

Review of Taiwan SBT Fishery of 2021/2022

1. Introduction

In the 1970s, the main target species of the Taiwanese conventional tuna longline fishery was albacore. Since 1980s, some operators began to build new vessels equipped with super freezer for fishing tropical tuna and started fishing SBT seasonally in early 1990s. Generally, the authorized SBT fishing fleet comes from tropical tuna fishing vessels, which shift southward and mainly operate in the central south Indian Ocean (Area 2 and 14) for SBT from March to September with some operating in the high seas area off South Africa (Area 14 and 9) for SBT from October to February of following year.

The annual catches of SBT were less than 250 tons in early 1980s, and the catches of SBT increased to a range of about 900 tons to 1,600 tons from 1990 to 2002 with the increase of fleet size and the expansion of fishing grounds. Since 2002, Taiwan has become a member of the Extend Commission of CCSBT, and its national allocation has been set at 1,140 tons. The annual catches of SBT fluctuated between 500 tons and 1,300 tons from 2002 to 2021. In 2022, 55 fishing vessels were authorized to fish for SBT and the SBT catch was 1,318 tons for calendar year and quota year both.

2. Catch and Effort

Taiwanese SBT longline fishery mainly operates in Area 2, Area 14, Area 8 and Area 9 (here after: major Areas) seasonally. The catch and efforts by calendar year are provided in Table 1 and Figure 1.

The annual catches of SBT ranged from 494 to 1,318 tons between 2002 and 2022 (Table 1) with the highest catch weight in 2022. The catch declined significantly to 533 tons in 2011 for the shared quota of 2010 and 2011, which had been mostly used in 2010 and less fishing vessels engaged in SBT in 2011. The low catch in 2012 was due to better catch rate in tropical area, so most of fishing vessels remained in tropical areas to target bigeye tuna instead of fishing for SBT. The annual catches of SBT resumed in 2013 for returning of fishing vessels for SBT out of poor revenue of harvesting tropical

tuna.

Figure 1 shows the variation of annual catches in number between 2002 and 2022. Most of the catches were made in Area 2 and 14. The aggregated number of SBT, which were caught in major Areas fluctuated between 28,000 and 41,000 during 2002-2010. After that, the total number declined rapidly in the following two years (2011-2012) and resumed to the level of 26,000-37,000 from 2013 to 2022.

The fishing efforts of 2002 and 2003 shown in Table 1 were aggregated all fishing efforts made by SBT fishing vessels, including the fishing efforts deployed in the tropical areas for bigeye tuna. Since 2004, only the fishing efforts of SBT vessels operated in the area south 20°S were included as fishing efforts for SBT.

The area-specific and monthly catches and fishing efforts of Taiwanese SBT longline fishing vessels in recent 5 years (2018-2022) are provided in Tables 2 and 3. It is observed that most of fishing efforts and catch were made in major Areas, and it should be noted that the fishing efforts made in Area 9 were mainly from the fishing vessels targeting oilfish or escolar in the Indian Ocean, and the fishing efforts made in Area 15 were mainly from fishing vessels targeting albacore with by-catch of SBT.

3. Nominal CPUE

The annual nominal CPUE of calendar years is shown in Table 1 and Figure 1. The nominal CPUE aggregated by the data from all areas reached the highest level in 2005, while the nominal CPUE aggregated by the data from major Areas reached the highest level in 2012.

It was noted that catches were mainly made in Areas 2 and 14 (Table 2), but it was noted there were significant fishing efforts deployed in Area 9 for oilfish or escolar (Table 3). The area-specific and monthly nominal CPUE in recent 5 years are provided in Table 4 and Figure 2. It was observed that the nominal CPUEs in Area 2 were generally higher than those in other areas.

4. Size composition

Before 2002, SBT fishing vessels were required to report their operation position, weights of SBT catches on weekly basis, afterwards they were requested to report the length of individual SBT catch between 2002 to 2009. With the implementation of catch

documentation scheme (CDS) in 2010, the length and weight of all individual SBT catch are collected through CDS scheme.

The annual area-specific size compositions are shown in Figure 3 and Figure 4. It was observed that the size composition mainly concentrated at the range of 110 cm to 125 cm among all areas of 2010s. However, the mode at 150 cm was observed in other areas with less number of catches comparing with that of the major Areas (Figure 3).

In recent 5 years (2018-2022), the size composition generally concentrated at the range of 116 cm to 126 cm among all areas (Figure 4) with modes at 120 cm in 2022.

5. Fleet size and fishing efforts distributions

According to the weekly reports and trading documents, there were more than 100 fishing vessels engaging in SBT fishery during 1998 to 2001. Since Taiwan became a member of the Extend Commission of CCSBT in 2002, all SBT fishing vessels have to be authorized to access this fishery, and the authorizations are reviewed and renewed by Fishery Agency (FA) of Taiwan annually.

The numbers of fishing vessels engaging in SBT fishery ranged from 30 to 100 from 2002 to 2022 (Table 5). From 2005 to 2008, the number of fishing vessels decreased significantly for some fishing vessels shifted to the waters off South Africa to target oilfish or escolar. In 2009 and 2010, the number of fishing vessels increased for some tropical tuna fishing vessels shifted operations southward due to piracy. The number of fishing vessels decreased to 56 in 2011 as national SBT allocation was set at 578 tons and decreased further to 36 in 2012 for most fishing vessels remained in tropical area fishing for bigeye tuna. Owing to poor catch of tropical tuna in 2013, the fishing vessels returned to SBT fishing ground and the number of SBT longline fishing vessels increased substantially to 76 with a slight decrease to 71 and 72 in 2014 and 2015. In 2016, some fishing vessels remained in tropical area for targeting yellowfin tuna, so the number of SBT fishing vessels decreased to 60. On the contrary, the number of fishing vessel increased to 75 and 77 respectively in 2017 and 2018, due to the poor catch of tropical tuna. The number of SBT fishing vessel of 2019 and 2020 were 72 and 70 respectively. The number of SBT fishing vessels decreased to 58 in 2021 mainly because there were fewer by-catch fishing vessels in 2021 than in 2020 by 11 vessels. And the number of SBT fishing vessels slightly decreased to 55 in 2022, mainly due to

a decrease of 9 by-catch fishing vessels and an increase of 6 seasonal target vessels compared to 2021.

Taiwanese SBT fishing vessels seasonally targeting SBT mainly operate in the waters of 20°S - 40°S in the Indian Ocean and the areas adjacent to the Atlantic Ocean. The distributions of fishing efforts and SBT catch in number are shown in Figure 5 to Figure 8. There are two major fishing grounds in general with one in the southern central Indian Ocean around 50°E-105°E, 20°S-40°S, and the other one in the high seas area off South Africa around 20°E-50°E, 25°S-45°S. The fishing season for Taiwanese SBT fishery in the southern central Indian Ocean is from March to September, and the fishing season in the southwest Indian Ocean is from October to February of following year. It was observed that the fishing efforts and SBT catches were mainly made in Areas 2, 14 and 9 in the second and the third quarters. The fishing efforts deployed in Area 9 are mainly from the fishing vessels targeting oilfish or escolar with SBT bycatch in the fourth quarter and the first quarter of the following year.

6. Research and monitoring to improve estimates of attributable catch

The number of SBT discarded by fishing vessels were 434 and 1,053 in 2021 and 2022 respectively, and these figures had been provided to the Commission as non-retained catches of Taiwanese SBT fishery.

Based on the discard information recorded by Taiwanese scientific observer program and e-logbook collected from Taiwanese longline vessels, we processed a procedure similar to the bootstrap approach to estimate total amount of estimated discards of Taiwanese fleet were less than 10 tons (per year). The details of the methodology please refer to CCSBT-ESC/2008/31.

7. Development and implementation of scientific observer programs

Appendix 1 provides the summary report on the implementation of scientific observer program.

8. Other relevant information

The collaboration between Taiwan and Australia on SBT archival tagging program had been conducted during 2004 to 2007. The observers dispatched to Taiwanese SBT fishing vessels carried out the SBT tagging program. There were 37, 48, 25 and 50

archival tags successfully settled during 2004 to 2007. The results were incorporated into the documents of CCSBT-ESC/0709/20 and CCSBT-ESC/0809/23.

To understand if and how effective fishers' hand-made tori line is in Taiwan, the Royal Society of the Protection of Birds (RSPB), Taiwan Wild Bird Federation (TWBF) and the FA have cooperated to conduct an at-sea tori line experiment for both small- and large-scale longline vessels since 2021. By comparing the tori line made by Taiwanese captains and an international standard one, this experiment aims to identify a design that not only effective but also welcome by the fishers. Such an experiment is expected to strengthen seabirds bycatch mitigation during fishery operation activity.

Table 1 Annual catches of SBT in weight and in number, fishing efforts and nominal CPUE of Taiwanese SBT longline fishery

Unit: Hooks_N: thousand hooks;
SBT_W: round weight in ton;
CPUE: SBT catch in number / number of hooks;

| Calendar year | Hooks_N | | SBT_N | | SBT_W | | CPUE | |
|---------------|----------|-----------------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | All Area | Area 2、 14、8、 9 | All Area | Area 2、 14、8、9 | All Area | Area 2、 14、8、9 | All Area | Area 2、 14、8、9 |
| 2002* | 102,908 | 39,188 | 34,841 | 34,754 | 1,137 | 1,132 | 0.34 | 0.89 |
| 2003* | 144,620 | 44,570 | 31,606 | 28,768 | 1,129 | 1,045 | 0.22 | 0.65 |
| 2004 | 36,055 | 34,993 | 42,151 | 41,733 | 1,298 | 1,279 | 1.17 | 1.19 |
| 2005 | 20,471 | 19,375 | 33,319 | 33,266 | 941 | 937 | 1.63 | 1.72 |
| 2006 | 20,444 | 18,919 | 30,667 | 30,660 | 846 | 845 | 1.50 | 1.62 |
| 2007 | 26,185 | 25,532 | 33,776 | 33,772 | 841 | 841 | 1.29 | 1.32 |
| 2008 | 28,724 | 26,656 | 35,144 | 35,082 | 913 | 911 | 1.22 | 1.32 |
| 2009 | 37,236 | 32,380 | 31,801 | 31,639 | 921 | 913 | 0.85 | 0.98 |
| 2010 | 40,916 | 33,897 | 33,407 | 33,263 | 1,208 | 1,201 | 0.82 | 0.98 |
| 2011 | 27,062 | 20,327 | 15,156 | 14,884 | 533 | 520 | 0.56 | 0.73 |
| 2012 | 18,414 | 9,702 | 17,578 | 17,198 | 494 | 472 | 0.95 | 1.77 |
| 2013 | 34,817 | 25,188 | 33,583 | 33,186 | 1,004 | 980 | 0.96 | 1.33 |
| 2014 | 30,823 | 21,067 | 26,659 | 26,300 | 944 | 922 | 0.86 | 1.27 |
| 2015 | 31,753 | 22,875 | 33,004 | 32,663 | 1,162 | 1,143 | 1.04 | 1.44 |
| 2016 | 32,071 | 27,865 | 30,392 | 30,204 | 1,023 | 1,013 | 0.95 | 1.09 |
| 2017 | 40,858 | 38,197 | 32,864 | 32,809 | 1,171 | 1,168 | 0.8 | 0.86 |
| 2018 | 36,206 | 33,251 | 35,784 | 35,671 | 1,218 | 1,211 | 0.99 | 1.08 |
| 2019 | 37,274 | 35,212 | 34,615 | 34,560 | 1,229 | 1,226 | 0.93 | 0.98 |
| 2020 | 37,239 | 33,785 | 29,514 | 29,456 | 1,116 | 1,113 | 0.79 | 0.87 |
| 2021 | 24,857 | 23,979 | 37,878 | 37,837 | 1,274 | 1,272 | 1.52 | 1.58 |
| 2022 | 23,673 | 22,414 | 36,183 | 36,117 | 1,318 | 1,315 | 1.53 | 1.61 |

* Including efforts deployed in the tropical areas for tropical tuna.

Table 2 SBT catch in number by area, by month and by year of Taiwanese SBT longline fishery

| Year | Month | Area1 | Area2 | Area3 | Area4 | Area5 | Area6 | Area7 | Area8 | Area9 | Area10 | Area11 | Area12 | Area13 | Area14 | Area15 |
|-------------|--------------|----------|--------------|----------|----------|-----------|----------|----------|-------------|------------|-----------|-----------|----------|----------|--------------|-----------|
| 2018 | Total | 0 | 16781 | 0 | 0 | 0 | 0 | 0 | 2888 | 521 | 10 | 12 | 0 | 0 | 15481 | 91 |
| | 1 | - | - | - | - | - | - | - | - | 188 | - | - | - | - | 0 | 0 |
| | 2 | - | - | - | - | - | - | - | 0 | 1 | 0 | 0 | - | - | 0 | 0 |
| | 3 | - | 2 | - | - | - | - | - | 551 | 2 | 0 | 0 | - | - | 0 | 0 |
| | 4 | - | 0 | - | - | - | - | - | 757 | 3 | 0 | - | - | - | 0 | 5 |
| | 5 | - | 430 | - | - | - | - | - | 781 | 65 | 10 | - | - | - | 27 | 4 |
| | 6 | - | 4600 | - | - | - | - | - | 799 | 76 | 0 | 0 | - | - | 3612 | 4 |
| | 7 | - | 7536 | - | - | - | - | - | - | 88 | 0 | 12 | - | - | 8496 | 37 |
| | 8 | - | 4013 | - | - | - | - | - | - | 26 | - | 0 | - | - | 2987 | 31 |
| | 9 | - | 200 | - | - | - | - | - | - | 72 | - | - | - | - | 259 | 10 |
| | 10 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 100 | 0 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 12 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| 2019 | Total | 0 | 17511 | 0 | 0 | 0 | 0 | 0 | 3717 | 433 | 0 | 0 | 0 | 0 | 12899 | 55 |
| | 1 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 2 | - | 0 | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 0 | - | - | - | - | - | 1390 | 5 | - | - | - | - | 0 | 0 |
| | 4 | - | 65 | - | - | - | - | - | 1777 | 4 | - | - | - | - | 0 | 0 |
| | 5 | - | 1219 | - | - | - | - | - | 486 | 55 | - | - | - | - | 61 | 1 |
| | 6 | - | 4737 | - | - | - | - | - | 64 | 57 | - | - | - | - | 2351 | 0 |
| | 7 | - | 10323 | - | - | - | - | - | - | 53 | - | - | - | - | 6928 | 13 |
| | 8 | - | 1150 | - | - | - | - | - | - | 139 | - | - | - | - | 3418 | 41 |
| | 9 | - | 17 | - | - | - | - | - | - | 92 | - | - | - | - | 139 | 0 |
| | 10 | - | - | - | - | - | - | - | - | 28 | - | - | - | - | 2 | 0 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | 0 |
| | 12 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| 2020 | Total | 0 | 12107 | 0 | 0 | 13 | 0 | 0 | 4507 | 841 | 0 | 0 | 0 | 0 | 12001 | 45 |
| | 1 | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 | - |
| | 2 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 15 | - | - | - | - | - | 1357 | 0 | - | - | - | - | 0 | 0 |
| | 4 | - | 42 | - | - | 0 | - | - | 2681 | 11 | - | - | - | - | 0 | 1 |
| | 5 | - | 1329 | - | - | 8 | - | - | 320 | 28 | - | - | - | - | 587 | 1 |
| | 6 | - | 4424 | - | - | 5 | - | - | 149 | 57 | - | - | 0 | - | 2911 | 11 |
| | 7 | - | 4335 | - | - | - | - | - | - | 70 | - | - | 0 | - | 4282 | 13 |
| | 8 | - | 1955 | - | - | 0 | - | - | - | 143 | - | - | 0 | - | 3602 | 5 |
| | 9 | - | 7 | - | - | - | - | - | - | 385 | - | - | - | - | 619 | 13 |
| | 10 | - | - | - | - | - | - | - | - | 147 | - | 0 | - | - | 0 | 1 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | 0 | - | - | 0 | 0 |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| 2021 | Total | 0 | 14986 | 0 | 0 | 0 | 0 | 0 | 4115 | 604 | 0 | 0 | 0 | 0 | 18132 | 41 |
| | 1 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 0 | - | - | - | - | - | 1168 | 0 | - | - | - | - | 0 | - |
| | 4 | - | - | - | - | - | - | - | 1136 | 47 | - | - | - | - | 0 | 0 |
| | 5 | - | 1316 | - | - | - | - | - | 1657 | 164 | - | - | - | - | 82 | 0 |
| | 6 | - | 4538 | - | - | - | - | - | 154 | 75 | - | - | - | - | 2373 | 8 |
| | 7 | - | 5988 | - | - | - | - | - | - | 122 | - | - | - | - | 9064 | 12 |
| | 8 | - | 2968 | - | - | - | - | - | - | 9 | - | - | - | - | 6479 | 21 |
| | 9 | - | 176 | - | - | - | - | - | - | 54 | - | - | - | - | 134 | - |
| | 10 | - | - | - | - | - | - | - | - | 133 | - | - | - | - | - | - |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2022 | Total | 0 | 8052 | 0 | 0 | 0 | 0 | 0 | 9192 | 491 | 0 | 0 | 0 | 0 | 18382 | 66 |
| | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | 0 | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 64 | - | - | - | - | - | 632 | 0 | - | 0 | - | - | - | 0 |
| | 4 | - | 83 | - | - | - | - | - | 3281 | 0 | - | - | - | - | 0 | - |
| | 5 | - | 1157 | - | - | - | - | - | 4015 | 0 | - | - | - | - | 24 | 1 |
| | 6 | - | 3065 | - | - | - | - | - | 1180 | 207 | - | - | - | - | 3806 | 12 |
| | 7 | - | 2863 | - | - | - | - | - | 84 | 16 | - | - | - | - | 10138 | 7 |
| | 8 | - | 692 | - | - | - | - | - | - | 74 | - | - | - | - | 4384 | 34 |
| | 9 | - | 128 | - | - | - | - | - | - | 44 | - | - | - | - | 30 | 12 |
| | 10 | - | - | - | - | - | - | - | - | 150 | - | - | - | - | 0 | - |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 3 Number of hooks (thousand hooks) deployed by area, by month and by year of Taiwanese SBT longline fishery

| Year | Month | Area1 | Area2 | Area3 | Area4 | Area5 | Area6 | Area7 | Area8 | Area9 | Area10 | Area11 | Area12 | Area13 | Area14 | Area15 |
|-------------|--------------|----------|-------------|----------|----------|------------|----------|----------|-------------|--------------|------------|------------|------------|----------|--------------|-------------|
| 2018 | Total | 0 | 4593 | 0 | 0 | 0 | 0 | 0 | 3992 | 11139 | 750 | 129 | 0 | 0 | 13527 | 2075 |
| | 1 | - | - | - | - | - | - | - | - | 181 | - | - | - | - | 40 | 8 |
| | 2 | - | - | - | - | - | - | - | 40 | 197 | 3 | 15 | - | - | 81 | 49 |
| | 3 | - | 10 | - | - | - | - | - | 807 | 1010 | 207 | 20 | - | - | 89 | 49 |
| | 4 | - | 36 | - | - | - | - | - | 1506 | 2361 | 238 | - | - | - | 109 | 146 |
| | 5 | - | 442 | - | - | - | - | - | 1327 | 2519 | 198 | - | - | - | 766 | 375 |
| | 6 | - | 1346 | - | - | - | - | - | 312 | 1922 | 93 | 7 | - | - | 2254 | 286 |
| | 7 | - | 1534 | - | - | - | - | - | - | 1214 | 11 | 79 | - | - | 3852 | 277 |
| | 8 | - | 985 | - | - | - | - | - | - | 580 | - | 8 | - | - | 3969 | 521 |
| | 9 | - | 240 | - | - | - | - | - | - | 567 | - | - | - | - | 1729 | 263 |
| | 10 | - | - | - | - | - | - | - | - | 174 | - | - | - | - | 602 | 101 |
| | 11 | - | - | - | - | - | - | - | - | 276 | - | - | - | - | 36 | - |
| | 12 | - | - | - | - | - | - | - | - | 138 | - | - | - | - | - | - |
| 2019 | Total | 0 | 5987 | 0 | 0 | 0 | 0 | 0 | 5152 | 12750 | 0 | 0 | 0 | 0 | 11321 | 2062 |
| | 1 | - | - | - | - | - | - | - | - | 14 | - | - | - | - | - | - |
| | 2 | - | 10 | - | - | - | - | - | - | 19 | - | - | - | - | 27 | - |
| | 3 | - | 10 | - | - | - | - | - | 1548 | 1013 | - | - | - | - | 39 | 61 |
| | 4 | - | 394 | - | - | - | - | - | 2375 | 1997 | - | - | - | - | 92 | 378 |
| | 5 | - | 1378 | - | - | - | - | - | 1185 | 2448 | - | - | - | - | 719 | 136 |
| | 6 | - | 1600 | - | - | - | - | - | 44 | 1258 | - | - | - | - | 3092 | 331 |
| | 7 | - | 2214 | - | - | - | - | - | - | 1005 | - | - | - | - | 2777 | 436 |
| | 8 | - | 363 | - | - | - | - | - | - | 1557 | - | - | - | - | 2927 | 353 |
| | 9 | - | 18 | - | - | - | - | - | - | 1494 | - | - | - | - | 1107 | 285 |
| | 10 | - | - | - | - | - | - | - | - | 953 | - | - | - | - | 324 | 67 |
| | 11 | - | - | - | - | - | - | - | - | 653 | - | - | - | - | 126 | 15 |
| | 12 | - | - | - | - | - | - | - | - | 339 | - | - | - | - | 91 | - |
| 2020 | Total | 0 | 3892 | 0 | 0 | 253 | 0 | 0 | 3600 | 13467 | 0 | 23 | 181 | 0 | 12828 | 2997 |
| | 1 | - | - | - | - | - | - | - | - | - | - | 4 | - | - | 150 | - |
| | 2 | - | - | - | - | - | - | - | - | 4 | - | - | - | - | 16 | - |
| | 3 | - | 7 | - | - | - | - | - | 1303 | 903 | - | - | - | - | 14 | 158 |
| | 4 | - | 169 | - | - | 42 | - | - | 1902 | 2195 | - | - | - | - | 294 | 284 |
| | 5 | - | 739 | - | - | 111 | - | - | 383 | 2415 | - | - | - | - | 1789 | 469 |
| | 6 | - | 1290 | - | - | 92 | - | - | 12 | 2244 | - | - | 12 | - | 1622 | 573 |
| | 7 | - | 1197 | - | - | - | - | - | - | 1440 | - | - | 100 | - | 3431 | 473 |
| | 8 | - | 465 | - | - | 8 | - | - | - | 1010 | - | - | 69 | - | 3374 | 364 |
| | 9 | - | 25 | - | - | - | - | - | - | 2001 | - | - | - | - | 1400 | 269 |
| | 10 | - | - | - | - | - | - | - | - | 1112 | - | 4 | - | - | 717 | 287 |
| | 11 | - | - | - | - | - | - | - | - | 143 | - | 15 | - | - | 21 | 116 |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | 4 | 4 |
| 2021 | Total | 0 | 3723 | 0 | 0 | 0 | 0 | 0 | 2458 | 8102 | 0 | 0 | 0 | 0 | 9694 | 880 |
| | 1 | - | - | - | - | - | - | - | - | 91 | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | 107 | - | - | - | - | 4 | - |
| | 3 | - | 18 | - | - | - | - | - | 460 | 868 | - | - | - | - | 15 | - |
| | 4 | - | - | - | - | - | - | - | 1089 | 2009 | - | - | - | - | 45 | 50 |
| | 5 | - | 492 | - | - | - | - | - | 793 | 2212 | - | - | - | - | 697 | 268 |
| | 6 | - | 1406 | - | - | - | - | - | 116 | 1251 | - | - | - | - | 1963 | 293 |
| | 7 | - | 1138 | - | - | - | - | - | - | 885 | - | - | - | - | 3344 | 209 |
| | 8 | - | 581 | - | - | - | - | - | - | 181 | - | - | - | - | 3433 | 60 |
| | 9 | - | 88 | - | - | - | - | - | - | 269 | - | - | - | - | 193 | - |
| | 10 | - | - | - | - | - | - | - | - | 173 | - | - | - | - | - | - |
| | 11 | - | - | - | - | - | - | - | - | 56 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2022 | Total | 0 | 3245 | 0 | 0 | 0 | 0 | 0 | 6337 | 5701 | 0 | 20 | 0 | 0 | 7134 | 1239 |
| | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | 30 | - | - | - | - | - | - | 73 | - | - | - | - | 10 | - |
| | 3 | - | 144 | - | - | - | - | - | 1058 | 283 | - | 20 | - | - | - | 37 |
| | 4 | - | 71 | - | - | - | - | - | 2586 | 1050 | - | - | - | - | 7 | - |
| | 5 | - | 845 | - | - | - | - | - | 2105 | 1151 | - | - | - | - | 165 | 247 |
| | 6 | - | 1116 | - | - | - | - | - | 541 | 1028 | - | - | - | - | 1570 | 284 |
| | 7 | - | 742 | - | - | - | - | - | 47 | 935 | - | - | - | - | 2919 | 207 |
| | 8 | - | 243 | - | - | - | - | - | - | 814 | - | - | - | - | 1500 | 311 |
| | 9 | - | 54 | - | - | - | - | - | - | 232 | - | - | - | - | 873 | 153 |
| | 10 | - | - | - | - | - | - | - | - | 131 | - | - | - | - | 90 | - |
| | 11 | - | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 4 Nominal CPUE by area, by month and by year of Taiwanese SBT longline fishery

Unit: CPUE=Numbers/Thousand hooks

| Year | Month | Area1 | Area2 | Area3 | Area4 | Area5 | Area6 | Area7 | Area8 | Area9 | Area10 | Area11 | Area12 | Area13 | Area14 | Area15 |
|------|--------------|-------|-------------|-------|-------|-------------|-------|-------|-------------|-------------|-------------|-------------|----------|--------|-------------|-------------|
| 2018 | Total | - | 3.65 | - | - | - | - | - | 0.72 | 0.05 | 0.01 | 0.09 | - | - | 1.14 | 0.04 |
| | 1 | - | - | - | - | - | - | - | - | 1.04 | - | - | - | - | 0 | 0 |
| | 2 | - | - | - | - | - | - | - | 0 | 0.01 | 0 | 0 | - | - | 0 | 0 |
| | 3 | - | 0.2 | - | - | - | - | - | 0.68 | 0 | 0 | 0 | - | - | 0 | 0 |
| | 4 | - | 0 | - | - | - | - | - | 0.5 | 0 | 0 | - | - | - | 0 | 0.03 |
| | 5 | - | 0.97 | - | - | - | - | - | 0.59 | 0.03 | 0.05 | - | - | - | 0.04 | 0.01 |
| | 6 | - | 3.42 | - | - | - | - | - | 2.56 | 0.04 | 0 | 0 | - | - | 1.6 | 0.01 |
| | 7 | - | 4.91 | - | - | - | - | - | - | 0.07 | 0 | 0.15 | - | - | 2.21 | 0.13 |
| | 8 | - | 4.07 | - | - | - | - | - | - | 0.04 | - | 0 | - | - | 0.75 | 0.06 |
| | 9 | - | 0.83 | - | - | - | - | - | - | 0.13 | - | - | - | - | 0.15 | 0.04 |
| | 10 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0.17 | 0 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 12 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| 2019 | Total | - | 2.92 | - | - | - | - | - | 0.72 | 0.03 | - | - | - | - | 1.14 | 0.03 |
| | 1 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 2 | - | 0 | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 0 | - | - | - | - | - | 0.9 | 0 | - | - | - | - | 0 | 0 |
| | 4 | - | 0.16 | - | - | - | - | - | 0.75 | 0 | - | - | - | - | 0 | 0 |
| | 5 | - | 0.88 | - | - | - | - | - | 0.41 | 0.02 | - | - | - | - | 0.08 | 0.01 |
| | 6 | - | 2.96 | - | - | - | - | - | 1.45 | 0.05 | - | - | - | - | 0.76 | 0 |
| | 7 | - | 4.66 | - | - | - | - | - | - | 0.05 | - | - | - | - | 2.49 | 0.03 |
| | 8 | - | 3.17 | - | - | - | - | - | - | 0.09 | - | - | - | - | 1.17 | 0.12 |
| | 9 | - | 0.94 | - | - | - | - | - | - | 0.06 | - | - | - | - | 0.13 | 0 |
| | 10 | - | - | - | - | - | - | - | - | 0.03 | - | - | - | - | 0.01 | 0 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | 0 |
| | 12 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| 2020 | Total | - | 3.11 | - | - | 0.05 | - | - | 1.25 | 0.06 | - | 0 | 0 | - | 0.94 | 0.02 |
| | 1 | - | - | - | - | - | - | - | - | - | - | 0 | - | - | 0 | - |
| | 2 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 2.14 | - | - | - | - | - | 1.04 | 0 | - | - | - | - | 0 | 0 |
| | 4 | - | 0.25 | - | - | 0 | - | - | 1.41 | 0.01 | - | - | - | - | 0 | 0 |
| | 5 | - | 1.8 | - | - | 0.07 | - | - | 0.84 | 0.01 | - | - | - | - | 0.33 | 0 |
| | 6 | - | 3.43 | - | - | 0.05 | - | - | 12.42 | 0.03 | - | - | 0 | - | 1.79 | 0.02 |
| | 7 | - | 3.62 | - | - | - | - | - | - | 0.05 | - | - | 0 | - | 1.25 | 0.03 |
| | 8 | - | 4.2 | - | - | 0 | - | - | - | 0.14 | - | - | 0 | - | 1.07 | 0.01 |
| | 9 | - | 0.28 | - | - | - | - | - | - | 0.19 | - | - | - | - | 0.44 | 0.05 |
| | 10 | - | - | - | - | - | - | - | - | 0.13 | - | 0 | - | - | 0 | 0 |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | 0 | - | - | 0 | 0 |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 0 |
| 2021 | Total | - | 4.03 | - | - | - | - | - | 1.67 | 0.07 | - | - | - | - | 1.87 | 0.05 |
| | 1 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 2 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 0 | - | - | - | - | - | 2.54 | 0 | - | - | - | - | 0 | - |
| | 4 | - | - | - | - | - | - | - | 1.04 | 0.02 | - | - | - | - | 0 | 0 |
| | 5 | - | 2.67 | - | - | - | - | - | 2.09 | 0.07 | - | - | - | - | 0.12 | 0 |
| | 6 | - | 3.23 | - | - | - | - | - | 1.33 | 0.06 | - | - | - | - | 1.21 | 0.03 |
| | 7 | - | 5.26 | - | - | - | - | - | - | 0.14 | - | - | - | - | 2.71 | 0.06 |
| | 8 | - | 5.11 | - | - | - | - | - | - | 0.05 | - | - | - | - | 1.89 | 0.35 |
| | 9 | - | 2 | - | - | - | - | - | - | 0.2 | - | - | - | - | 0.69 | - |
| | 10 | - | - | - | - | - | - | - | - | 0.77 | - | - | - | - | - | - |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2022 | Total | - | 2.48 | - | - | - | - | - | 1.45 | 0.09 | - | 0 | - | - | 2.58 | 0.05 |
| | 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 2 | - | 0 | - | - | - | - | - | - | 0 | - | - | - | - | 0 | - |
| | 3 | - | 0.44 | - | - | - | - | - | 0.6 | 0 | - | 0 | - | - | - | 0 |
| | 4 | - | 1.17 | - | - | - | - | - | 1.27 | 0 | - | - | - | - | 0 | - |
| | 5 | - | 1.37 | - | - | - | - | - | 1.91 | 0 | - | - | - | - | 0.15 | 0 |
| | 6 | - | 2.75 | - | - | - | - | - | 2.18 | 0.2 | - | - | - | - | 2.42 | 0.04 |
| | 7 | - | 3.86 | - | - | - | - | - | 1.79 | 0.02 | - | - | - | - | 3.47 | 0.03 |
| | 8 | - | 2.85 | - | - | - | - | - | - | 0.09 | - | - | - | - | 2.92 | 0.11 |
| | 9 | - | 2.37 | - | - | - | - | - | - | 0.19 | - | - | - | - | 0.03 | 0.08 |
| | 10 | - | - | - | - | - | - | - | - | 1.15 | - | - | - | - | 0 | - |
| | 11 | - | - | - | - | - | - | - | - | 0 | - | - | - | - | - | - |
| | 12 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 5 Number of fishing vessel engaged in SBT fishery during 2002-2022

| Year | No. of seasonal target vessels | No. of by-catch vessels | Total vessels |
|------|--------------------------------|-------------------------|---------------|
| 2002 | 21 | 50 | 71 |
| 2003 | 76 | 24 | 100 |
| 2004 | 79 | 18 | 97 |
| 2005 | 49 | 8 | 57 |
| 2006 | 33 | 3 | 36 |
| 2007 | 27 | 3 | 30 |
| 2008 | 35 | 6 | 41 |
| 2009 | 34 | 33 | 67 |
| 2010 | 65 | 17 | 82 |
| 2011 | 28 | 28 | 56 |
| 2012 | 12 | 24 | 36 |
| 2013 | 39 | 37 | 76* |
| 2014 | 37 | 34 | 71 |
| 2015 | 45 | 27 | 72 |
| 2016 | 34 | 26 | 60 |
| 2017 | 43 | 32 | 75 |
| 2018 | 46 | 31 | 77 |
| 2019 | 44 | 28 | 72 |
| 2020 | 38 | 32 | 70 |
| 2021 | 37 | 21 | 58 |
| 2022 | 43 | 12 | 55 |

* There was one vessel shipwrecked.

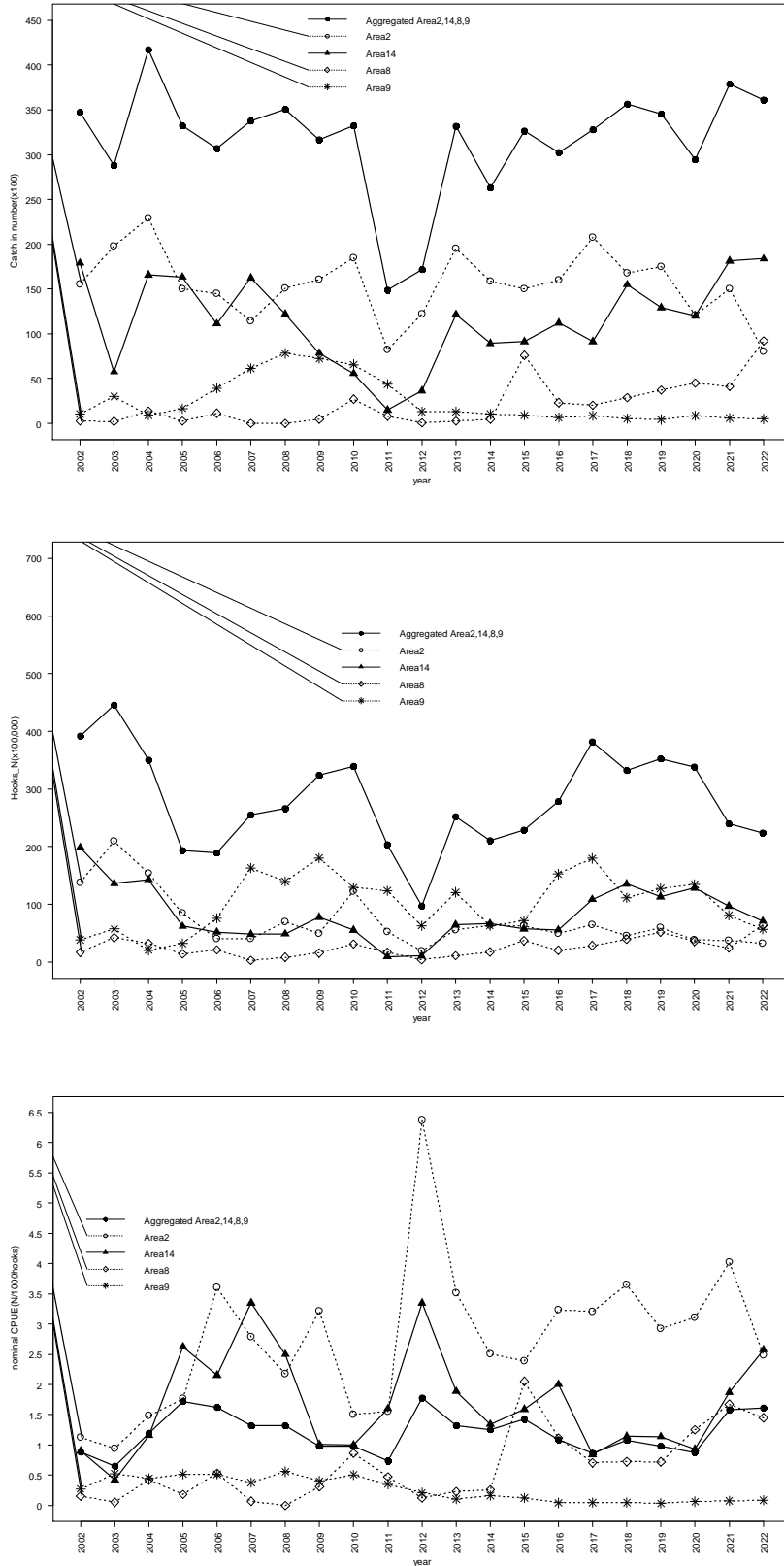


Fig. 1 Annual SBT catches in number, fishing effort and nominal CPUE of Taiwanese SBT longline fishery in main fishing grounds.

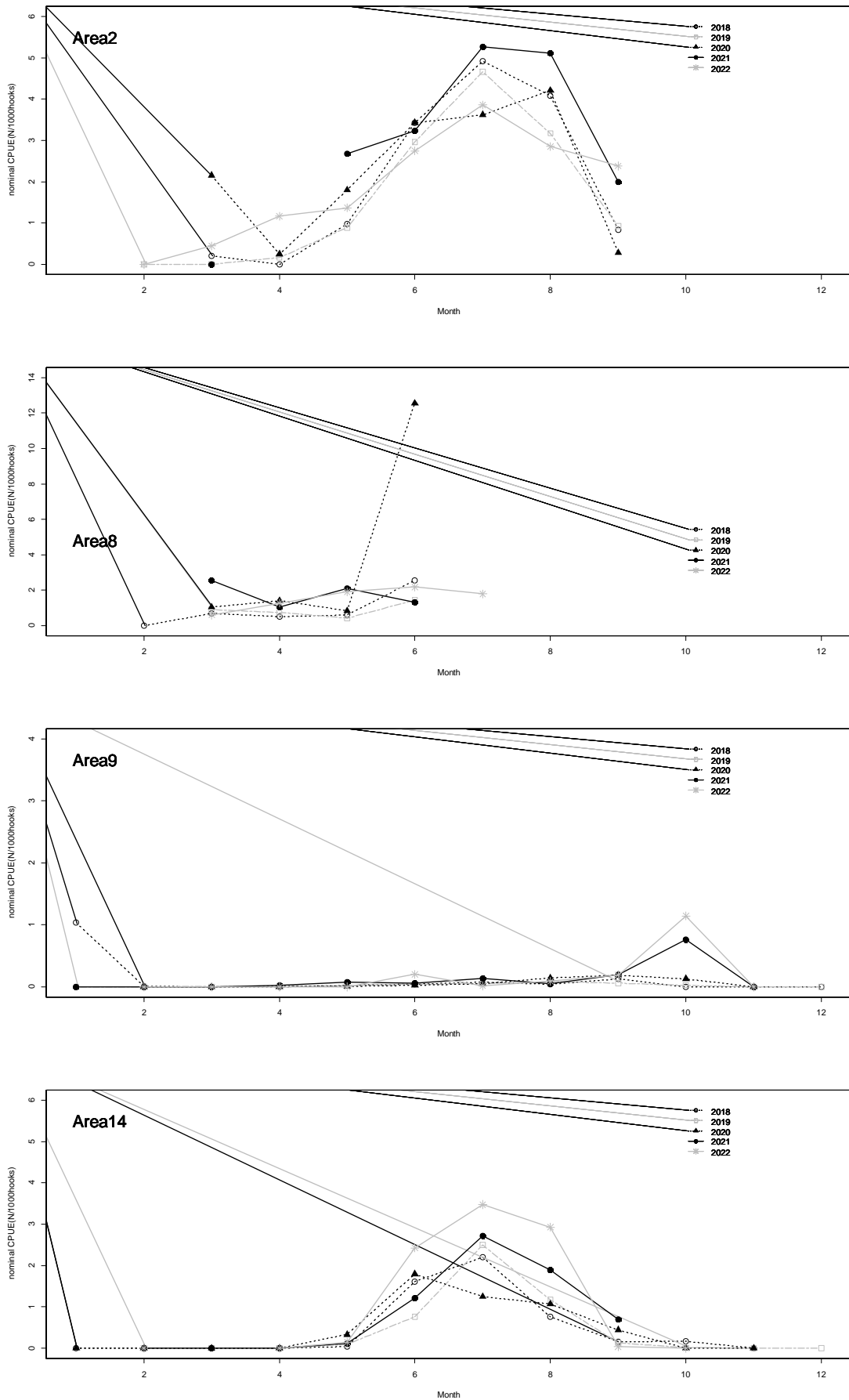


Fig. 2 Annual nominal CPUE by area, by month and by year of Taiwanese SBT

longline fishery in main fishing grounds

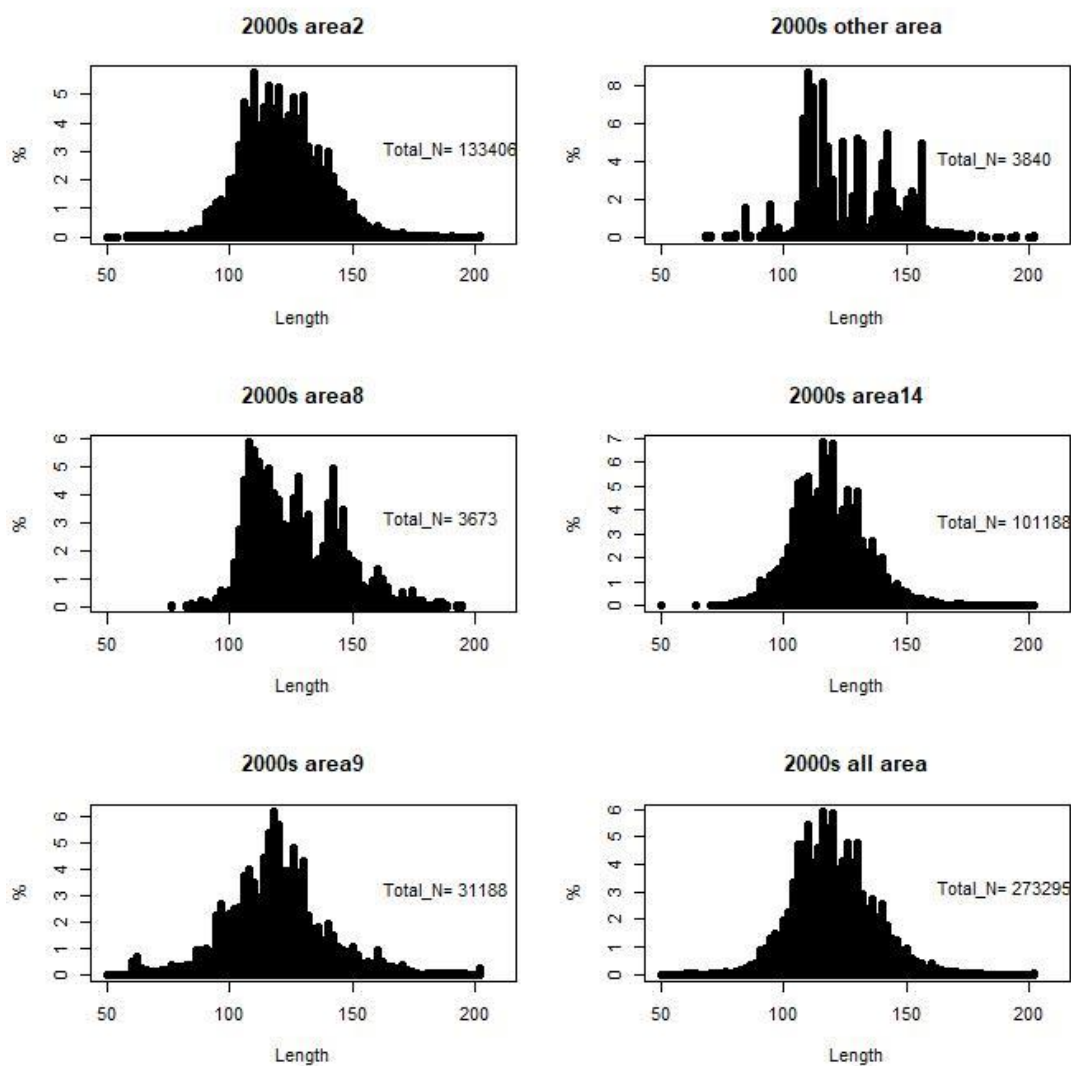


Fig.3 (1) SBT size frequency by area of Taiwanese SBT longline fishery in 2000s

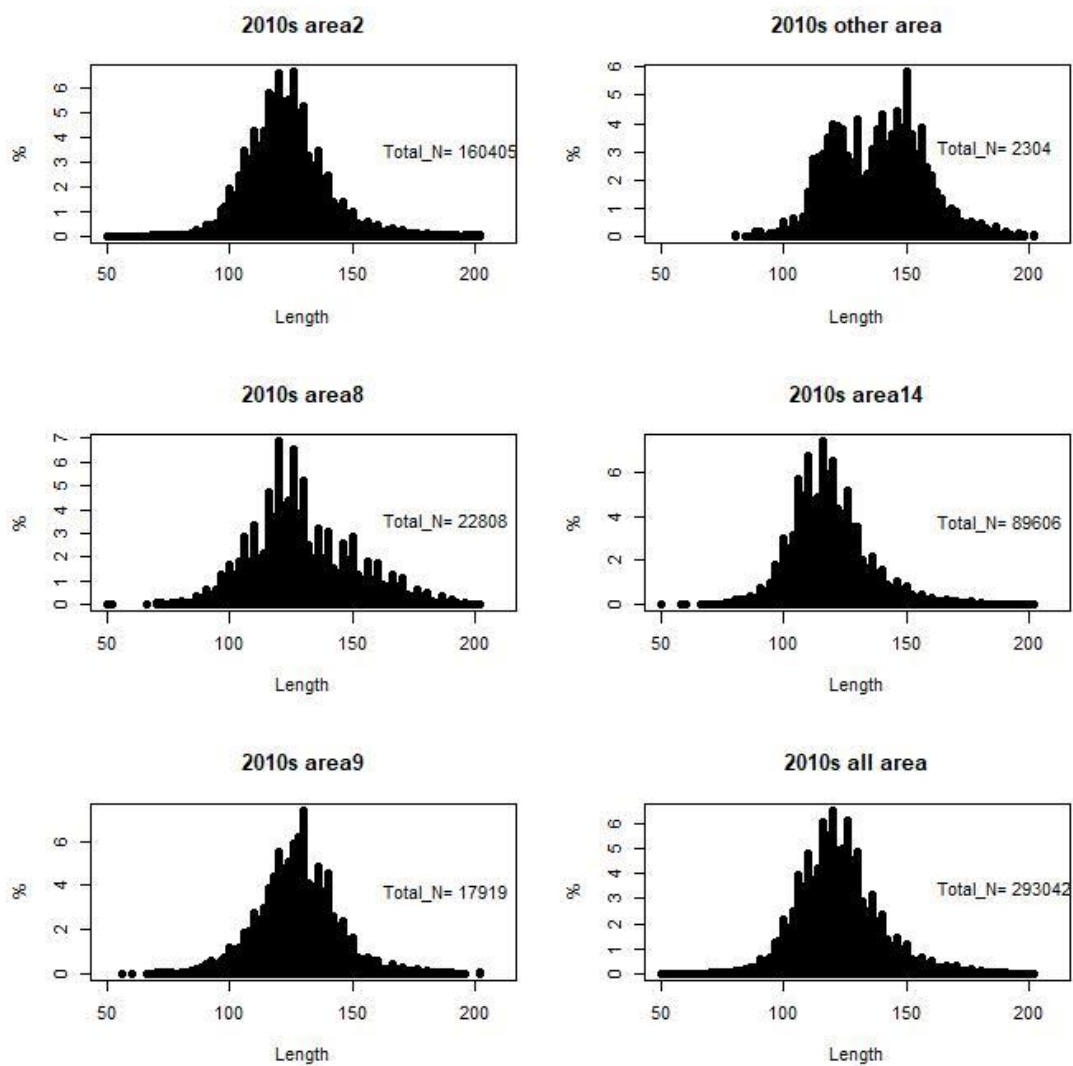


Fig.3 (2) SBT size frequency by area of Taiwanese SBT longline fishery during in 2010s

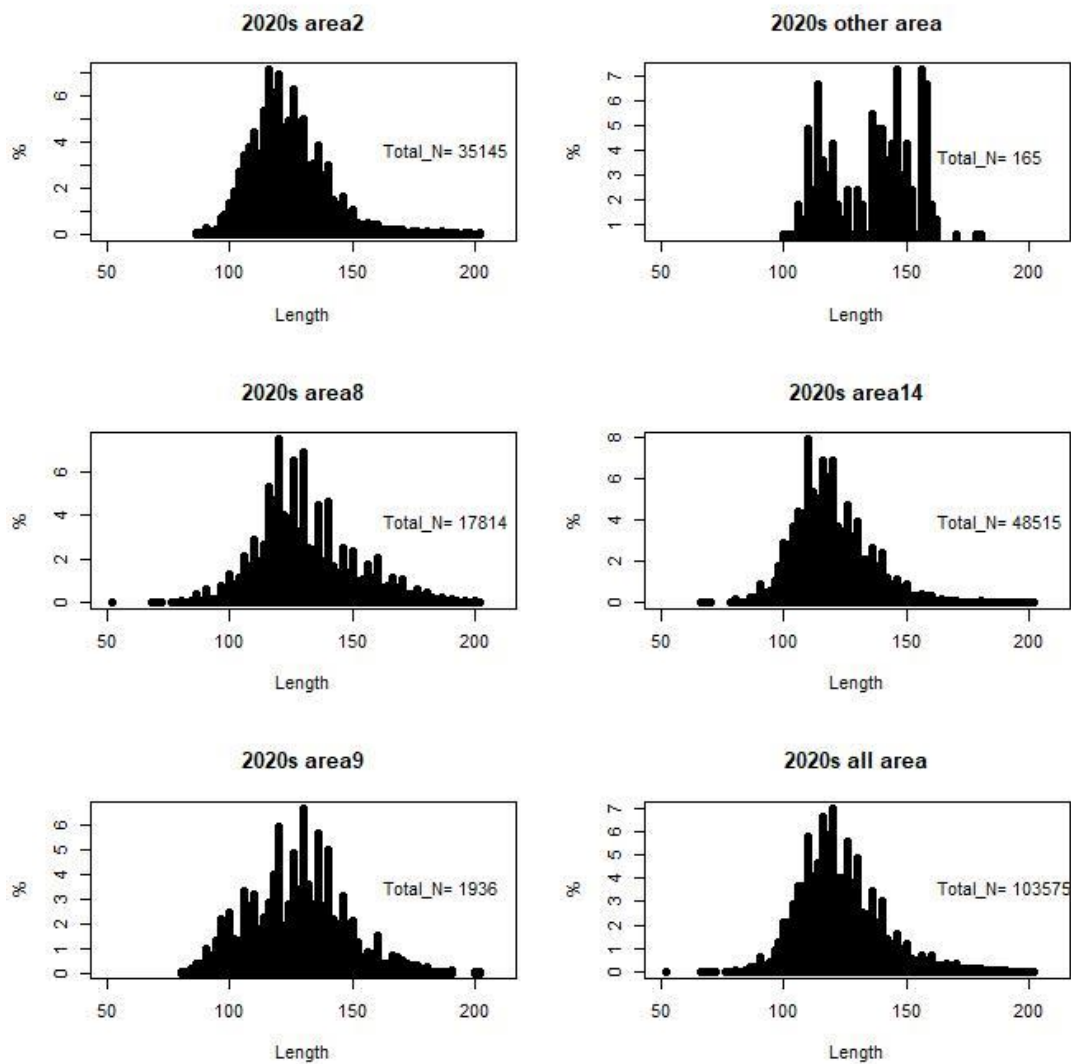


Fig.3 (3) SBT size frequency by area of Taiwanese SBT longline fishery during in 2020s

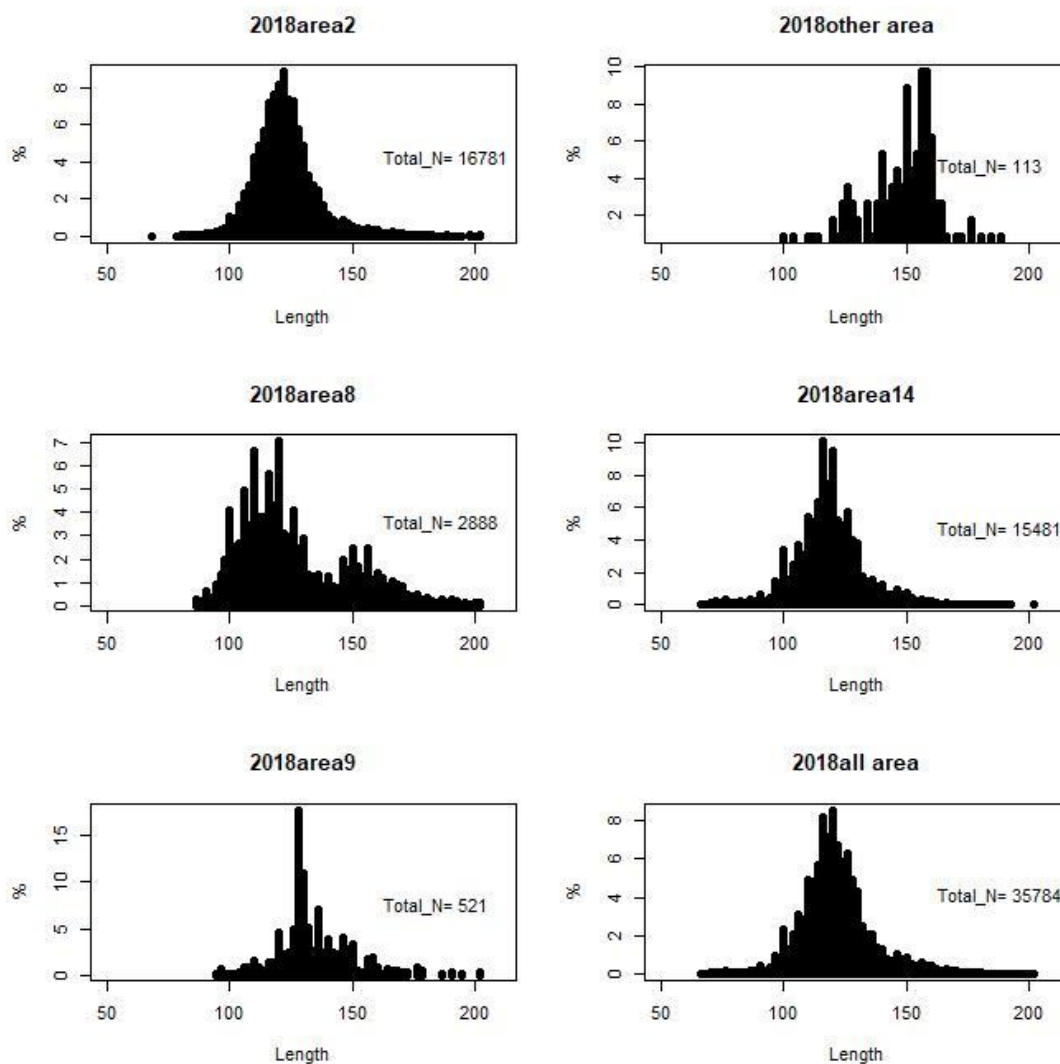


Fig.4 (1) SBT size frequency by area of Taiwanese SBT longline fishery in 2018

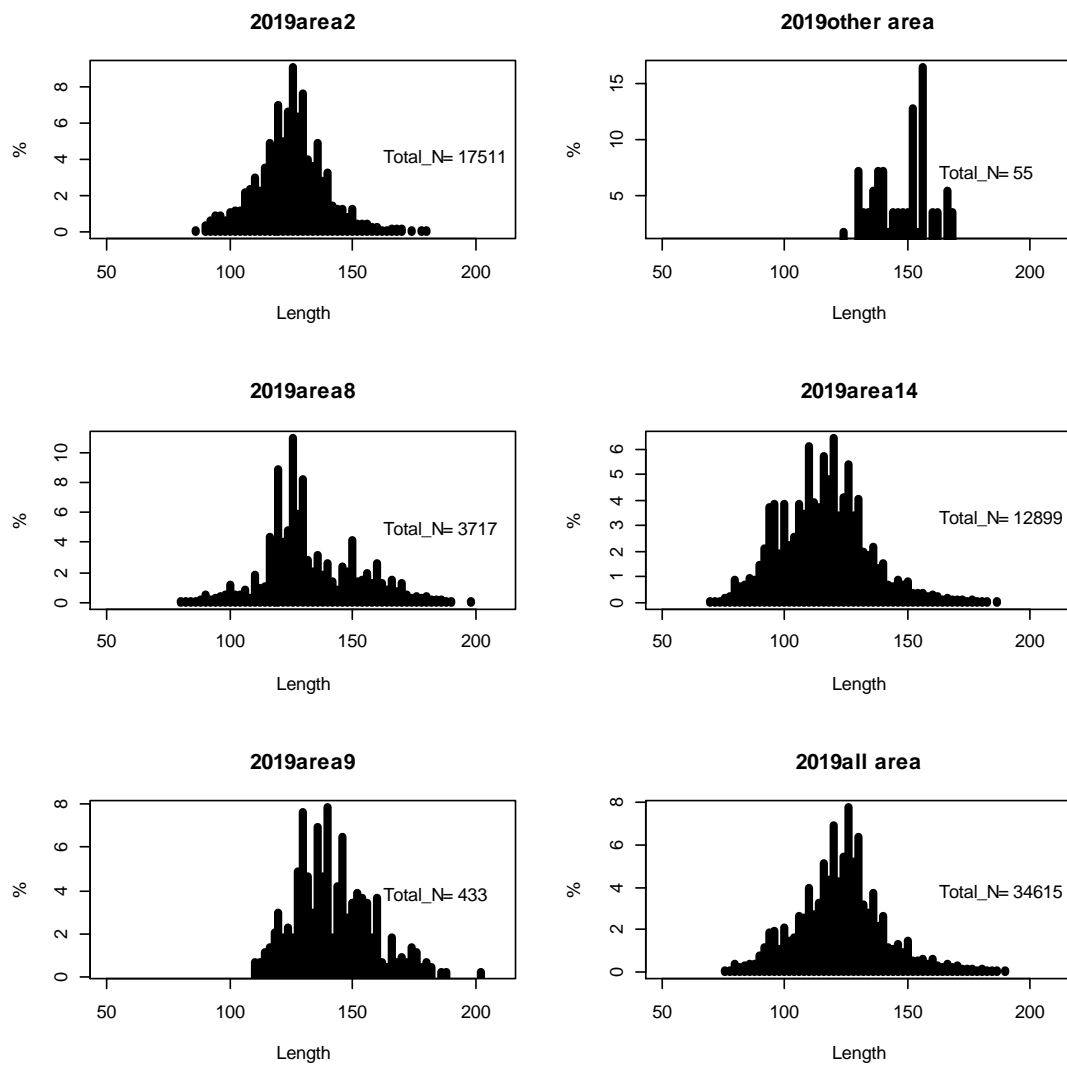


Fig.4 (2) SBT size frequency by area of Taiwanese SBT longline fishery in 2019

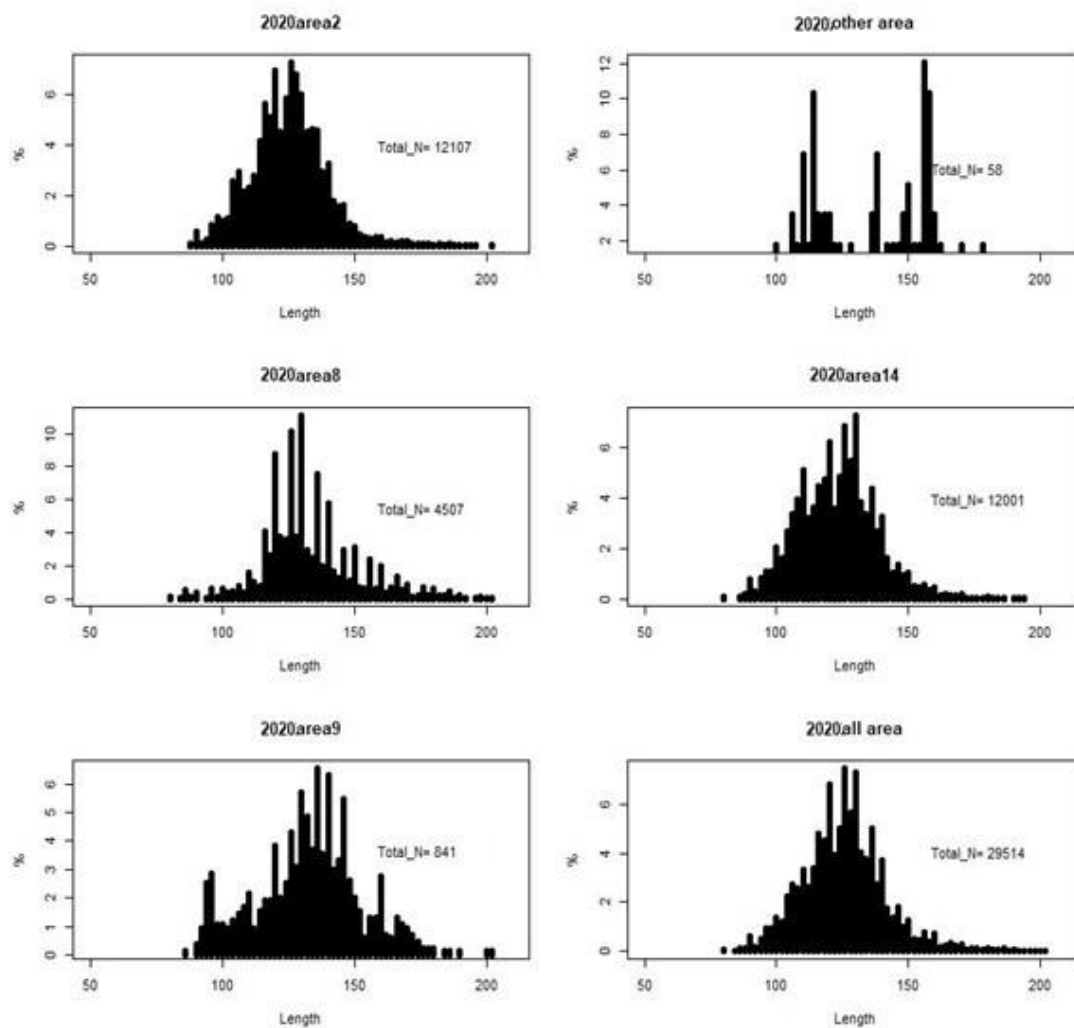


Fig.4 (3) SBT size frequency by area of Taiwanese SBT longline fishery in 2020

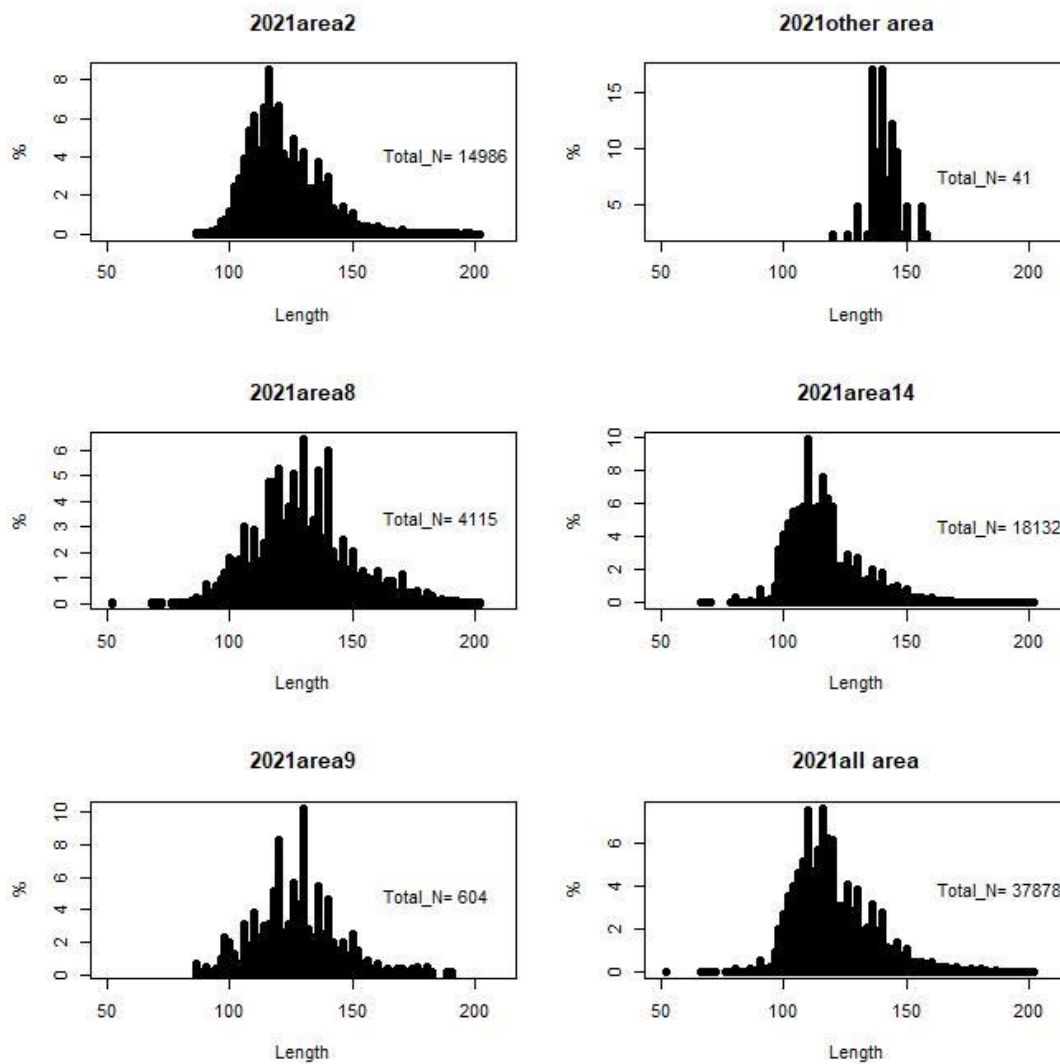


Fig.4 (4) SBT size frequency by area of Taiwanese SBT longline fishery in 2021

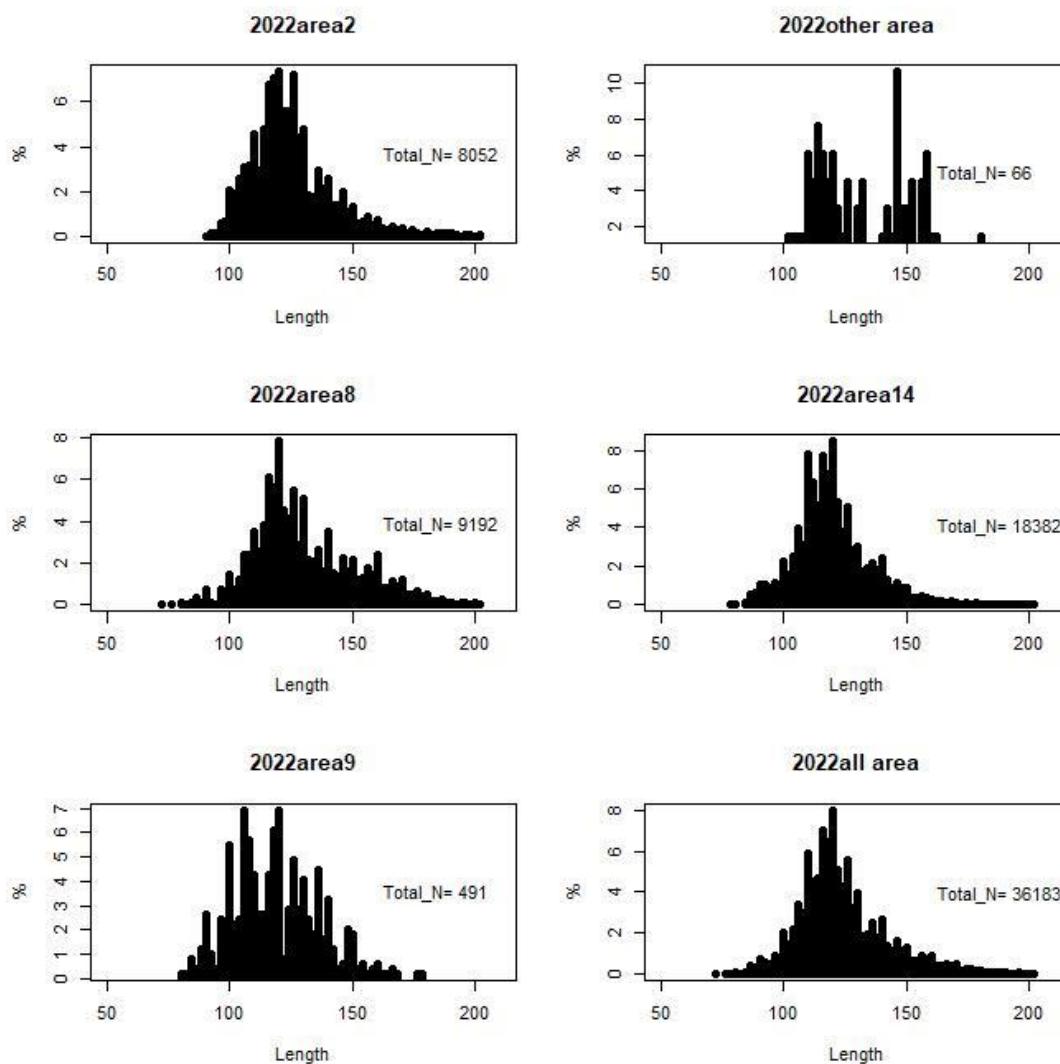


Fig.4 (5) SBT size frequency by area of Taiwanese SBT longline fishery in 2022

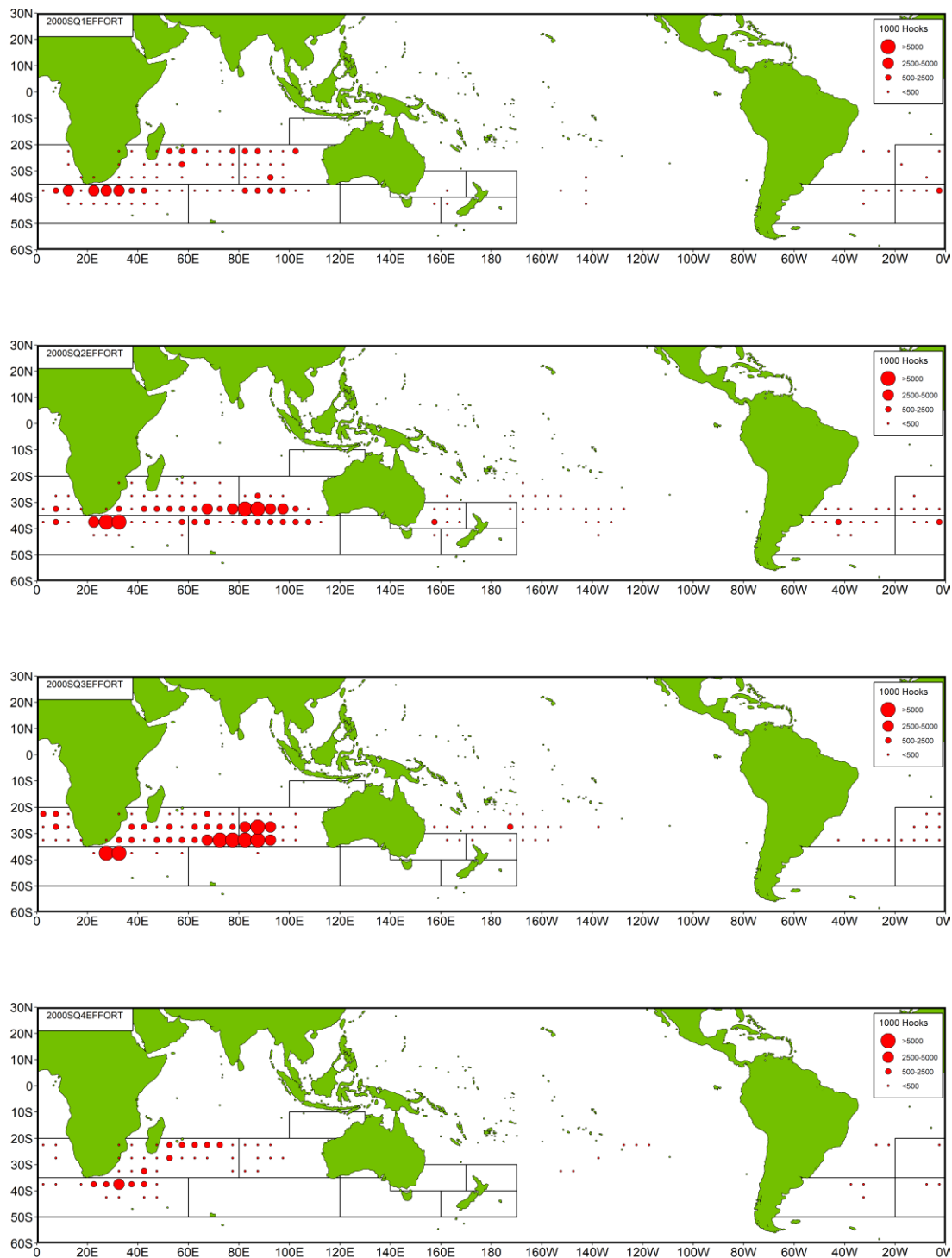


Fig.5 (1) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2000s

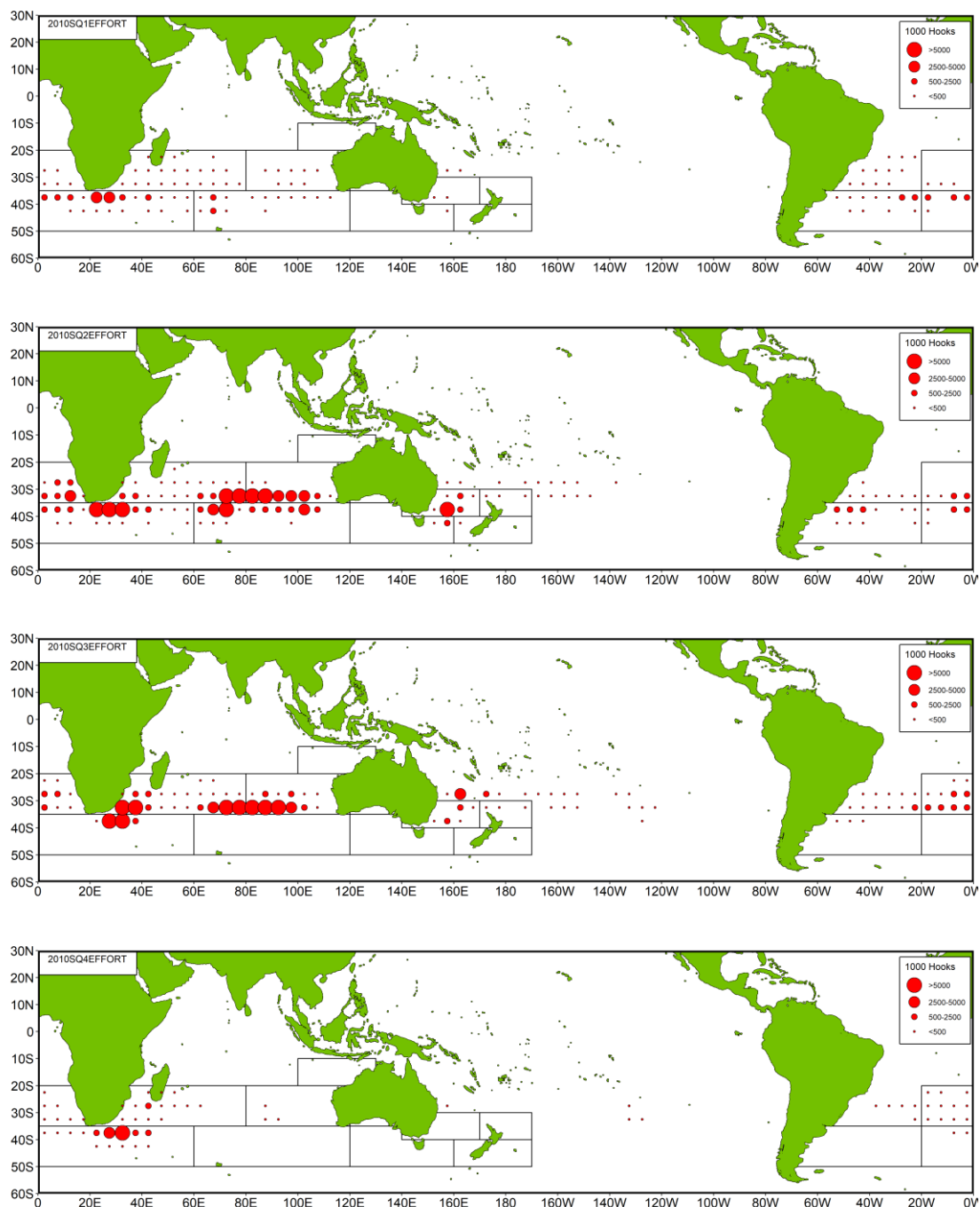


Fig.5 (2) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2010s

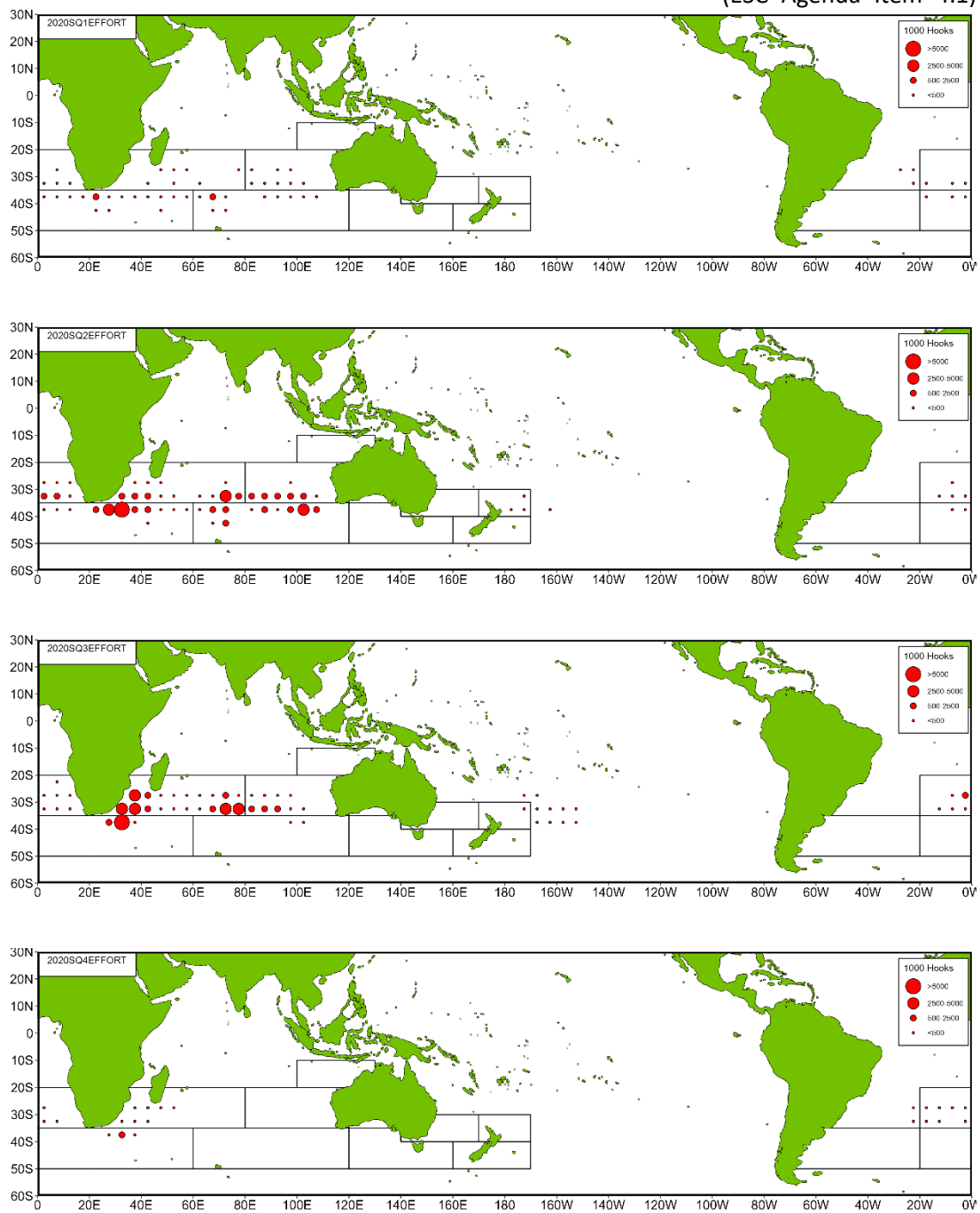


Fig.5 (3) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2020s

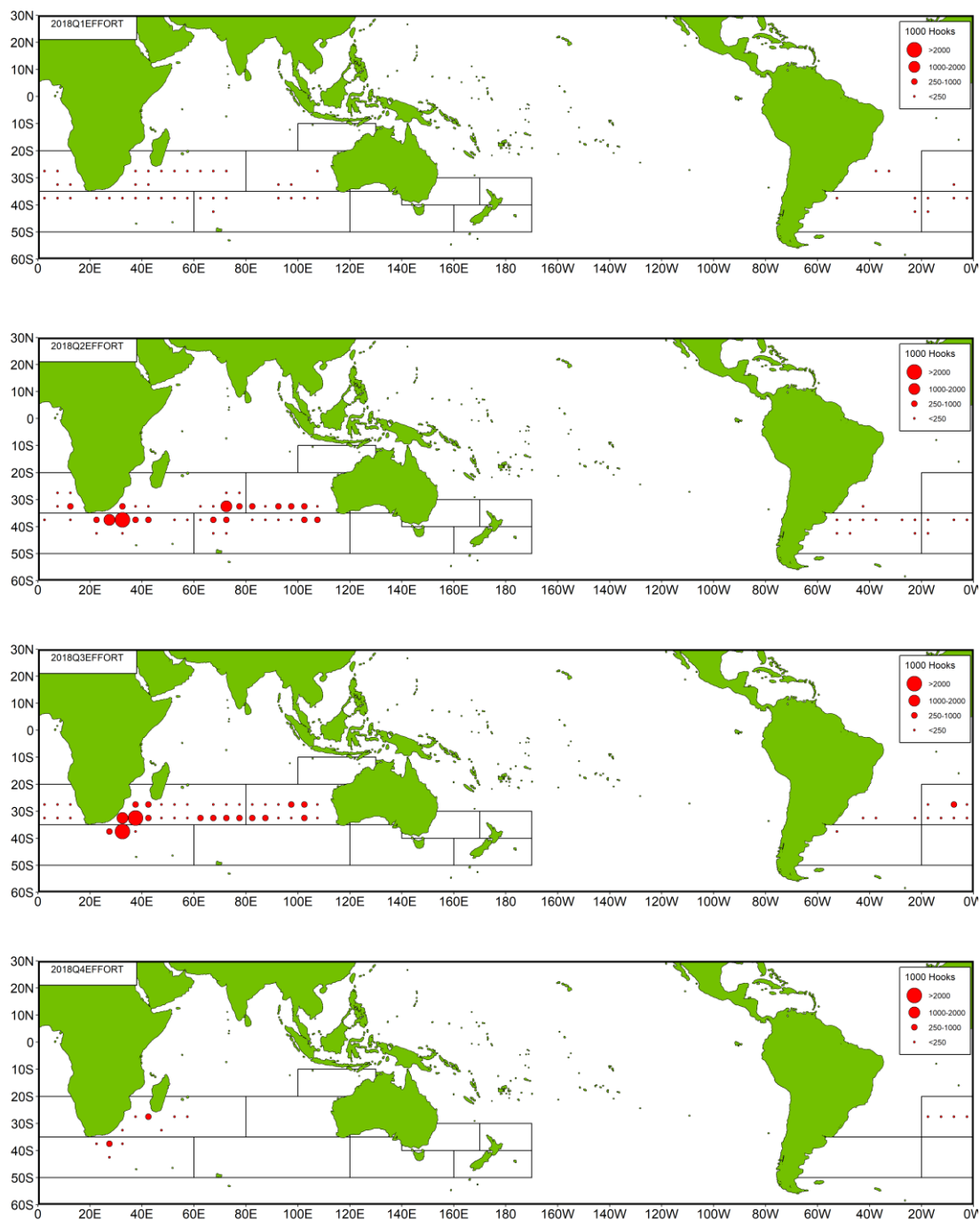


Fig.6 (1) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2018

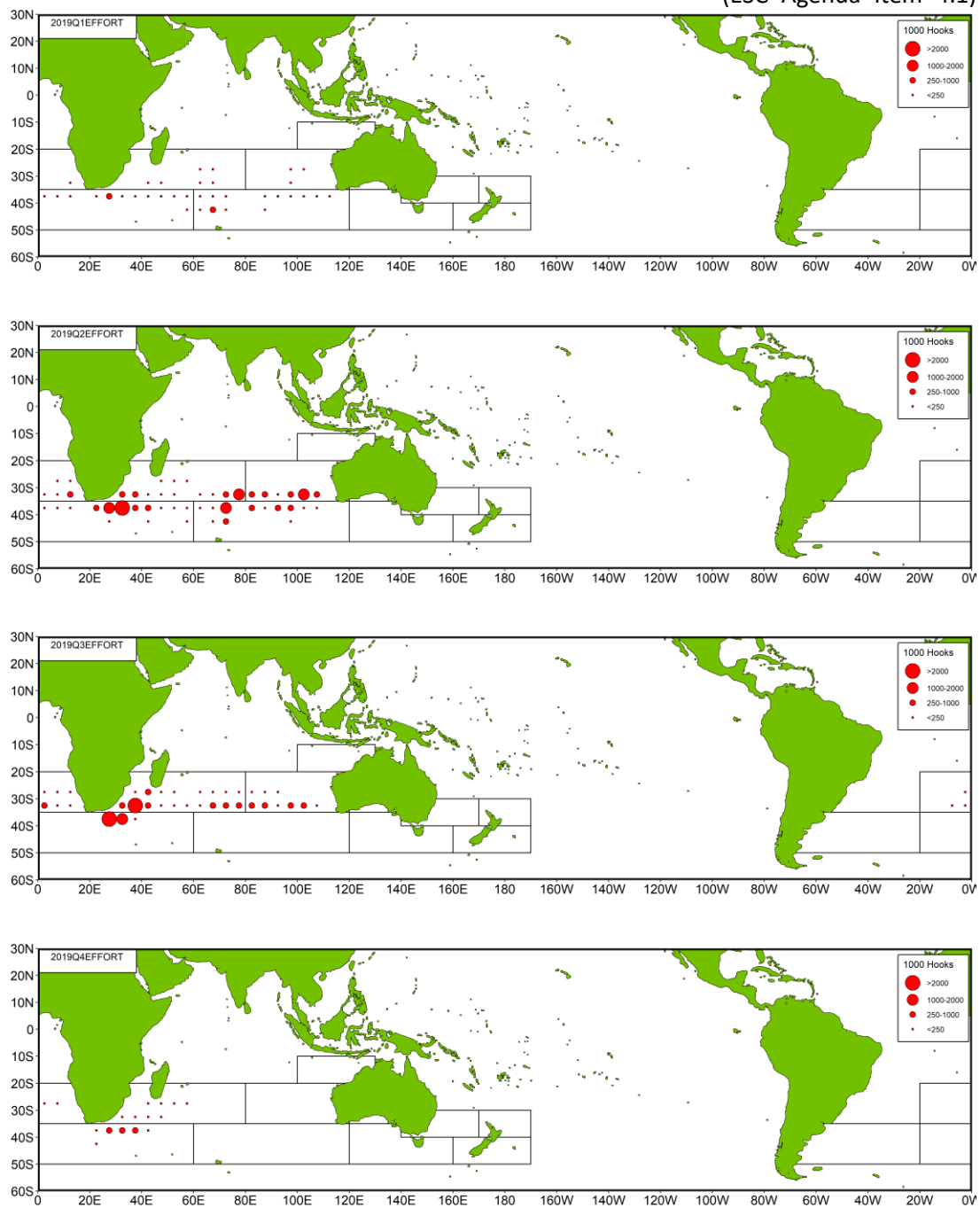


Fig.6 (2) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2019

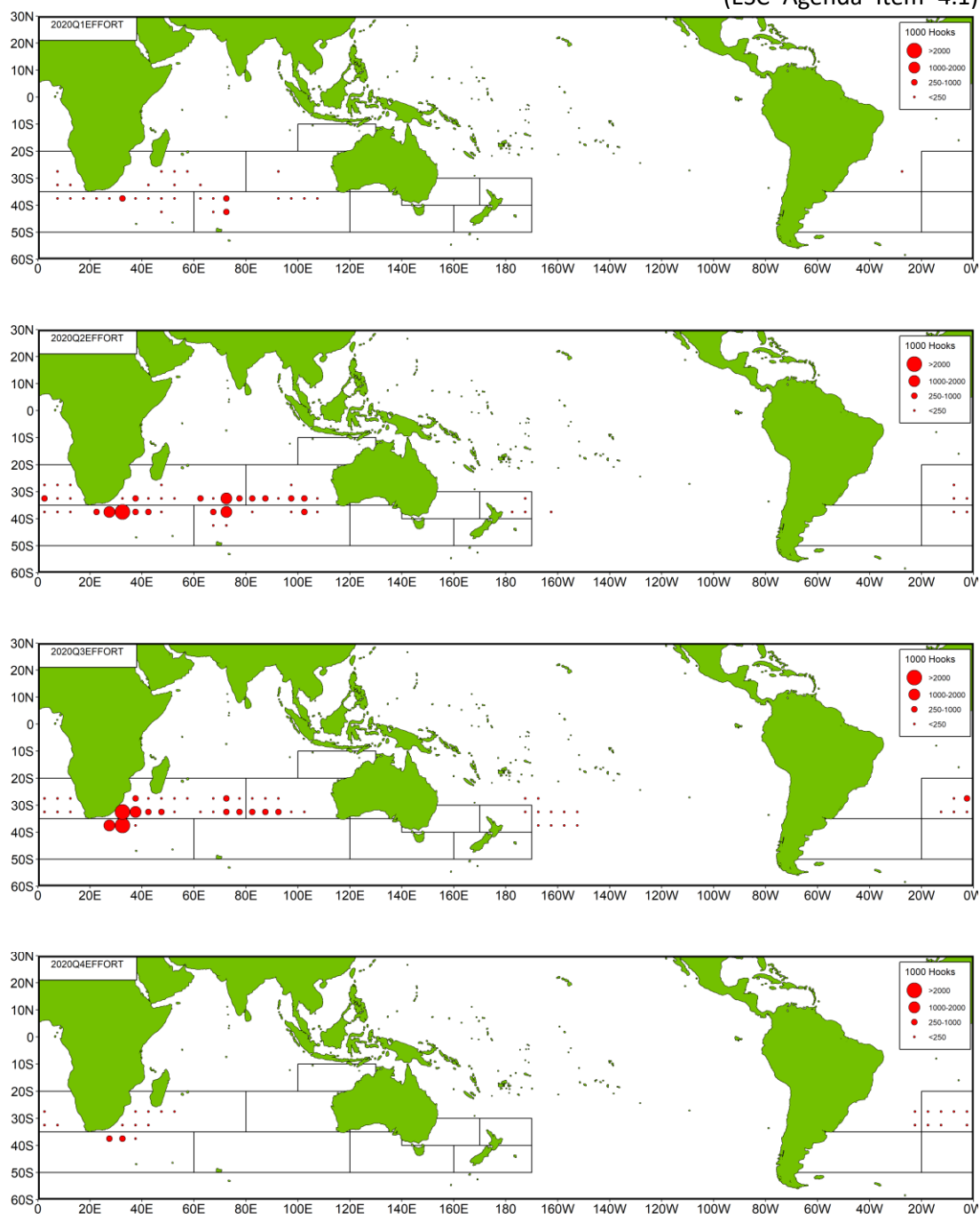


Fig.6 (3) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2020

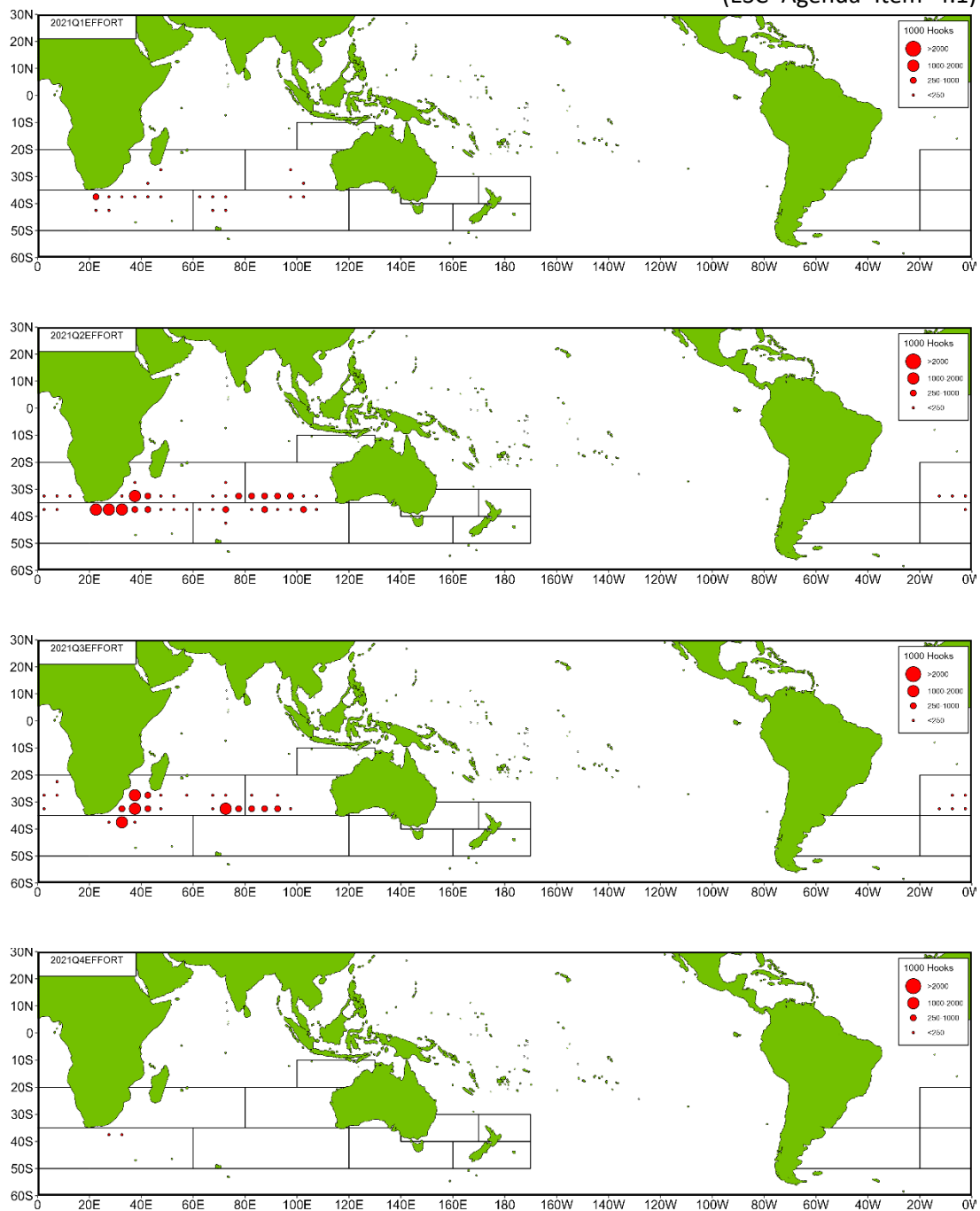


Fig.6 (4) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2021

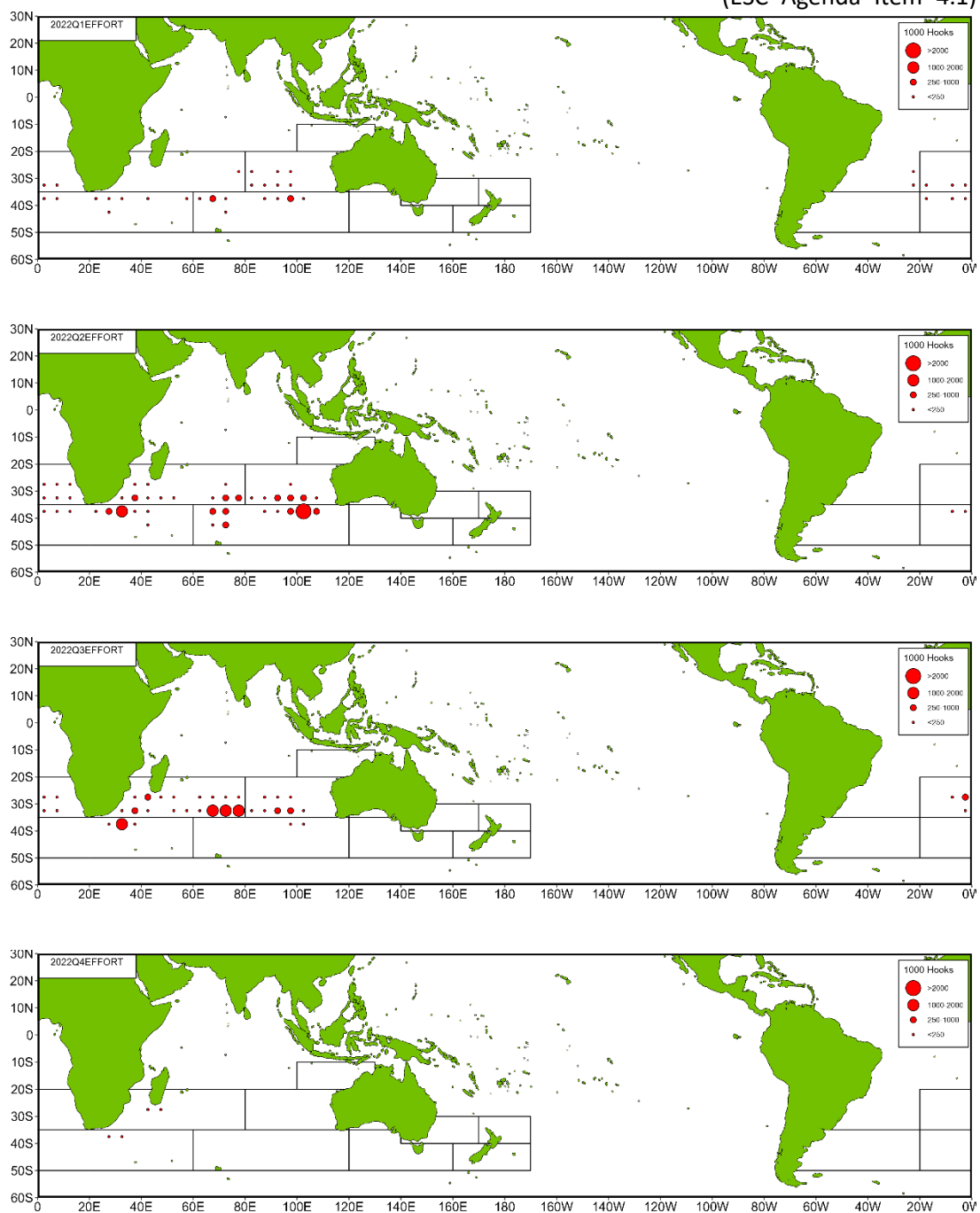


Fig.6 (5) Fishing efforts distributions by quarter of Taiwanese SBT longline fishery in 2022

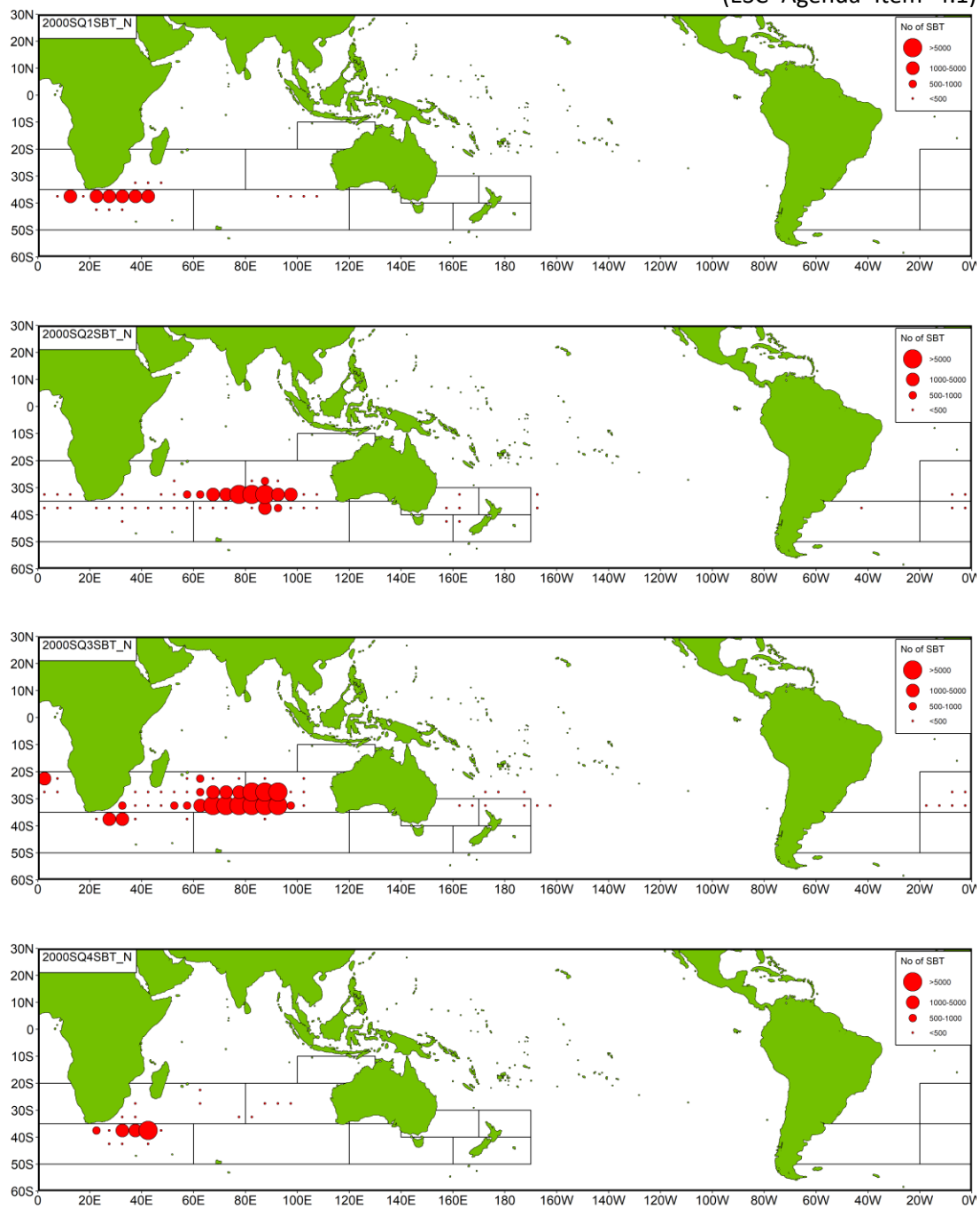


Fig.7 (1) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2000s

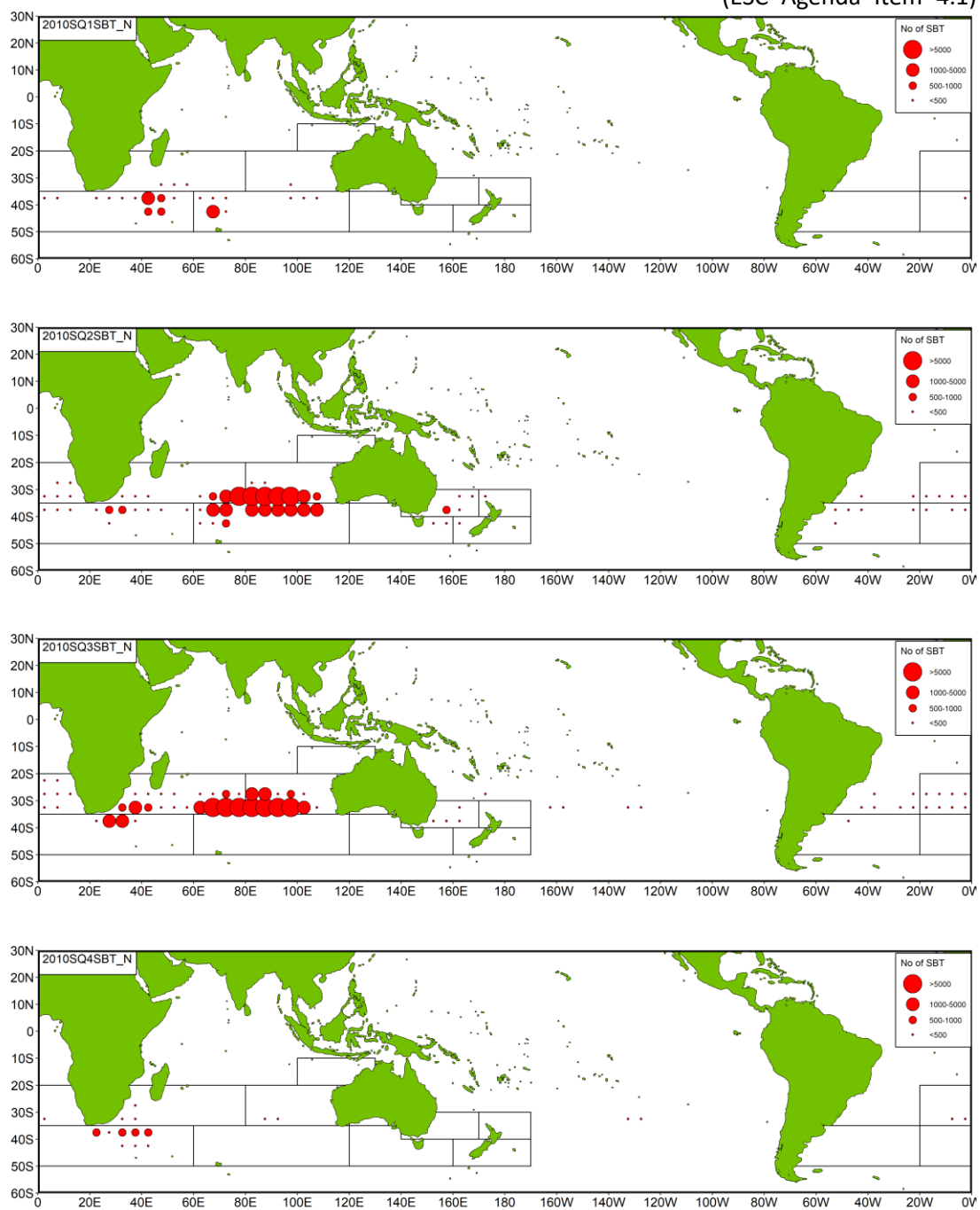


Fig.7 (2) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2010s

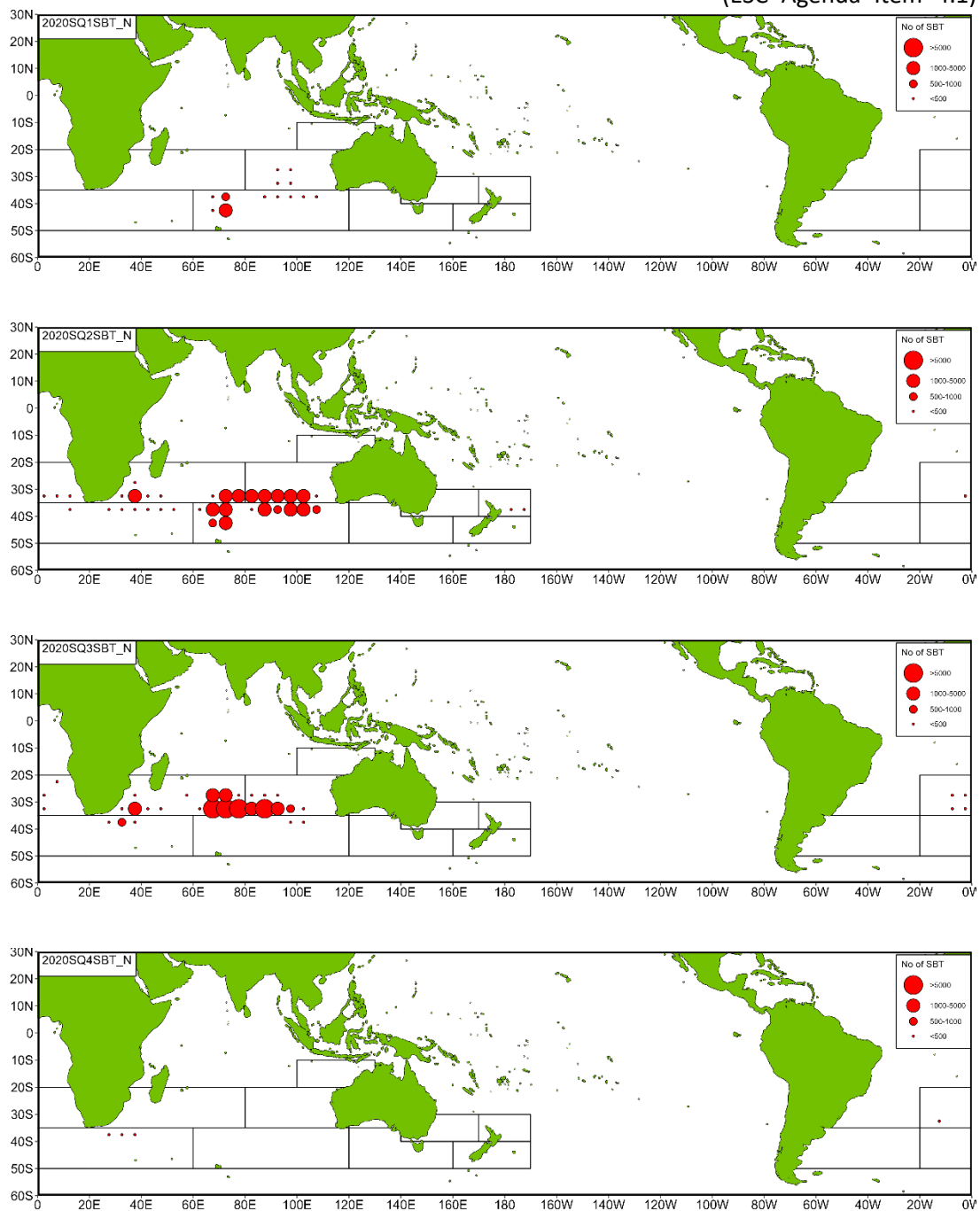


Fig.7 (3) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2020s

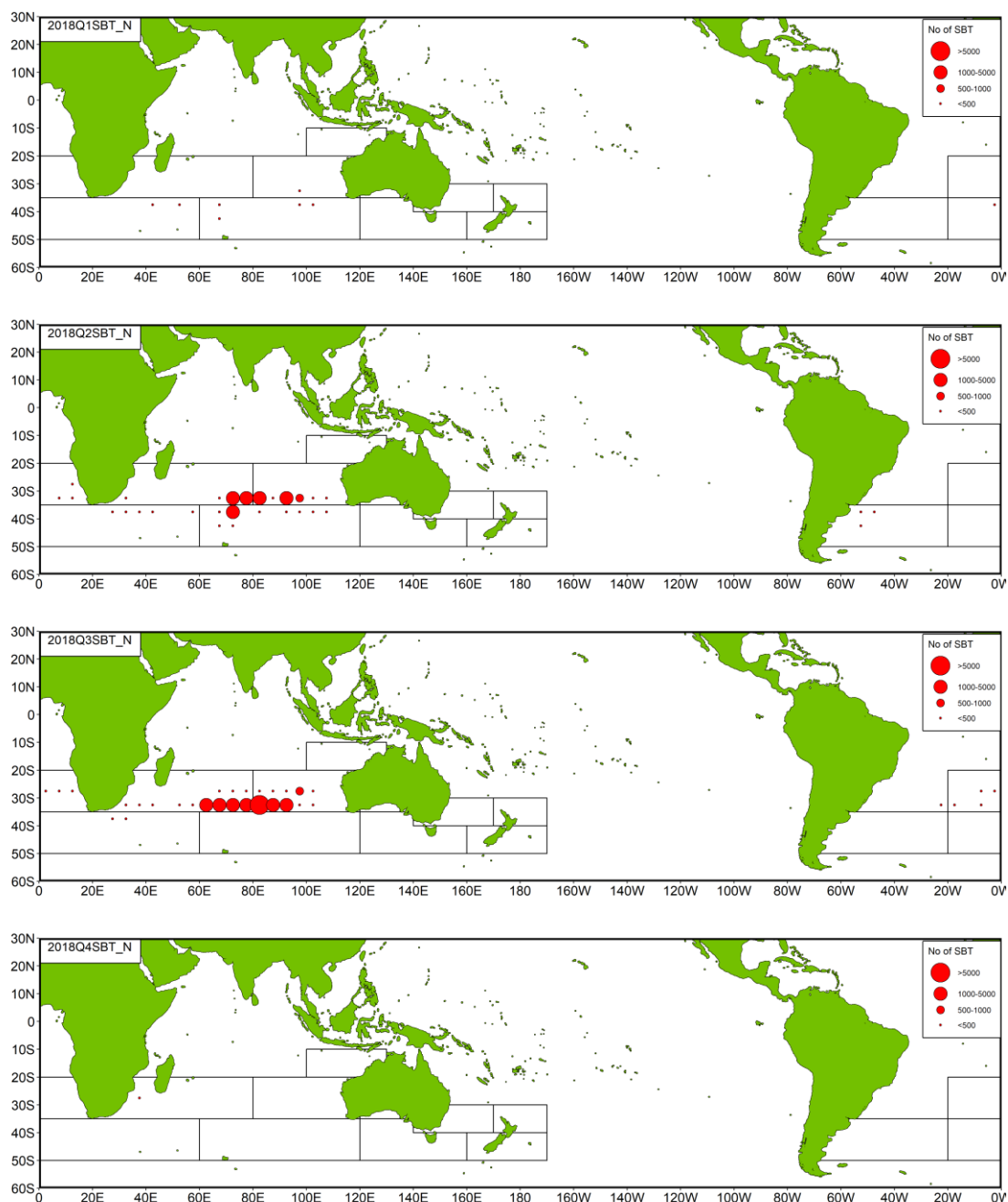


Fig.8 (1) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2018

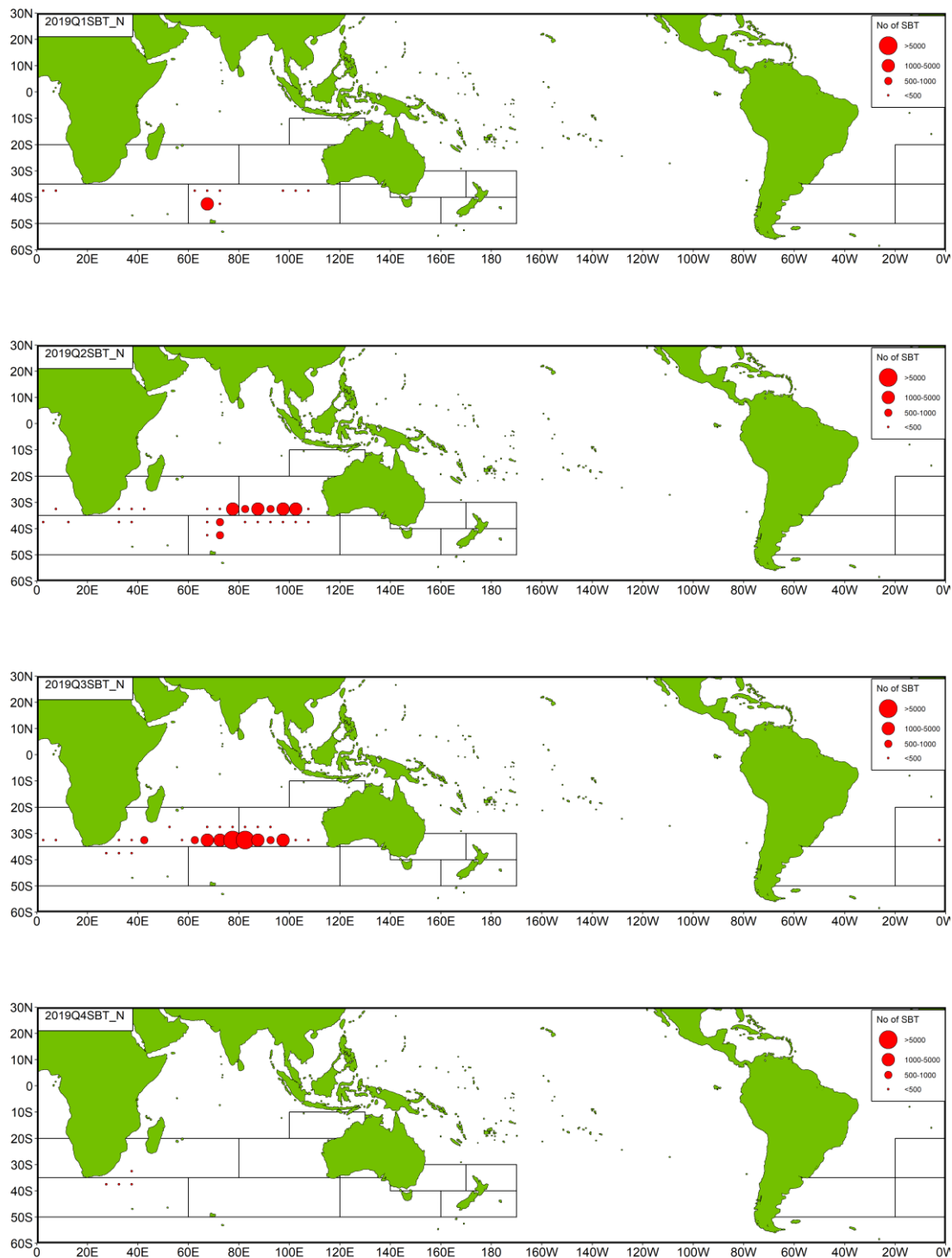


Fig.8 (2) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2019

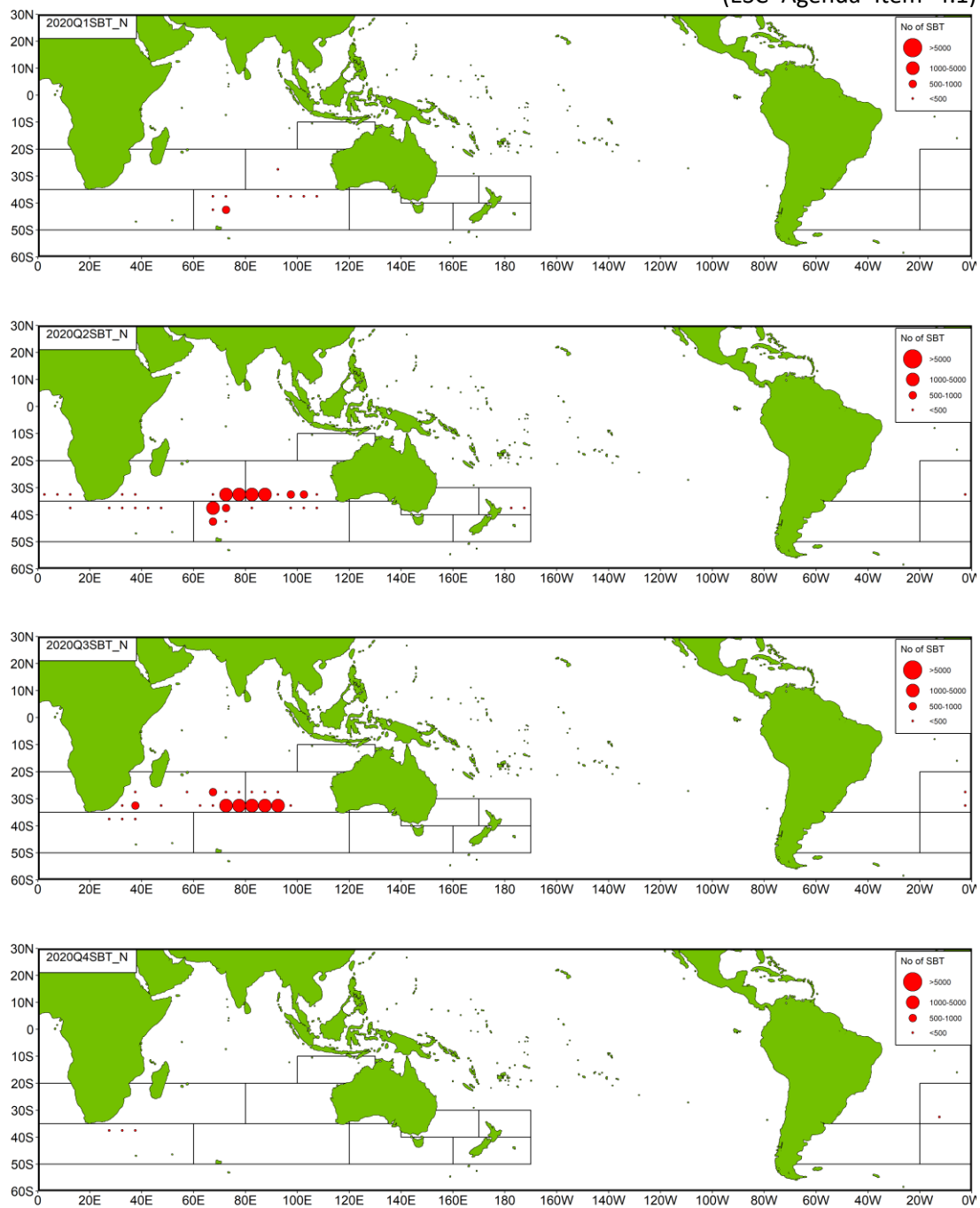


Fig.8 (3) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2020

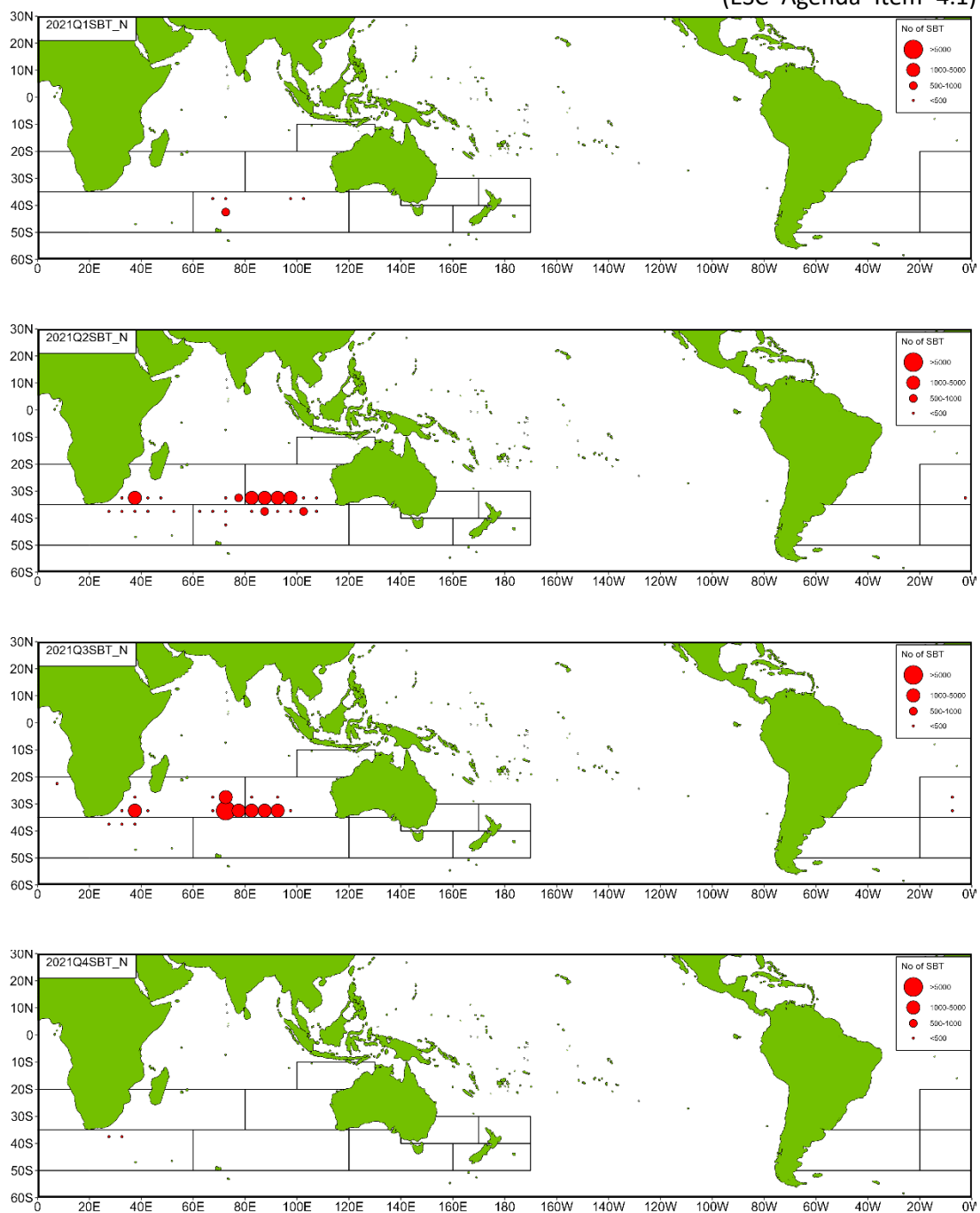


Fig.8 (4) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2021

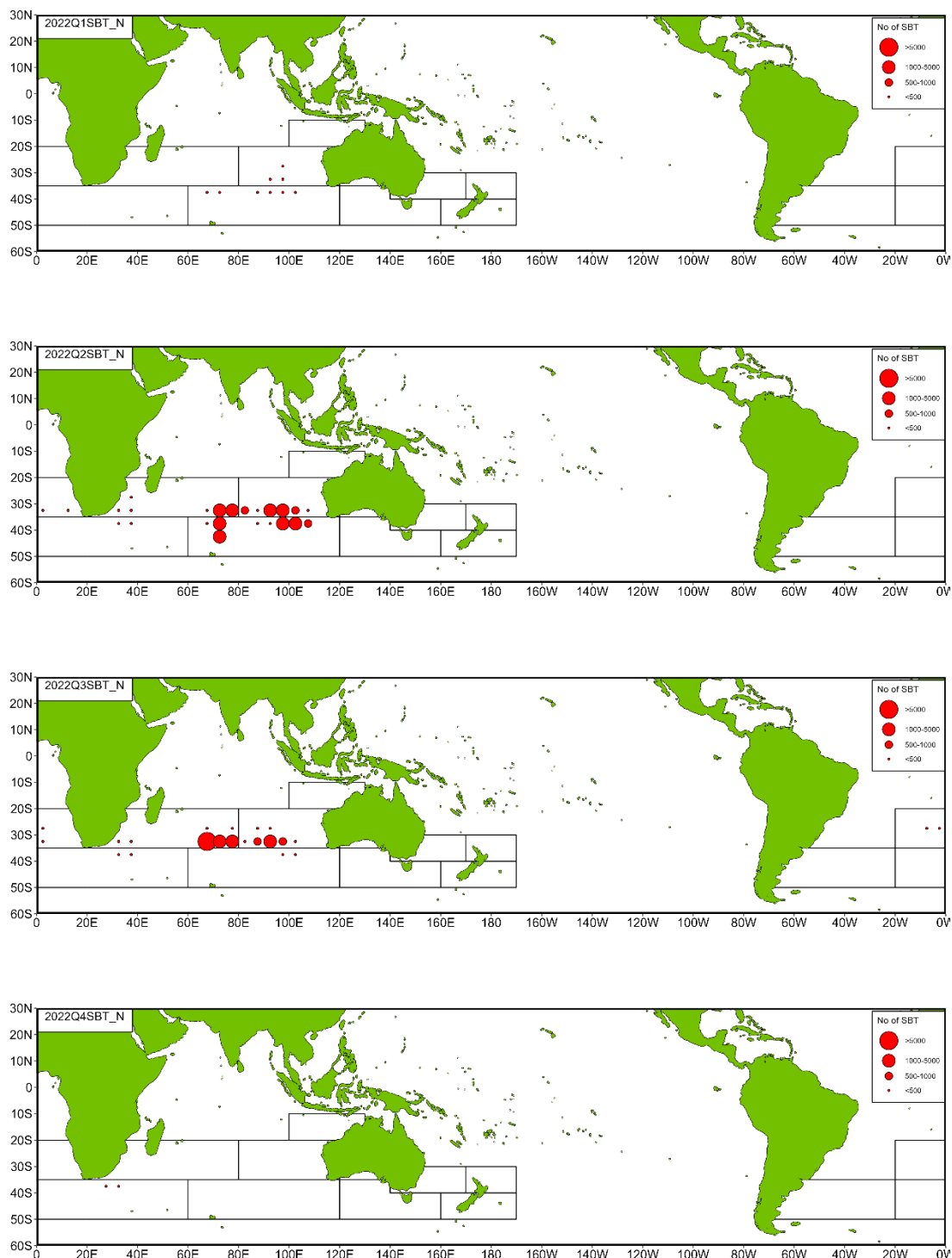


Fig.8 (5) SBT catch (in number) distributions by quarter of Taiwanese SBT longline fishery in 2022

Annex 1

Scientific Observer Program

Observer Training

To collect scientific information of tuna longliners, the scientific observer program of large-scale tuna longline fishery of Taiwan was launched in 2002. After trained, observers started being deployed on board and conducting the observation program of SBT in the following year.

To work in coordination with the FA, the Overseas Fisheries Development Council (OFDC) is responsible for implementing the program and recruiting scientific observers. The Program also invited researchers on fishery sciences and senior observers to form a special panel for designing the observer training program, items of observation, biological and by-catch information to be collected for scientific research and the format of data records.

The qualifications of recruitment for observer is senior high school graduation, with experience on-board preferred. They are also required the competence to live and work at sea. Candidate observers who have passed the oral examination will have to take a 4-week training program, and only those who pass the training program and medical check will be qualified and deployed on board as scientific observers.

Observer training program includes basic safety training for seafaring, operations of navigation devices and VMS system, identification of catch species, sea turtles, seabirds, sharks and marine mammals, sampling skill for muscle tissue, otolith, stomach content and gonad, and data collection for fishing activities, catches and locations, and basically understanding of Conservation and Management Measures and Resolutions of the RFMOs. After 3-weeks training, they are required to undergo at sea training on a training ship for one week and have a test in identifying tuna and tuna-like species at domestic fish market.

In recently, the Program held 2 batches of observer training respectively per year, inviting experts and scholars to provide follow-up trainings on observer safety during maritime navigation, species identification, and sampling. The Program also conducted

observer experiences sharing events periodically, sharing at-sea observation practice, sampling technique, and potential problems that observers might encounter.

Scientific Observer Program Design and Coverage

At the initial stage, for the purpose of encouraging industries to join the observer program, the observed vessels were offered reward catch quota after completing the observation cruise, if they fully cooperated with the observer's duties. However, this measure has been put an end since 2007. It is regarded as the obligation of industries to accept observer on board and the vessels were selected to carry observer by draw a lottery. Since 2008, upon completion of the observation missions, debriefers, served by senior observers, will examine observer's reports to enhance data accuracy.

The threat of Somalia piracy still exists in the tropical Indian Ocean. The same as recent years, most of our observers deployed on fishing vessels which operate in the southern Indian Ocean for the safety of observers, therefore, the observer coverage rate for SBT fishing vessels maintaining stability. In 2021, the deployment of observers was hindered by covid-19 pandemic, thus the observer dispatched on fishing vessels were decrease greatly. However, the observer coverage rate by vessels was still meet the requirements, only for efforts and catches were close approach to 10%.

In 2021 calendar year, 9 observers were deployed on 9 of the 37 fishing vessels authorized to target SBT seasonally, and 3 were deployed on 3 of the 21 fishing vessels authorized to bycatch SBT. There were 2,142 fishing days with 1,343 days observed. And 13 observers were deployed on 13 of the 43 fishing vessels authorized to target SBT, and there were not deployed on fishing vessels authorized to bycatch SBT in 2022 with 2,675 days observed out of 3,089 fishing days. In 2021, the coverage rate of observation was 20.7% by vessels, 8.1% by hooks and 8.5% by catch. The coverage rate was accounted for 23.6% by vessels in 2022, 16.3% by hooks, and 11.7% by catch. To conducting effectively monitoring, it is necessary for FA to considering the sustainable development observer program and budget to reduce the affluence of fishing vessels changing which may involve the coverage rates.

Observer Data Collected

The data recorded by observer on board includes 3 categories: vessel and gear attributes, set details and by-catch/incidental catch information (including sighting of marine mammals, sea turtles and sea birds).

The biological samples, including measurement of weight and length of all fishes during the observation time, and collection of otoliths, muscle tissues, stomach, and gonads of SBT, were carried out by observers on board. Table 2 shows the summary of biological samples collected by observers from 2021 and 2022. The length measurements of SBT in 2021 and 2022 were 3,012 and 4,172 respectively, and the number of otoliths of SBT collected were 29 and 16 in 2021 and 2022. The length measurements by species were summarized in Table 3.

Tag Return Monitoring

The tags retrieved from SBT by Taiwanese fishing vessels are 779 in total among which 693 were released by the CCSBT and 86 tagged by CSIRO during 2002-2021. The details of tag recaptures for each year are shown in Table 4. The returned tags and the related information had been delivered to the CCSBT Secretariat.

Problems Experienced

Although the program was fully supported by boat owners and masters of SBT observed vessels, there are still some difficulties that could not be resolved technically. For example: Sometimes the biological sampling device is damaged, but the homeport is far from the fishing ground, it will take more than 1 month to transport the supplies and equipment needed for sampling from Taiwan to fishing ground, and sometimes the supplies could not reach to observers on board in time. Besides, the samples collected by observers may be lost when they are transferred by transshipping vessels. In addition, it is also difficult to arrange interviews with masters for collecting information on fishing activities since these SBT fishing vessels seldom return to Taiwan when they finished SBT fishing.

Table 1 Summary of observed catch and effort by area and by month
(a) 2021 (calendar year)

| Area* | Month | Numbers of vessels observed | Numbers of all vessels | Cover rate for the number of vessels | Number of hooks used by observed vessels | Number of hooks by all vessels | Cover rate for the number of hooks | Number of SBT observed | Number of SBT by all vessels | Cover rate for the number of SBT |
|---------------|--------------------|-----------------------------|------------------------|--------------------------------------|--|--------------------------------|------------------------------------|------------------------|------------------------------|----------------------------------|
| Area2 | Total | 9 | 24 | 37.5% | 657432 | 3723840 | 17.7% | 2084 | 14986 | 13.9% |
| | 3 | - | 2 | - | - | 17932 | - | - | 0 | - |
| | 5 | 3 | 14 | 21.4% | 72648 | 492330 | 14.8% | 267 | 1316 | 20.3% |
| | 6 | 7 | 22 | 31.8% | 227982 | 1405575 | 16.2% | 542 | 4538 | 11.9% |
| | 7 | 6 | 16 | 37.5% | 253573 | 1138255 | 22.3% | 866 | 5988 | 14.5% |
| | 8 | 5 | 11 | 45.5% | 103229 | 581428 | 17.8% | 409 | 2968 | 13.8% |
| | 9 | - | 1 | - | - | 88320 | - | - | 176 | - |
| | Area8 | Total | 2 | 18 | 11.1% | 145330 | 2457300 | 5.9% | 142 | 4115 |
| 3 | 1 | 9 | 11.1% | 6256 | 459570 | 1.4% | 9 | 1168 | 0.8% | |
| 4 | 2 | 15 | 13.3% | 84463 | 1089270 | 7.8% | 83 | 1136 | 7.3% | |
| 5 | 2 | 13 | 15.4% | 54611 | 792680 | 6.9% | 50 | 1657 | 3% | |
| 6 | - | 5 | - | - | 115780 | - | - | 154 | - | |
| Area9 | Total | 2 | 18 | 11.1% | 11504 | 2466998 | 0.5% | 5 | 604 | 0.8% |
| | 1 | - | 1 | - | - | 91240 | - | - | 0 | - |
| | 2 | - | 1 | - | - | 36300 | - | - | 0 | - |
| | 3 | - | 1 | - | - | 108300 | - | - | 0 | - |
| | 4 | - | 9 | - | - | 337484 | - | - | 47 | - |
| | 5 | 1 | 10 | 1% | 4128 | 767054 | 0.5% | 2 | 164 | 1.2% |
| | 6 | 1 | 7 | 14.3% | 7376 | 376040 | 2% | 3 | 75 | 4% |
| | 7 | - | 7 | - | - | 393380 | - | - | 122 | - |
| | 8 | - | 2 | - | - | 94500 | - | - | 9 | - |
| | 9 | - | 2 | - | - | 87900 | - | - | 54 | - |
| | 10 | - | 1 | - | - | 119100 | - | - | 133 | - |
| | 11 | - | 1 | - | - | 55700 | - | - | 0 | - |
| Area14 | Total | 7 | 42 | 16.7% | 327875 | 5477216 | 6% | 985 | 18132 | 5.40% |
| | 4 | - | 2 | - | - | 29842 | - | - | 0 | - |
| | 5 | - | 7 | - | - | 231826 | - | - | 82 | - |
| | 6 | 7 | 34 | 20.6% | 48555 | 1160957 | 4.2% | 72 | 2373 | 3% |
| | 7 | 4 | 25 | 16% | 167240 | 2024994 | 8.3% | 677 | 9064 | 7.50% |
| | 8 | 3 | 24 | 12.5% | 112080 | 1933079 | 5.8% | 236 | 6479 | 3.60% |
| | 9 | - | 5 | - | - | 96518 | - | - | 134 | - |
| | Grand Total | | 12 | 58 | 20.7% | 1142141 | 14125354 | 8.1% | 3216 | 37837 |

* The areas which with observer deployed.

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(b) 2022 (calendar year)

| Area* | Month | Numbers of vessels observed | Numbers of all vessels | Cover rate for the number of vessels | Number of hooks used by observed vessels | Number of hooks by all vessels | Cover rate for the number of hooks | Number of SBT observed | Number of SBT by all vessels | Cover rate for the number of SBT |
|--------------------|--------------|-----------------------------|------------------------|--------------------------------------|--|--------------------------------|------------------------------------|------------------------|------------------------------|----------------------------------|
| Area2 | Total | 8 | 27 | 29.6% | 634590 | 3174088 | 20% | 1082 | 8052 | 13.4% |
| | 2 | 1 | 3 | 33.3% | 13538 | 30385 | 44.6% | - | 0 | - |
| | 3 | 1 | 5 | 20% | 39074 | 143900 | 27.2% | 11 | 64 | 17.2% |
| | 4 | 1 | 12 | 8.3% | 4080 | 71193 | 5.7% | 3 | 83 | 3.6% |
| | 5 | 6 | 22 | 27.3% | 138712 | 836760 | 16.6% | 114 | 1157 | 9.9% |
| | 6 | 7 | 26 | 26.9% | 159658 | 1066424 | 15% | 360 | 3065 | 11.7% |
| | 7 | 4 | 11 | 36.4% | 150978 | 729076 | 20.7% | 393 | 2863 | 13.7% |
| | 8 | 3 | 6 | 50% | 100774 | 242590 | 41.5% | 160 | 692 | 23.1% |
| | 9 | 1 | 1 | 100% | 27776 | 53760 | 51.7% | 41 | 128 | 32% |
| Area8 | Total | 13 | 37 | 35.1% | 976631 | 6176739 | 15.8% | 764 | 9192 | 8.3% |
| | 3 | 6 | 24 | 25% | 126581 | 1042300 | 12.1% | 33 | 632 | 5.2% |
| | 4 | 11 | 32 | 34.4% | 356235 | 2514175 | 14.2% | 231 | 3281 | 7% |
| | 5 | 13 | 36 | 36.1% | 402129 | 2051031 | 19.6% | 384 | 4015 | 9.6% |
| | 6 | 7 | 18 | 38.9% | 91686 | 522188 | 17.6% | 116 | 1180 | 9.8% |
| | 7 | - | 3 | - | - | 47045 | - | - | 84 | - |
| Area9 | Total | 2 | 11 | 18.2% | 281168 | 2273055 | 12.4% | 42 | 491 | 8.6% |
| | 2 | - | 1 | - | - | 72540 | - | - | 0 | - |
| | 3 | - | 1 | - | - | 118800 | - | - | 0 | - |
| | 4 | - | 1 | - | - | 108000 | - | - | 0 | - |
| | 5 | 2 | 6 | 33.3% | 33962 | 292150 | 11.6% | - | 0 | - |
| | 6 | 2 | 6 | 33.3% | 95873 | 507565 | 18.9% | 17 | 207 | 8.2% |
| | 7 | 2 | 8 | 25% | 89802 | 494000 | 18.2% | - | 16 | - |
| | 8 | 2 | 10 | 20% | 61531 | 412400 | 14.9% | 25 | 74 | 33.8% |
| | 9 | - | 4 | - | - | 132000 | - | - | 44 | - |
| | 10 | - | 1 | - | - | 131100 | - | - | 150 | - |
| | 11 | - | 1 | - | - | 4500 | - | - | 0 | - |
| Area14 | Total | 10 | 38 | 26.3% | 944430 | 5823343 | 16.2% | 2330 | 18382 | 12.7% |
| | 2 | - | 1 | - | - | 9600 | - | - | 0 | - |
| | 5 | 4 | 10 | 40% | 36540 | 150680 | 24.3% | 35 | 24 | 145.8% |
| | 6 | 7 | 30 | 23.3% | 230337 | 1339948 | 17.2% | 579 | 3806 | 15.2% |
| | 7 | 8 | 33 | 24.2% | 424502 | 2622085 | 16.2% | 1386 | 10138 | 13.7% |
| | 8 | 10 | 28 | 35.7% | 194046 | 1197050 | 16.2% | 330 | 4384 | 7.5% |
| | 9 | 2 | 8 | 25% | 59005 | 413580 | 14.3% | - | 30 | - |
| | 10 | - | 4 | - | - | 90400 | - | - | 0 | - |
| Grand Total | | 13 | 55 | 23.6% | 2836819 | 17447225 | 16.3% | 4218 | 36117 | 11.7% |

* The areas with observer deployed.

Table 2 Number of biological samples collected by observers in 2021 and 2022

| Year | | 2021 | 2022 |
|-------------------------|-----------|------|------|
| SBT catch data recorded | | 3216 | 4218 |
| SBT length measured | | 3012 | 4172 |
| Otolith | SBT | 29 | 16 |
| | OIL | 0 | 2 |
| | CEO | 0 | 1 |
| Gonad | SBT | 78 | 44 |
| | LEC | 94 | 114 |
| | OIL | 28 | 43 |
| | CEO | 0 | 7 |
| Muscle | Sharks | 4 | 0 |
| | OIL | 0 | 1 |
| caudal peduncle | Mahi mahi | 44 | 0 |
| | LEC | 93 | 107 |
| | OIL | 28 | 30 |
| | CEO | 0 | 7 |
| head | LEC | 94 | 106 |
| | SWO | 6 | 0 |
| | SBT | 46 | 22 |
| | OIL | 28 | 41 |
| | CEO | 0 | 6 |

Table 3 Number of the length measurements per species by area and by month
(a) 2021

| Area | Area 2 | | | | Area 8 | | | Area9 | | Area 14 | | |
|------------------------------|--------|------|------|-----|--------|------|------|-------|-----|---------|------|-----|
| | 5 | 6 | 7 | 8 | 3 | 4 | 5 | 5 | 6 | 6 | 7 | 8 |
| Albacore | 1160 | 2057 | 1812 | 702 | 66 | 1535 | 1153 | 97 | 2 | 520 | 1705 | 739 |
| Bigeye tuna | 55 | 124 | 124 | 17 | 0 | 1 | 8 | 4 | 1 | 46 | 114 | 145 |
| Pomfrets | 1 | 8 | 15 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 4 |
| Blue shark | 6 | 13 | 18 | 15 | 1 | 15 | 10 | 6 | 6 | 5 | 11 | 9 |
| Butterfly kingfish | 12 | 11 | 0 | 0 | 1 | 37 | 15 | 0 | 0 | 1 | 0 | 0 |
| Rudderfish | 4 | 7 | 11 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 4 | 0 |
| Common dolphinfish | 6 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 6 |
| Opah | 69 | 286 | 194 | 218 | 10 | 160 | 88 | 0 | 0 | 39 | 42 | 28 |
| Escolar | 62 | 229 | 219 | 55 | 0 | 15 | 9 | 3 | 66 | 119 | 363 | 175 |
| Striped marlin | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oilfish | 6 | 13 | 13 | 3 | 0 | 9 | 3 | 13 | 234 | 99 | 446 | 13 |
| Southern bluefin tuna | 267 | 513 | 866 | 409 | 9 | 83 | 50 | 2 | 3 | 72 | 543 | 195 |
| Skipjack tuna | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 0 | 2 |
| Shortfin mako | 9 | 9 | 6 | 2 | 0 | 1 | 2 | 1 | 0 | 0 | 12 | 3 |
| Shortbill spearfish | 0 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| Swordfish | 12 | 14 | 25 | 5 | 2 | 5 | 6 | 0 | 6 | 6 | 38 | 9 |
| Wahoo | 2 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| Yellowfin tuna | 1 | 15 | 0 | 5 | 0 | 0 | 0 | 18 | 0 | 0 | 2 | 6 |

(b) 2022

| Area | Area 2 | | | | | | | Area 8 | | | | Area 9 | | | | Area 14 | | | | |
|-----------------------|--------|-----|----|------|------|------|-----|--------|-------|-------|------|--------|------|------|------|---------|------|------|------|------|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 3 | 4 | 5 | 6 | 5 | 6 | 7 | 8 | 5 | 6 | 7 | 8 | 9 |
| Albacore | 76 | 561 | 32 | 2672 | 1456 | 1196 | 676 | 4198 | 13623 | 11373 | 1514 | 12 | 35 | 95 | 74 | 1055 | 4933 | 4084 | 1729 | 86 |
| Bigeye tuna | 3 | 3 | 1 | 3 | 12 | 36 | 41 | 3 | 18 | 45 | 2 | 9 | 10 | 31 | 39 | 27 | 150 | 394 | 108 | 21 |
| Black marlin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Pomfrets | 0 | 0 | 0 | 2 | 34 | 36 | 26 | 1 | 25 | 50 | 11 | 0 | 1 | 0 | 2 | 0 | 5 | 18 | 5 | 0 |
| Blue shark | 20 | 34 | 0 | 6 | 25 | 29 | 89 | 98 | 181 | 152 | 14 | 8 | 10 | 21 | 23 | 5 | 23 | 58 | 57 | 35 |
| Butterfly kingfish | 0 | 0 | 0 | 11 | 45 | 24 | 3 | 6 | 44 | 65 | 43 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Blue marlin | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rudderfish | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 1 | 6 | 4 | 0 | 0 | 0 | 1 | 5 | 1 | 1 | 3 | 0 | 0 |
| Common dolphinfish | 10 | 32 | 0 | 0 | 0 | 7 | 24 | 4 | 2 | 38 | 2 | 1 | 0 | 0 | 0 | 3 | 13 | 7 | 14 | 0 |
| Opah | 1 | 2 | 11 | 142 | 323 | 876 | 170 | 190 | 631 | 759 | 137 | 4 | 2 | 4 | 2 | 23 | 123 | 300 | 107 | 6 |
| Escolar | 7 | 0 | 1 | 40 | 57 | 96 | 80 | 18 | 49 | 87 | 10 | 425 | 1667 | 1476 | 1364 | 48 | 258 | 660 | 384 | 2051 |
| Striped marlin | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| Ocean sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Oilfish | 0 | 0 | 0 | 3 | 21 | 11 | 12 | 2 | 18 | 21 | 11 | 937 | 4549 | 6530 | 3587 | 3 | 37 | 19 | 186 | 1591 |
| Slender sunfish | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern bluefin tuna | 0 | 11 | 3 | 104 | 359 | 393 | 160 | 33 | 231 | 384 | 116 | 0 | 17 | 0 | 25 | 35 | 555 | 1376 | 330 | 0 |
| Skipjack tuna | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 0 |
| Shortfin mako | 0 | 0 | 0 | 0 | 5 | 4 | 2 | 3 | 7 | 14 | 2 | 2 | 2 | 13 | 7 | 0 | 3 | 14 | 5 | 5 |
| Shortbill spearfish | 2 | 4 | 0 | 0 | 4 | 0 | 2 | 0 | 1 | 5 | 0 | 0 | 1 | 0 | 0 | 1 | 8 | 6 | 6 | 0 |
| Swordfish | 0 | 0 | 0 | 6 | 8 | 7 | 15 | 3 | 8 | 16 | 7 | 19 | 80 | 67 | 74 | 5 | 26 | 57 | 13 | 32 |
| Wahoo | 3 | 16 | 0 | 0 | 1 | 0 | 7 | 0 | 0 | 5 | 3 | 1 | 0 | 0 | 0 | 5 | 36 | 11 | 25 | 10 |
| Yellowfin tuna | 3 | 5 | 0 | 0 | 0 | 0 | 15 | 0 | 3 | 4 | 0 | 3 | 8 | 9 | 12 | 5 | 52 | 19 | 69 | 7 |

Table 4 Number of SBT tag returned during 2002-2022

| Year | Total | | |
|--------------------|------------|------------|-----------|
| | | CCSBT | CSIRO |
| 2002 | 18 | 2 | 16 |
| 2003 | 42 | 24 | 18 |
| 2004 | 133 | 112 | 21 |
| 2005 | 229 | 204 | 25 |
| 2006 | 259 | 253 | 6 |
| 2007 | 40 | 40 | 0 |
| 2008 | 5 | 5 | 0 |
| 2009 | 0 | 0 | 0 |
| 2010 | 27 | 27 | 0 |
| 2011 | 13 | 13 | 0 |
| 2012 | 5 | 5 | 0 |
| 2013 | 5 | 5 | 0 |
| 2014 | 1 | 1 | 0 |
| 2015 | 2 | 2 | 0 |
| 2016 | 0 | 0 | 0 |
| 2017 | 0 | 0 | 0 |
| 2018 | 0 | 0 | 0 |
| 2019 | 0 | 0 | 0 |
| 2020 | 0 | 0 | 0 |
| 2021 | 0 | 0 | 0 |
| 2022 | 0 | 0 | 0 |
| Grand Total | 779 | 693 | 86 |