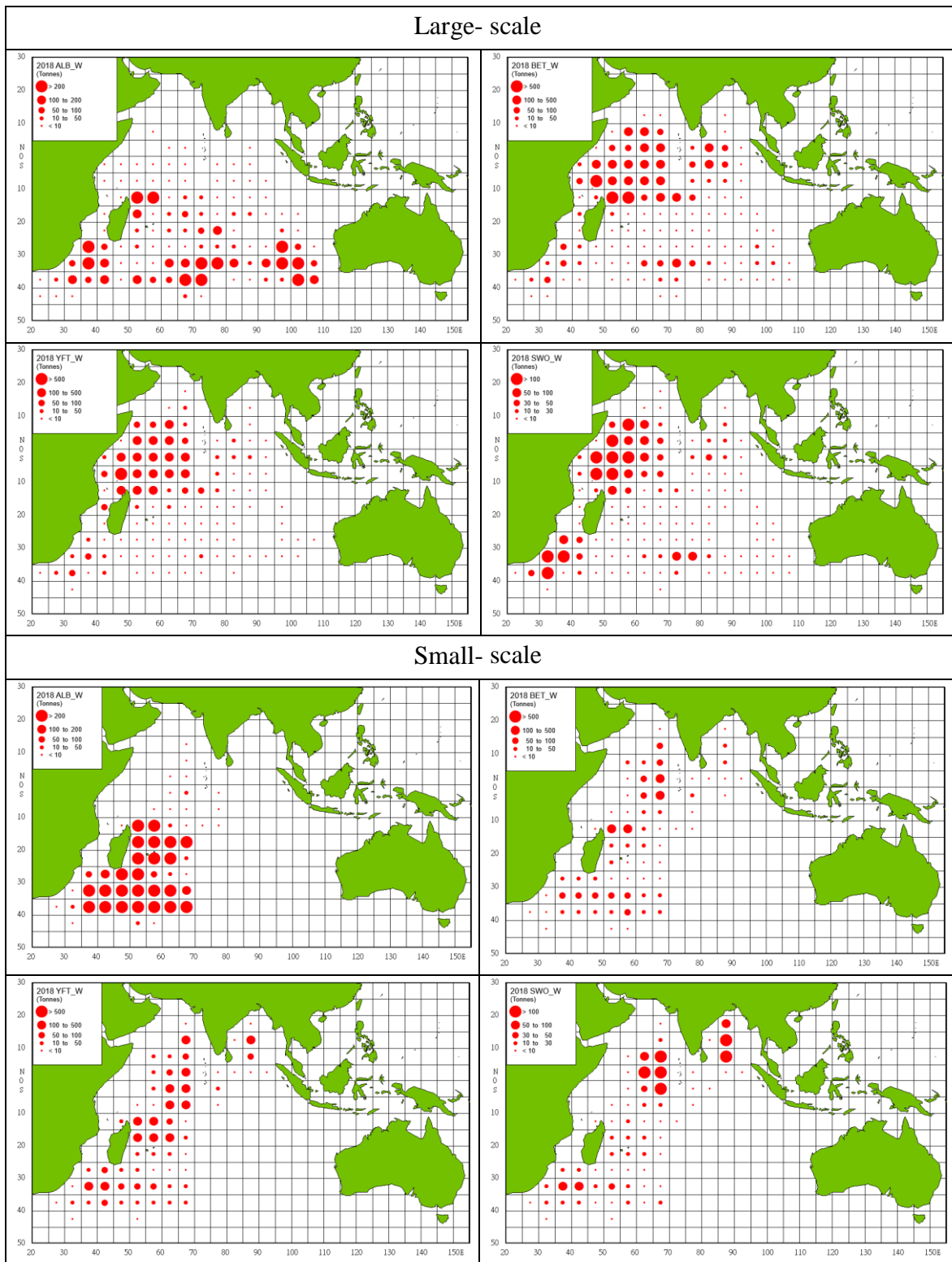


**Fig. 2a** The distributions of fishing efforts of Taiwanese large and small scale longline fleets in the Indian Ocean, 2018.

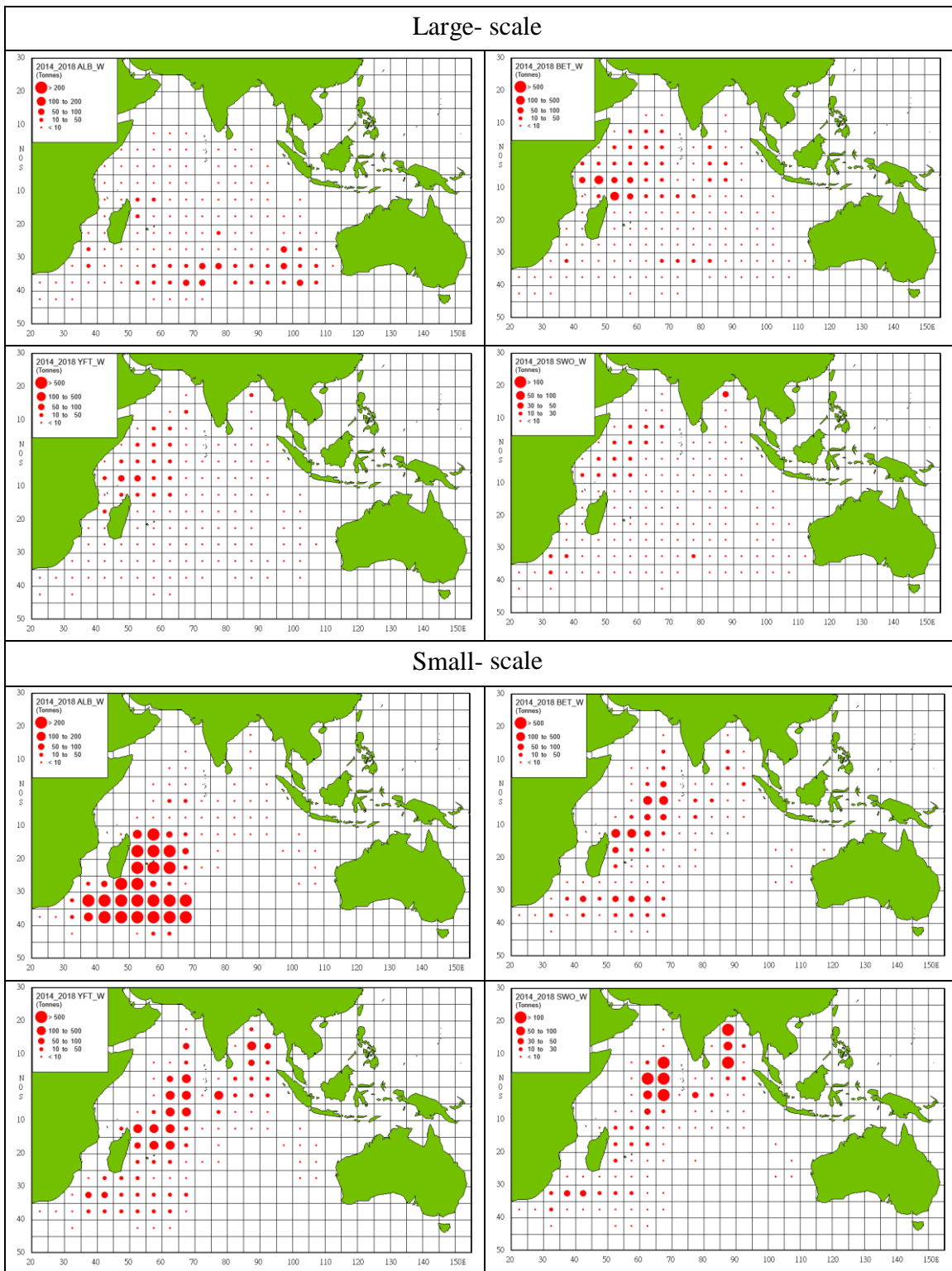


**Fig. 2b** The distributions of fishing effort of Taiwanese large and small scale longline fleets in the Indian Ocean from 2014 to 2018.





**Fig. 3a** The distributions of catch by major species of Taiwanese large and small scale longline fleets in the Indian Ocean, 2018.



**Fig. 3b** The distributions of catch by major species of Taiwanese large and small scale longline fleets in the Indian Ocean from 2014 to 2018.

#### **4. RECREATIONAL FISHERY**

There is no recreational fishery from Taiwan in the Indian Ocean.

#### **4. ECOSYSTEM AND BYCATCH ISSUES**

The fishing vessels are required to release incidental catches of seabird, marine turtle, thresher shark, oceanic whitetip shark, whale shark, any specimen smaller than 60 cm of striped marlin, black marlin, blue marlin and Indo Pacific sailfish, and other conservation-reliant species alive, and shall discard instantly if the incidental catch appears dead. Meanwhile, it is required to record incidental catches whether it is alive or dead. Additionally, fishermen are required to keep all necessary equipment on board for the release of incidental catch.

##### **5.1 Sharks**

Sharks have been recognized as important fisheries resources by Taiwan and many international organizations. Regarding fisheries impacts on shark stocks, Taiwan has proposed an effective and feasible National Plan of Action by taking into account the internationally agreed codes of conduct in order to implement appropriate conservation and management of sharks. The species subjected to this Action Plan are Elasmobranchii (sharks/rays) living or migrating in Taiwanese exclusive economic zone (EEZ) and Elasmobranchii caught by Taiwanese fisheries outside the EEZ. The fisheries harvesting those species are subjected to Taiwanese domestic regulations based on this Action Plan. Fishing vessels employing ice chilling method to preserve shark catches are required not to fully cut off shark fins. Large scale fishing vessels employing freezing method to preserve its shark catches and transporting such shark catches to land in a domestic port are required as well not to fully cut off shark fins. Small scale fishing vessels employing freezing method to preserve its shark catches and transporting such shark catches to land in a domestic port are required either not to fully cut off shark fins or alternatively to keep fins tied to the corresponding carcass. Those employing freezing method to preserve shark catches and transporting such shark catches to land in the first foreign port are required not to have onboard fins that total more than 5% of the weight of sharks on board, and fins and carcasses shall offloaded together at the same time whatever landing or transshipping. In addition, the fishing vessels are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks, whale sharks and oceanic whitetip sharks. The amount of shark capture by species are provided by observers from 2014 to 2018 in Table 3. The numbers of discards and live release sharks by species recorded by observers from 2014 to 2018 are listed in Table 4.1 and Table 4.2, respectively. To be consistent with global trend for the conservation and management of

sharks, Taiwan will keep updating its NPOA-sharks.

**Table 3.** The shark catch by number and weight recorded by observer from 2014 to 2018.

| Year<br>Species | 2014   |        | 2015   |        | 2016   |        | 2017   |        | 2018   |        |
|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                 | Number | Weight | Number | Weight | Number | Weight | Number | Weight | Number | Weight |
| BSH             | 773    | 19,539 | 652    | 16,694 | 1,871  | 40,429 | 1,458  | 38,192 | 2,508  | 63,382 |
| FAL             | 30     | 640    | 12     | 289    | 97     | 1,924  | 11     | 416    | 44     | 1,527  |
| SMA             | 87     | 3,982  | 62     | 3,782  | 113    | 4,737  | 146    | 6,143  | 291    | 13,568 |
| SPZ             | 0      | 0      | 1      | 20     | 0      | 0      | 0      | 0      | 0      | 0      |
| SPL             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 1      | 60     |
| OCS             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      |
| TIG             | 1      | 12     | 1      | 27     | 1      | 46     | 0      | 0      | 0      | 0      |
| LMA             | 3      | 32     | 2      | 68     | 0      | 0      | 4      | 17     | 1      | 52     |
| CCG             | 0      | 0      | 0      | 0      | 0      | 0      | 3      | 68     | 0      | 0      |
| BRO             | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 0      | 3      | 209    |

**Table 4.1.** The number of discarded shark by species recorded by observer from 2014 to 2018.

| Species \ Year      | 2014   | 2015   | 2016   | 2017   | 2018   |
|---------------------|--------|--------|--------|--------|--------|
|                     | Number | Number | Number | Number | Number |
| ALV                 | 7      | 1      | 0      | 0      | 4      |
| BSH                 | 1,565  | 325    | 302    | 846    | 1,598  |
| BRO                 | 0      | 0      | 0      | 0      | 3      |
| FAL                 | 4      | 11     | 19     | 14     | 62     |
| SCK                 | 1      | 0      | 0      | 0      | 0      |
| SMA                 | 11     | 14     | 25     | 47     | 108    |
| SPZ                 | 0      | 2      | 0      | 1      | 3      |
| SPL                 | 1      | 1      | 0      | 1      | 0      |
| SPK                 | 1      | 0      | 0      | 0      | 0      |
| SSQ                 | 0      | 0      | 1      | 0      | 0      |
| OCS                 | 9      | 2      | 13     | 3      | 26     |
| POR                 | 4      | 0      | 0      | 0      | 0      |
| PTH                 | 3      | 17     | 21     | 3      | 2      |
| BTH                 | 51     | 18     | 3      | 1      | 26     |
| ISB                 | 0      | 1      | 0      | 0      | 0      |
| TIG                 | 3      | 2      | 1      | 0      | 1      |
| WSH                 | 18     | 12     | 0      | 0      | 0      |
| LMA                 | 246    | 39     | 189    | 88     | 38     |
| PSK                 | 269    | 24     | 38     | 6      | 25     |
| CCG                 | 0      | 0      | 1      | 0      | 0      |
| CCB                 | 0      | 1      | 0      | 0      | 0      |
| Other Shark Species | 3      | 4      | 23     | 1      | 0      |

**Table 4.2.** The number of live released shark by species recorded by observer from 2014 to 2018.

| Species \ Year      | 2014   | 2015   | 2016   | 2017   | 2018   |
|---------------------|--------|--------|--------|--------|--------|
|                     | Number | Number | Number | Number | Number |
| ALV                 | 1      | 1      | 0      | 0      | 2      |
| BSH                 | 361    | 43     | 198    | 1,165  | 547    |
| BLR                 | 0      | 0      | 0      | 0      | 1      |
| FAL                 | 0      | 2      | 6      | 10     | 7      |
| SMA                 | 5      | 1      | 18     | 23     | 44     |
| SPZ                 | 0      | 0      | 0      | 0      | 1      |
| OCS                 | 9      | 5      | 5      | 12     | 8      |
| ISB                 | 0      | 0      | 0      | 0      | 0      |
| TIG                 | 0      | 1      | 0      | 0      | 0      |
| PTH                 | 0      | 1      | 2      | 2      | 2      |
| BTH                 | 52     | 5      | 4      | 2      | 19     |
| WSH                 | 0      | 0      | 0      | 0      | 0      |
| LMA                 | 105    | 0      | 17     | 107    | 26     |
| PSK                 | 147    | 10     | 44     | 9      | 9      |
| Other Shark Species | 0      | 0      | 0      | 0      | 0      |

## 5.2 Seabirds

Taiwan has implemented a number of measures, which include:

- 1) Providing assistance to vessels in the installation of tori lines and other mitigation equipment,
- 2) Providing financial assistance to vessels in the installation of automatic line shooting machine and tori line,
- 3) Disseminating the notion of seabird conservation to captains, crewmembers and fishing companies concerned through various channels,
- 4) Enhancement of international cooperation and scientific research.

In addition, the government of Taiwan has introduced a regulation to require vessels fishing southern than 28°S to deploy a tori line to reduce seabird incidental catch since 2004. Besides, in line with the Resolution 08/03 on reducing the incidental catch of seabirds in longline fisheries adopted by IOTC, vessels fishing south of 30°S shall use at least two of mitigation measures since 2009. Since 2011, to conform to the Resolution 10/06 on reducing the incidental bycatch of seabirds in longline fisheries, Taiwan has imposed regulation of requiring all Taiwanese longline vessels fishing south of 25°S in Indian Ocean shall use at least two different mitigation measures including tori line and one the other measure, such as night setting, weighted branch lines, offal discharge control or line shooting device in consistence with the Resolution. Following the adoption of Resolution 12/06, Taiwan has accordingly amended the relevant regulations to require fishing vessels operating in the area south of 25°S in Indian Ocean to start using at least two of these three mitigation measures including night setting with minimum deck lighting, tori lines, or line weighting in consistence with the latest Resolution.

Bycatch data were collected by onboard observers. The onboard observers' record include fisheries information of target species and the details of bycatch species, such as seabirds, sea turtles, and cetaceans. The following table shows nine species of the seabird bycatch data analyzed for the longline fishery in 2018.

Species : Black-browed albatross (DIM)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |   |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|---|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |   |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |   |
| S                 | 35  | E  | 30  | 9352477                   | 570628                             | 6.1%                           | 1                 | 1                    | 0                      | -                           |   |
| Total             |     |    |     |                           | 9352477                            | 570628                         | 6.1%              | 1                    | 1                      | 0                           | - |

Species : Wandering albatross (DIX)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 35  | E  | 30  | 9352477                   | 570628                             | 6.1%                           | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 40  | 2826352                   | 144511                             | 5.11%                          | 1                 | 1                    | 0                      | -                           |
| Total             |     |    |     | 12178829                  | 715139                             | 5.87%                          | 2                 | 2                    | 0                      | -                           |

Species : Salvin's albatross (DKS)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 35  | E  | 45  | 1329435                   | 28994                              | 2.18%                          | 1                 | 1                    | 0                      | -                           |
| Total             |     |    |     | 1329435                   | 28994                              | 2.18%                          | 1                 | 1                    | 0                      | -                           |

Species : Light-mantled sooty albatross (PHE)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 35  | E  | 55  | 3147929                   | 331669                             | 10.54%                         | 1                 | 1                    | 0                      | -                           |
| Total             |     |    |     | 3147929                   | 331669                             | 10.54%                         | 1                 | 1                    | 0                      | -                           |

Species : Sooty albatross (PHU)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 35  | E  | 30  | 9352477                   | 570628                             | 6.1%                           | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 40  | 2826352                   | 144511                             | 5.11%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 50  | 2949425                   | 165716                             | 5.62%                          | 2                 | 2                    | 0                      | -                           |
| S                 | 35  | E  | 65  | 2264619                   | 141237                             | 6.24%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 100 | 775436                    | 66541                              | 8.58%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 40  | E  | 65  | 88932                     | 28550                              | 32.1%                          | 1                 | 1                    | 0                      | -                           |
| Total             |     |    |     | 18257241                  | 1117183                            | 6.12%                          | 7                 | 7                    | 0                      | -                           |

Species : White-chinned petrel (PRO)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 30  | E  | 30  | 2903360                   | 191280                             | 6.59%                          | 3                 | 3                    | 0                      | -                           |
| S                 | 30  | E  | 35  | 7155388                   | 544174                             | 7.61%                          | 2                 | 2                    | 0                      | -                           |
| S                 | 35  | E  | 25  | 3403437                   | 49166                              | 1.44%                          | 3                 | 3                    | 0                      | -                           |
| S                 | 35  | E  | 30  | 9352477                   | 570628                             | 6.1%                           | 2                 | 2                    | 0                      | -                           |
| S                 | 35  | E  | 40  | 2826352                   | 144511                             | 5.11%                          | 3                 | 2                    | 1                      | -                           |
| S                 | 35  | E  | 60  | 2255294                   | 134916                             | 5.98%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 65  | 2264619                   | 141237                             | 6.24%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 70  | 955394                    | 272045                             | 28.47%                         | 2                 | 2                    | 0                      | -                           |
| Total             |     |    |     | 31116321                  | 2047957                            | 6.58%                          | 17                | 16                   | 1                      | -                           |

Species : White-capped albatross (TWD)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 30  | E  | 80  | 1057703                   | 151900                             | 14.35%                         | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 30  | 9352477                   | 570628                             | 6.1%                           | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 40  | 2826352                   | 144511                             | 5.11%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 40  | E  | 65  | 88932                     | 28550                              | 32.1%                          | 2                 | 2                    | 0                      | -                           |
| Total             |     |    |     | 13325464                  | 895589                             | 6.72%                          | 5                 | 5                    | 0                      | -                           |

Species : Yellow-nosed albatross (TQH)

| Longline Fishery  |     |    |     |                           | Observed                           |                                |                   |                      |                        | Estimate                    |
|-------------------|-----|----|-----|---------------------------|------------------------------------|--------------------------------|-------------------|----------------------|------------------------|-----------------------------|
| Area <sup>1</sup> |     |    |     |                           | Total observed effort <sup>2</sup> | Observer coverage <sup>3</sup> | Captures (number) | Mortalities (number) | Live releases (number) | Mortality estimate (number) |
| NS                | Lat | EW | Lon | Total effort <sup>2</sup> |                                    |                                |                   |                      |                        |                             |
| S                 | 30  | E  | 80  | 1057703                   | 149788                             | 14.16%                         | 1                 | 1                    | 0                      | -                           |
| S                 | 35  | E  | 25  | 3403437                   | 49166                              | 1.44%                          | 2                 | 2                    | 0                      | -                           |
| S                 | 35  | E  | 60  | 2255294                   | 134916                             | 5.98%                          | 1                 | 1                    | 0                      | -                           |
| S                 | 40  | E  | 65  | 88932                     | 28550                              | 32.1%                          | 2                 | 2                    | 0                      | -                           |
| Total             |     |    |     | 6805366                   | 362420                             | 5.33%                          | 6                 | 6                    | 0                      | -                           |

<sup>1</sup>Spatial stratification (5x5)

<sup>2</sup>Number of hooks observed hauled

<sup>3</sup>Percentage of all hooks set that were observed hauled

In total, 40 seabirds were caught incidentally in 2018, the species were Black-browed albatross (DIM), Wandering albatross (DIX), Salvin's albatross (DKS), Light-mantled sooty albatross (PHE), Sooty albatross (PHU), White-chinned petrel (PRO), White-capped albatross (TWD), and Yellow-nosed albatross (TQH). These interactions occur in the area of south of 25° S. latitude, where seabirds are typically abundant.

There are 30 vessels of longline fishery which collected the bycatch information by observers in 2018. Among those vessels operating in south of 25°S, 30 used bird scaring lines, 30 used night setting, and 4 used line weighting, respectively.

### 5.3 Marine Turtles

For conservation of sea turtles stocks, the government of Taiwan has publicized domestic management regulation to require that fishing vessels shall have necessary devices on board, such as scoop net, de-hooker and line cutters for appropriate release of incidentally caught sea turtles during the voyage or operation periods. The bycatch individuals shall be released alive. Moreover, disposing of any type of plastic trash at sea is prohibited to avoid endangering sea turtle. Since 2009, fishermen of longline fishing vessels are required to bring aboard, if practicable, any comatose or inactive sea turtle as soon as possible and foster recovery, including resuscitation, before returning it to the water.



#### 5.4 Other ecologically related species

According to the “Wildlife Conservation Act”, all marine mammals are prohibited from being fished, and whale shark fishing was banned outright in 2008 based on “Fisheries Act”.

**Table 5.** Observed annual bycatch numbers of species of special interest by species (seabirds, marine turtles) in IOTC from 2014 to 2018.

| Year \ Species | seabirds | marine turtles |
|----------------|----------|----------------|
| 2014           | 47       | 19             |
| 2015           | 21       | 4              |
| 2016           | 35       | 11             |
| 2017           | 36       | 6              |
| 2018           | 40       | 12             |

## 6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

### 6.1. Logsheet data collection and verification

The logbook is the major data source of catch and effort for all species. The size data of all species mainly come from the first 30 fish caught during each fishing day recorded on logbook. The authorized fishing vessels are required to provide catch data daily through electronic logbook. Catch data are also required to be recorded in logbooks. The catch data are crosschecked with trading information and other information available.

Additionally, Taiwan has carried out a mechanism of both advance notice of landing and landing declaration in order to strengthen monitoring and reporting of the catches harvested by its fishing vessels. Any fishing vessel intending to conduct landing at domestic and foreign ports shall submit the advance notice of landing and the landing declaration after landing is completed to the competent authority within the prescribed time limit. The documents about landing shall at least include trip information, fish species and quantities. Besides, the competent authority also randomly conducts inspections of the fishing vessels.

### 6.2. Vessel Monitoring System

All of Taiwanese fishing vessels operating in the Indian Ocean are required to install VMS. The data from VMS have also been used to verify the logbook data to improve the data quality.

### 6.3. Observer programme

For purposes of collecting fisheries data and bycatch data, Taiwan launched the pilot observer program in 2001 and deployed observers on vessels fishing in the Indian

Ocean commenced in 2002. In 2018, there are 2,111 fishing day observed by 19 observers dispatched to the large-scale tuna longline vessels in the Indian Ocean. For the small-scale longline fishery in the Indian Ocean, there are 1,870 fishing day observed by 26 observers. The details of the number of deployment for scientific observer program of large-scale and small-scale tuna longline fishing from 2014-2018 are shown in Table 6.1 and Table 6.2. The distributions of the number of hook observed vessels were presented during 2014-2018 in Figure 4. The observers are required to collect fisheries data and size data on target species and record bycatch species, such as shark, seabird, sea turtle, and marine mammals.

**Table 6.1** The annual observer coverage by vessels for large-scale tuna longline fishing from 2014 to 2018.

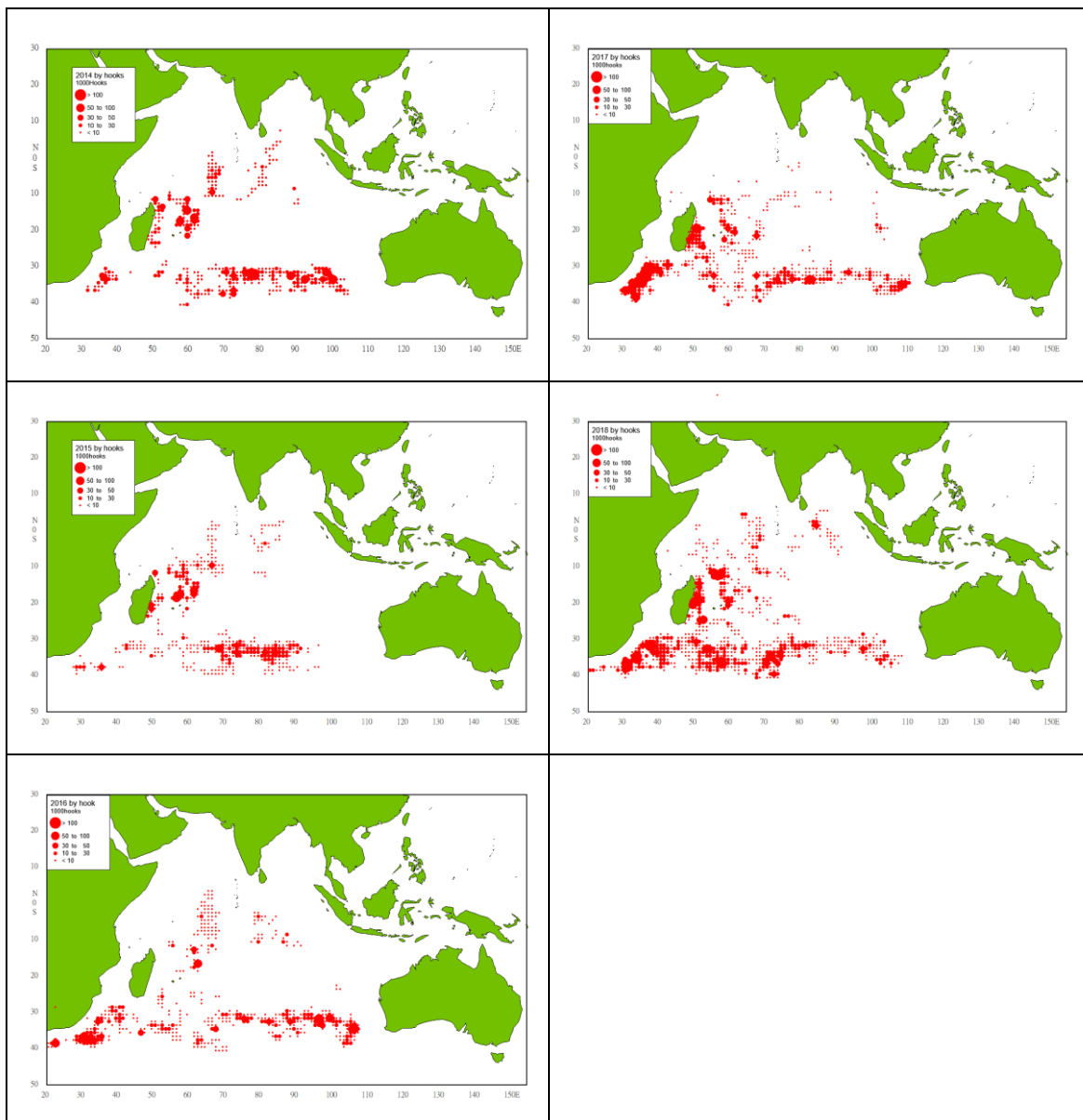
| Year  | Observers Deployed | Observed Trips | Sea Days | Set Observed | Observed Vessels (%) | Observed Set (%) |
|-------|--------------------|----------------|----------|--------------|----------------------|------------------|
| 2014  | 11                 | 11             | 1,737    | 1,499        | 9.02%                | 8.95%            |
| 2015  | 15                 | 17             | 1,613    | 1,531        | 13.28%               | 5.99%            |
| 2016  | 17                 | 20             | 2,545    | 1,685        | 14.71%               | 5.34%            |
| 2017  | 19                 | 19             | 2,752    | 1,894        | 13.77%               | 6.32%            |
| 2018* | 19                 | 20             | 3,046    | 2,111        | 15.04%               | 7.53%            |

\* Data of 2018 is still preliminary.

**Table 6.2** The annual observer coverage by vessels for small-scale tuna longline fishing from 2014 to 2018.

| Year  | Observers Deployed | Observed Trips | Sea Days | Set Observed | Observed Vessels (%) | Observed Set (%) |
|-------|--------------------|----------------|----------|--------------|----------------------|------------------|
| 2014  | 10                 | 16             | 962      | 815          | 5.52%                | 1.65%            |
| 2015  | 13                 | 23             | 1,055    | 931          | 9.20%                | 2.15%            |
| 2016  | 8                  | 11             | 624      | 409          | 5.19%                | 1.05%            |
| 2017  | 12                 | 12             | 1,174    | 756          | 6.67%                | 2.36%            |
| 2018* | 26                 | 27             | 2,912    | 1,870        | 17.65%               | 5.92%            |

\* Data of 2018 is still preliminary.



**Fig. 4** The distributions of observed efforts in the Indian Ocean from 2014 to 2018

#### 6.4. Port sampling programme

Owing to the fact that most of Taiwanese Large-scale tuna longliners unloaded their catches at overseas ports, Taiwan has launched port sampling program at major foreign landing ports since 2005. Three sampling trips in the three Oceans were made at three foreign ports in 2006 during fishing seasons. For the Indian Ocean, the sampling program was conducted in December 2006 in the Port of Louis and only Albacore tuna was measured. The implementation of sampling program is showed in Table 7-1. From 2007, there had been a domestic sampling program conducted to collect the length data from the catch transported from the Indian Ocean. And in 2013, there was a port sampling and unloading monitoring program launched in Port Louis, Mauritius to collect biological data. All measured samples were landed from small-scale tuna longline and the measured species were not only Albacore tuna, but also the others species. The implementation of sampling program is showed in Table 7-2.

**Table7-1.** The number of individual albacore measured

| Gear                      | Year   |        |        |
|---------------------------|--------|--------|--------|
|                           | 2007   | 2008   | 2009   |
| Large-scale tuna longline | 4,802  | 8,450  | 5,478  |
| Small-scale tuna longline | 21,460 | 25,916 | 45,154 |
| Total                     | 26,262 | 34,366 | 50,632 |

**Table7-2.** The number of individual species measured

| Year | Species | ALB | BET   | BLM | DOX | MLS | OIL | SFA | SHK | SKJ | SWO | WAH | YFT | Total |
|------|---------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
|      | 2013    |     | 5,980 | 21  | 45  | 82  | 1   | 45  | 29  | 6   | 17  | 26  | 94  | 436   |

#### 6.5. Unloading/Transshipment

##### Unloading

Any fishing vessel intending to conduct landing at domestic and foreign ports shall submit the advance notice of landing, and the landing declaration after landing is completed, to the competent authority of Taiwan within the prescribed time limit. For the advance notice of landing, the operator or captain of fishing vessel shall submit it, basically, no later than three days before the estimated date for landing. For landing declaration, the operator or captain of fishing vessel shall submit the declaration within five working days after the completion of landing.

##### Transshipment

Any fishing vessel intending to conduct transshipment shall apply for the approval from the competent authority of Taiwan before the transshipment at sea or in port. The operator or captain fishing vessel shall fill in the transshipment notification and submit it no later than three working days before the estimated date for transshipment. After the completion of

transshipment, the operator or captain of fishing vessel shall submit the transshipment declaration to the competent authority of Taiwan within seven working days. The IOTC Transshipment Declaration shall, within 24 hours after the completion of transshipment, be filled in and submitted to the IOTC and the competent authority of Taiwan.

## 7. NATIONAL RESEARCH PROGRAMS

The domestic scientists carried out a series of research programs with respect to stock assessments, standardizations of catch-per-unit-effort on tropical tuna, swordfish, albacore, southern bluefin tuna, billfish, and other incidental catch species, such as shark and seabirds, sea turtles and cetaceans.

**Table 8.** Summary table of national research programs

| Project title   | Period | Countries involved | Budget total         | Funding source             | Objectives  | Short description |
|---|--------|--------------------|----------------------|----------------------------|---|-------------------|
| Study on population dynamics of tunas, billfishes and sharks in the Indian Ocean                                      | 2019   | Taiwan             | 2,650,000 NT dollars | Fisheries Agency of TAIWAN | Conduct stock assessment of tunas, billfishes, and sharks     |                   |
| Analysis on bycatch of Taiwanese distant water tuna longline fisheries  | 2019   | Taiwan             | 550,000 NT dollars   | Fisheries Agency of TAIWAN | Conduct studies of bycatch species                            |                   |
| Feasibility analysis on the fishing condition forecast of tunas for the Taiwanese tuna longline fishery in Indian Sea | 2019   | Taiwan             | 680,000 NT dollars   | Fisheries Agency of TAIWAN | Conduct fishing condition forecast of tuna longline fisheries |                   |

## 8. IMPLEMENTATION OF SCIENTIFIC COMMITTEE RECOMMENDATIONS AND RESOLUTIONS OF THE IOTC RELEVANT TO THE SC. [Mandatory]

**Table 9.** Scientific requirements contained in the Resolutions of the Commission, adopted from 2011 to 2017.

| Res. No. | Resolution  | Scientific requirement | CPC progress   |
|----------|---|------------------------|--|
| 15/01    | On the recording of catch and effort by fishing vessels in the IOTC area of competence  | Paragraphs 1–10        | All authorized fishing vessels are required to report their fishery data via e-logbook.  |
| 15/02    | Mandatory statistical reporting requirements for IOTC Contracting Parties and Cooperating Non-Contracting Parties (CPCs)        | Paragraphs 1–7         | Fishery data were provided on 28/June/2019.  |
| 13/04    | On the conservation of cetaceans  | Paragraphs 7–9         | In accordance with “Wildlife Conservation Act”, all cetaceans are prohibited from being fished.  |
| 13/05    | On the conservation of whale sharks ( <i>Rhincodon typus</i> )  | Paragraphs 7–9         | In accordance with “Fisheries Act”, whale shark fishing are banned.  |
| 13/06    | On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries | Paragraph 5–6          | The fishing vessel are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of oceanic whitetip sharks. |
| 12/09    | On the conservation of thresher sharks (family alopiidae) caught in association with fisheries                                  | Paragraphs 4–8         | The fishing vessel are prohibited from retaining on board, transshipping, landing, storing, selling or   |

| <b>Res. No.</b> | <b>Resolution</b>  | <b>Scientific requirement</b> | <b>CPC progress</b>   |
|-----------------|--|-------------------------------|---|
|                 | in the IOTC area of competence   |                               | offering for sale any part or whole carcass of thresher sharks.   |
| 12/06           | On reducing the incidental bycatch of seabirds in longline fisheries.              | Paragraphs 3–7                | Taiwan has already amended the relevant regulations to request fishing vessels operating in the area south of 25°S in Indian Ocean to start using at least two of the three mitigation measures, night setting with minimum deck lighting, tori lines, or line weighting. Bycatch information is provided every year. |
| 12/04           | On the conservation of marine turtles  | Paragraphs 3, 4, 6–10         | According to the domestic management regulation of Taiwan, all fishing vessels shall be equipped with necessary devices on board, and the bycatch individuals shall be released alive. Bycatch information is provided every year.  |
| 11/04           | On a regional observer scheme  | Paragraph 9                   | Relevant information, including observer coverage is provided every year.   |
| 17/05           | On the conservation of sharks caught in association with fisheries managed by IOTC | Paragraphs 6, 9, 11           | Taiwan has submitted required shark data to IOTC in accordance with IOTC resolution 15/02. In addition, Taiwan has commissioned scientists to conduct a series of shark research.   |