



**SCIENTIFIC COMMITTEE
ELEVENTH REGULAR SESSION**

Pohnpei, Federated States of Micronesia
5-13 August 2015

**ANNUAL REPORT TO THE COMMISSION
PART 1: INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS**

WCPFC-SC11-AR/CCM-23

CHINESE TAIPEI

National Report

Tuna Fisheries Status Report of Chinese Taipei in the Western and Central Pacific Region

Fisheries Agency, Council of Agriculture
and
Overseas Fisheries Development Council

August, 2015

This paper is prepared for the 11th meeting of the WCPFC Scientific Committee held in Pohnpei, Federated States of Micronesia, from 5 to 13 August, 2015. Document should not to be cited without permission of the authors.

<i>Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by 30 April 2015</i>	Yes
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Summary

There are 3 Taiwanese tuna fishing fleets operating in the WCPFC Convention Area: large scale tuna longline fleet (LTLL, previous named FTLL), distant-water purse seine fleet (DWPS) and small scale tuna longline fleet (STLL, previous named CTLL). In 2014, the total catches of main tuna and tuna-like species for these 3 fleets were 16,633 MT for LTLL, 237,156 MT for DWPS and 28,795 MT for STLL, respectively. In 2014, 24 observers were deployed on the tuna longline fishing vessels operating in the Pacific Ocean.

1 Annual fisheries' information

The Pacific Ocean is the earliest fishing grounds among 3 oceans which our fisheries commenced tuna fishing in. Currently, there are three tuna fishing fleets operating in the WCPFC Convention Area: large scale tuna longliners (LTLL), distant-water purse seiners (DWPS) and small scale tuna longliners (STLL). All LTLL and DWPS vessels operate outside the EEZ of Taiwan; most of the STLL vessels operate in the EEZ of Taiwan with some operate on the high seas or in the PICS' EEZ through relevant agreements.

1.1 Fleet structure

Table 1 shows the numbers of active vessel of LTLL, DWPS and STLL fleets in recent five years (2010-2014) in the WCPFC Convention Area.

1.1.1 LTLL

The LTLL vessels refer to those vessels larger than 100 GRT, and the number of active vessels increased to 95 for some shifting from Indian Ocean for piracy in 2011. Due to more LTLL shifting back to Indian Ocean, the number of active LTLL decreased year by year. They were 87 in 2012 and 82 in 2013. The number of active LTLL decreased further to 73 because nine LTLLs temporarily ceased operation for financial loss in 2014.

1.1.2 DWPS

Tuna purse seine fishery was introduced into Taiwan in 1982 and has become one of

our major fishing fleet operating in WCPO. In 1992 the fleet reached its peak of 45 vessels, and reduced to 42 due to adjustment of business strategy of some companies. The fleet further reduced to 34 authorized in 2004 and maintained at this level ever since. The number of active purse seiners reached the lowest of recent years at 32 in 2009 for 2 fishing vessels sank, and returned to 34 in 2010 with 2 new building ones. In 2013, there were three aged purse seiners replaced by 3 new-built ones. There were 34 DWPS active vessels operating in the WCPFC Convention Area in 2014 with 2 new building ones replacement.

1.1.3 STLL

The STLL fleet operates both within and beyond the EEZ of Taiwan. Some with freezing equipment extended their fishing grounds to more distant waters operating in a similar pattern as LTLL vessel. They change their fishing grounds and target species based on fishing season and market price. In 2014 there were 1,275 STLL vessels operating in the WCPFC Convention Area.

1.2 Annual Catch in the WCPFC Convention Area

1.2.1 LTLL

The catch of major tuna and tuna-like species caught by LTLL fishery in the recent five years (2010-2014) in the WCPFC Convention Area is shown in Table 2. The catch composition distribution of tuna and tuna-like species of LTLL in recent 5 years (2010-2014) is shown in Figure 1. Mean catch percentage of major tuna and tuna-like species of our LTLL fishery in the WCPFC Convention area in the recent five years is shown in Figure 2. The dominant species of catch were albacore (35.5%), bigeye tuna (34.9%) and yellowfin tuna (13.5%).

1.2.2 DWPS

The catch of major tuna species in the WCPFC Convention Area during 2010-2014 is shown in Table 3. The most dominant species remained to be skipjack, accounting for about 87.2% of the total catch, followed by yellowfin tuna and bigeye tuna, which accounts for 11.4% and 1.4% of the total catch, respectively (Figure 3). The catch composition distribution of DWPS in recent 5 years (2010-2014) is shown in Figure 4.

1.2.3 STLL

Total catch of mainly tuna and tuna-like species landed in domestic ports in 2014 was 10,959 MT. The dominant species of catch are yellowfin tuna (32%), billfish (44%), swordfish (14%) and bigeye tuna (4%). As to those landed in foreign ports, yellowfin and bigeye are the main species of catch. Total catch of main species by

STLL from 2010 to 2014 in WCPFC Convention Area is shown in Table 4. The catch composition distribution of tuna and tuna-like species of STLL during 2012-2014 is shown in Figure 5.

1.3 Fishing Patterns

1.3.1 LTLL

LTLL fleet can be divided into two groups in accordance with target species: those operating mainly in tropical area (between 15°N and 15°S) targeting on bigeye tuna, and those operating in subtropical and temperate waters targeting on albacore. The fleet targeting bigeye tuna usually conducts a year round operation, and transship their catches to transport vessels and receive fuel and supplies during transshipment. Those fishing for albacore usually entered fishing ports in the Pacific twice a year for catch landing, fuel and supply receiving. The fishing effort distribution in recent 5 years (2010-2014) is shown in Figure 6.

1.3.2 DWPS

The DWPS vessels mainly operate in the tropical waters close to the equator area targeting on SKJ. Since most of the fishing grounds are located in the EEZs of PICs, these vessels acquire fishing permits through access agreements with PICs, including PNG, FSM, Nauru, Marshall Islands, Solomon Islands, Tuvalu and Kiribati.

In early 1980s, logs were used as fish aggregation objects and sets were made on schools associated with these floating objects. This practice continued throughout the 80s and early 90s. Successful exploitation on free-swimming schools in mid 1990s has made free school setting to be the most prevailing fishing method. In 2014, about 54.4% sets were deployed on free school.

The fishing effort distribution in recent 5 years (2010-2014) is shown in Figure 7. The fishing effort is more concentrated in the central Pacific Ocean in 2014 for El Nino.

1.3.3 STLL

Most of STLL based at domestic or foreign ports mainly target on YFT for fresh sashimi markets, while some STLL vessels target on billfish or albacore. Flake ice is used as coolant on the STLL vessels, but some are equipped with freezing equipment for better preservation of their catches. The fishing effort distribution in recent 3 years (2012-2014) is shown in Figure 8.

1.4 Estimated total catches of non-target, associated and dependent species

The LTLL logbook format had been revised in 2003 to accommodate 4 more shark

species (blue shark, silky shark, shortfin mako, and other sharks), sea birds, sea turtles and marine mammals. To compliance with CMM 2008-06 and CMM 2009-04, the logbook format had been revised again and included more shark specie (thresher shark, tiger shark, white shark, porbeagle shark, crocodile shark, hammerhead shark and oceanic white tip shark) into logbook recording items. Annual catch of key shark species of LTLL, STLL and DWPS in 2014 is shown in Table 5.

In 2013, observers of longliners recorded that 39 sea turtles (6 loggerhead, 10 green and 23 olive ridley turtles), 10 seabirds (2 black-footed albatross, 7 albatrosses nei and 1 white-chinned petrel) were taken. In addition, 13103 seabirds, 1 sea turtle and 150 cetaceans were sighted in 2013. In 2014, observers of longliners recorded that 7 sea turtles (1 loggerhead, 2 leatherback, 1 green, 1 olive ridley and 2 unidentified turtles), 19 seabirds (1 black-footed albatross, 4 laysan albatross, 11 albatross nei and 3 white-chinned petrel) were taken. Besides, 9284 seabirds, 143 cetaceans were sighted in 2014. Since some observation trips have not been closed until 2015, the observer data of those trips is incomplete. As for information regarding cetaceans and whale sharks which were encircled by our purse seiners is described in section 3.8.

1.5. Trends in the fishery and future prospects of the fishery

In view of conservation of tuna species, it is the policy of the government to maintain the size of its fleets to a level that is commensurate with the availability of fishing possibilities. The government will continue implementing the policy of limited entry in tuna fisheries.

2 Research and statistic

2.1 Summary of observer programs

For better understanding the fishing activities and bycatch of the longline fishery, FA launched a pilot observer program in 2002. During 2010-2014, the number of observers deployed on LTLL, STLL and DWPS fleets in Pacific Ocean is shown in Table 6. In accordance with the government's policy in establishing an observers program and supporting the increase of observers, in 2012 the observer program was extended to the STLL fleets. Totally the number of observers deployed on longline vessels in 2014 was 24, including 13 observers for LTLL vessels and 11 observers for STLL vessels respectively. Our observer program had received interim authorization in 2009 and received full authorization after auditing in November 2011. The forms used in our observer program are fully conformed to the standards set by WCPFC which include the fishing activities, catch number and weight, species identification,

bycatch species and status. In addition, length frequency of major species and the sighting and incidental catch of ecological species were recorded, and biological samplings were collected for biological research.

2.2 Research activities

For the purpose of improving stock assessment of species in the Pacific Ocean, government of Taiwan has commissioned scientists to conduct a series of researches in 2014 as follows :

- Studies on abundance index and stock assessment of tropical tuna in the Western and Central Pacific and bluefin tuna in the Pacific Ocean.
- A study on CPUE standardization and stock status for North Pacific striped marlin and Atlantic billfishes.
- Study on age composition of southern bluefin tuna and Pacific bluefin tuna in the longline fishery.
- Study on the Pacific albacore resource.
- Potential analysis of climatic change impact on the fishing condition of tuna longline fisheries in the Pacific and Atlantic Oceans.
- Ecological risk assessment of bycatch sharks by Taiwanese fisheries caught in three oceans
- Environmental effects on the CPUE of Striped Marlin in the Pacific Ocean
- Studies on tropical tuna resources in the Western and Central Pacific
- Estimation of historical catches and standardization of CPUEs for dominant sharks in three oceans

The scientific papers presented at recent Pacific Ocean RFMOs meetings during 2014 to 2015 were as follows:

- Seabirds and sea turtles bycatch of Taiwanese tuna longline fleets in the Pacific Ocean. (SC10/EB-WB-06)
- Analysis of longline catch per unit effort data for bigeye and yellowfin tunas. (SC10/SA-IP-03)
- Updated and revised historical catch and standardized CPUE series of the blue shark by Taiwanese large scale tuna longline fisheries in the North Pacific Ocean.(ISC/14/SHARKW G-1/07)
- CPUE Standardization and catch estimate of shortfin mako shark, caught by the Taiwanese large-scale longline fishery in the North Pacific Ocean. (ISC/14/SHARKWG-3/11)

- Revised CPUE standardization and catch estimate of shortfin mako shark, caught by the Taiwanese large-scale longline fishery in the North Pacific Ocean. (ISC/15/SHARKWG-1/07)
- Spatial and temporal patterns of shortfin mako shark size and sex in the North Pacific Ocean.(ISC/15/SHARKWG-1/04)
- Standardized CPUE of swordfish (*Xiphias gladius*) for the Taiwanese distant-water tuna longline fishery, based on a two-stock scenario in the North Pacific Ocean.(ISC/14/BILLWG-1/07)
- Standardized CPUE of striped marlin for the Taiwanese distant-water tuna longline fishery in the western and central North Pacific Ocean. (ISC/15/BILLWG-1/09)
- Catch and length data of striped marlin (*Kajikia audax*) from Taiwanese fisheries in the western and central North Pacific Ocean. (ISC/15/BILLWG-1/08)
- Stock Assessment of Striped Marlin (*Kajikia audax*) in the Western and Central North Pacific Ocean Using an Age-structured Model: Updated to 2013. (ISC/15/BILLWG-2/03)
- Albacore catch statistics of Taiwanese longline fisheries operated in the North Pacific Ocean, 1995-2011, and preliminary estimates for the year of 2012.(ISC/14/ALBWG/05)
- A comparison study of North Pacific albacore (*Thunnus alalunga*) age and growth among various sources.(ISC/14/ALBWG/04)
- Standardized catch per unit effort of Pacific Bluefin tuna (*Thunnus orientalis*) by general linear model for Taiwanese small-scale longline fishery in the southwestern North Pacific Ocean.(ISC/14/PBFWG-2/01)

The scientific papers published on scientific journal during 2014 to 2015 were as follows:

- Amano Y, J.C. Shiao, T. Ishimura, K. Yokouchi, and K. Shirai, 2014, Otolith geochemical analysis for stock discrimination and the study of migratory ecology. In Biology & Ecology of Bluefin Tuna. Edited by Kitagawa T & Kimura S. (CRC Press, In Press).
- Brodziak, J., M. Mangel, and C.L. Sun, 2015. Stock-recruitment resilience of North Pacific striped marlin based on reproductive ecology. Fisheries Research, 166, 140-150.
- Chang, S.K. and T.L. Yuan, 2014. Deriving high-resolution spatiotemporal fishing effort of large-scale longline fishery from vessel monitoring system (VMS) data and validated by observer data. Canadian Journal of Fisheries and Aquatic Sciences 71(9): 1363-1370.

- Chang, Y.J., J. Brodziak, J. O'Malley, H.H. Lee, G. DiNardo, and C.L. Sun, 2015. Model selection and multi-model inference for Bayesian surplus production models: A case study for Pacific blue and striped marlin. *Fisheries Research*, 166, 129-139.
- Chiang, W.C., M.K. Musyl, C.L. Sun, G. DiNardo, H.M. Hung, H.C. Lin, S.C. Chen, S.Z. Yeh, W.Y. Chen, and C.L. Kuo, 2015. Seasonal movements and diving behaviour of black marlin (*Istiompax indica*) in the northwestern Pacific Ocean. *Fisheries Research*, 166, 92-102.
- Hsu, H. H., S. J. Joung, R. Hueter, and K. M. Liu, 2014. Age and growth of the whale shark, *Rhincodon typus* in the northwestern Pacific. *Marine and Freshwater Research* 65(12): 1145-1154. doi: 10.1071/MF1330.
- Huang H.W., 2015. Incidental catch of seabirds and sea turtles by Taiwanese longline fleets in the Pacific Ocean, *Fisheries Research*, in press, doi: 10.1016/j.fishres.2015.06.004
- Joung, S. J., J. H. Chen, C. P. Chin, K. M. Liu, 2015. Age and growth of the dusky shark, *Carcharhinus obscurus*, in the Northwest Pacific Ocean. *Terrestrial, Atmospheric and Oceanic Sciences* 26(2): 153-160. Doi: .3319/TAO.2014.10.15.01(Oc).
- Lee, H.H., K.R. Piner, M.G. Hinton, Y.J. Chang, A. Kimoto, M. Kanaiwa, N. J. Su, W. Walsh, C.L. Sun, DiNardo, G., 2014. Sex-structured population dynamics of blue marlin *Makaira nigricans* in the Pacific Ocean, *Fisheries Science*, 80(5), 869-878.
- Lien, Y.H., N.J. Su, C.L. Sun., A.E. Punt, S.Z. Yeh, and G. DiNardo, 2014. Spatial and environmental determinants of the distribution of Striped Marlin (*Kajikia audax*) in the western and central North Pacific Ocean, *Environmental Biology of Fishes*, 97(3), 267-276.
- Musyl, M.K., C.D. Moyes, R.W. Brill, B.L. Mourato, A. West, L.M. McNaughton, W.C. Chiang, and C.L. Sun, 2015. Postrelease mortality in istiophorid billfish. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(4), 538-556.
- Punt, A.E., N.J. Su, and C.L. Sun, 2015. Assessing billfish stocks: A review of current methods and some future directions. *Fisheries Research*, 166, 103-118.
- Su, N.J., C.L. Sun, A.E. Punt, S.Z. Yeh, and G. DiNardo, 2015. Environmental influences on seasonal movement patterns and regional fidelity of striped marlin *Kajikia audax* in the Pacific Ocean. *Fisheries Research*, 166, 59-66.
- Sun, C.L., H.Y. Chang, T.Y. Liu, S.Z. Yeh, and Y.J. Chang, 2015. Reproductive biology of the black marlin, *Istiompax indica*, off southwestern and eastern Taiwan. *Fisheries Research*, 166, 12-20.

- Sun, C.L., S.Z. Yeh, C.S. Liu, N.J. Su, and W.C. Chiang, 2015. Age and growth of Black marlin (*Istiompax indica*) off eastern Taiwan. *Fisheries Research*, 166, 4-11.
- Tsai, C.N., W.C. Chiang, C.L. Sun, K.T. Shao, S.Y. Chen, and S.Z. Yeh, 2015. Stomach content and stable isotope analysis of sailfish (*Istiophorus platypterus*) diet in eastern Taiwan waters. *Fisheries Research*, 166, 39-46.
- Tsai, C.N., W.C. Chiang, C.L. Sun, K.T. Shao, S.Y. Chen, and S.Z. Yeh, 2014. Trophic size-structure of sailfish *Istiophorus platypterus* in eastern Taiwan estimated by stable isotope analysis, *Journal of Fish Biology*, 84, 354-371.
- Tsai, W. P., C. L. Sun, K. M. Liu, S. B. Wang, and N. C. H. Lo. CPUE standardization and catch estimate of the blue shark by Taiwanese large-scale tuna longline fishery in the North Pacific Ocean. *Journal of Marine Science and Technology* (Accepted).
- Tsai, W. P., C. L. Sun., A. E. Punt, and K. M. Liu, 2014. Demographic analysis of the shortfin mako shark, *Isurus oxyrinchus*, in the Northwestern Pacific using a two-sex stage-based matrix model. *ICES Journal of Marine Science* 71(7): 1604-1618. doi: 10.1093/icesjms/fsu056.
- Tsai, W. P., K. M. Liu, A. E. Punt, and C. L. Sun, 2015. Assessing the potential biases of ignoring sexual dimorphism and mating mechanism in using a single-sex demographic model: the shortfin mako shark as a case study. *ICES Journal of Marine Science* 72(3): 793-803. doi:10.1093/icesjms/fsu 210.
- Tsai, W.P., C.L. Sun, A.E. Punt, and K.M. Liu, 2014. Demographic analysis of the shortfin mako shark, *Isurus oxyrinchus*, in the Northwest Pacific using a two-sex stage-based matrix model. *ICES Journal of Marine Science*, 71(7), 1604-1618.
- Tsai, W.P., K.M. Liu, A.E. Punt, and C.L. Sun, 2015. Assessing the potential biases of ignoring sexual dimorphism and mating mechanism in using a single-sex demographic model: the shortfin mako shark as a case study. *ICES Journal of Marine Science*, 72(3), 793–803.

2.3 Statistics data collection system in use

Logbooks of LTLL, STLL and DWPS fishing vessels authorized to operate in WCPFC Convention Area are collected while calling port or transshipping. All fleets are required to submit catch reports periodically while fishing: fishing vessels of LTLL and DWPS report weekly and the STLL fishing vessels operating outside of our EEZ report monthly.

In addition, the fishing vessels and the fish traders have to report the trade and transshipment data. Market State data on LTLL are collected from the Organization

for the Promotion of Responsible Tuna Fishery (OPRT) and from fish traders at foreign ports; as to the landing of STLL fishery in foreign ports, information on the fishing activities of the fishery was obtained from port States trading companies and such information together with available commercial trade data was used for the catch estimation.

2.4 Data coverage of catches, effort and size data for all species

2.4.1 Longline fisheries

The logbook is the main data source of catch and effort for all species, supplemented by trade data. The size data of all species is mainly from the first 30 fish caught for each setting recorded on logbook. A port-sampling program conducted in domestic ports aims at collecting the length data of tuna and tuna-like catch. The observer program has been collecting size data for all species. These data have already been used and reported in some researches.

2.4.2 DWPS fishery

The logbook is the source of catch and effort data. Trade data has been collected for estimating the catch composition of bigeye tuna and yellowfin tuna. Length data was collected from fishing vessels. To strengthen length data collection of DWPS fishery, the fishing fleet started collecting length data from December, 2013. At least ten fishes, mainly skipjack and tuna species, are measured the fork length randomly per set.

3. Implementation of Conservation and Management Measure

3.1 CMM 2005-03

In accordance with CMM 2005-03, all CCMs shall report annually to the WCPFC Commission all catches of albacore north of the equator and all fishing effort north of the equator in fisheries directed at albacore. In 2014, the total catch of north Pacific albacore made by our fishing fleet was 2,617 MT with 2,045 MT in the north Convention area, and 22 LTLL vessels directed at albacore in the North Pacific Ocean with 2,348 fishing days; 1,991 days was deployed in the north Convention area.

3.2 CMM 2006-04

In accordance with CMM 2006-04, CCMs shall report annually to the Commission the catch levels of their fishing vessels that have taken striped marlin as a bycatch as well as the number and catch levels of vessels fishing for striped marlin in the Convention Area south of 15°S. The bycatch of striped marlin in the convention area south of 15°s during the period 2010-2014 is shown in Table 7. None of our

fishing vessel targets on striped marlin.

3.3 CMM 2007-01

In order to estimate observer coverage rates on longline vessels fishing according CMM 2007-01 and in accordance with the decision of WCPFC11, Table 8 provides the information of observer coverage rate estimations of LTLL and STLL of 2014.

3.4 CMM 2009-03

In accordance with CMM 2009-03, the number of the fishing vessels for swordfish in the Convention Area south of 20°S was limited to the number in any year during 2000-2005, and the catch of swordfish caught in the Convention Area south of 20°S is limited to the amount caught in any year during the period 2000-2006. The information mentioned above is shown in Table 9.

3.5 CMM 2009-06

In accordance with CMM 2009-06, CCMs shall report on all transshipment activities (including transshipment activities that occur in ports or EEZs) in Part 1 of its Annual Report. Table 10 shows the information of transshipment activities of our fishing fleets in 2014.

3.6 CMM 2010-05

In accordance with CMM 2010-05, CCMs shall report annually to the Commission the catch levels of their fishing vessels that have taken South Pacific Albacore as a bycatch as well as the number and catch levels of vessels actively fishing for South Pacific albacore in the Convention area south of 20°S. The catch of South Pacific albacore in the convention area south of 20°s during the period 2006-2014 and the number of longline vessels fishing are shown in Table 11.

3.7 CMM 2010-07

In accordance with CMM 2010-07, each CCM shall include key shark species, as identified by the Scientific Committee, in their annual reporting to the Commission of annual catch and fishing effort statistics by gear type, including available historical data, in accordance with the WCPF Convention and agreed reporting procedures. The total catch of key shark species of 3 Taiwanese fishing fleets in 2014 shows in Table 5.

3.8 CMM 2011-03 and CMM 2012-04

In accordance with CMM 2011-03 and CMM 2012-04, CCMs shall advise in their

Part 1 Annual Report of any instances in which cetaceans and whale sharks have been encircled by the purse seine nets of their flagged vessels, respectively. Table 12 shows detailed information on the cetaceans and whale shark encircled during operation, which was reported by fishing masters required by FA.

3.9 CMM 2011-04

In accordance with CMM 2011-04, each CCM shall estimate, through data collected from observer programs and other means, the number of releases of oceanic whitetip shark, including the status upon release (dead or alive), and report this information to the WCPFC in Part 1 of their Annual Reports. In 2014, observers of longliners recorded 40 dead, 28 alive and 1 unknown status of released oceanic whitetip shark in the WCPFC Convention Area. Based on information for observers of longliners, released oceanic whitetip shark were estimated 1007 (576 dead, 410 alive and 21 unknown) for LTLL and 2,917 (1,373 dead and 1,544 alive) for STLL in 2014. Discard of oceanic whitetip shark of DWPS already related in Table 5.

3.10 CMM 2007-04 and CMM 2012-07

In accordance with CMM 2007-04 and CMM 2012-07, CCMs shall annually provide to the Commission, in part 1 of their annual reports, all available information on interactions with seabirds reported or collected by observers, including mitigation used, observed and reported species specific seabird bycatch rates and numbers, to enable the Scientific Committee to estimate seabird mortality in all fisheries to which the WCPFC Convention applies. Taiwan Fisheries Agency has required fishermen and industries to take appropriate measures to mitigate incidental catch of seabirds. Fishing vessels operating in the Convention area south of 30 degrees South are required to employ at least two of the following seabird mitigation measures: tori lines, weighted branch lines, and night setting with minimum deck lighting. For fishing vessels >24m operating in the Convention area north of 23 degrees North are required to employ tori lines and one of the following seabird mitigation measures: tori lines, weighted branch lines, night setting with minimum deck lighting, line shooter or management of offal discharge. In addition, fishing vessels are required to carry de-hookers and line cutters on board for the purpose of releasing seabirds alive. The information regarding interactions with seabirds is shown in Table 13-16. Base on SC10 recommendation, Figure 9 showed the observed efforts and seabirds bycatch of observer trips of longliners in the WCPFC Convention Area during 2012 to 2014. Whether LTLL or STLL, no seabird bycatch interaction were observed in 23°N-30°N and 125°W-160°W.

3.11 CMM 2013-08

In accordance with CMM 2013-08, CCMs shall estimate, through data collected from observer programs and other means, the number of releases of silky shark caught in the Convention Area, including the status upon release (dead or alive), and report this information to the WCPFC in Part 1 of their Annual Reports. In 2014, observers of longliners recorded 84 dead 、 324 alive and 16 unknown status of released silky shark in the WCPFC Convention Area. Based on information for observers of longliners, released silky shark were estimated 1,668 (851 dead 、 763 alive and 54 unknown) for LTLL and 5,192 (2,734 dead 、 2,327 alive and 131 unknown) for STLL in 2014. Discard of silky shark of DWPS already related in Table 5.

Table 1. The number of fishing vessel by fishery in the WCPFC Convention Area during 2010-2014.

Year	LTLL	DWPS	STLL
2010	90	34	1,235
2011	95	34	1,376
2012	87	34	1,326
2013	82	34	1,296
2014	73	34	1,275

Table 2. The catch (in MT, round weight) of major tuna and tuna-like species of LTLL fishery in the WCPFC Convention Area during 2010-2014.

Year	N-ALB	S-ALB	BET	YFT	SWO	MLS	BUM	BLM	SKJ	TOTAL
2010	1,952	5,831	8,000	3,569	1,339	239	1269	61	104	22,364
2011	2,818	4,121	6,579	3,167	1,554	257	1,166	22	155	19,839
2012	1,592	4,064	5,770	2,059	1,319	249	975	7	214	16,249
2013	2,035	4,498	5,486	1,441	1,386	222	934	1	179	16,182
2014*	1,730	3,757	6,005	2,057	1,621	275	1,063	5	120	16,633

* Preliminary estimate

Table 3. The catch (in MT, round weight) of major tuna species of DWPS fishery in the WCPFC Convention Area during 2010-2014.

Year	SKJ	YFT	BET	Total
2010	166,211	29,203	3,437	198,851
2011	155,641	18,143	2,151	175,935
2012	172,664	25,750	2,239	200,653
2013	186,330	22,659	3,491	212,480
2014*	213,154	20,548	3,418	237,156

* Preliminary estimate

Table 4. The catch (in MT, round weight) of tuna and tuna-like species of the STLL fishery in WCPFC Convention Area during 2010-2014.

Year	ALB	BET	YFT	PBF	SWO	BILL
2010	12,652	3,874	18,656	373	2,740	7,861
2011	9,276	4,696	18,153	292	3,239	7,046
2012	8,505	5,224	14,889	210	3,430	6,430
2013	10,870	5,114	13,558	331	2,932	7,337
2014*	5,264	4,013	10,200	480	2,214	6,625

* Preliminary estimate

**BILL: striped marlin, blue marlin, black marlin, and other billfish

Table 5. The catches (in MT, round weight) of key shark species* of LTLL, STLL and DWPS fisheries in the WCPFC Convention Area in 2014 (preliminary estimate).

Fishery	BSH	FAL	MAK		OCS	PTH	BTH	ALV	SPZ	SPL	SPK	EUB	POR	SHK
			SMA	LMA										
LTLL	1804	196	330	0	0	5	2	0	0	0	0	0	0	27
STLL	8799	39	428		0	274	308	0	82	156	0	0	0	1620
DWPS**	0	32	1		1	0	+***	0	0	0	0	0	0	6

* The government has prohibited all vessels from retaining on board, transshipping, storing on a fishing vessel, or landing any whale sharks since 2008. Therefore, the table does not include the whale shark.

** Discards

*** Less than 0.5 MT

Table 6. The number of observers deployed on LTLL, STLL and DWPS fisheries in the Pacific Ocean during 2010-2014.

	LTLL	STLL	DWPS
2010	17	-	_*
2011	15	-	_*
2012	20	12	_*
2013	15	9	_*
2014	13	11	_*

* In accordance with CMM 2008-01, the coverage of observers for DWPS had reached 100%.

Table 7. The catch of striped marlin in the area of south of 15°S during 2010-2014.

Year	Catch (MT)
2010	138
2011	132
2012	82
2013	64
2014*	38

* Preliminary estimate

Table 8. Observer coverage of Taiwanese longline fleets in 2014.

Fishery	Days at Sea		
	Total estimated	Observer	%
LTLL	20,714	2,183	10.5%
STLL	74,036	841	1.1%

Table 9. The catch of swordfish and the number of the fishing vessel in the area of south of 20°S during 2000-2014.

Year	Catch (MT)	Number of fishing vessel	
		Seasonal Target	Bycatch
2000	54	10	58
2001	208	10	58
2002	233	10	59
2003	248	12	72
2004	466	8	56
2005	202	6	59
2006	198	4	53
2007	217	3	46
2008	61	0	53
2009	133	7	46
2010	105	4	40
2011	98	3	66
2012	119	0	57
2013	140	0	72
2014*	105	0	48

* Preliminary estimate

Table 10. The transshipment information in 2014

Offloaded / Received	Location of transshipment	Area of transshipment	Product Form	Area of Catch	Gear Type	Number of Transshipments	BET	ALB	YFT	SKJ	SWO	BUM	MLS	SKX	OTH
Offloaded	High sea	WCPFC area	Frozen	Catch in WCPFC area	Longliner	107	4,166	887	1,276	0	600	165	114	283	299
				Catch in other Pacific			1,046	107	67	0	116	15	8	8	20
		Other Pacific		Catch in WCPFC area		90	642	1,225	160	0	108	69	24	57	132
	Port	WCPFC area		Catch in WCPFC area		596	3,075	8,849	8,842	0	393	1,114	35	1,321	1,939
				Catch in other Pacific			193	1,246	37	0	53	92	9	9	162
				Catch in WCPFC area			Tuna purse seiner	327	1,309	0	17,750	189,165	0	0	0

Table 11. The catch of south Pacific albacore and the number of fishing vessel in the area of south of 20°S during 2006-2014.

Year	Catch (tonnes)		Number of vessels fishing for South Pacific albacore
	Target	Bycatch	
2006	5,042	-	57
2007	4,329	276	49
2008	1,848	59	53
2009	3,350	22	53
2010	4,231	121	44
2011	3,887	91	69
2012	2,815	39	57
2013	3,729	162	62
2014*	3,670	103	52

* Preliminary estimate

Table 12. The master of the vessel reported event that cetaceans or whale sharks were not deliberately encircled in the purse seine net.

DATE	TIME	Lat	NS	Lon	EW	Species	Number	Reason	Measure for ensure safe release	Status on release
2014/5/10	17:20	1.87	S	173.63	E	unidentified dolphin	9	not deliberately encircled	unspecified	died
2014/6/27	5:48	3.77	S	170.10	E	unidentified dolphin	4	not deliberately encircled	stop operating	alive
2014/6/27	5:48	3.77	S	170.10	E	unidentified dolphin	1	not deliberately encircled	haul to the deck and let it go	died
2014/12/10	18:04	2.65	S	165.85	E	unidentified dolphin	13	not deliberately encircled	unspecified	died
2014/5/25	23:33	0.18	N	166.87	E	whale shark	1	not deliberately encircled	stop hauling	alive

2014/6/5	14:00	1.63	N	170.08	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/6/23	14:15	2.62	S	165.20	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/6/28	12:00	0.05	N	171.23	E	whale shark	1	unspecified	stop operating	alive
2014/7/27	4:31	2.92	S	174.42	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/8/5	19:10	1.30	S	177.55	E	whale shark	1	not deliberately encircled	stop hauling	alive
2014/10/8	3:38	0.33	S	170.68	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/10/20	4:51	0.38	S	176.30	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/11/18	18:16	6.15	S	176.82	E	whale shark	1	not deliberately encircled	stop hauling	alive
2014/12/1	6:02	0.02	S	165.88	E	whale shark	1	not deliberately encircled	stop operating	alive
2014/12/6	6:00	1.23	S	164.82	E	whale shark	1	not deliberately encircled	stop hauling	died
2014/12/21	8:00	0.00	S	170.78	E	whale shark	1	not deliberately encircled	stop operating	alive

Table 13. Fishing effort, observed effort and seabird bycatch information of longline fishery in the area of south of 30°S during 2009-2014.

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2009	23	3,248,476	376,003	11.6%	0	0.000
2010	23	3,520,686	41,910	1.2%	0	0.000
2011	32	2,678,483	335,746	12.5%	123	0.366
2012	27	3,142,654	641,731	20.4%	8	0.012
2013*	24	4,097,895	390,427	9.5%	4	0.010
2014*	27	4,405,455	350,827	8.0%	3	0.009

* Preliminary

Table 14. Fishing effort, observed effort and seabird bycatch information of longline fishery in the area of north of 23°N during 2009-2014.

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2009	456	65,002,329	285,358	0.4%	3	0.011
2010	428	41,458,705	0	0.0%	0	-
2011	465	64,460,898	0	0.0%	0	-
2012	495	51,349,311	122,160	0.2%	3	0.025
2013*	442	52,226,550	385,993	0.7%	6	0.016
2014*	442	31,716,522	354,224	1.1%	16	0.045

* Preliminary

Table 15. Fishing effort, observed effort and seabird bycatch information of longline fishery in the area of 23°N - 30°S during 2009-2014.

Year	Fishing effort				Observed seabird captures	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2009	946	233,712,964	2,590,346	1.1%	10	0.004
2010	880	230,406,268	2,781,913	1.2%	0	0.000
2011	892	253,889,416	2,710,106	1.1%	4	0.001
2012	929	200,889,530	4,220,207	2.1%	5	0.001
2013*	876	214,374,060	4,010,888	1.9%	0	0.000
2014*	797	113,314,695	2,547,934	2.2%	0	0.000

* Preliminary

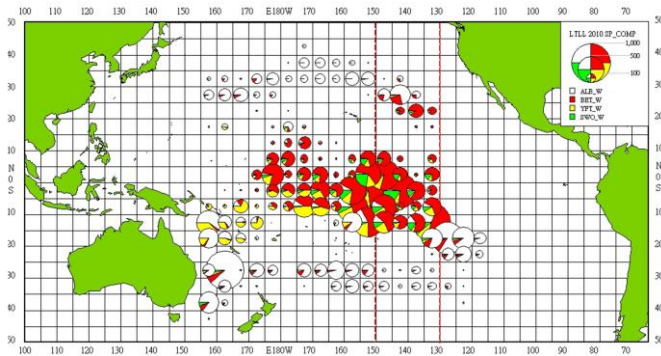
Table 16. Number of observed seabird bycatch of longline fishery by

species and area during 2009-2014.

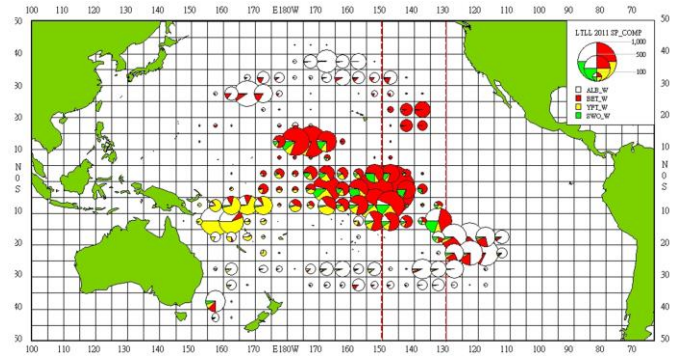
Year	Species	South of 30°S	North of 23°N	23°N - 30°S
2009	Unidentified albatross		3	4
	Unidentified seabirds			6
	Total	0	3	10
2010	-			
2011	Black-browed albatross	1		
	Buller's albatross	1		
	Wandering albatross	10		
	Unidentified albatross	96		
	Flesh-footed shearwater	6		
	Tropical shearwater			1
	Wedge-tailed shearwater	2		
	Black petrel	1		
	White-chinned petrel	4		1
	Brown booby			2
	Unidentified seabirds	2		
	Total	123	0	4
2012	Black-footed albatross		2	
	Campbell albatross	1		
	Wandering albatross	2		
	Unidentified albatross	5	1	
	Frigatebird			4
	Masked booby			1
	Total	8	3	5
2013	Black-footed albatross		2	
	Unidentified albatross	3	4	
	White-chinned petrel	1		
	Total	4	6	0
2014	Black-footed albatross		1	
	Laysan albatross		4	
	Unidentified albatross		11	
	White-chinned petrel	3		
	Total	3	16	0

* Preliminary

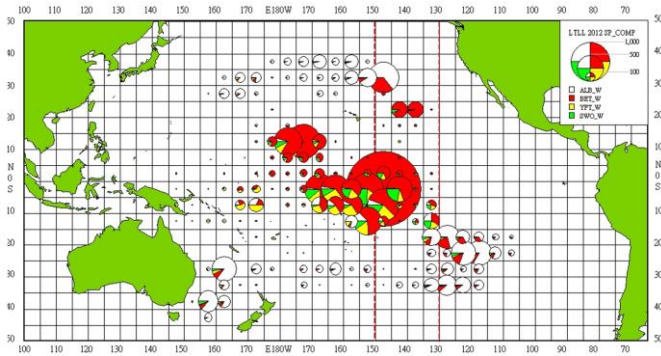
2010



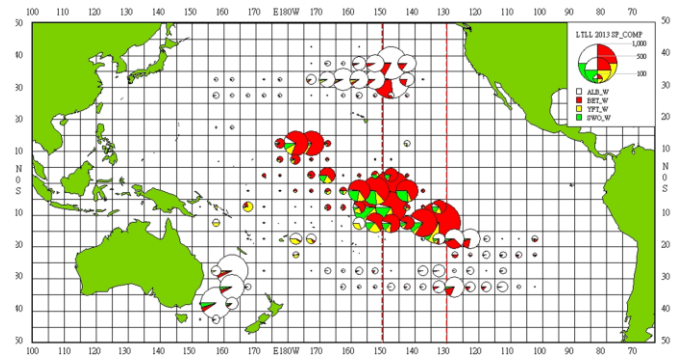
2011



2012



2013* preliminary



2014* preliminary

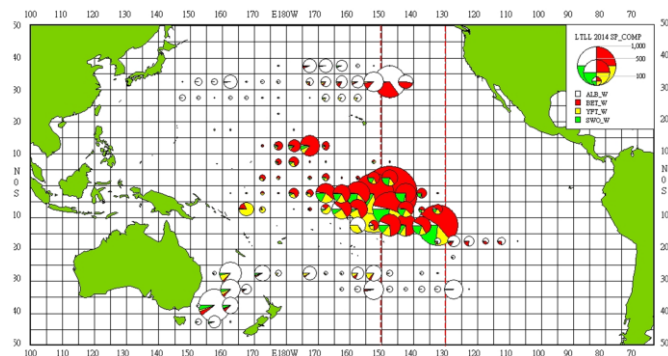


Figure 1. The catch composition distributions of tuna and tuna-like species of LTLL fishery during 2010-2014. The figures of 2013 and 2014 are still in preliminary.

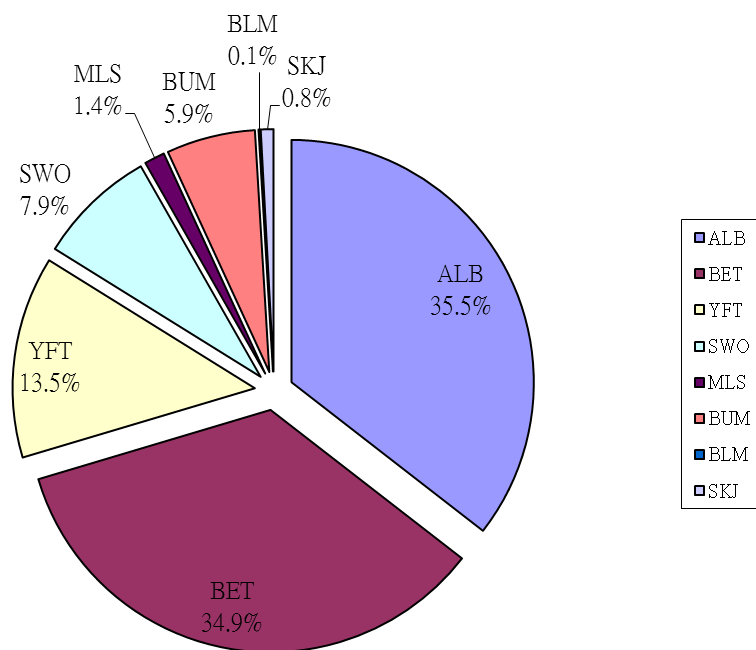


Figure 2. Mean catch percentage of major tuna and tuna-like species of LTLL fishery in the WCPFC Convention area during 2010-2014.

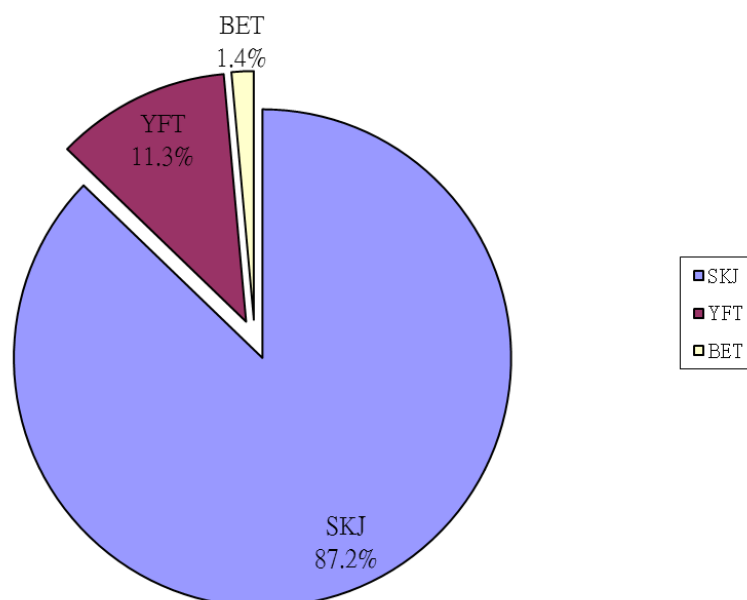
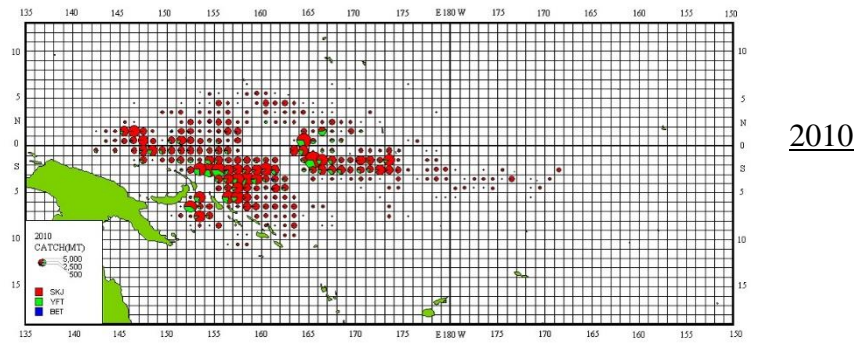
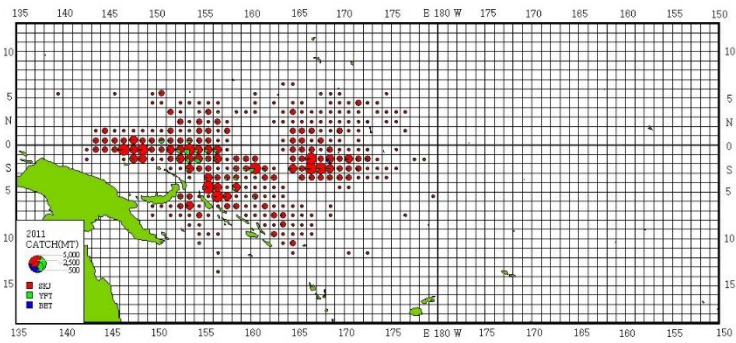


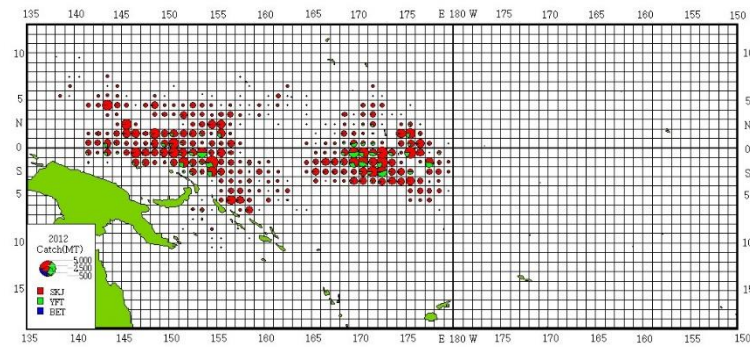
Figure 3. Mean catch percentage of major tuna and tuna-like species of DWPS fishery in the WCPFC Convention area during 2010-2013.



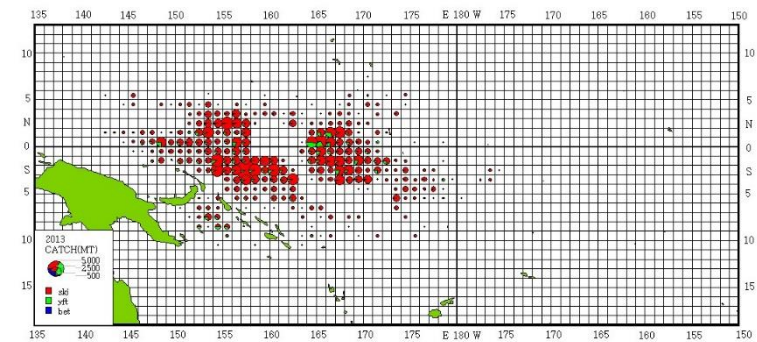
2011



2012



2013



2014

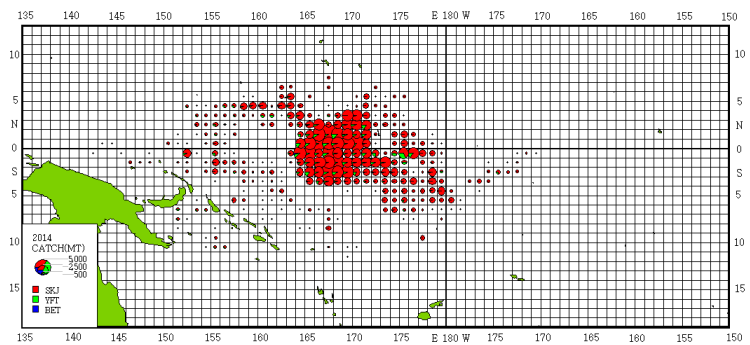
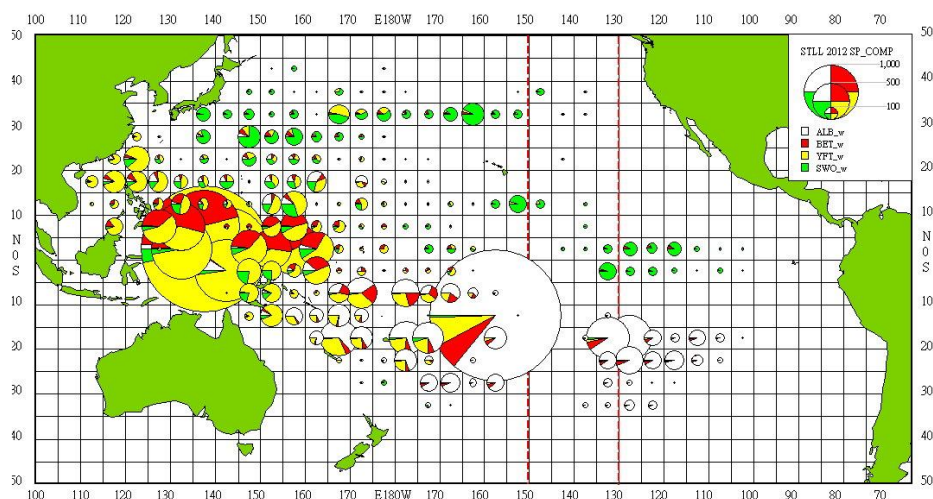
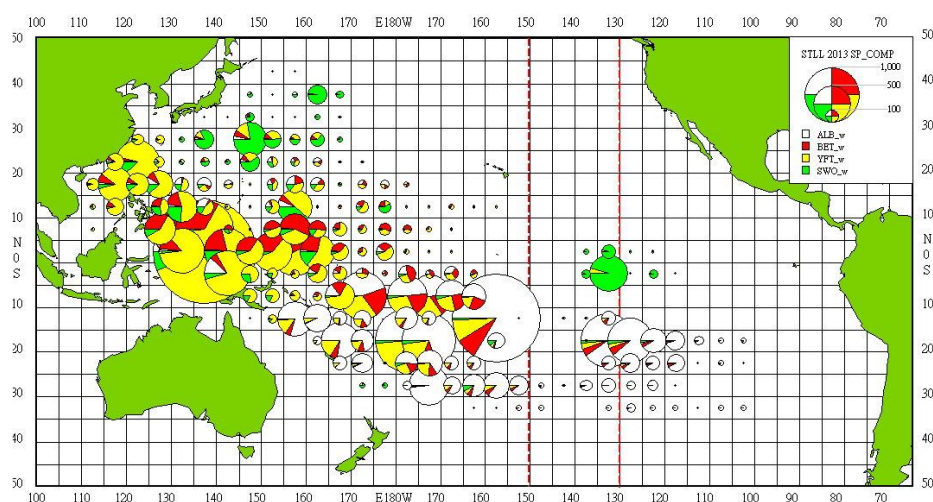


Figure 4. The catch composition distributions of DWPS fleet during 2010-2014.

2012



2013* preliminary



2014* preliminary

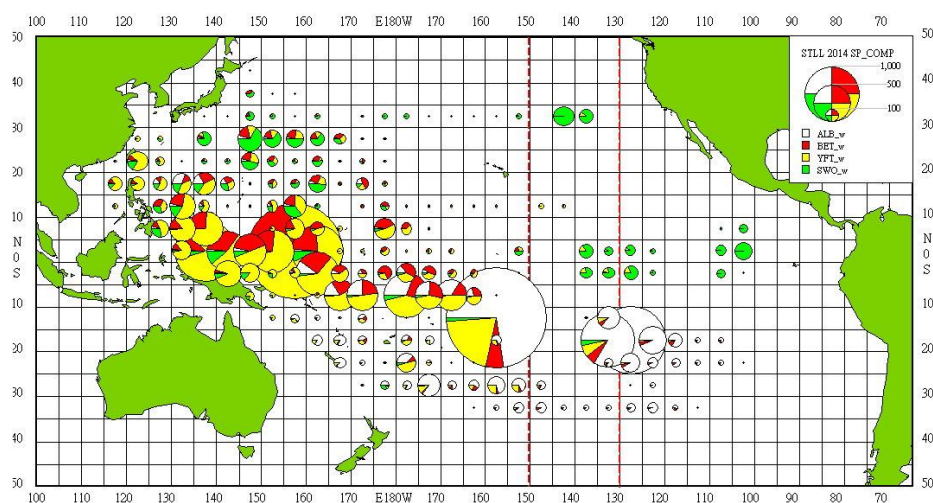
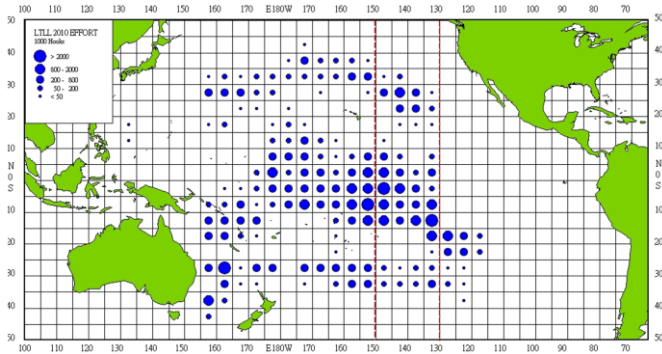
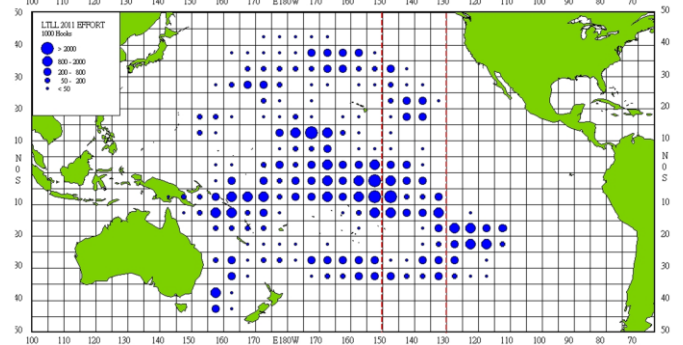


Figure 5. The catch composition distributions of tuna and tuna-like species of STLL fishery during 2012-2014. The figures of 2013 and 2014 are still in preliminary.

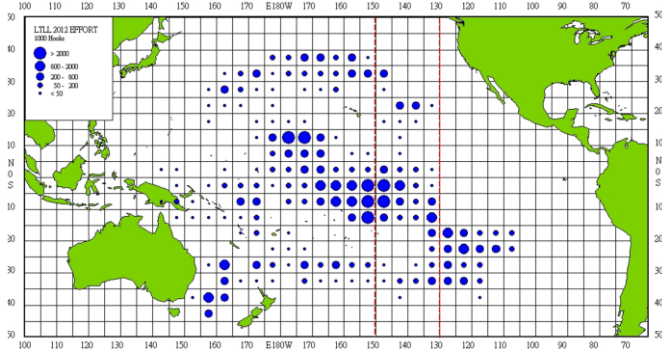
2010



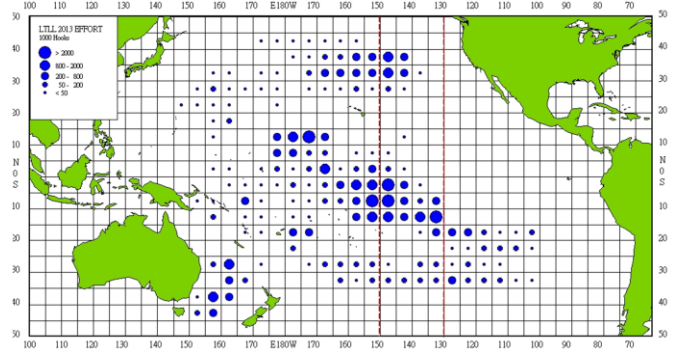
2011



2012



2013* preliminary



2014* preliminary

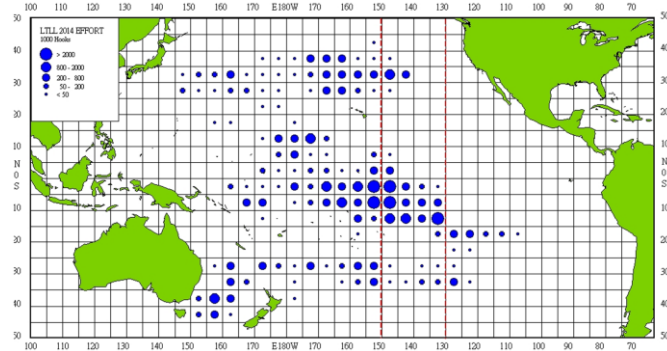
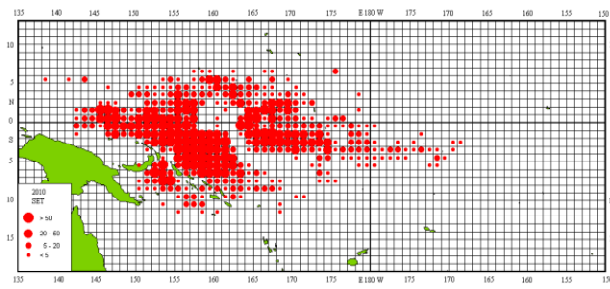
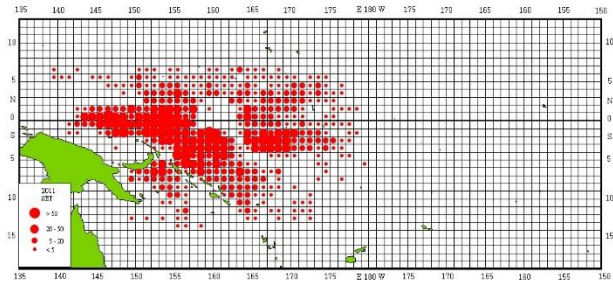


Figure 6. The effort distributions of LTLL fishery during 2010-2014. The figures of 2013 and 2014 are still in preliminary.

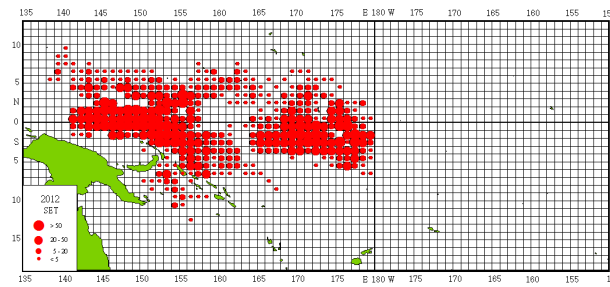


2010

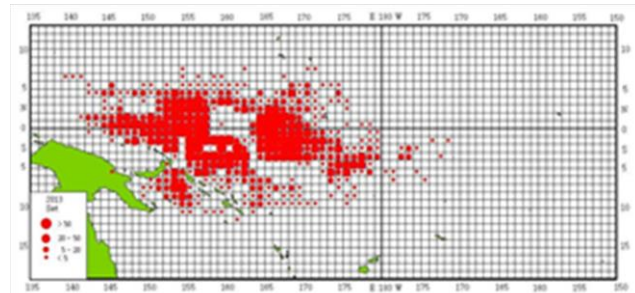
2011



2012



2013



2014

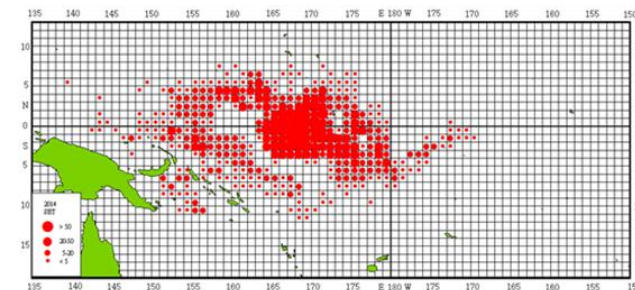
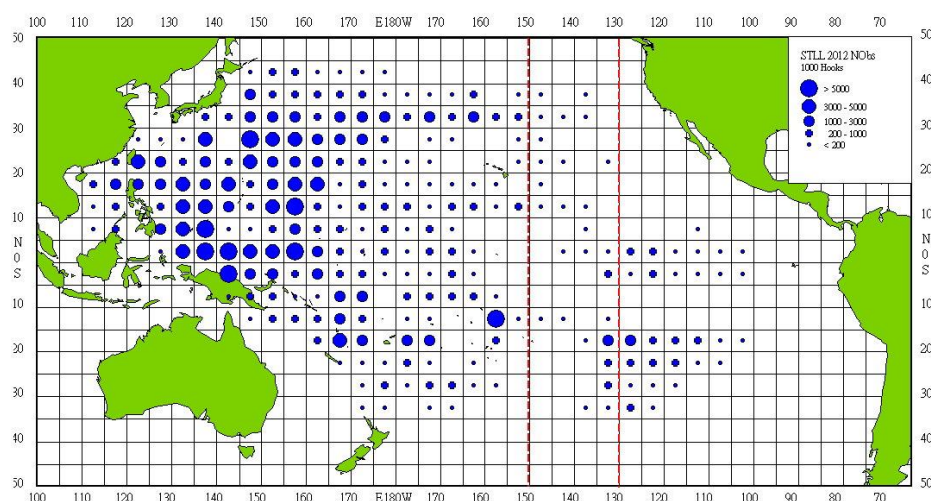
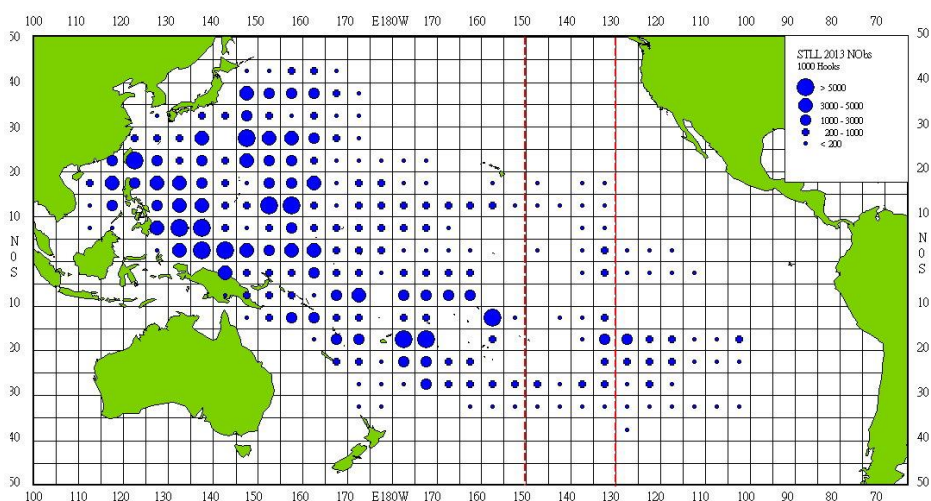


Figure 7. The effort distributions of DWPS fleet during 2010-2014.

2012



2013* preliminary



2014* preliminary

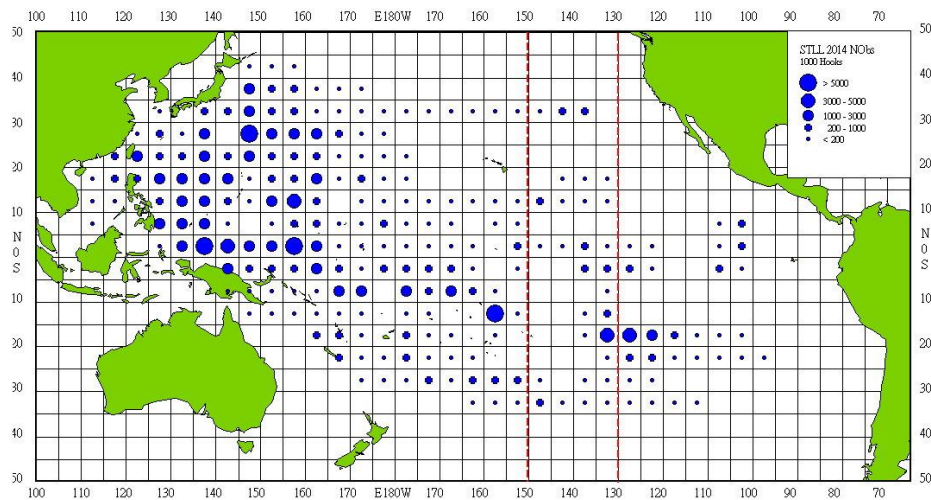


Figure 8. The effort distributions of STLL fishery during 2012-2014. The figures of 2013 and 2014 are still in preliminary.

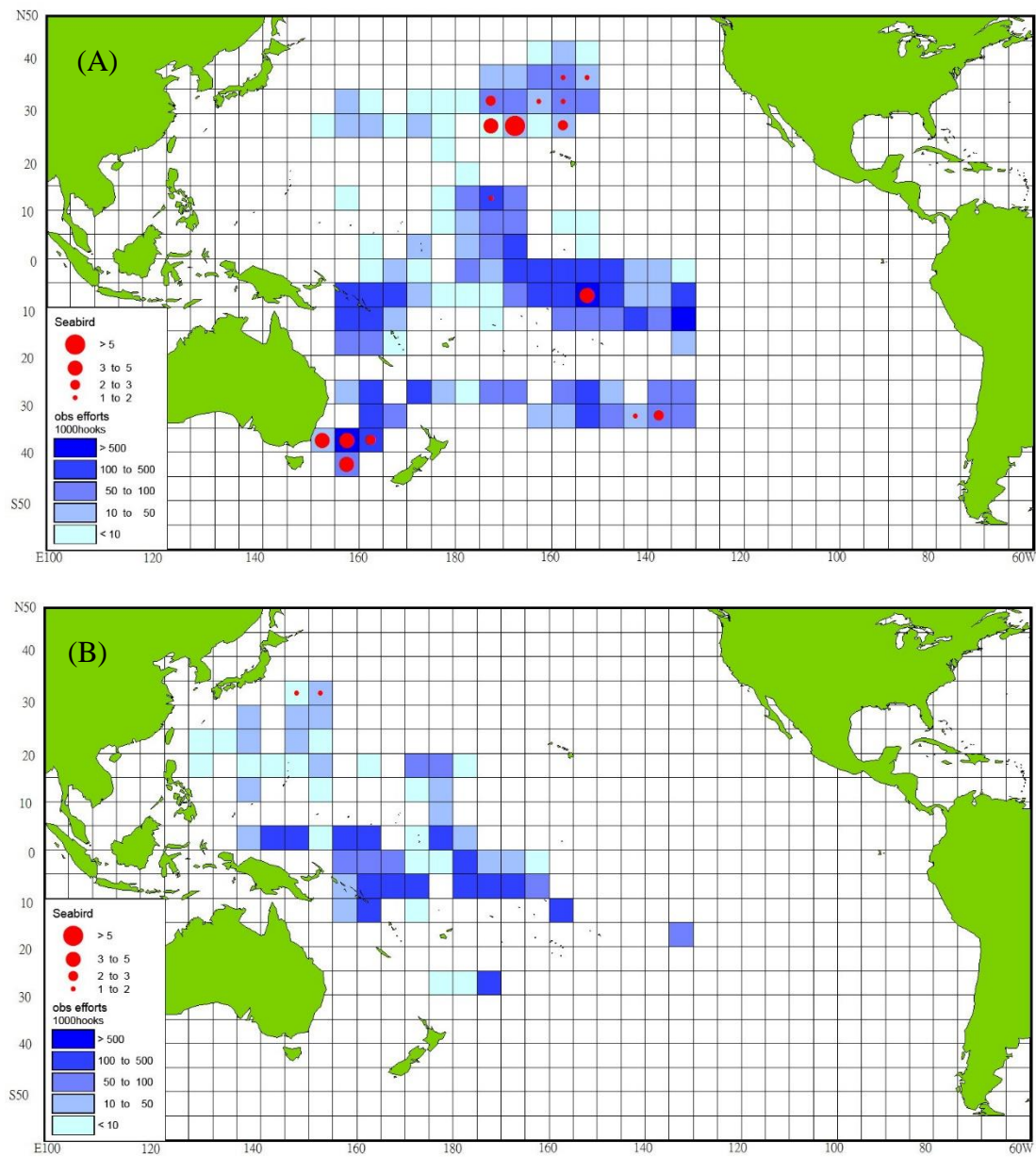


Figure 9. Distribution of observed efforts, seabirds and turtles bycatch by observer trips of (A)LTLL and (B)STLL between 2012 and 2014 in the WCPFC Convention Area.