

**National Report of Taiwan: Ecologically Related Species in the Taiwanese  
Southern Bluefin Tuna Fishery 2016-2017  
Fisheries Agency of Taiwan**

**Summary**

For Taiwanese fishing vessels, only longliner catch SBT. The number of active vessels catching SBT in 2016 and 2017 calendar years were 60 and 75, respectively, covering seasonal target vessels and bycatch vessels.

The annual catches of quota year (from April 1 to March 31) were 1,026 and 1,175 tons for 2016 and 2017, respectively, while the catches of calendar year were 1,023 tons in 2016 and 1,171 tons in 2017.

The observers were sent onboard SBT fishing vessels for collecting and recording catch data and ERS bycatch data. The observer coverage rate has been all above 10% in terms of effort since 2005. In 2016 calendar year, 15 observers were deployed on 15 of the 60 fishing vessels authorized to target SBT seasonally and bycatch vessels. There were 16 observers being deployed on 16 of the 75 fishing vessels authorized in 2017. In 2016, the coverage rate was 25.00% by vessels, 17.45% by hooks and 16.35% by catch. The coverage rate was 21.33% by vessels, 9.99% by hooks, and 11.62% by catch in 2017.

Taiwanese SBT fishing vessels mainly operate in the IOTC area, and partial SBT bycatch vessels operate in the ICCAT and WCPFC area. Therefore, the Fisheries Agency of Taiwan has imposed regulations which are based on the resolutions/recommendations adopted by those organizations and required our longliners to comply with the regulations.

**1. Introduction**

Taiwanese tuna longline fishery has a long development history. 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 and switch to super freezer tuna longline fishing for bigeye tuna and yellowfin tuna, then started fishing SBT seasonally in the early 1990s. In the meantime, some tropical tuna fishing vessels shift southward and mainly operate in the central south Indian Ocean (Area 2 and 14) for SBT during April to September, and some operate in the high seas area off South Africa (Area 14 and 9) for SBT during October to February of the following

year.

This report includes information on ecologically related species (ERS) of Taiwanese SBT fishery collected by scientific observers updated to 2017.

## **2. Review of SBT fisheries**

### ***Fleet size and distribution***

More than 100 vessels had SBT catch records during 1998-2001. Since 2002, Taiwan has become a member of the Extended Commission of CCSBT and agreed on its national quota of 1,140 tons. Taiwan has imposed strict regulations and started to allocate individual quota to each vessel authorized to fish for SBT since 2002. The foregoing vessels are categorized as (1) seasonal SBT-targeting or (2) SBT bycatch vessels. The number of active vessels for SBT from 2002 to 2017 is shown as Table 1.

### ***Distribution of Catch and Effort***

Historically, annual catches of SBT were less than 250 tons in the early 1980s. Thereafter, with the improvement of vessel facilities, the fishing grounds and target species have also been changed. Apart from capturing albacore, some Taiwanese vessels also capture SBT in specific seasons. From 1986 to 1996, annual catch of SBT fluctuated around 400 to 1,450 tons. Since CCSBT has been established, Taiwan, in line with the CCSBT conservation and management measures, voluntarily set up its SBT catch limit at 1996 level of 1,450 tons since 1997. During 1996-2001, the average annual catch of SBT therefore maintain around 1,450 tons. When Taiwan joined CCSBT in 2002, it compromised by reducing 310 tons from its original self-restraint catch limit, and set up the annual catch quota to 1,140 tons. In 2006, CCSBT adopted TAC arrangement based on binding allocated catch limits for 2007-2009, and Taiwan's catch quota has been fixed in 1,140 tons. For the 2010 and 2011 fishing season, the communion quota was 1,718 tons. The allocations of quota from 2012 to 2015 were 911 tons, 948 tons, 1,045 tons and 1,215.675 tons, respectively.

In 2016 and 2017 quota years, Taiwan's national allocations were 1,140 tons and 1,229.28 tons, respectively. The higher quota in 2017 was because of the unused allocation from 2016 (89.28 tons) that was carried forward to the 2017 quota year. The total catch of each quota year (from April 1 to March 31) was 1,026 and 1,175 tons for 2016 and 2017, respectively, while the catch of each calendar year was 1,023

tons in 2016, and 1,171 tons in 2017. The annual catch of SBT by gear from 1969 to 2017 is provided in Table 2.

The fishing locations of SBT fishing vessels are mainly concentrated in the waters of 30°S - 40°S in the Indian Ocean and the waters adjacent to the Atlantic Ocean. The catch distribution of the calendar year from 2013 to 2017 is shown in Fig. 1.

### **3. Fisheries Monitoring for Each Fleet**

Taiwan has been continuously exerted intensive efforts for monitoring the SBT fishery through the following measures:

- (1) Since April 2002, vessels authorized to fish for SBT have been required to install VMS equipment in order to monitor the positions of the vessels.
- (2) Weekly report for SBT catch is required for submission to the Fisheries Agency (hereafter referred to as FA) of Taiwan through Taiwan Tuna Association. From 2002, provision of such information as daily catch, fishing location and discards is required in the weekly report when applying for SBT statistical document. Since 1 January 2010, the CCSBT SBT Statistical Document has been replaced by the CCSBT Catch Documentation Scheme (CDS). When fishers apply for validation on CDS, the officials authorized by the FA of Taiwan shall check all of the above information consistent with the real catch. Since April 2015, all SBT authorized fishing vessels have been required to report their fishing data through E-logbook system, and data fields of E-logbook are the same as the paper logbook. The weekly catch reports of individual fishing vessel is thus terminated due to the E-logbook system has been conducted routinely.
- (3) The FA of Taiwan has designated two foreign ports (Port Louis and Cape Town) for SBT transshipment and landing since March 2010 and has prohibited transshipment and landing at other foreign ports. Government officials stationed at Port Louis and Cape Town are responsible for inspecting and supervising all SBT catch. Any catch without inspection by the officials shall not obtain validated catch document.
- (4) Besides, the FA of Taiwan has designated fishing port of Qianzhen in Kaohsiung for domestic SBT unloading port by carrier vessels or fishing vessels. Since September 2009, the FA of Taiwan has dispatched officials to

supervise all of the SBT catch. Only for those catch are verified, the officials of the FA of Taiwan shall validate catch documents.

- (5) In case of transshipment at sea, regional observer of IOTC, ICCAT boarding on carrier vessel shall observe if all of SBT transshipped quantities consistent with the reported catch in the transshipment declaration since 1 April 2009. Besides, catch data were also verified by scientific observers on board. With exception of 2008 and 2011, the observer coverage rate was all above 10% in terms of effort since 2005. In 2008, due to high fuel price, fishing vessels reduced visiting ports and meeting with carrier vessels, it is difficult to dispatch observer onboard. Then in the 2011 quota year, because of the increasing threat of Somalia piracy, considering the safety of observer, the FA of Taiwan stopped dispatching observer on board in the Indian Ocean until the end of December. Since 2012, due to the above mentioned reason, the FA of Taiwan has suspended dispatching observers to the tropical area of India Ocean, instead the observers have been assigned to the southern India Ocean. Therefore, the observer coverage rate has increased in the southern India Ocean. In the 2016 calendar year, 15 observers were deployed on 15 of the 60 fishing vessels authorized to target SBT seasonally and bycatch vessels. There were 16 observers deployed on 16 of the 75 fishing vessels authorized in 2017. In 2016, the coverage rate of observation was 25.00% by vessels, 17.45% by hooks and 16.35% by catch. The coverage rate was accounted for 21.33% by vessels in 2017, 9.99% by hooks, and 11.62% by catch. The summary of observed catch and effort by area and month during 2016-2017 are provided in Table 3. In addition to catch data, observers also collected and recorded ecologically related species (ERS) data, such as seabirds, sea turtles, marine mammals, and sharks data. Besides, mitigation measures adopted by fishing vessels shall be recorded.
- (6) Besides, Patrol boats were also dispatched to inspect Taiwanese fishing vessels operating in the three oceans. In 2008, two SBT fishing vessels were boarded and inspected by patrol boats. It accounts for 4.9 % of the Taiwanese SBT fishing vessels. In 2009, five SBT fishing vessels were boarded and inspected. It accounts for 7.5 % of the Taiwanese SBT fishing vessels. Since 2010, due to the threat of Somalia piracy and for safety consideration, no patrol boat was dispatched to the Indian Ocean for

inspection.

- (7) There are penalties for over catch, illegal transshipment, unloading catch at any non-designated ports, and any violation of regulations.
- (8) The seabird mitigation measures taken during each fishing operation of fishing vessel shall be recorded in the e-logbook and logbook since 20 January 2017.

#### **4. Seabirds**

In 2016, 19 seabirds were observed incidentally caught by SBT vessels, among which three were live released and 16 were discarded. In 2017, 11 seabirds were observed incidentally caught by SBT vessels, among which two were live released, and nine were discarded. The distribution of observed seabirds bycatch by SBT vessels were shown in Fig. 2, and the yellow-nosed albatross (TQH) were the most common species in 2016 and 2017.

Table 4 and Table 5 shows the bycatch (capture) rate and mortality rate by CCSBT statistical areas for each seabird species observed by observers in 2016 and 2017, respectively. The seabird bycatch mitigation measures used on these observed vessels, include bird-scaring lines, nighttime setting, weighted branch-lines. Vessels operate southern of 25°S are required to use at least two mitigation measures. The proportion of observed effort that apply specific mitigation measures is shown in the Table 4 and Table 5.

#### **5. Other Non-target Fishes**

For Taiwanese SBT vessels, the main catch is albacore and SBT. Other non-target fishes include bigeye tunas, yellowfin tunas, sharks, and billfishes. For shark species, blue shark was observed as the most dominant species captured, which accounts for 85.56% in 2016, and 81.18% in 2017. The CPUE and total number of sharks caught by area from 2016-2017 were shown in Table 6 and Table 7.

#### **6. Marine Mammals and Marine Reptiles**

According to observer records in 2016-2017, there was no bycatch of cetaceans and sea turtles recorded for the SBT vessels.

#### **7. Mitigation Measures to Minimize Seabird and Other Bycatch Species**

##### **Current Measures**

➤ ***Mandatory Measures for Each Fleet***

Taiwanese SBT fishing vessels mainly operate in the IOTC area, and partial SBT bycatch vessels operate in the ICCAT and WCPFC area, so that the FA of Taiwan has imposed relevant regulations which are based on the resolutions/recommendations adopted by these organizations, and has required the fishers to comply.

➤ ***Seabird***

The FA of Taiwan has introduced a regulation which requires vessels fishing at the areas of southern than 30°S to deploy a tori line to reduce seabird incidental catch since 2004<sup>1</sup>. Besides, in line with the IOTC Resolution 08/03 on reducing the incidental catch of seabirds in longline fisheries, all Taiwanese longline vessels fishing south of 30°S shall use at least two of the mitigation measures (tori line, weighted branch line, or night setting) in consistence with the Resolution since 2009.

Since 2010, IOTC requests the longline vessels fishing in the area south of 25°S in Indian Ocean shall use at least two different mitigation measures including tori line and one other measure, such as nighttime setting, weighted branch lines, offal discharge control or line shooting device in consistence with Resolution 10/06. In consistence with the Resolution 12/06, the FA of Taiwan has amended the relevant regulations to request fishing vessels operating in the area south of 25°S in Indian Ocean to use at least two of the three mitigation measures, i.e., nighttime setting with minimum deck lighting, tori lines, or line weighting from 1 July 2014. In addition, fishers shall fill out the specified form regarding the measures adopted by its vessels with photos of the finished mitigation measures and inform the FA of Taiwan in advance of one month of the vessel fishing south of 25°S in the Indian Ocean. Government officials stationed at Port Louis and Cape Town shall examine the tori line by random and request fishers to make rectification so as to be consistent with the resolution.

Besides, in accordance with ICCAT's recommendation 2011-09, the FA of Taiwan imposed regulation requiring all Taiwanese longline vessels fishing south of 25°S in the Atlantic Ocean have to use tori lines and line weighting as the mitigation measures, with between 20°S to 25°S that tori lines as compulsory.

In accordance with WCPFC CMM 2012-07, Conservation and Management

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<sup>1</sup> Vessels operating in South of 30 ° S must be installed tori line. See "Regulations for fishing vessels catching southern bluefin tuna in three oceans of 2004 (2003.11.28.Code 0921331476)"

Measure to mitigate the impact of fishing for highly migratory fish stocks on seabirds. The FA of Taiwan has required firms and industries to take appropriate measures in accordance with the NPOA-seabird to mitigate incidental catch of seabirds. Furthermore, according to the domestic regulations, fishing vessels operating in south of 30°S are required to employ at least two seabird mitigation measures, one should be tori lines, the other should be one of those including: weighted branch lines and nighttime setting with minimum deck lighting. Incidentally caught seabirds are encouraged to release alive. For this purpose, fishing vessels are required to carry de-hookers and line cutters on board.

➤ ***Sea turtle***

To conserve sea turtles, the FA of Taiwan has publicized domestic management regulations since 2006, which requires fishing vessels to carry necessary devices on board during voyage or operation periods, such as dig nets, de-hookers and line cutters, for appropriate release of incidentally-caught sea turtles. The incidentally caught individuals shall be released alive, and the operators shall record all incidents involving marine turtles during fishing operations in their e-logbooks and logbooks.

In addition to the above mentioned regulations, the FA of Taiwan has imposed “WildLife Conservation Act”, forbidding fishers to capture or possess the following kinds of sea turtles, which include green turtle, loggerhead turtle, olive ridley turtle, leatherback turtle and hawksbill turtle. The incidentally caught sea turtles must be released and the fishers are required to record this event in the e-logbook and logbook.

➤ ***Shark***

According to the Recommendations/Resolutions adopted by ICCAT and IOTC, the FA of Taiwan has applied mandatory regulations since 2005 to require its authorized vessels fishing in the Atlantic Ocean and the Indian Ocean not to have onboard fins that total more than 5% of the weight of sharks onboard, up to the first point of landing. The regulation has subsequently applied to the fleets operating in the Pacific Ocean since 2006. Besides, since 2008, the FA of Taiwan has imposed a regulation to prohibit *Rhincodon typus* (whale shark) to be captured, possessed and sold.

In line with IOTC Resolution 10/12 and 12/09, the FA of Taiwan has required that fishers operating in the Indian Ocean not to retain on board, transship, land, store,

sell or offer for sale any part or whole carcass of all species of the thresher shark family, Alopiidae, since 2011. In addition, according IOTC Resolution 13/06, the FA of Taiwan has revised the requirement to prohibit vessels from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of oceanic whitetip shark since September 1 , 2013. In line with IOTC Resolution 17/05, for any tuna longline fishing vessel operating in India Ocean employing ice chilling method to preserve its sharks catches, shark fins shall naturally attached to the carcasses, and such vessels shall not retain onboard, carry, transship, and land shark catches whose fins are not naturally attached since January 2018.

Besides, based on the ICCAT Recommendations 2009-07, 2010-07, 2010-08, 2011-08 and 2012-05 on sharks, the FA of Taiwan have enacted and revised periodically various domestic regulations, including prohibiting our vessels operating in the Atlantic Ocean from capturing hammerhead sharks (family Sphyrnidae), oceanic whitetip sharks (*Carcharhinus longimanus*), thresher sharks (family Alopiidae), and silky sharks (*Carcharhinus falciformis*).

To further conserve shark resources, the FA of Taiwan adopted the fins attached regulations in January 2012. Starting from January 2013, fishing vessel over 100 tons employing freezing method to preserve their catches are requested to implement regulations of shark fins naturally attached to the carcass, and fishing vessels less than 100 tons employing freezing method to preserve their catches are requested to implement regulations of shark fins naturally attached to the carcass or tied to the carcass when landing in our ports.

### ***Voluntary Measures for Each Fleet***

No information.

### ***Measures under Development/Testing***

For mitigation of sea turtle bycatch for tuna longliner, the FA of Taiwan has collaborated with the United States of America for circle hook experiment in the Atlantic Ocean from September 2012 to May 2013. Both sides presented a joint paper to the ICCAT SCRS meeting in July 2013. This research has been published in Marine Policy in 2016<sup>2</sup>.

In 2013, the FA commissioned scholars to collaborate with South Atlantic

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<sup>2</sup> Huang, Hsiang-Wen, et al. "Influence of hook type on catch of commercial and bycatch species in an Atlantic tuna fishery." *Marine Policy* 65 (2016): 68-75.

albacore targeting vessel to perform studies on the effectiveness of combined mitigation measures, such as use of tori line, weighted branch-lines, and nighttime setting.

## **8. Public Relations and Education Activities**

### *Public Relations Activities*

- (1) The FA of Taiwan has distributed posters, sheets and booklets for guidance of mitigation measures of reducing seabird bycatch, shark full utilization, and species identification for seabirds, sharks and sea turtles to fishers (CCSBT/0402/Info28).
- (2) For sea turtles, the FA of Taiwan encouraged fishers to carry dip net and line clipper on board to safely release sea turtles. Meanwhile, the FA of Taiwan also distributed 3,000 copies of posters entitled “Release the sea turtle incidentally caught” to our fishers in 2003.
- (3) In 2004, the FA, the Chinese Wild Bird Federation, and Birdlife International held a conference in Kaohsiung on the reduction of longline seabird bycatch and exchanged opinions with representatives from the USA, Japan, and Birdlife International, among others. Besides, the FA cooperated with Birdlife International, the Chinese Wild Bird Federation, and the International Seafood Sustainability Foundation (ISSF) in the “Mitigation of seabird bycatch workshop” held in Kaohsiung in 2013. Experts from the United Kingdom, the USA, and Japan were invited to extensively exchange experiences and opinions with representatives from the industry, government, and academia in Taiwan on issues regarding mitigation devises to avoid seabird bycatch by tuna longline vessels and on possible directions for future cooperation.
- (4) In order to avoid incidental catch of sea birds, sea mammals and sea turtles by deep-sea fisheries, Taiwan government sponsored the World Wildlife Fund (WWF) international and Chinese Wild Bird Federation to hold the International Smart Gear Competition Judges Workshop in Taiwan in September 2007. After the workshop, the FA of Taiwan hosted a forum inviting the international experts and the related industries to discuss how to mitigate bycatching species during fishing operation.

- (5) The FA of Taiwan published a seabird identification guideline in 2009 and a shark identification pamphlet for the observer training and for the related staffs training in 2011. Besides, the FA of Taiwan published shark identification pads, 2,000 copies of which were distributed to fishers in 2011.
- (6) For disseminating shark fins naturally attached policy, the FA of Taiwan distributed posters, brochures and CDs for fishers, the related fisheries associations and managers for further understanding the regulation and the practical processes of implementing the policy in January 2012.
- (7) Fisheries journal as “New Fisheries” and magazines are published and distributed domestically and overseas to fishers, the related fisheries associations/organizations, and managers.
- (8) All local governments and related fisheries associations/organizations have been required to strengthen the knowledge to fishers. Besides, broadcasting for educating fishers through the professional fisheries radio station has been conducted regularly. The related information has been passed on to ship masters and crews during observer trips and while in ports.

### *Education*

- (1) The FA of Taiwan had authorized Wild Bird Federation Taiwan (WBFT) to implement a fishers’ education program for mitigating seabird bycatch in 2005. The WBFT conducted an educational program for Taiwanese fishers in the Port Louis, Mauritius in the fall of 2005. The program was the first trial to discuss the bycatch problems and the efficiency of mitigation measures with fishers in their cabins.
- (2) Candidate observers who have passed the oral examination will have to take a 3-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, mini-log thermometer and VMS system, identification of tuna, tuna-like 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. After the training program, 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 local fish markets.

- (3) In addition to the above mentioned posters, brochures, and CD, the FA of Taiwan has held a series of education training for fishers, the related association and managers for promoting shark fins naturally attached since January 2012.
- (4) In order to improve the skills to identify the bycatch seabirds from photographs, the FA of Taiwan cooperated with Birdlife International through a collaborative seabird identification training project. In 2014, supporting by BirdLife International, the FA of Taiwan sent an expert to New Zealand to learn the seabird ID method through seabird necropsy and photo ID technique and on-vessel seabird identification techniques.
- (5) From 2015 to 2018, the FA of Taiwan cooperated with Birdlife International and the Chinese Wild Bird Federation to carry out the Port-based Outreach (PBO) program, directly providing practical instructions to captains. The program was the vital first step for raising awareness of such issues and providing knowledge and skills to utilize seabird bycatch mitigation measures that should be optimal for Taiwanese vessels. The FA of Taiwan and Birdlife International also developed an instructional video in Taiwanese for outreach with longline vessel's captains and crews. Two Taiwanese instructors reached 83 longline vessels successfully in Port Louis, Mauritius and gathered feedback from fishermen on mitigation measures in 2016, and 49 longline vessels in 2018.

#### *Information Exchange*

In line with the resolution/recommendation adopted by IOTC, ICCAT, WCPFC and IATTC aimed at the protection of ecologically related species (ERS), the FA of Taiwan has reported on its compliance with all current binding and recommendatory measures and on exchanging ERS information to these regional fisheries management organizations annually.

#### **9. Information on Other ERS (Non-bycatch)**

For investigating the prey species of southern bluefin tuna (SBT), the FA of Taiwan commissioned scientists to conduct analysis on the stomach content of SBT in 2006 and 2009. The results were as follows.

- (1) The stomach contents of 131 southern bluefin tunas captured by Taiwanese longliners in southern central Indian Ocean in August 2004 and in June-July 2005 were examined. The size ranged from 84-187 cm FL (12-115 kg GG). The length and weight frequency distributions indicated that most specimens were in the range of 100-120 cm FL with a body weight between 10 and 20 kg. For the stomachs with prey items, almost all the preys are Pisces, and the proportion of each prey groups are fishes (56.02%), cephalopods (5.39%), and crustaceans (38.59%). In total, seven prey taxa were identified – four species of fish, one unidentified Pisces, one unidentified crustacean, and one unidentified cephalopod. The four fish species fall in the family of Emmelichthyidae, Hemiramphidae, Carangidae, and Clupeidae.
- (2) In total 53 stomach samples were collected by observers at mid-western South Indian Ocean from Nov. 2007 to Jan. 2008 and Jun. to Sep. 2008. The mean fork length (FL) were  $118.9 \pm 1.84$  (90-175) cm and  $27.2 \pm 12.9$  (9-74) kg. 95% of the fish samples were within 91-150 cm FL. Among the 18 good stomach samples, the rate of empty stomach was 38.9%, having 11 non-empty stomachs for further analysis. The prey items can be distinguished into four major groups, i.e. fish, cephalopod, crustacean and marine pollution, and subdivided into 12 items. Paralepididae (Pisces) and Euphausiidae (Crustacean) were the only two families can be identified. The descending orders of the prey-importance were fish > cephalopod > crustacean = marine pollution by occurrence.

## **10. Others**

No other information.

## **11. Implementation of the IPOA-Seabirds and IPOA-Sharks**

In line with “International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries” of FAO, the FA of Taiwan has adopted “National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (NPOA-Seabirds)”

which came into force in October 2006 to act as a basis for establishing seabird conservation policy. The FA of Taiwan then updated this NPOA-Seabirds' information in June 2014. (The website: <http://www.fa.gov.tw/en/Policy/content.aspx?id=13&chk=5aa236af-8280-456c-b5a3-867780b7a261&param=pn%3d2> )

Similarly, in respect of shark's conservation, the FA of Taiwan has adopted NPOA-sharks which entered into force in May 2006, not only for the guidance to encourage the full usage of shark caught, but also for avoidance of waste. For consistent with the global trend for the conservation and management of sharks, the FA of Taiwan is updating its NPOA-sharks. (The website: <http://www.fa.gov.tw/en/Policy/content.aspx?id=5&chk=505be529-a59a-4528-99f3-7ce83f45261d&param=pn%3d3> )

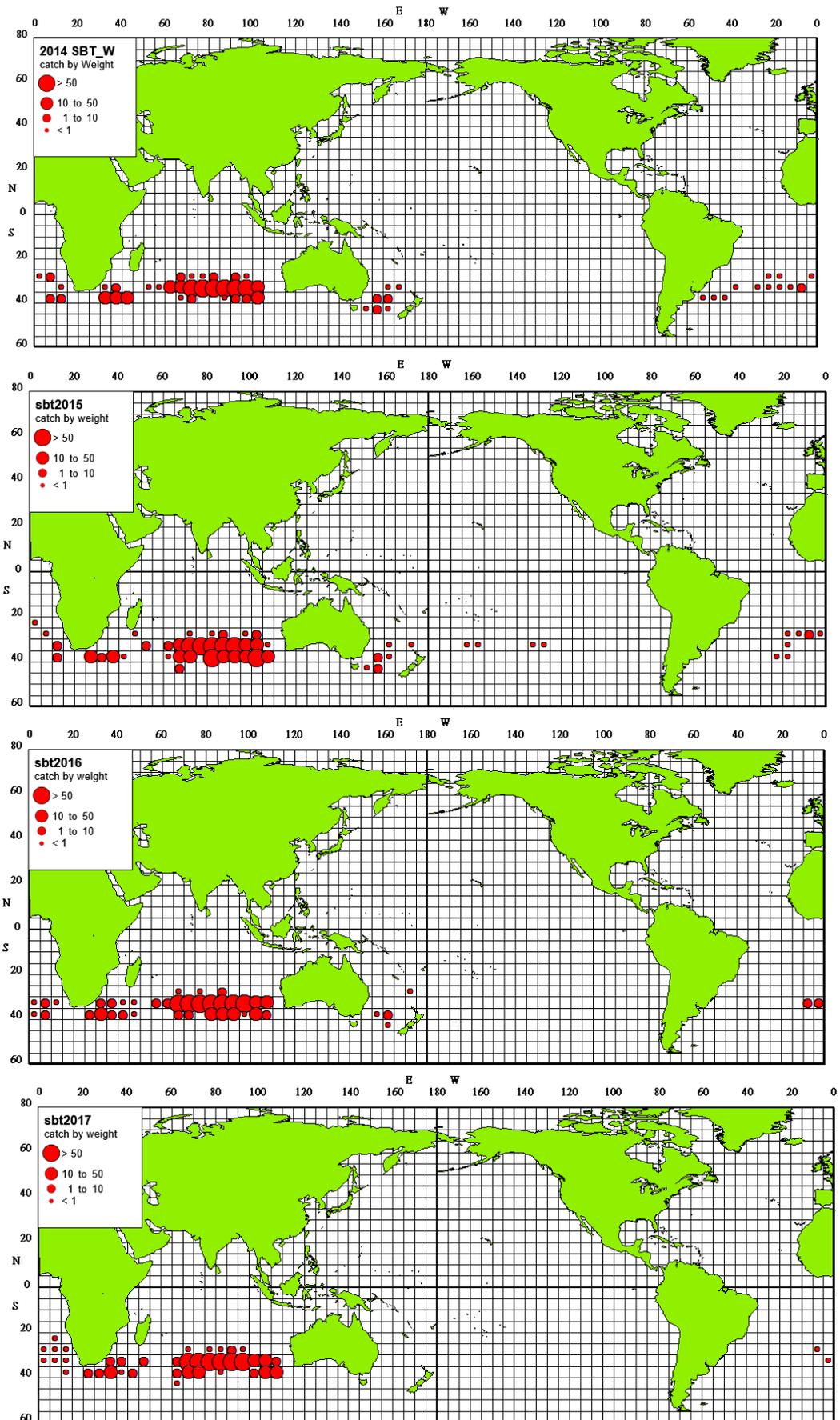


Fig. 1 Distribution of SBT catch by Taiwanese longline fishery from 2014 to 2017

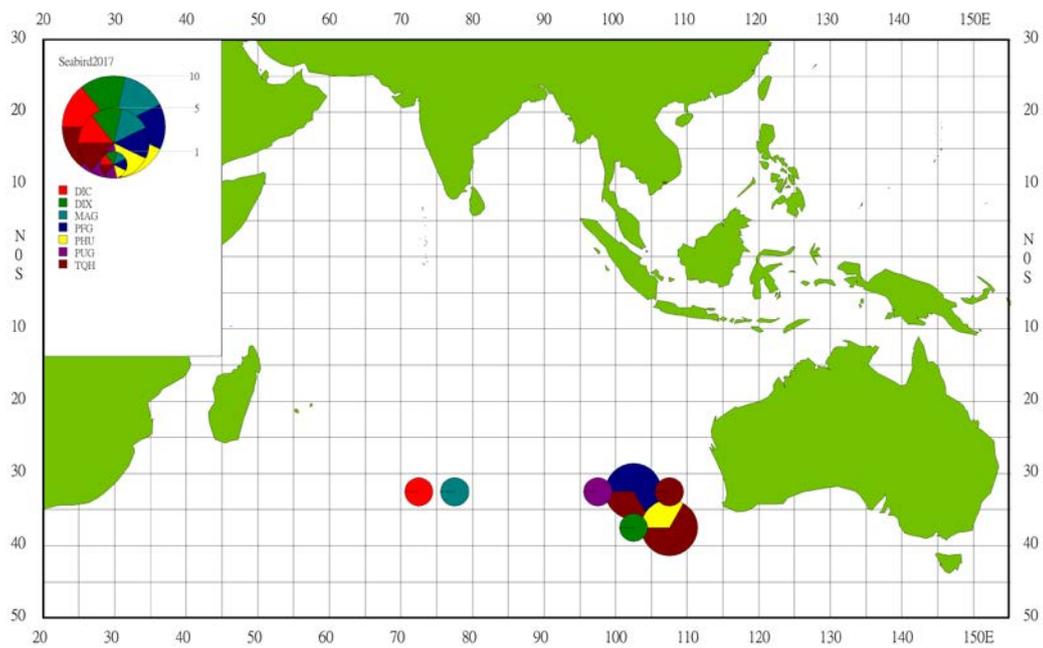
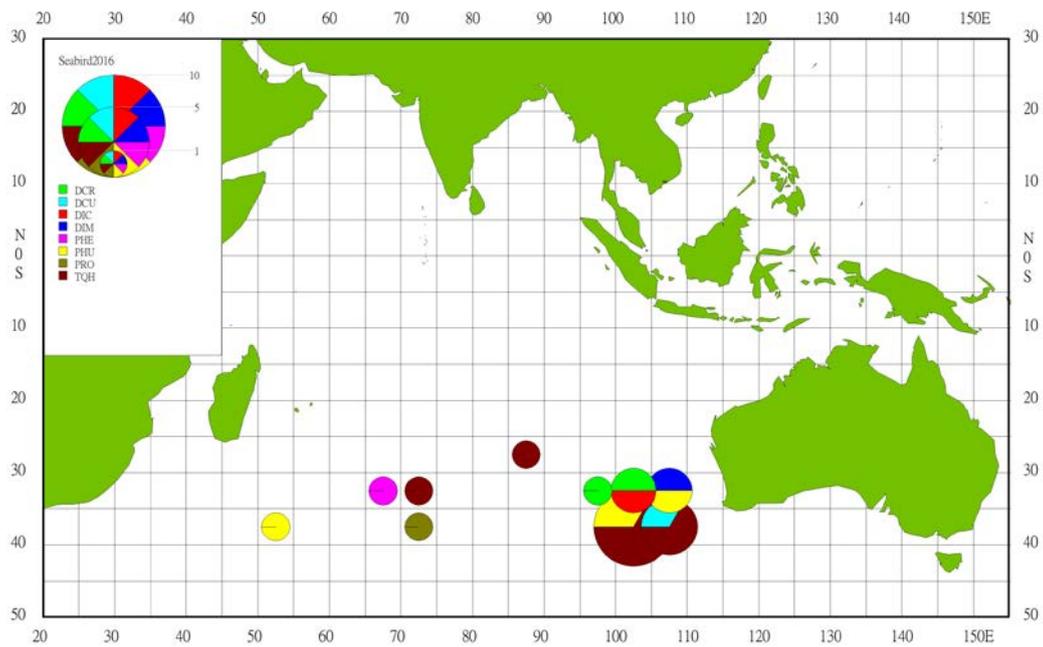


Fig. 2 Distribution of the Seabirds observed by observer from 2016 to 2017

Table 1 The number of active vessels fishing for SBT during 2002-2017 calendar year

Year	No. of seasonal target vessels	No. of bycatch 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

Table 2 Annual SBT catches by gear for Taiwanese fishing vessels during 1969-2017  
Unit: MT

Calendar Year	Catch by Longliner (MT)		Taiwan Gillnet
	Calendar year	Quota year	
1969	80		
1970	130		
1971	30		
1972	70		
1973	90		
1974	100		
1975	15		
1976	15		
1977	5		
1978	80		
1979	53		
1980	64		
1981	92		
1982	171		11
1983	149		12
1984	244		0
1985	174		67
1986	433		81
1987	623		87
1988	622		234
1989	1,076		319
1990	872		305
1991	1,353		107
1992	1,219		3
1993	958		
1994	1,020		
1995	1,431		
1996	1,467		
1997	872		
1998	1,446		
1999	1,513		
2000	1,448		
2001	1,580		
2002	1,137		
2003	1,128		
2004	1,298		
2005	941		
2006	846		
2007	841		
2008 <sup>1</sup>	913	926	
2009	921	949	
2010	1,208	1,140	
2011	533	502	
2012	494	496	
2013	1,004	992	
2014	944	962	
2015	1,162	1,145	
2016	1,023	1,026	
2017	1,171	1,175	

Quota year was applied since 2008.

Table 3 Summary of results for scientific observer programs by area and month during 2016-2017

(a) 2016 (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
<b>Area2</b>	<b>Total</b>	9	23	39.13%	1223972	4958989	24.68%	3271	16026	20.41%
	3	-	2	-	-	19780	-	-	0	-
	4	-	1	-	-	3200	-	-	0	-
	5	5	11	45.45%	133789	411950	32.48%	94	250	37.60%
	6	9	23	39.13%	300113	1429985	20.99%	670	4292	15.61%
	7	9	22	40.91%	392250	1622441	24.18%	1391	5911	23.53%
	8	7	15	46.67%	315627	1193330	26.45%	882	4356	20.25%
	9	4	6	66.67%	82193	278303	29.53%	234	1217	19.23%
	<b>Area8</b>	<b>Total</b>	6	20	30%	314391	2068661	15.20%	302	2311
4	5	15	33.33%	182176	1061046	17.17%	126	474	26.58%	
5	6	19	31.58%	118415	880985	13.44%	136	1153	11.80%	
6	1	9	11.11%	13800	126630	10.90%	40	684	5.85%	
<b>Area9</b>	<b>Total</b>	5	25	20%	480908	4825965	9.97%	22	659	3.34%
	1	2	3	66.67%	107171	328830	32.59%	-	1	-
	2	1	3	33.33%	52590	188575	27.89%	-	0	-
	3	2	6	33.33%	52500	202675	25.90%	-	0	-
	4	4	7	57.14%	47924	482470	9.93%	-	0	-
	5	3	14	21.43%	140854	718220	19.61%	5	48	10.42%
	6	3	17	17.65%	68193	701525	9.72%	11	104	10.58%
	7	1	9	11.11%	11676	482460	2.42%	6	60	10%
	8	-	9	-	-	528560	-	-	88	-
	9	-	5	-	-	360800	-	-	15	-
	10	-	3	-	-	318500	-	-	0	-
	11	-	3	-	-	319350	-	-	222	-
	12	-	2	-	-	194000	-	-	121	-
<b>Area14</b>	<b>Total</b>	7	29	24.14%	746532	3996282	18.68%	1343	11208	11.98%
	3	1	4	25%	2085	49125	4.24%	-	0	-
	4	2	3	66.67%	15303	35790	42.76%	-	0	-
	5	1	10	10%	34725	247450	14.03%	1	3	33.33%
	6	7	18	38.89%	148453	880784	16.85%	7	805	0.87%
	7	6	19	31.58%	241325	1150413	20.98%	895	5112	17.51%
	8	7	21	33.33%	250939	1348180	18.61%	440	5268	8.35%
	9	3	9	33.33%	53702	236820	22.68%	-	20	-
	10	-	1	-	-	44420	-	-	0	-
	11	-	1	-	-	3300	-	-	0	-
	<b>Grand Total</b>		15	60	25.00%	2765803	15849897	17.45%	4938	30204

\*The areas which had observer deployed were appeared.

**(b)2017 (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
<b>Area2</b>	<b>Total</b>	9	35	25.71%	865523	6477769	13.36%	2676	20789	12.87%
	3	-	3	-	-	35600	-	-	0	-
	4	-	4	-	-	59600	-	-	9	-
	5	6	15	40%	120399	650678	18.50%	57	478	11.92%
	6	9	27	33.33%	330691	1998301	16.55%	656	5375	12.20%
	7	8	34	23.53%	300729	2484767	12.10%	1404	10770	13.04%
	8	5	21	23.81%	113704	1109583	10.25%	559	4005	13.96%
	9	-	3	-	-	139240	-	-	152	-
<b>Area8</b>	<b>Total</b>	8	28	28.57%	338272	2877334	11.76%	219	2025	10.81%
	3	-	1	-	-	47000	-	-	0	-
	4	5	19	26.32%	183804	1496016	12.29%	170	1094	15.54%
	5	8	26	30.77%	154468	1243348	12.42%	49	697	7.03%
	6	-	4	-	-	90970	-	-	234	-
<b>Area9</b>	<b>Total</b>	4	27	14.81%	16762	3725558	0.45%	10	863	1.16%
	1	-	1	-	-	47100	-	-	87	-
	2	-	1	-	-	100203	-	-	0	-
	3	-	3	-	-	303520	-	-	0	-
	4	1	13	7.69%	2376	495740	0.48%	1	30	3.33%
	5	-	10	-	-	503090	-	-	14	-
	6	-	9	-	-	316525	-	-	12	-
	7	-	9	-	-	312625	-	-	72	-
	8	1	12	8.33%	9315	364180	2.56%	7	151	4.64%
	9	2	13	15.38%	5071	426600	1.19%	2	174	1.15%
	10	-	7	-	-	346175	-	-	67	-
	11	-	4	-	-	353800	-	-	122	-
	12	-	2	-	-	156000	-	-	134	-
<b>Area14</b>	<b>Total</b>	12	53	22.64%	617700	5328463	11.59%	906	9132	9.92%
	3	1	3	33.33%	26424	115400	22.90%	-	0	-
	4	1	2	50%	3824	20800	18.38%	-	0	-
	5	3	15	20%	35409	514745	6.88%	35	493	7.10%
	6	6	35	17.14%	160504	1581326	10.15%	310	2358	13.15%
	7	10	38	26.32%	235879	1353898	17.42%	345	2934	11.76%
	8	6	36	16.67%	146026	1541413	9.47%	213	3176	6.71%
	9	3	10	30%	9634	177631	5.42%	3	152	1.97%
	10	-	3	-	-	18450	-	-	18	-
	11	-	1	-	-	4800	-	-	1	-
<b>Grand Total</b>		16	75	21.33%	1838257	18409124	9.99%	3811	32809	11.62%

\*The areas which had observer deployed were appeared.

Table 4 Incidental catch of seabirds recorded by observers deployed on Taiwanese SBT vessels  
Country: Taiwan Year (calendar year):2016

Fishery		Observed								Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort <sup>3</sup>	Species	Total Observed Effort <sup>3</sup>	Observer Coverage <sup>4</sup>	Captures (number)	Capture Rate <sup>5</sup>	Mortalities (number)	Mortality Rate <sup>5</sup>	Live releases (number)	Estimated total mortalities (number)	TP + NS <sup>6</sup>	TP + WB <sup>6</sup>	NS + WB <sup>6</sup>	TP + WB + NS <sup>6</sup>	NIL <sup>6</sup>
2	4,958,989	DIC	1,223,972	24.68%	1	0.000817012	1	0.000817012	0	4	48.48%	7.60%	0.00%	43.92%	0.00%
2	4,958,989	DIM	1,223,972	24.68%	1	0.000817012	1	0.000817012	0	4	48.48%	7.60%	0.00%	43.92%	0.00%
2	4,958,989	PHU	1,223,972	24.68%	1	0.000817012	1	0.000817012	0	4	48.48%	7.60%	0.00%	43.92%	0.00%
2	4,958,989	TQH	1,223,972	24.68%	1	0.000817012	1	0.000817012	0	4	48.48%	7.60%	0.00%	43.92%	0.00%
2	4,958,989	DCR	1,223,972	24.68%	2	0.001634024	2	0.001634024	0	8	48.48%	7.60%	0.00%	43.92%	0.00%
8	2,068,661	DCU	314,391	15.20%	1	0.003180753	0	0	1	0	53.13%	5.63%	0.00%	41.25%	0.00%
8	2,068,661	PHU	314,391	15.20%	2	0.006361505	2	0.006361505	0	13	53.13%	5.63%	0.00%	41.25%	0.00%
8	2,068,661	PRO	314,391	15.20%	1	0.003180753	1	0.003180753	0	7	53.13%	5.63%	0.00%	41.25%	0.00%
8	2,068,661	TQH	314,391	15.20%	6	0.019084516	4	0.012723011	2	26	53.13%	5.63%	0.00%	41.25%	0.00%
9	4,825,965	PHU	479,228	9.93%	1	0.002086689	1	0.002086689	0	10	47.64%	0.00%	0.00%	52.36%	0.00%
14	3,996,282	PHE	745,616	18.66%	1	0.001341173	1	0.001341173	0	5	81.42%	6.56%	0.00%	12.02%	0.00%
14	3,996,282	TQH	745,616	18.66%	1	0.001341173	1	0.001341173	0	5	81.42%	6.56%	0.00%	12.02%	0.00%

<sup>3</sup> For longline provide number of hooks, for purse seine provide number of sets.

<sup>4</sup> For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.

<sup>5</sup> For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

<sup>6</sup> TP = tori poles, NS = night setting, WB = weighted branchline, NIL = no mitigation measures used.

Table 5 Incidental catch of seabirds recorded by observers deployed on Taiwanese SBT vessels

Country: Taiwan Year (calendar year):2017

Fishery		Observed								Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort <sup>7</sup>	Species	Total Observed Effort <sup>3</sup>	Observer Coverage <sup>8</sup>	Captures (number)	Capture Rate <sup>9</sup>	Mortalities (number)	Mortality Rate <sup>5</sup>	Live releases (number )	Estimated total mortalities (number)	TP + NS <sup>10</sup>	TP + WB <sup>6</sup>	NS + WB <sup>6</sup>	TP + WB + NS <sup>6</sup>	NIL <sup>6</sup>
2	6,477,769	PFG	865,523	13.36%	2	0.002310742	2	0.002310742	0	15	87.56%	2.22%	0.00%	10.22%	0.00%
2	6,477,769	PUG	865,523	13.36%	1	0.001155371	0	0	1	0	87.56%	2.22%	0.00%	10.22%	0.00%
2	6,477,769	TQH	865,523	13.36%	2	0.002310742	1	0.001155371	1	7	87.56%	2.22%	0.00%	10.22%	0.00%
8	2,877,334	DIX	338272	11.76%	1	0.002956201	1	0.002956201	0	9	91.98%	4.81%	0.00%	3.21%	0.00%
8	2,877,334	PHU	338272	11.76%	1	0.002956201	1	0.002956201	0	9	91.98%	4.81%	0.00%	3.21%	0.00%
8	2,877,334	TQH	338272	11.76%	2	0.005912402	2	0.005912402	0	17	91.98%	4.81%	0.00%	3.21%	0.00%
14	5,328,463	DIC	617,700	11.59%	1	0.001618909	1	0.001618909	0	9	69.84%	0.63%	0.00%	29.52%	0.00%
14	5,328,463	MAG	617,700	11.59%	1	0.001618909	1	0.001618909	0	9	69.84%	0.63%	0.00%	29.52%	0.00%

<sup>7</sup> For longline provide number of hooks, for purse seine provide number of sets.

<sup>8</sup> For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.

<sup>9</sup> For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

<sup>10</sup> TP = tori poles, NS = night setting, WB = weighted branchline, NIL = no mitigation measures used.

Table 6 Incidental catch of sharks recorded by observers deployed on Taiwanese SBT vessels in 2016

Country: Taiwan Year (calendar year): 2016

Fishery		Observed								Estimate
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort <sup>11</sup>	Species	Total Observed Effort <sup>7</sup>	Observer Coverage <sup>12</sup> (%)	Captures (Number)	Capture Rate <sup>13</sup> (Number/Thousand Hooks)	Mortalities (Number)	Mortality Rate <sup>9</sup> (Number/Thousand Hooks)	Live releases (Number)	Estimated total mortalities (Number)
2	4,958,989	BSH	1,223,972	24.68%	363	0.296575412	262	0.214057184	101	
2	4,958,989	BTH	1,223,972	24.68%	1	0.000817012	0	0	1	
2	4,958,989	LMA	1,223,972	24.68%	120	0.098041458	0	0	120	
2	4,958,989	PSK	1,223,972	24.68%	4	0.003268049	1	0.000817012	3	
2	4,958,989	SMA	1,223,972	24.68%	40	0.032680486	27	0.022059328	13	
8	2,068,661	BSH	314,391	15.20%	214	0.680681063	202	0.642512031	12	
8	2,068,661	LMA	314,391	15.20%	74	0.235375695	17	0.054072795	57	
8	2,068,661	SMA	314,391	15.20%	10	0.031807526	8	0.025446021	2	
9	4,825,965	BSH	479,228	9.93%	705	1.471116045	632	1.318787717	73	
9	4,825,965	FAL	479,228	9.93%	2	0.004173379	2	0.004173379	0	
9	4,825,965	LMA	479,228	9.93%	1	0.002086689	1	0.002086689	0	
9	4,825,965	PTH	479,228	9.93%	1	0.002086689	0	0	1	
9	4,825,965	SMA	479,228	9.93%	17	0.03547372	12	0.025040273	5	
14	3,996,282	BSH	745,616	18.66%	579	0.77653913	471	0.631692453	108	
14	3,996,282	FAL	745,616	18.66%	6	0.008047038	6	0.008047038	0	
14	3,996,282	LMA	745,616	18.66%	9	0.012070556	2	0.002682346	7	
14	3,996,282	PSK	745,616	18.66%	2	0.002682346	0	0	2	
14	3,996,282	SMA	745,616	18.66%	27	0.036211669	24	0.03218815	3	

<sup>11</sup> For longline provide number of hooks, for purse seine provide number of sets.

<sup>12</sup> For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.

<sup>13</sup> For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Table 7 Incidental catch of sharks recorded by observers deployed on SBT vessels in 2017

Country: Taiwan Year (calendar year): 2017

Fishery		Observed								Estimate
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort <sup>14</sup>	Species	Total Observed Effort <sup>10</sup>	Observer Coverage <sup>15</sup> (%)	Captures (Number)	Capture Rate <sup>16</sup> (Number/ Thousand Hooks)	Mortalities (Number)	Mortality Rate <sup>12</sup> (Number/ Thousand Hooks)	Live releases (Number)	Estimated total mortalities (Number)
2	6,477,769	BSH	865,523	13.36%	569	0.657405985	509	0.588083737	60	
2	6,477,769	LMA	865,523	13.36%	65	0.075099102	44	0.050836315	21	
2	6,477,769	SKX	865,523	13.36%	1	0.001155371	1	0.001155371	0	
2	6,477,769	SMA	865,523	13.36%	38	0.04390409	38	0.04390409	0	
8	2,877,334	BSH	338,272	11.76%	253	0.747918835	185	0.546897172	68	
8	2,877,334	LMA	338,272	11.76%	51	0.150766247	38	0.112335635	13	
8	2,877,334	SMA	338,272	11.76%	12	0.035474411	7	0.020693406	5	
9	3,725,558	BSH	16,762	0.45%	25	1.491468798	5	0.29829376	20	
14	5,328,463	BSH	617,700	11.59%	292	0.472721386	111	0.179698883	181	
14	5,328,463	BTH	617,700	11.59%	2	0.003237818	0	0	2	
14	5,328,463	LMA	617,700	11.59%	80	0.129512708	9	0.01457018	71	
14	5,328,463	PSK	617,700	11.59%	1	0.001618909	0	0	1	
14	5,328,463	SMA	617,700	11.59%	14	0.022664724	9	0.01457018	5	

<sup>14</sup> For longline provide number of hooks, for purse seine provide number of sets.

<sup>15</sup> For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.

<sup>16</sup> For longline provide as captures per thousand hooks, for purse seine provide as captures per set.