

**National Report of Taiwan: Ecologically Related Species in the Taiwanese
Southern Bluefin Tuna Fishery 2014-2015
Fisheries Agency of Taiwan**

1. Summary

For Taiwanese fishing vessels, only longliner caught SBT. The number of active vessels catching SBT in 2014 and 2015 calendar years were 71 and 72, respectively, which consist of seasonal target vessels and by-catch vessels.

The total catches of quota year (from April 1 to March 31) were 962 and 1,143 tons for 2014 and 2015, respectively, while the catches of calendar year were 944 tons in 2014 and 1,161 tons in 2015.

The observers were sent onboard SBT fishing vessels for collection and record of catch data and ERS by-catch data. The observer coverage rate was all above 10% in terms of effort since 2005. In 2014 calendar year, 11 observers were deployed on 11 fishing vessels authorized to target SBT seasonally. There were 13 observers being deployed on 13 fishing vessels authorized in 2015. In 2014, the coverage rates by vessels accounted for 15.49%, 14.20% by hooks and 13.10% by catch. The coverage rates by vessels accounted for 18.06% in 2015, 10.34% by hooks, and 11.67% by catch.

Taiwanese SBT fishing vessels mainly operate in the IOTC area, and partial SBT by-catch vessels operate in the ICCAT and WCPFC area, so that the FA of Taiwan has imposed a regulation which base on the resolutions/recommendations adopted by these organizations to make the fishers comply with the recommendations/resolutions.

2. Introduction

Southern Bluefin Tuna (*Thunnus maccoyii*, SBT) was by-catch of Taiwanese tuna longline fishery targeting albacore in the past. After the fishing vessels equipped with super freezers, some fishing vessels operating in the Indian Ocean have started targeting SBT seasonally since 1990s. There are no vessels fishing for SBT whole year round. For Taiwanese fishing vessels, only longliner caught SBT and except by-catch vessels, seasonal target SBT vessels all operate in the Indian Ocean. There are two main fishing grounds in general: one is in the southern central Indian Ocean around 55°E – 95°E, 30°S – 40°S, and the other locates off the southeast coast of Africa

around 20°E – 55°E, 35°S – 45°S. Two fishing seasons for Taiwanese seasonal target SBT fishing vessels have been in the southern central Indian Ocean from April to September, and in the southern and western Indian Ocean extending to the eastern limit of the Atlantic Ocean from November to February of the following year.

This report includes information on ecologically related species (ERS) of Taiwanese SBT fishery sampled by scientific observers updated to 2015.

3. 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 regulation and started to allocate individual quota to each vessel authorized to fish for SBT since 2002. Besides, those vessels are separated to either seasonal target ones or by-catch ones. The number of active vessels to fish for SBT from 2002 to 2015 is shown as Table 1.

Distribution of Catch and Effort

Historically, annual catches of SBT were less than 250 tons in early 1980s. Thereafter, with the improvement of vessel facilities, the fishing grounds and target species have also been changed. Apart from capturing albacore, Taiwanese vessels also capture SBT in the specific seasons. From 1989 to 2001, annual catch of SBT fluctuated around 900 to 1,600 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 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 annual catch quota to 1,140 tons. In 2006, CCSBT adopted TAC arrangement based on binding allocated catch limits for 2007 – 2009, and Taiwan catch quota has been fixed in 1,140 tons. For the 2010 and 2011 fishing season, the communion quota was 1,718 tons. And the allocations in 2012 and 2013 quota year were 911 tons and 948 tons, respectively.

In 2014 and 2015 quota years, Taiwan's national allocations were 1,045 tons and 1,215.675 tons, respectively. Due to the two year period with unused allocation from the first year carried forward to the second year and the unused quota 75.675 MT in

2014 has been carried over to 2015 quota year. The total catches of quota year (from April 1 to March 31) were 962 and 1,143 tons for 2014 and 2015, respectively, while the catches of calendar year were 944 tons in 2014 and 1,161 tons in 2015. The annual catch of SBT by gear from 1969 to 2015 was shown 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 2012 to 2015 was shown in Fig. 1.

4. Fisheries Monitoring for Each Fleet

Intensive efforts have been continuously exerted 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 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.
- (3) The FA of Taiwan has designated two foreign ports (Port Louis and Cape Town) for SBT transshipment since March 2010 and has prohibited transshipment at other foreign ports. Government officials stationed at Port Louis and Cape Town are responsible for sampling inspection and supervising all SBT catch. Any catch without inspection by its 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 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 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 at the end of December. Since 2012, due to the above mentioned reason the FA of Taiwan stopped dispatching observers to tropical area of India Ocean, so that observers were assigned to southern India Ocean. Therefore, the observer coverage rate increased in southern India Ocean. In 2014 calendar year, 11 observers were deployed on 11 fishing vessels authorized to target SBT seasonally. There were 13 observers being deployed on 13 fishing vessels authorized in 2015. In 2014, the coverage rates by vessels accounted for 15.49%, 14.20% by hooks and 13.10% by catch. The coverage rates by vessels accounted for 18.06% in 2015, 10.34% by hooks, and 11.67% by catch. The summary of observed catch and effort by area and month during 2014-2015 was shown 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 boat. It accounts for 4.9 % of Taiwanese SBT fishing vessels. In 2009, five SBT fishing vessels were boarded and inspected. It accounts for 7.5 % of Taiwanese SBT fishing vessels. Since 2010, due to the threat of Somalia piracy and for safety consideration, no patrol boat was dispatched in the Indian Ocean.
- (7) There are penalties for over catch, transshipment or unloading catch at any other non-designated ports or any violation of regulations.

5. Seabirds

In 2014, 43 seabirds were incidentally caught among which 6 were live released and 37 were discarded. In 2015, 21 seabirds were incidentally caught among which 1 were live released, and 20 were discarded. The distribution of seabirds observed by observer were shown in Fig. 2, Albatross nei and Yellow-nosed albatross were observed mainly in 2014 and 2015 respectively.

Table 4 and Table 5 shows capture rate, and mortality rate by CCSBT statistical areas for each seabird species observed by observers in 2014 and 2015, respectively. The seabird by-catch mitigation measures used on these observation vessels, include Bird-scaring lines, nighttime setting, weighted branch-line. In the area south of 25 degrees latitude use at least two mitigation measures, and the proportion of observed effort with specific mitigation measures is shown in the Table 4 and Table 5.

6. Other Non-target Fish

For Taiwanese SBT vessels, the main catch is albacore and SBT. Other non-target fish include bigeye tuna, yellowfin tuna, sharks, and billfish. For shark species, blue shark was the most dominant species observed by observer accounting for 82.65% in 2014, and 83.53% in 2015. CPUE and total numbers of shark by area from 2014-2015 were shown in Table 6 and Table 7.

7. Marine Mammal and Marine Reptile

According to observer record in 2014-2015, there were no by-catch recorded of cetaceans and sea turtles.

8. Mitigation Measures to Minimize Seabird and Other Species By-catch

Current Measures

➤ *Mandatory Measures for Each Fleet*

Taiwanese SBT fishing vessels mainly operate in the IOTC area, and partial SBT by-catch vessels operate in the ICCAT and WCPFC area, so that the FA of Taiwan has imposed a regulation which base on the resolutions/recommendations adopted by these organizations to make the fishers comply with the recommendations/resolutions.

➤ *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 2004¹. 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 mitigation measures in consistence with the Resolution since 2009.

Since 2010, 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. the FA of Taiwan has already amended the relevant regulations to request fishing vessels operating in the area south of 25°S in Indian Ocean to start using at least two of the three mitigation measures, nighttime setting with minimum deck lighting, tori lines, or line weighting from 1 July 2014 in consistence with Resolution 12/06. 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 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 measure, with between 20°S to 25°S that tori lines as compulsory.

In accordance with WCPFC CMM 2012-07, Conservation and Management Measure to mitigate the impact of fishing for highly migratory fish stocks on seabirds. The FA of Taiwan has required fishers and industries to take appropriate measures in accordance with the NPOA-seabird to mitigate incidental catch of seabirds. Furthermore, according to 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, nighttime setting with minimum deck lighting. Incidentally caught seabirds are encouraged to

¹ 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)"

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, requiring fishing vessels to carry necessary devices on board, such as dig nets, de-hookers and line cutters, during voyage or operation periods, for appropriate release of incidentally caught sea turtles. The incidental catch individuals shall be released alive, and the operators shall record in their logbooks all incidents involving marine turtles during fishing operations.

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 logbook.

➤ *Shark*

According to the Recommendations/Resolutions adopted by ICCAT and IOTC, the FA of Taiwan has applied mandatory regulations 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 since 2005. The regulation has subsequently applied to the fleets operating in the Pacific Ocean since 2006. Besides, the FA of Taiwan has imposed regulation to prohibit *Rhincodon typus* (whale shark) to be captured, possessed and sold since 2008.

In line with IOTC Resolution 10/12, 12/09, the FA of Taiwan has required that fishers operating in the Indian Ocean are prohibited from retaining on board, transshipping, landing, storing, selling or offering for sale any part or whole carcass of thresher sharks of all the species of the family Alopiidae since 2011. In addition, according IOTC Resolution 13/06, the FA of Taiwan has revised the requirement to prohibit 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.

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 prohibiting from hammerhead sharks(family Sphyrnidae),

oceanic whitetip sharks, thresher sharks (family Alopiidae), silky sharks.

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 vessel less 100 tons employing freezing method to preserve their catches are requested to implement regulations of shark fins 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 by-catch 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 2016².

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

9. Public Relations and Education Activities

Public Relations Activities

- (1) Distribution of posters, sheets and booklets for guidance of mitigation measures of reducing seabird by-catch, 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 3000 copies of posters entitled “Release the sea turtle incidentally caught” to our fishers in 2003.

² 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.

- (3) In 2004, the FA, the Chinese Wild Bird Federation, and Birdlife International held a conference in Kaohsiung on the reduction of longline seabird by-catch 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) during a “mitigation of seabird by-catch workshop” held in Kaohsiung in 2013. Experts from the United Kingdom, the USA, and Japan were invited to extensively exchange experiences and opinions with representative from the industry, government, and academia in Taiwan on issues regarding mitigation devise to avoid seabird by-catch by TLVs and on possible directions for future cooperation.
- (4) In order to avoid incidental catch of sea bird, sea mammal and sea turtle 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 by-catch species during fishing operation.
- (5) The FA of Taiwan published seabird identification guideline in 2009 and shark identification pamphlet for observer training and for the related staffs training in 2011. Besides, the FA of Taiwan also published shark identification pads 2,000 copies for fishers in 2011.
- (6) For disseminating shark fins naturally attached policy, the FA of Taiwan distributed posters, brochures and CD for fishers, the related fisheries associations and managers further understanding the regulation and the practical process for how to naturally attach fins 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 port.

Education

- (1) The FA of Taiwan had authorized Wild Bird Federation Taiwan (WBFT) to implement a fishers' education program for mitigating seabird by-catch 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 by-catch 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 market.
- (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 seabirds from photographs of by-catch birds, 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 technique.

- (5) From 2015 to 2016, 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 instruction to skippers. The program was the vital first step for raising awareness of the issues and providing knowledge and skills to use seabird by-catch 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 vessels and crews. Two Taiwanese instructors reached 83 longline vessels successfully in Port Louis, Mauritius and gathered feedback from fishermen on mitigation measures.

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.

10. Information on Other ERS (Non by-catch)

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, 7 prey taxa were identified – 4 species of fish, 1 unidentified Pisces, 1 unidentified crustacean, and 1 unidentified cephalopod. The 4 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 ± 1.84 (90-175) cm and 27.2 ± 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.

11. Others

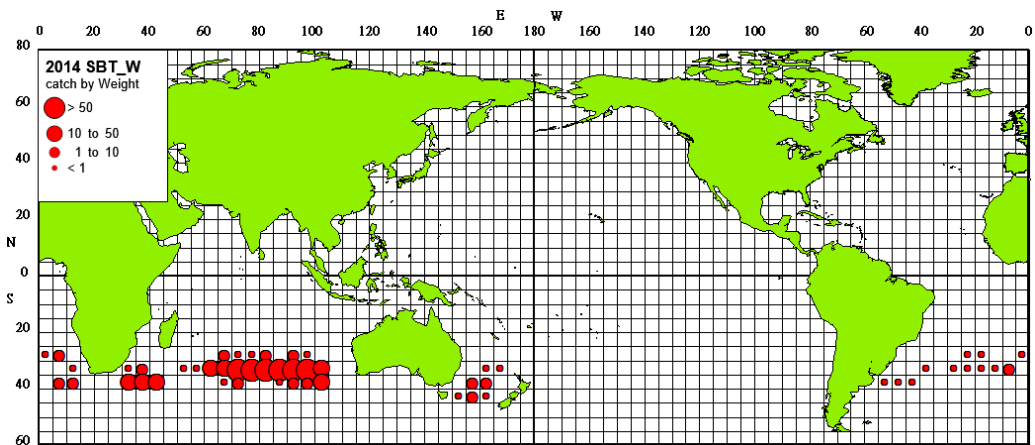
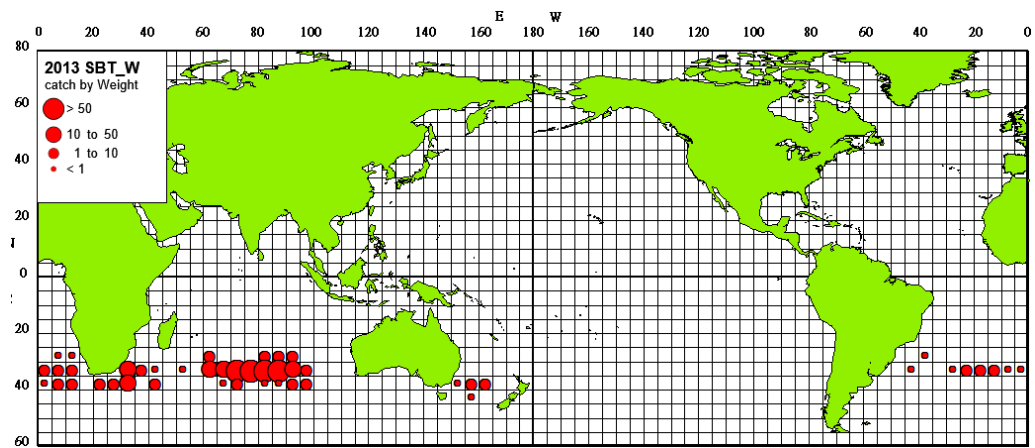
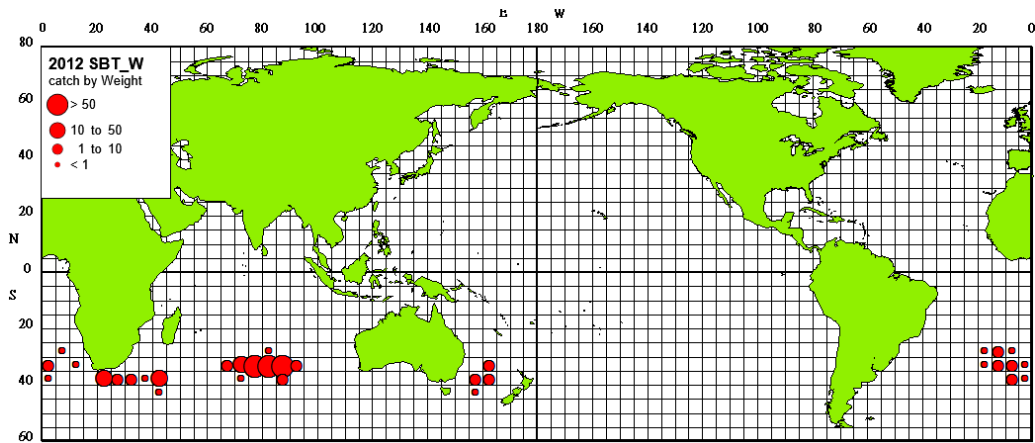
No other information.

12. 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 and 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¶m=pn%3d2>)

Similarly, in respect of shark’s conservation, the FA of Taiwan have adopted NPOA-sharks which entered into force in May 2006, not only for the guidance to encourage full usage of shark caught, but also for avoidance of waste.

For consistent with 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¶m=pn%3d3>)



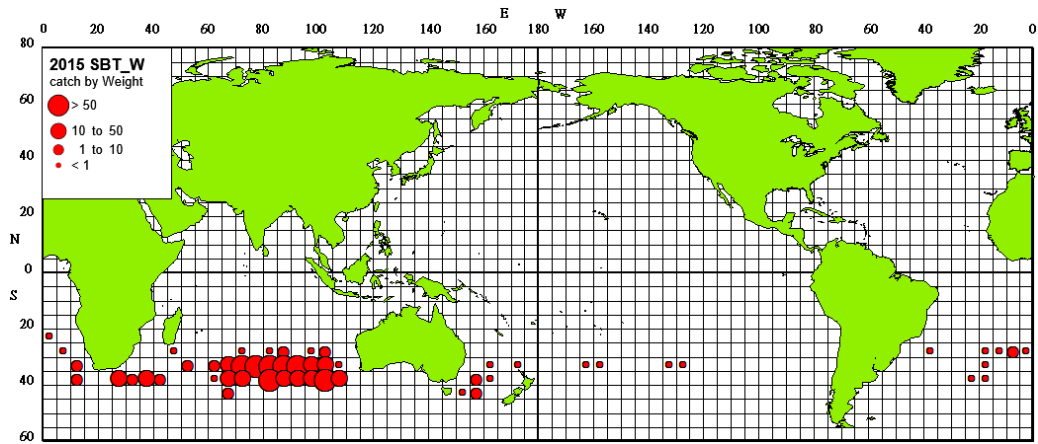


Fig. 1 Distribution of SBT catch by Taiwanese longline fishery from 2012 to 2015

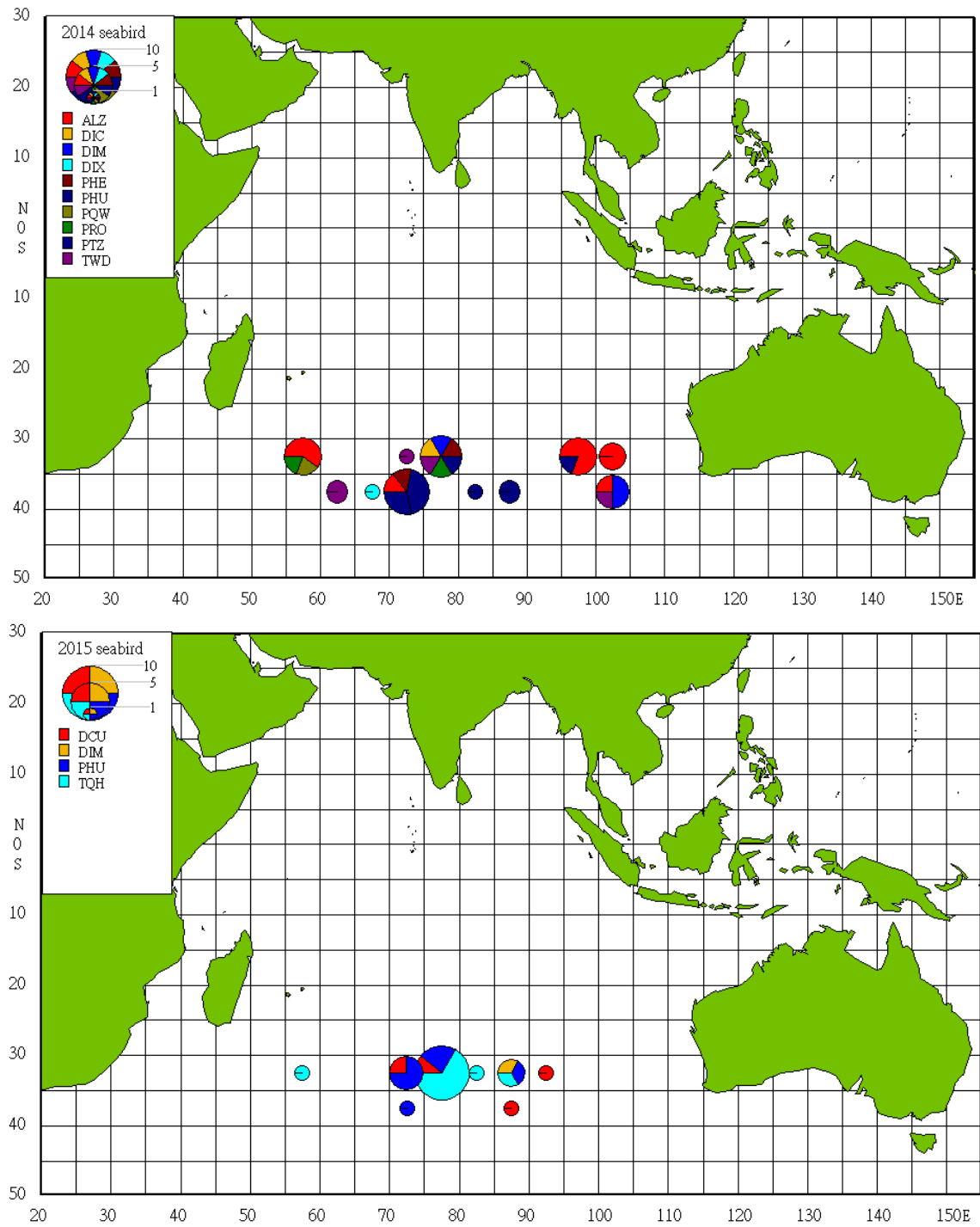


Fig. 2 Distribution of the Seabirds observed by observer from 2014 to 2015. (Data in 2015 is preliminary.)

Table 1 The number of active vessels fishing for SBT during 2002-2015 calendar year

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

Table 2 Annual SBT catches by gear for Taiwanese fishing vessels during 1969-2015

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 ¹	913	926	
2009	921	949	
2010	1,208	1,140	
2011	533	502	
2012	494	496	
2013	1,004	992	
2014	944	962	
2015*	1,161	1,143	

Quota year was applied since 2008.

* Preliminary value and landed weight

Table 3 Summary of results for scientific observer programs by area and month during 2014-2015

(a) 2014(calendar year)

Area	Month	Number of vessels observed	Number 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	7	24	29.17%	1032278	6336522	16.29%	2263	15872	14.26%
	4	1	1	100%	2025	8700	23%	0	0	-
	5	6	13	46%	158349	553927	29%	157	521	30%
	6	6	20	30.00%	276660	1489796	18.57%	507	2645	19.17%
	7	6	21	29%	286649	1822292	16%	793	4275	19%
	8	6	22	27.27%	302479	1949549	15.52%	778	6583	11.82%
	9	1	9	11.11%	6116	492138	1.24%	28	1785	1.57%
	10	-	1	-	-	20120	-	-	63	-
Area8	Total	10	23	43.48%	437689	1752979	24.97%	106	453	23.40%
	3	-	2	-	-	54080	-	-	0	-
	4	8	16	50.00%	206519	755407	27.34%	13	74	17.57%
	5	10	23	43.48%	231170	929692	24.87%	93	361	25.76%
	6	-	2	-	-	13800	-	-	18	-
Area9	Total	2	17	11.76%	42995	4270561	1.01%	9	1041	0.86%
	1	-	2	-	-	87750	-	-	0	-
	2	-	1	-	-	108880	-	-	0	-
	3	1	5	20.00%	17520	314606	5.57%	0	0	-
	4	1	9	11.11%	7440	454172	1.64%	0	38	0.00%
	5	1	12	8.33%	1935	496926	0.39%	0	136	0.00%
	6	1	10	10%	16100	573912	3%	9	61	15%
	7	-	7	-	-	255659	-	-	16	-
	8	-	6	-	-	225771	-	-	31	-
	9	-	4	-	-	387745	-	-	0	-
	10	-	5	-	-	580990	-	-	0	-
	11	-	5	-	-	437445	-	-	388	-
	12	-	4	-	-	346705	-	-	371	-
Area14	Total	8	32	25%	1024450	5508930	19%	1067	8934	12%
	1	-	1	-	-	12000	-	-	0	-
	2	-	3	-	-	22030	-	-	0	-
	3	1	2	50.00%	1890	16940	11.16%	0	0	-
	4	6	17	35.29%	112405	449717	24.99%	10	48	20.83%
	5	6	20	30.00%	284652	1284659	22.16%	241	1143	21.08%
	6	7	25	28.00%	306592	1672318	18.33%	308	1882	16.37%
	7	7	28	25.00%	247001	1348327	18.32%	488	4030	12.11%
	8	4	18	22.22%	71910	618939	11.62%	20	1831	1.09%
	9	-	2	-	-	39000	-	-	0	-
	10	-	1	-	-	45000	-	-	0	-
	11	8	32	25%	1024450	5508930	19%	1067	8934	12%
	12	-	1	-	-	12000	-	-	0	-
Grand Total		11	71	15.49%	2537412	17868992	14.20%	3445	26300	13.10%

*The areas which had observer deployed were appeared.

(b)2015 (calendar year)

Area	Month	Number of vessels observed	Number 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	10	40	25%	629551	6291714	10.01%	2411	15049	16.02%
	5	2	10	20%	8070	162880	4.95%	-	379	-
	6	10	37	27.03%	251993	1795007	14.04%	796	6247	12.74%
	7	8	31	25.81%	254003	2058390	12.34%	1208	5394	22.40%
	8	2	18	11.11%	97320	1700420	5.72%	367	1753	20.94%
	9	2	14	14.29%	18165	575017	3.16%	40	1276	3.13%
Area8	Total	8	33	24.24%	314793	3699830	8.51%	347	7595	4.57%
	2	-	2	-	-	24702	-	-	0	-
	3	-	3	-	-	94494	-	-	0	-
	4	4	23	17.39%	103477	1163918	8.89%	38	1332	2.85%
	5	8	29	27.59%	187573	1847746	10.15%	222	4667	4.76%
	6	4	22	18.18%	23743	568970	4.17%	87	1596	5.45%
Area9	Total	3	15	20.00%	174149	3146410	5.53%	25	895	2.79%
	1	-	2	-	-	234565	-	-	288	-
	2	-	2	-	-	99336	-	-	138	-
	3	-	1	-	-	7600	-	-	0	-
	4	1	5	20%	12630	169442	7.45%	-	0	-
	5	-	8	-	-	291025	-	-	38	-
	6	-	9	-	-	420550	-	-	39	-
	7	-	7	-	-	256480	-	-	21	-
	8	-	7	-	-	433280	-	-	44	-
	9	-	4	-	-	391070	-	-	0	-
	10	1	4	25%	20385	388740	5.24%	-	0	-
	11	2	5	40%	61247	184260	33.24%	14	159	8.81%
	12	2	3	66.67%	79887	270062	29.58%	11	168	6.55%
Area14	Total	9	35	25.71%	822119	5634930	14.59%	1028	9124	11.27%
	3	2	6	33.33%	21246	113784	18.67%	-	0	-
	4	1	5	20%	2115	43000	4.92%	-	10	-
	5	5	15	33.33%	128752	636916	20.21%	5	8	62.50%
	6	7	22	31.82%	123610	805120	15.35%	80	1507	5.31%
	7	7	29	24.14%	222392	1963660	11.33%	590	4830	12.22%
	8	7	26	26.92%	277821	1718760	16.16%	338	2133	15.89%
	9	3	14	21.43%	46183	308830	14.95%	15	636	2.36%
	10	-	2	-	-	44860	-	-	0	-
Grand Total		13	72	18.06%	1940612	18772884	10.34%	3811	32663	11.67%

*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):2014

Fishery		Observed								Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort ³	Species	Total Observed Effort ³	Observer Coverage ⁴	Captures (number)	Capture Rate ⁵	Mortalities (number)	Mortality Rate ⁵	Live releases (number)	Estimated total mortalities (number)	TP + NS ⁶	TP + WB ⁶	NS + WB ⁶	TP + WB + NS ⁶	NIL ⁶
2	6336522	TQH	1032278	16.29	1	0.0010	1	0.0010	0		21.22%	78.78%	0.00%	0.00%	0.00%
2	6336522	ALZ	1032278	16.29	7	0.0068	4	0.0039	3		21.22%	78.78%	0.00%	0.00%	0.00%
2	6336522	PTZ	1032278	16.29	1	0.0010	0	0.0000	1		21.22%	78.78%	0.00%	0.00%	0.00%
8	1752979	DIM	437689	24.97	2	0.0046	2	0.0046	0		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	PHU	437689	24.97	6	0.0137	6	0.0137	0		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	TQH	437689	24.97	5	0.0114	4	0.0091	1		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	DIX	437689	24.97	1	0.0023	1	0.0023	0		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	PHE	437689	24.97	1	0.0023	1	0.0023	0		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	TWD	437689	24.97	3	0.0069	3	0.0069	0		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	ALZ	437689	24.97	2	0.0046	1	0.0023	1		17.90%	82.10%	0.00%	0.00%	0.00%
8	1752979	PTZ	437689	24.97	2	0.0046	2	0.0046	0		17.90%	82.10%	0.00%	0.00%	0.00%
14	5508930	DIM	1024450	18.60	1	0.0023	1	0.0023	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	PHU	1024450	18.60	1	0.0010	1	0.0010	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	DIC	1024450	18.60	1	0.0010	1	0.0010	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	PHE	1024450	18.60	1	0.0010	1	0.0010	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	TWD	1024450	18.60	2	0.0020	2	0.0020	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	ALZ	1024450	18.60	3	0.0029	3	0.0029	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	PRO	1024450	18.60	2	0.0020	2	0.0020	0		0.00%	100.00%	0.00%	0.00%	0.00%
14	5508930	PQW	1024450	18.60	1	0.0010	1	0.0010	0		0.00%	100.00%	0.00%	0.00%	0.00%

³ For longline provide number of hooks, for purse seine provide number of sets.

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

⁵ For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

⁶ 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):2015

Fishery		Observed								Estimate	Proportion of observed effort with specific mitigation measures				
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort ⁷	Species	Total Observed Effort ⁷	Observer Coverage ⁸	Captures (number)	Capture Rate ⁹	Mortalities (number)	Mortality Rate ⁷	Live releases (number)	Estimated total mortalities (number)	TP + NS ¹⁰	TP + WB ¹⁰	NS + WB ¹⁰	TP + WB + NS ¹⁰	NIL ¹⁰
2	6291714	DIM	629551	10.01	1	0.001588434	1	0.001588434	0		59.31%	25.24%	7.57%	7.89%	0.00%
2	6291714	PHU	629551	10.01	1	0.001588434	1	0.001588434	0		59.31%	25.24%	7.57%	7.89%	0.00%
2	6291714	TQH	629551	10.01	2	0.003176867	2	0.003176867	0		59.31%	25.24%	7.57%	7.89%	0.00%
2	6291714	DCU	629551	10.01	1	0.001588434	1	0.001588434	0		59.31%	25.24%	7.57%	7.89%	0.00%
8	3699830	PHU	314793	8.51	1	0.003176691	1	0.003176691	0		59.64%	10.24%	0.00%	30.12%	0.00%
8	3699830	DCU	314793	8.51	1	0.003176691	1	0.003176691	0		59.64%	10.24%	0.00%	30.12%	0.00%
14	5634930	PHU	822119	14.59	5	0.006081845	5	0.006081845	0		48.61%	11.84%	10.08%	29.47%	0.00%
14	5634930	TQH	822119	14.59	7	0.008514582	6	0.007298214	1		48.61%	11.84%	10.08%	29.47%	0.00%
14	5634930	DCU	822119	14.59	2	0.002432738	2	0.002432738	0		48.61%	11.84%	10.08%	29.47%	0.00%

⁷ For longline provide number of hooks, for purse seine provide number of sets.

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

⁹ For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

¹⁰ 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 2014

Country: Taiwan Year (calendar year): 2014

Fishery		Observed								Estimate
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort ¹¹	Species	Total Observed Effort ¹¹	Observer Coverage ¹² (%)	Captures (Number)	Capture Rate ¹³ (Number/ Thousand Hooks)	Mortalities (Number)	Mortality Rate ¹¹ (Number/ Thousand Hooks)	Live releases (Number)	Estimated total mortalities (Number)
2	6336522	BSH	1032278	16.29	1129	1.0937	1023	0.9910	106	
2	6336522	LMA	1032278	16.29	14	0.0136	7	0.0068	7	
2	6336522	POR	1032278	16.29	3	0.0029	3	0.0029	0	
2	6336522	PSK	1032278	16.29	1	0.0010	1	0.0010	0	
2	6336522	SMA	1032278	16.29	27	0.0262	27	0.0262	0	
2	6336522	WSH	1032278	16.29	9	0.0087	9	0.0087	0	
8	1752979	BSH	437689	24.97	292	0.6671	231	0.5278	61	
8	1752979	LMA	437689	24.97	83	0.1896	47	0.1074	36	
8	1752979	POR	437689	24.97	1	0.0023	1	0.0023	0	
8	1752979	PSK	437689	24.97	35	0.0800	7	0.0160	28	
8	1752979	SMA	437689	24.97	12	0.0274	10	0.0228	2	
8	1752979	WSH	437689	24.97	9	0.0206	9	0.0206	0	
9	4270561	BSH	42995	1.01	36	0.8373	23	0.5349	13	
9	4270561	LMA	42995	1.01	18	0.4187	9	0.2093	9	
9	4270561	SMA	42995	1.01	1	0.0233	1	0.0233	0	
14	5508930	BSH	1024450	18.6	729	0.7116	572	0.5583	157	
14	5508930	BTH	1024450	18.6	3	0.0029	0	0.0000	3	
14	5508930	LMA	1024450	18.6	235	0.2294	182	0.1777	53	
14	5508930	PSK	1024450	18.6	2	0.0020	0	0.0000	2	
14	5508930	SMA	1024450	18.6	6	0.0059	3	0.0029	3	

¹¹ For longline provide number of hooks, for purse seine provide number of sets.¹² For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.¹³ 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 2015

Country: Taiwan Year (calendar year): 2015

Fishery		Observed								Estimate
Stratum (CCSBT Statistical Areas or finer scale)	Total Effort ¹⁴	Species	Total Observed Effort ¹⁴	Observer Coverage ¹⁵ (%)	Captures (Number)	Capture Rate ¹⁶ (Number/ Thousand Hooks)	Mortalities (Number)	Mortality Rate ¹⁴ (Number/ Thousand Hooks)	Live releases (Number)	Estimated total mortalities (Number)
2	6291714	ALV	629551	10.01	1	0.0016	0	0.0000	1	
2	6291714	BSH	629551	10.01	198	0.3145	54	0.0858	144	
2	6291714	ISB	629551	10.01	1	0.0016	0	0.0000	1	
2	6291714	LMA	629551	10.01	16	0.0254	3	0.0048	13	
2	6291714	PTH	629551	10.01	1	0.0016	0	0.0000	1	
2	6291714	SMA	629551	10.01	21	0.0334	19	0.0302	2	
2	6291714	WSH	629551	10.01	1	0.0016	1	0.0016	0	
8	3699830	BSH	314793	8.51	134	0.4257	80	0.2541	54	
8	3699830	BTH	314793	8.51	2	0.0064	1	0.0032	1	
8	3699830	LMA	314793	8.51	15	0.0477	13	0.0413	2	
8	3699830	PTH	314793	8.51	1	0.0032	0	0.0000	1	
8	3699830	SMA	314793	8.51	11	0.0349	11	0.0349	0	
8	3699830	WSH	314793	8.51	5	0.0159	1	0.0032	4	
9	3146410	BSH	174149	5.53	40	0.2297	25	0.1436	15	
9	3146410	BTH	174149	5.53	1	0.0057	0	0.0000	1	
9	3146410	LMA	174149	5.53	3	0.0172	0	0.0000	3	
9	3146410	SMA	174149	5.53	2	0.0115	2	0.0115	0	
14	5634930	BSH	822119	14.59	267	0.3248	204	0.2481	63	
14	5634930	LMA	822119	14.59	8	0.0097	6	0.0073	2	
14	5634930	SMA	822119	14.59	31	0.0377	24	0.0292	7	
14	5634930	WSH	822119	14.59	6	0.0073	3	0.0036	3	

¹⁴ For longline provide number of hooks, for purse seine provide number of sets.¹⁵ For longline provide as a percentage of the number of hooks, for purse seine provide as a percentage of the number of shots.¹⁶ For longline provide as captures per thousand hooks, for purse seine provide as captures per set.

Annex 1**Summary of papers submitted to ERSWG**

#	CCSBT-ERS/1703/Info05
Title	Distribution of seabirds bycatch of Taiwanese longline fleets in Southern Ocean between 2010 and 2016
Authors	Hsiang-Wen Huang
Abstract	<p>Observer data collected from 120 Taiwanese tuna longline vessel trips operating in the southern Ocean (south of 25° S) between 2010 and 2016, including 26 in the Atlantic Ocean, 24 in the Pacific Ocean, and 72 in the Indian Ocean, were analyzed in this study. For those 11874 sets, 1363 seabirds were incidental caught. The percentage of albatross bycatch was 62.4%. Thirteen species albatross were identified. The major species were black-browed albatross, wandering, yellow-nosed and sooty albatrosses. The percentage of albatross was highest in the Pacific Ocean and lowest in the Atlantic Ocean. As for the other seabirds, the white-chinned petrel, great shearwater and spectacled petrels were dominant. The highest bycatch rate was 0.318 bird per thousand hooks in the southwestern Pacific Ocean from January to March, followed by first season in the south western Atlantic Ocean (0.270 bird per thousand hooks). Although the bycatch number were higher in the area between 30°-40°S, the bycatch rates were higher in the south of 40° S.</p>