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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

November, 2018*
This paper is originally prepared for the 14th meeting of the WCPFC Scientific Committee held in Busan, Republic of Korea, from 8 to 16 August, 2018 and submitted to WCPFC Secretariat in August, 2018.

*This version is to provide update to observer coverage rate (Table 8) and transshipment information (Table 10)

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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 2018	Yes

Summary

Three Taiwanese tuna fishing fleets are currently operating in the WCPFC Convention Area, namely 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 2017, the total catches of main tuna and tuna-like species for the three fleets were 19,550 MT for LTLL, 167,239 MT for DWPS and 41,395 MT for STLL, respectively. In 2017, 66 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 ground for Taiwanese tuna fisheries. 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 (2013-2017) in the WCPFC Convention Area.

1.1.1 LTLL

The LTLL vessels refer to those vessels larger than 100 GRT, and most of them operate in the high sea areas or in the EEZs of coastal countries under access agreements. The number of active LTLL fishing vessels around 73 to 82 in the last 5 years. The lowest number of active LTLL fishing vessels was 73 in 2014, due to temporarily cease operation out of financial loss. However, the number of active LTLL fishing vessels returned to 82 in 2017.

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. There were 28 active vessels operating in the WCPFC Convention Area in 2017.

1.1.3 STLL

The STLL fleet operates both within and beyond the EEZ of Taiwan. Some STLL fishing vessels with freezing capacity extend their fishing grounds and operate in a similar pattern as that of the LTLL fleet. In 2017 there were 1,079 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 over the last 5 years (2013-2017) in the WCPFC Convention Area is shown in Table 2. The

distribution of species composition of LTLL in recent 5 years (2013-2017) 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 recent 5 years is shown in Figure 2, and it observed that the dominant species of catch were albacore (36%), followed by bigeye tuna (29%) and yellowfin tuna (16%).

1.2.2 DWPS

The catch of major tuna species in the WCPFC Convention Area during 2013-2017 is shown in Table 3. Skipjack remained the most dominant species, accounting for about 84% of the total catch, followed by yellowfin tuna and bigeye tuna, which accounts for 14% and 2% of the total catch respectively (Figure 3). The distribution of species composition in recent 5 years (2013-2017) is shown in Figure 4.

1.2.3 STLL

The total catch of major tuna and tuna-like species caught by STLL vessels in 2017 was 41,395 MT with yellowfin tuna accounting 43% of the total catch, albacore (26%), billfish (13%) and bigeye tuna (13%). As to those landed in foreign ports, yellowfin, albacore and bigeye tuna were the main species of catch. The total catch of main species of STLL from 2013 to 2017 in WCPFC Convention Area is shown in Table 4. The distribution of species composition during 2015-2017 is shown in Figure 5.

1.3 Fishing Patterns

1.3.1 LTLL

The LTLL fleet can be divided into two groups in accordance with their targeting species, namely bigeye tuna targeting longline fleet operating mainly in tropical area (between 15°N and 15°S), and albacore targeting longline fleet operating in subtropical and temperate waters. The fleet targeting bigeye tuna usually conducts a year round operation, transshipping catch, refueling and receiving supplies at sea. Those fishing for albacore usually enter fishing ports in the Pacific Ocean twice a year for catch landing, refueling and supply receiving. The distribution of fishing effort in recent 5 years (2013-2017) 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 skipjack. 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 and it observed that there were 67.4% sets were deployed on free school in 2017. The distribution of fishing effort in recent 5 years (2013-2017) is shown in Figure 7. In the years where El Niño phenomena occur (e.g., 2015), the fish tends to move more eastwards and the fishing activities follow the pattern of this movement. In contrary, in years of La Niña, fish schools tend to concentrate more in the western part of the Pacific, and the fishing activities move likewise.

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 commonly used as coolant on the STLL vessels, while some STLL vessels are equipped with freezing equipment for better preservation of their catches. The distribution of fishing effort in recent 3 years (2015-2017) 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 recording the bycatch of 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 2017 is shown in Table 5.

In 2016, our observers had recorded 31 seaturtles (1 Green, 1 Loggerhead turtle, 27 Olive ridley turtles and 2 Unidentified turtles), 37 seabirds (4 Antipodean albatross, 2 Black-Browed albatross, 1 Black-footed albatross, 8 Campbell albatross, 1 Great frigatebird, 2 Grey headed albatross, 2 Grey petrel, 4 Laysan albatross, 1 Light-mantled albatross, 3 Wandering albatross, 1 Westland petrel and 8 White-chinned petrel) hooked with 6,196 seabirds and 181 cetaceans sighted. In 2017, our observers had recorded 40 seaturtles (5 Green turtles, 1 Leatherback turtle, 4 Loggerhead turtles and 30 Olive ridley turtles), 5 seabirds (2 Black-footed albatross, 1 Campbell albatross and 1 Laysan albatross) and 1 cetaceans (Bottlenose dolphin) hooked with 2,508 seabirds and 250 cetaceans sighted. Because some observation trips of 2017 will be completed in 2018, the observer data of 2017 is still in preliminary. As for the information on cetaceans and whale sharks encircled by our purse seiners is related in section 3.7.

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 2012-2016, 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 2017 was 66, including 15 observers for LTLL vessels and 51 observers for STLL vessels respectively.

Our observer program had received interim authorization in 2009 and received full authorization after auditing in November 2011 and October 2017, respectively. 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 highly migratory species in the Pacific Ocean, government of Taiwan has commissioned scientists to conduct a

series of researches in 2017 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 swordfish and billfishes in the three oceans.
- Study on the Pacific albacore resource.
- Fishery Dynamics and Statistics Analyses on Taiwanese Small-scale Tuna Longline Fishery.
- Investigate the shark by-catch, abundance index and non-detriment findings in the Pacific Ocean.
- Research on Bycatch of Ecological Related Species by Taiwanese Distant Water Tuna Longline Fisheries
- Feasibility analysis on the fishing condition forecast of albacore tunas for the Taiwanese tuna longline fishery in the three oceans Taiwanese tuna longline fishery in the three oceans.
- Feasibility analysis on the fishing condition forecast of albacore tunas for the Taiwanese tuna longline fishery in the three oceans.
- Feasibility analysis on the fishing condition forecast of swordfish for the Taiwanese tuna longline fishery in the three oceans.
- The feasibility analysis on purse seine fishing condition of skipjack tuna in the western and central Pacific Ocean.

The scientific papers presented at recent Pacific Ocean RFMOs meetings during 2017 to 2018 were as follows:

- Project 35: Age, growth and maturity of bigeye tuna in the western and central Pacific Ocean. (WCPFC-SC13-2017/ SA-WP-01)
- Standardized PBF CPUE Series for Taiwanese Longline Fishery. (ISC/17/PBFWG-1/02)
- The need for spatial-temporal modeling of catch-per-unit-effort data when used to derived indices of relative abundance to include in stock assessment models. (ISC/17/ALBWG/05)
- Length distributions of albacore catch made by Taiwanese albacore-targeting longline fishery in the Pacific Ocean north of 25°N, 2003-2015. (ISC/17/ALBWG/02)
- Evaluating stock structure hypotheses for swordfish (*Xiphias gladius*) in the Pacific Ocean using size composition statistics of Taiwanese distant water longliners. (ISC/17/BILLWG- 1/4)
- Environmental effects on the spatial distribution of swordfish as inferred from data for the Taiwanese distant-water tuna longline fishery in the Pacific Ocean. (ISC/17/BILLWG- 1/6)
- Standardized CPUE and historical catch estimate of shortfin mako shark by Taiwanese large-scale tuna longline fishery in the North Pacific Ocean. (ISC/17/SHARKWG-3/09)
- Size composition of shortfin mako shark caught by the Taiwanese tuna longline fishery in the North Pacific Ocean. (ISC/17/SHARKWG-3/12)
- Revised integrated analysis of maturity size of shortfin mako (*Isurus oxyrinchus*) in the North Pacific. (ISC/17/SHARKWG-3/22)
- Catch and length data of swordfish (Xiphias gladius) for the WCNPO and EPO areas from the Taiwanese fisheries. (ISC/18/BILLWG-01/04)
- Standardized catch-rates of swordfish (*Xiphias gladius*) for the Taiwanese distant-water tuna longline fishery in the North Pacific Ocean for 1964-2016.

(ISC/18/BILLWG-01/06)

- Standardized PBF CPUE Series and size frequency for Taiwanese longline fishery up to 2017 calendar year. (ISC/18/PBFWG-1/02)
- Estimation of initial equilibrium catch for North Pacific shortfin mako. (ISC/18/SHARKWG-2/01)

The scientific papers published on scientific journal during 2017 to 2018 were as follows:

- Carvalho, F., Punt, A. E., Chang, Y. J., Maunder, M. N., & Piner, K. R. (2017). Can diagnostic tests help identify model misspecification in integrated stock assessments? Fisheries Research, 192, 28-40.
- Chang, S. K., Liu, H. I., Fukuda, H., & Maunder, M. N. (2017). Data reconstruction can improve abundance index estimation: An example using Taiwanese longline data for Pacific bluefin tuna. PloS one, 12(10), e0185784.
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2.3 Statistics data collection system

Logbooks of LTLL, STLL and DWPS fishing vessels authorized to operate in WCPFC Convention Area are collected while calling port or transshipping. To collect fishery data in real time, Taiwan implemented electronic logbook reporting on LTLL and DWPS fleets in 2014, and on STLL fleet in 2015. Fishing vessels are required to transmit their fishing data electronically in a daily manner.

In addition, the fishing vessels and the fish traders have to report the trade and transshipment data. In order to improve fisheries management and ensure compliance and traceability, the control over landing and transshipment is one of the critical approaches. The transshipment declarations and landing declarations required to submit by operators, together with available commercial trade data were 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 10 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 2017, the total catch of north Pacific albacore made by our fishing fleet was 4,333 MT with 3,809 MT in the north Convention area, and 25 LTLL vessels directed at albacore in the North Pacific Ocean with 2,567 fishing days; 2,134 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 2013-2017 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 estimates for LTLL and STLL of 2017.

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 2017.

3.6 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 by fishery in 2017 shows in Table 5.

3.7 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 11 shows detailed information on the cetaceans and whale shark encircled during operation reported in 2017 by fishing masters of our purse seine fleet.

3.8 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 2017, our observers recorded 36 dead, 42 alive and 41 unknown status of released oceanic whitetip shark in the WCPFC Convention Area, and we used this information to estimate the number of released oceanic whitetip shark taken by our longline fleets which was 482 (193 dead, 161 alive and 128 unknown) for LTLL and 2,999 (865 dead, 1,067 alive and 1,067 unknown) for STLL. The discard information of oceanic whitetip shark of DWPS is related in Table 5.

3.9 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 2017, there were 274 dead, 665 alive and 740 status unknown of released silky shark recorded in our observer data in the WCPFC Convention Area, and the silky shark bycatch estimate of LTLL and STLL fisheries were 4,366 (1,412 dead, 1,413 alive and 1,541 unknown) and 44,481 (6,630 dead, 17,902 alive and 19,949 unknown) respectively in 2016, which were raised on the catch rate calculated from observer data. Discard of silky shark of DWPS is related in Table 5.

3.10 CMM 2017-06

In accordance with CMM 2017-06, 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. All Taiwanese longliners operating in the area south of 30 degrees south are required to deploy at least two of the following seabird mitigation measures, namely tori lines, weighted branch lines and night setting with minimum deck lighting. For Taiwanese longliners larger than 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,

namely 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 are shown in Tables 12-16.

Table 1. The number of active fishing vessel by fishery in the WCPFC Convention Area during 2013-2017.

Year	LTLL	DWPS	STLL
2013	82	34	1,296
2014	73	34	1,275
2015	76	34	1,306
2016	79	34	1,303
2017	82	28	1,079

Table 2. The catch (in MT, round weight) of major tuna and tuna-like species of LTLL fishery in the WCPFC Convention Area during 2013-2017.

Year	N-ALB	S-ALB	BET	YFT	SWO	MLS	BUM	BLM	SKJ	TOTAL
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
2015	2,251	3,275	5,331	2,848	1,781	243	1,670	8	162	17,569
2016	1,697	5,834	4,707	4,230	1,904	260	1,456	5	165	20,258
2017*	1,520	6,313	4,440	3,809	2,015	224	915	11	303	19,550

* Preliminary estimate

Table 3. The catch (in MT, round weight) of major tuna species of DWPS fishery in the WCPFC Convention Area during 2013-2017.

Year	SKJ	YFT	BET	Total
2013	186,330	22,659	3,491	212,480
2014	213,154	20,548	3,418	237,120
2015	160,597	28,593	5,059	194,249
2016	146,204	34,494	4,994	185,693
2017*	126,960	35,345	4,934	167,239

* Preliminary estimate

Table 4. The catch (in MT, round weight) of major tuna and tuna-like species of the STLL fishery in WCPFC Convention Area during 2013-2017.

Year	ALB	BET	YFT	PBF	SWO	BILL
2013	10,870	5,114	13,558	331	2,932	7,337
2014	5,264	4,013	10,200	483	2,214	6,625
2015	5,673	4,103	11,270	552	2,574	5,739
2016	7,998	4,781	13,586	454	1,581	4,904
2017*	10,711	5,198	17,813	415	1,781	5,477

* 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 2017 (preliminary estimate).

	BSH	FAL	MAK		OCS	PTH	BTH	ALV	SPZ	SPL	SPK	EUB	POR	SHK	RMB	RMV
			SMA	LMA												
LTLL	3,223	0	440	10	0	7	47	0	14	0	0	0	0	7	0	0
STLL	9,658	0	631		0	174	339	17	83	153	0	0	0	2,616	0	0
DWPS**	0	140	0		1	0	0	0	0	0	0	0	0	35	3	4

* Our domestic law had ban all fisheries from catching whale sharks since 2008. Therefore, the table excludes whale shark.

** Discards

Table 6. The number of observers deployed on LTLL, STLL and DWPS fisheries in the Pacific Ocean during 2013-2017.

	LTLL	STLL	DWPS
2013	15	9	-*
2014	13	11	-*
2015	12	20	-*
2016	10	18	-*
2017	15	51	-*

* In accordance with CMM 2008-01, all our DWPS fishing vessels have to be deployed PIC observer on board and the observer coverage of for DWPS reached 100%.

Table 7. The catch of striped marlin in the area of south of 15°S during 2013-2017.

Year	Catch (MT)
2013	64
2014	38
2015	97
2016	116
2017*	142

* Preliminary estimate

Table 8. The estimate of observer coverage rate for Taiwanese longline fisheries in 2017.

Fishery	Days at Sea		
	Total estimated	Observer	Coverage rate
LTLL	20,915	2,112	10.1%
STLL	111,240	6,414	5.8%

Table 9. The catch of swordfish and the number of the longliner operating in the area of south of 20°S during 2000-2017.

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	62
2014	105	0	52
2015	116	0	45
2016	124	0	44
2017*	231	0	56

* Preliminary estimate

Table 10. The aggregated transshipment information in 2017.

Offloaded / Received	Location of transshipment	Area of transshipment	Product Form	Gear Type	Number of Transshipments	Area of Catch	BET	ALB	YFT	SKJ	SWO	BUM	MLS	SKX	OTH
Offloaded	High sea	WCPFC area	Frozen	Longliner	356	Catch in WCPFC area	2268	3250	2970	0	432	574	47	223	782
					117	Catch in WCPFC area	1658	1028	325	0	409	230	40	416	451
						Catch in other Pacific	964	484	146	0	272	116	19	127	191
					3	Catch in other Pacific	77	2	5	0	15	5	0	21	51
		Other Pacific			1	Catch in WCPFC area	84	0	13	0	50	0	2	0	0
					51	Catch in WCPFC area	624	82	76	0	129	41	7	31	63
						Catch in other Pacific	990	313	106	5	219	53	10	72	182
					13	Catch in other Pacific	382	125	37	2	81	17	5	1	22
	Port	WCPFC area			278	Catch in WCPFC area	1063	3262	2287	12	140	313	59	109	473

					54	Catch in WCPFC area	606	1629	325	7	157	132	18	54	238
						Catch in other Pacific	140	203	48	1	92	49	3	31	62
					179	Catch in EEZ of WCPFC member	325	606	2132	0	33	197	5	74	334
					3	Catch in other Pacific	1	0	0	0	3	14	0	0	31
				Purse seiner	283	Catch in WCPFC area	2231	13	37115	117278	0	0	0	0	0
					2	Catch in EEZ of WCPFC member	6	0	10	504	0	0	0	0	0
					5	Catch in other Pacific	27	0	516	3195	0	0	0	0	0
Received	High sea	WCPFC area		Longliner	153	Catch in WCPFC area	355	473	1304	0	74	422	9	142	543
					36	Catch in WCPFC area	27	216	33	0	5	138	3	193	345
						Catch in other Pacific	8	86	8	0	2	75	1	88	156

				2	Catch in other Pacific	0	2	0	0	0	4	0	21	51
		Other Pacific		13	Catch in WCPFC area	3	76	1	0	15	24	0	19	40
					Catch in other Pacific	13	300	7	5	10	26	1	34	144
				3	Catch in other Pacific	9	122	5	2	5	8	1	1	17
	Port	WCPFC area		26	Catch in WCPFC area	13	100	68	0	9	62	1	13	93
				48	Catch in EEZ of WCPFC member	34	481	247	0	17	114	0	26	186

Table 11. The fishing master reports on cetaceans/whale sharks encircled incidentally in operation of purse seine fishery in 2017.

DATE	Longitude	Latitude	Species	Number	Reason	Measure for ensure safe release	Status on release
2017/1/5	E164°29'	S02°18'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/1/16	E170°27'	N04°57'	False killer whale	1	not deliberately encircled	stop operating and release	alive
2017/2/11	E155°12'	S01°18'	Whale shark	1		stop operating	alive
2017/2/12	E159°41'	N03°35'	Whale shark	1	not deliberately encircled	release	alive
2017/2/26	E146°9'	S01°20'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/2/25	E146°42'	S00°16'	Whale shark	1		stop operating	alive
2017/2/28	E144°53'	S01°33'	Whale shark	1		stop operating	alive
2017/2/26	E146°24'	S01°2'	Whale shark	1		stop operating	alive
2017/3/1	E144°56'	S01°30'	Whale shark	1		stop operating	alive
2017/2/28	E144°51'	N01°25'	Whale shark	1		stop hauling	alive
2017/3/4	E147°12'	N00°35'	Sei whale	1		release	alive
2017/3/2	E145°51'	N01°15'	Whale shark	2		release	alive
2017/3/12	E153°53'	S07°28'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/3/12	E153°27'	N02°35'	Dolphins nei	3	not deliberately encircled	stop operating	alive
2017/3/14	E154°31'	S06°40'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/3/15	E149°11'	S00°20'	Whale shark	1		stop hauling	alive
2017/3/19	E156°7'	N00°33'	Bottlenose dolphin	2	not deliberately encircled	stop hauling and release	alive
2017/3/19	E158°18'	S01°50'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/3/19	E153°58'	S01°29'	Whale shark	1		stop operating	alive
2017/3/20	E156°9'	N00°34'	Bottlenose dolphin	2		stop hauling and release	alive
2017/3/20	E164°14'	S07°27'	Dolphins nei	16	not deliberately encircled	stop hauling and release	alive
2017/3/29	E150°44'	N00°27'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/4/3	E147°33'	N04°8'	Whale shark	1	not deliberately encircled	stop operating	dead
2017/5/12	E172°32'	N06°4'	Sei whale	1		stop hauling and release	alive
2017/5/18	E170°14'	S08°29'	Sei whale	1		release	alive

2017/5/21	E170°16'	S04°2'	Sei whale	1		release	alive
2017/6/3	E156°17'	S01°25'	Great hammerhead	1		release	alive
2017/6/4	E160°23'	N02°30'	Baleen whales nei	1	not deliberately encircled	stop hauling and release	alive
2017/6/16	E151°33'	S00°23'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/6/17	E151°30'	S01°1'	False killer whale	1	not deliberately encircled	stop operating	alive
2017/8/3	E166°23'	N00°6'	False killer whale	3	not deliberately encircled	release	alive
2017/8/10	E179°28'	S01°11'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/8/12	W179°28'	S02°20'	Whale shark	1	not deliberately encircled	release	alive
2017/9/12	E178°4'	S01°17'	Bryde's whale	1		stop operating	alive
2017/10/5	E140°1'	N05°7'	Killer whale	1	not deliberately encircled		alive
2017/10/30	E178°28'	N00°5'	Whale shark	1		stop operating	alive
2017/11/2	E168°8'	S01°22'	Fin whale	2		stop operating	alive
2017/11/6	E167°2'	S01°19'	Fin whale	1	not deliberately encircled	stop operating	alive
2017/11/5	E167°12'	S02°1'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/11/3	E167°12'	S01°22'	Whale shark	1	not deliberately encircled	stop operating	alive
2017/11/6	E167°6'	S01°9'	Pygmy killer whale	1	not deliberately encircled	stop operating	alive
2017/11/8	E146°34'	S00°9'	Whale shark	1	not deliberately encircled	stop hauling	alive
2017/11/8	E166°23'	S01°16'	Whale shark	1		stop operating	alive
2017/11/8	E166°10'	S01°13'	Bryde's whale	1		stop hauling	alive
2017/11/9	E166°16'	S01°16'	Pygmy killer whale	1	not deliberately encircled	stop operating	alive
2017/11/8	E166°17'	S01°15'	Pygmy killer whale	1	not deliberately encircled	stop operating	alive
2017/11/20	E157°5'	S09°26'	Whale shark	1			alive
2017/11/23	E160°11'	S01°13'	Whale shark	1	not deliberately encircled	release	alive
2017/11/26	E155°11'	S02°21'	False killer whale	1	not deliberately encircled	stop operating	alive
2017/12/4	E161°4'	N04°4'	Whale shark	1		stop operating	alive
2017/12/5	E167°2'	S07°13'	Common dolphin	1		stop operating	alive
2017/12/5	E156°33'	S10°11'	Whale shark	1	not deliberately encircled	stop hauling	alive
2017/12/4	E156°32'	S10°13'	Whale shark	1	not deliberately encircled	stop hauling	alive

2017/12/2	E157°29'	S02°19'	Whale shark	1	not deliberately encircled	stop hauling	alive
2017/12/7	E158°34'	S02°17'	Pilot whales nei	1	not deliberately encircled	stop hauling	alive
2017/12/11	E167°22'	S07°20'	Whale shark	1	not deliberately encircled		alive
2017/12/30	E168°28'	S09°9'	Whale shark	1		stop operating	alive
2017/12/27	E163°35'	S08°31'	Sei whale	1	not deliberately encircled	release	alive
2017/12/23	E153°7'	N06°15'	Whale shark	1		stop operating	alive
2017/12/29	E148°8'	N06°10'	Dolphins nei	6	not deliberately encircled	stop hauling	alive

Table 12. The seabird bycatch information of longline fishery in the area of south of 30°S during 2013-2017.

Year	Fishing effort				Observed seabird hooked	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2013	24	3,921,402	390,427	10.0%	4	0.010
2014	22	5,054,026	350,827	6.9%	3	0.009
2015	27	3,965,911	419,452	10.6%	4	0.010
2016*	23	4,831,867	337,517	7.0%	18	0.053
2017*	30	5,619,981	111,998	2.0%	1	0.009

* Preliminary

Table 13. The seabird bycatch information of longline fishery in the area of north of 23°N during 2013-2017.

Year	Fishing effort				Observed seabird hooked	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2013	442	21,338,293	385,993	1.8%	6	0.016
2014	442	37,985,919	354,224	0.9%	16	0.045
2015	472	35,582,655	208,703	0.6%	0	0.000
2016*	439	38,839,250	322,373	0.8%	5	0.016
2017*	493	21,305,415	553,267	2.6%	2	0.004

* Preliminary

Table 14. The seabird bycatch information of longline fishery in the area of 23°N - 30°S during 2013-2017.

Year	Fishing effort				Observed seabird hooked	
	Number of vessels	Number of hooks	Observed hooks	% hooks observed	Number	Rate
2013	876	176,278,326	4,010,888	2.3%	0	0.000
2014	797	147,782,404	2,547,934	1.7%	0	0.000
2015	808	158,931,506	3,521,069	2.2%	2	0.001
2016	814	177,395,301	3,099,217	1.7%	14	0.005
2017	851	177,827,670	6,342,280	3.6%	2	0.000

* Preliminary

Table 15. The number of observed seabird bycatch of longline fishery by species and by area during 2013-2017.

Year	Species	South of 30°S	North of 23°N	23°N - 30°S	Total
2013	Black-footed albatross		2		2
	Unidentified albatross	3	4		7
	White-chinned petrel	1			1
	Total	4	6	0	10
2014	Black-footed albatross		1		1
	Laysan albatross		4		4
	Unidentified albatross		11		11
	White-chinned petrel	3			3
	Total	3	16	0	19
2015	Buller's albatross	1			1
	Christmas Island frigatebrid			1	1
	Sooty shearwater			1	1
	Wandering albatross	1			1
	White capped albatross	2			2
	Total	4	0	2	6
2016*	Antipodean albatross	3		1	4
	Black-browed albatross	1		1	2
	Black-footed albatross		1		1
	Campbell albatross	6		2	8
	Great frigatebird			1	1
	Grey headed albatross	1		1	2
	Grey petrel	1		1	2
	Laysan albatross		4		4
	Light-mantled albatross	1			1
	Wandering albatross	3			3
	Westland petrel			1	1
	White-chinned petrel	2		6	8
	Total	18	5	14	37
2017*	Black-footed albatross			2	2
	Campbell albatross	1			1
	Laysan albatross		2		2
	Total	1	2	2	5

* Preliminary

Table 16. Proportion of mitigation types used by longline fishery during 2013-2017.

Combination of Mitigation Measures *	Proportion of observed effort using mitigation measures				
	2013	2014	2015	2016	2017
No mitigation measures	4.2%	4.6%	4.5%	6.2%	31.4%
TL + NS	8.3%	9.8%	7.4%	10.3%	7.1%
TL + WB	4.7%	5.0%	2.3%	1.2%	1.3%
NS + WB	16.1%	16.4%	9.7%	7.6%	5.0%
TL + WB + NS	4.2%	4.0%	2.3%	1.2%	0.9%
TL	9.7%	11.1%	7.7%	11.0%	9.9%
NS	33.9%	30.3%	55.3%	54.1%	38.2%
WB	19.0%	18.8%	10.9%	8.4%	6.2%
Totals	100.0%	100.0%	100.0%	100.0%	100.0%

* TL = tori line, NS = night setting, WB = weighted branch lines.

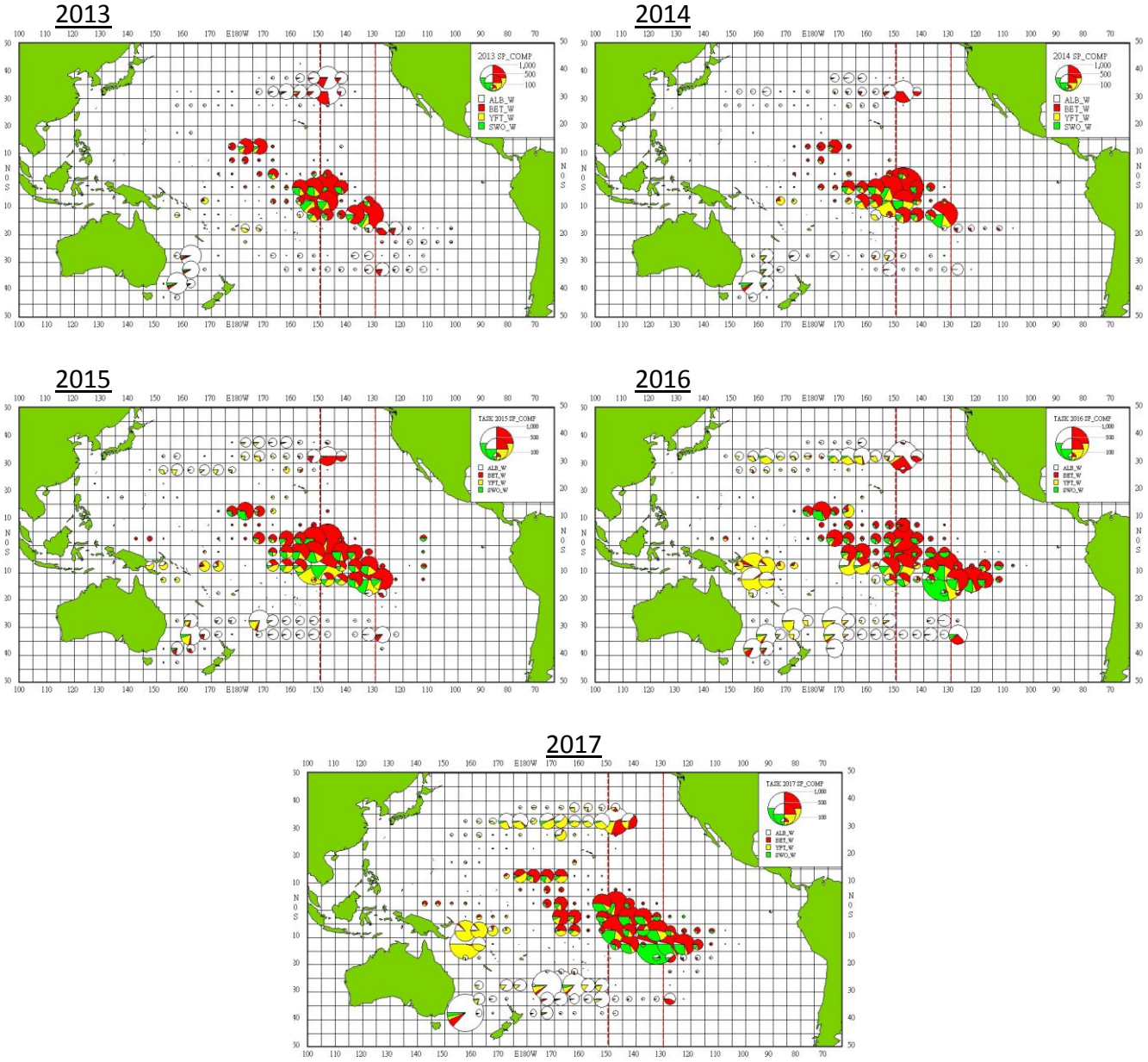


Figure 1. The catch composition distributions of tuna and tuna-like species of LTLL fishery during 2013-2017. Figures of 2016 and 2017 are still in preliminary.

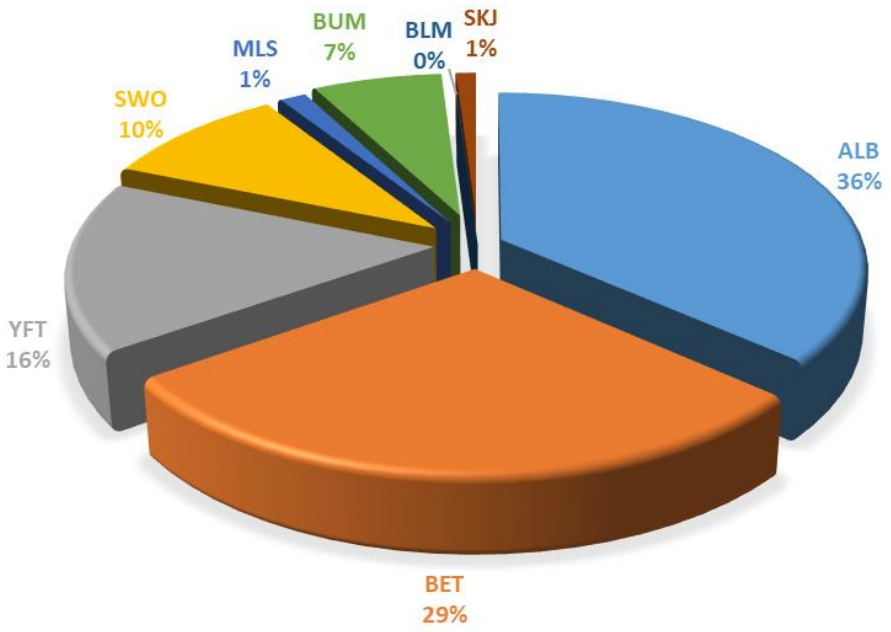


Figure 2. The catch composition of major tuna and tuna-like species for LTLL fishery in the WCPFC Convention area during 2013-2017.

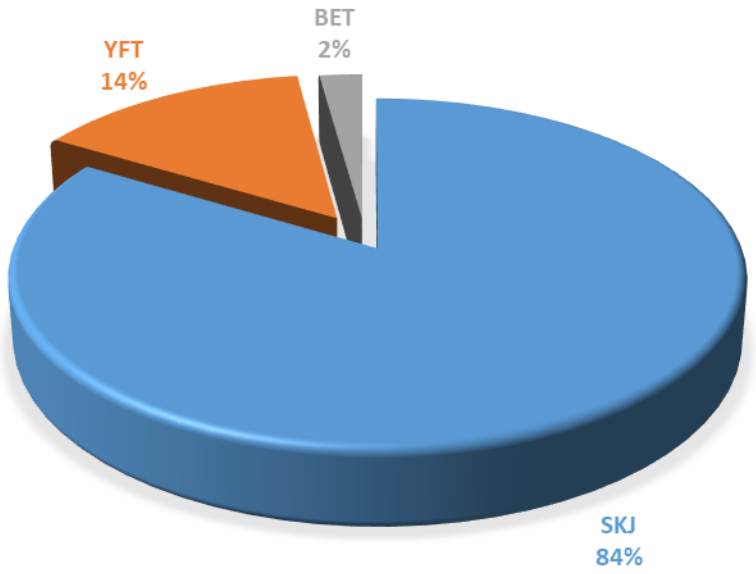


Figure 3. The catch composition of major tuna species for DWPS fishery in the WCPFC Convention area during 2013-2017.

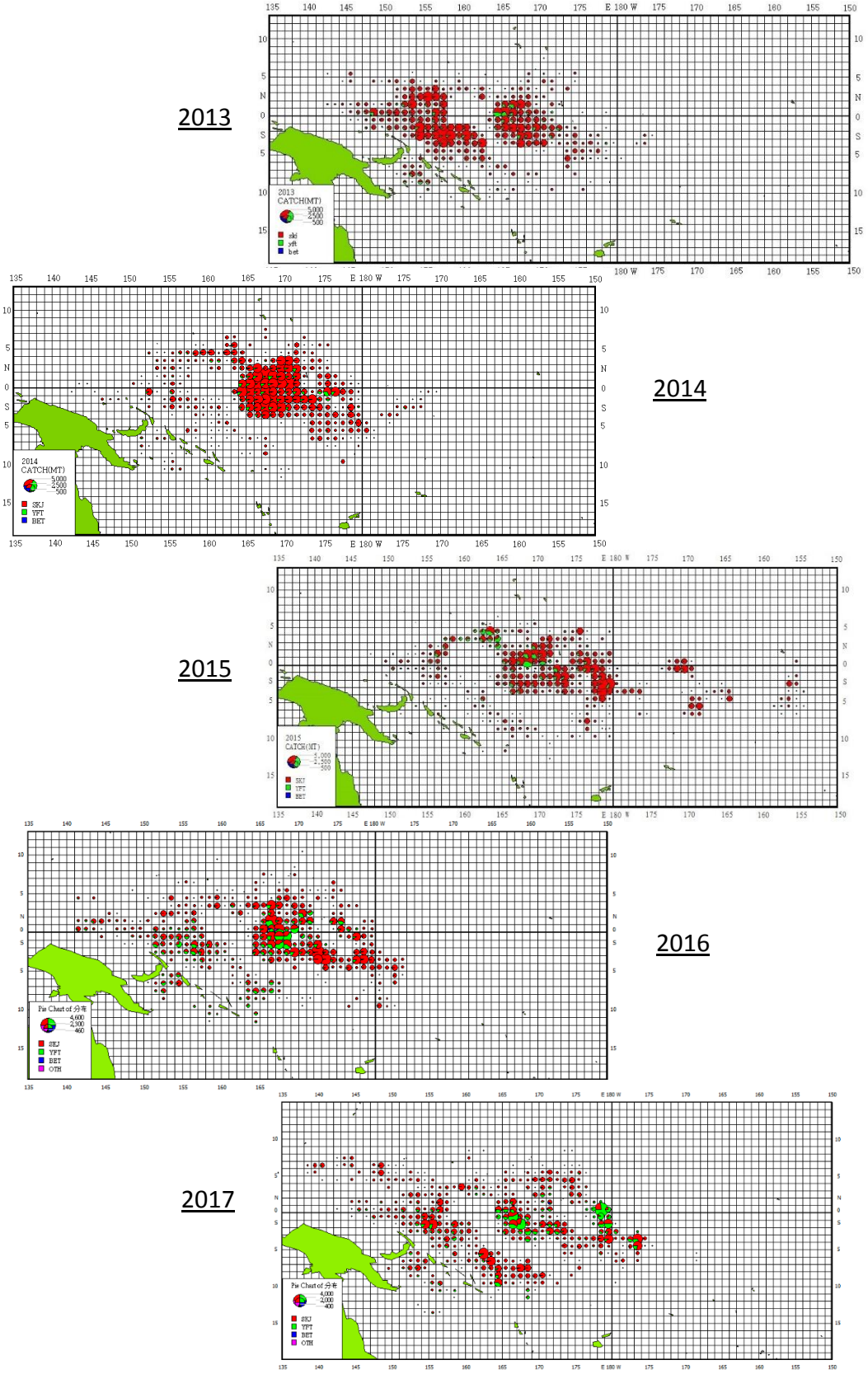
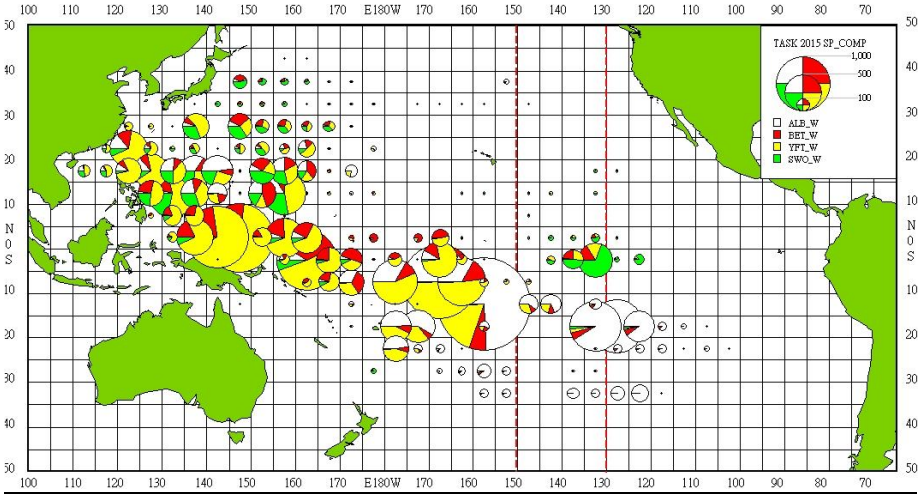
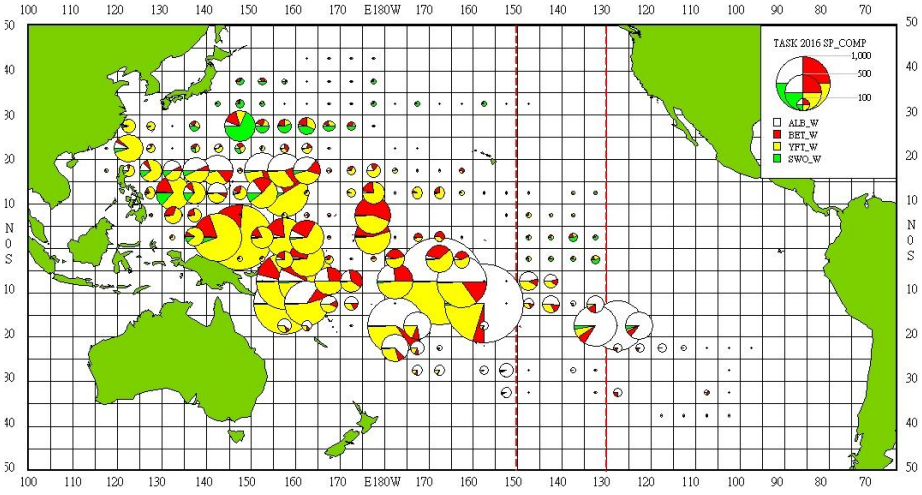


Figure 4. The catch composition distributions of DWPS fleet during 2013-2017.

2015



2016



2017

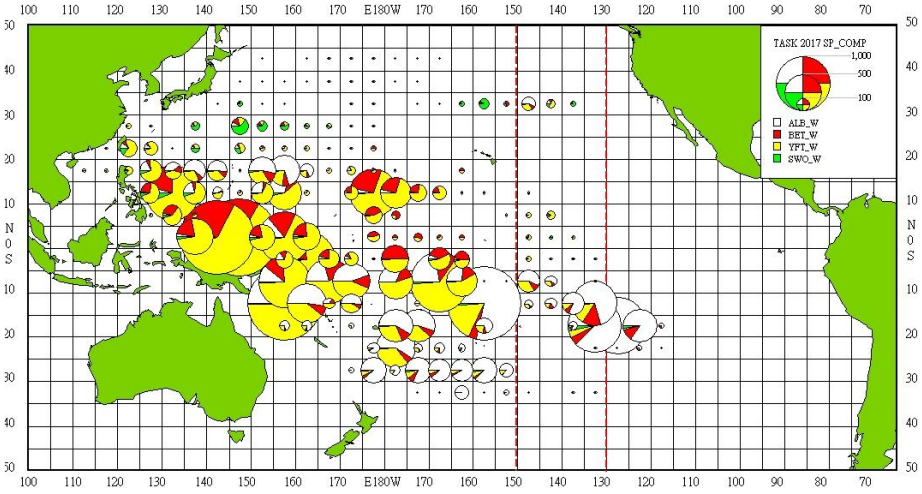
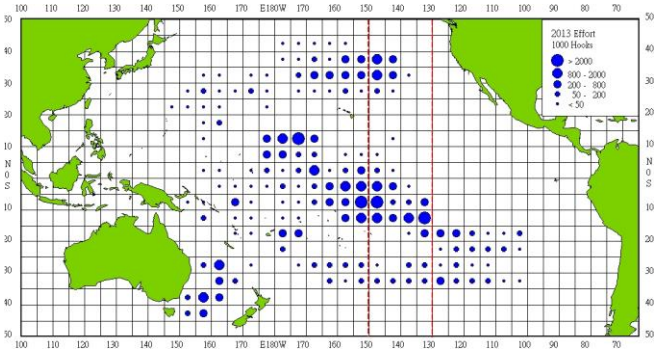
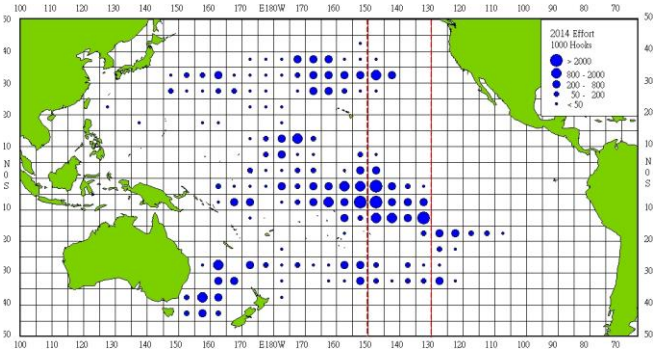


Figure 5. The catch composition distributions of tuna and tuna-like species of STLL fishery during 2015-2017. The figures of 2016 and 2017 are still in preliminary.

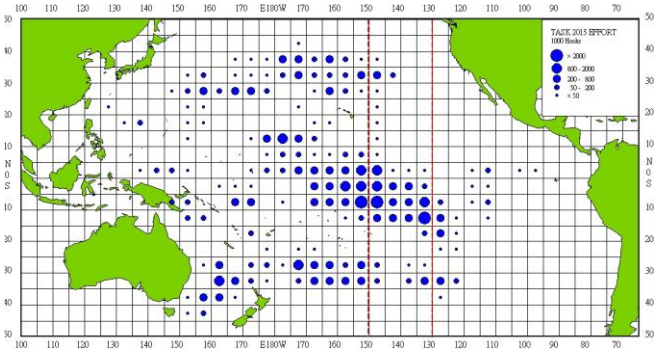
2013



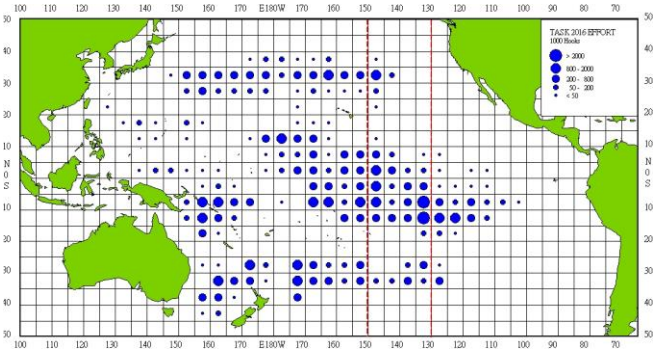
2014



2015



2016



2017

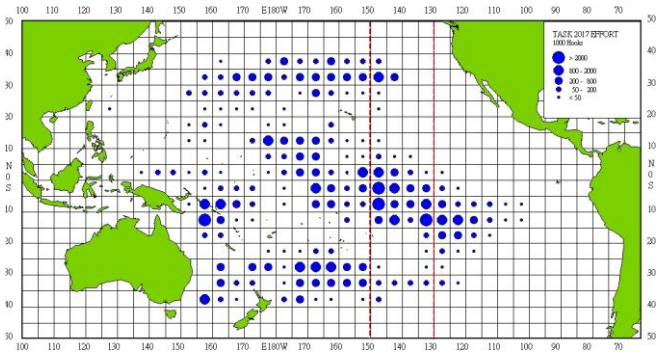
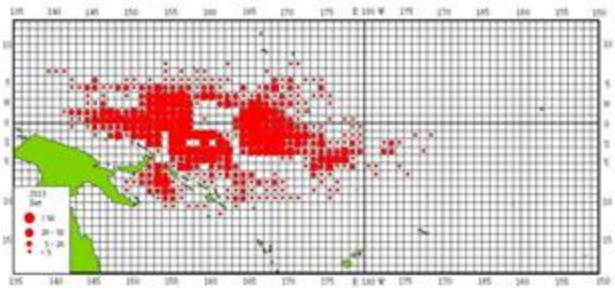
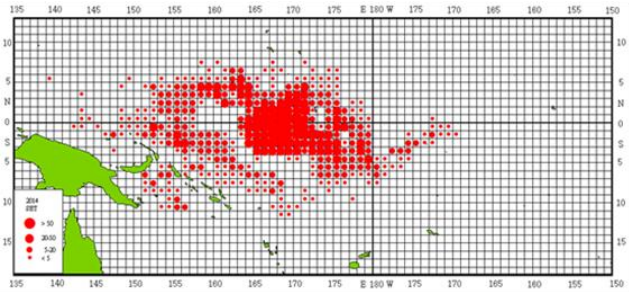


Figure 6. The effort distributions of LTLL fishery during 2013-2017. The figures of 2016 and 2017 are still in preliminary.

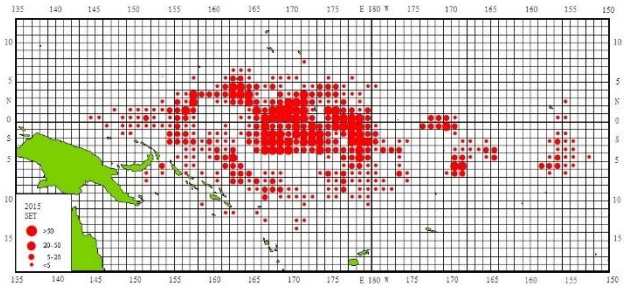
2013



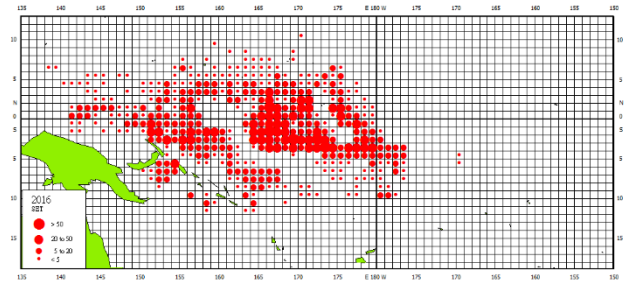
2014



2015



2016



2017

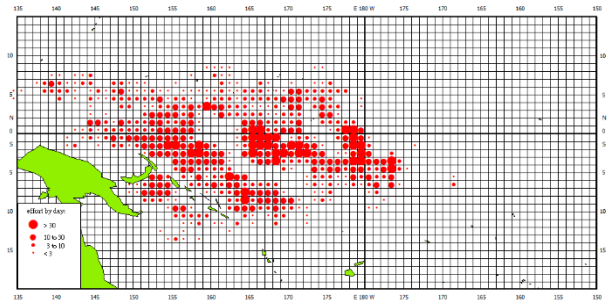
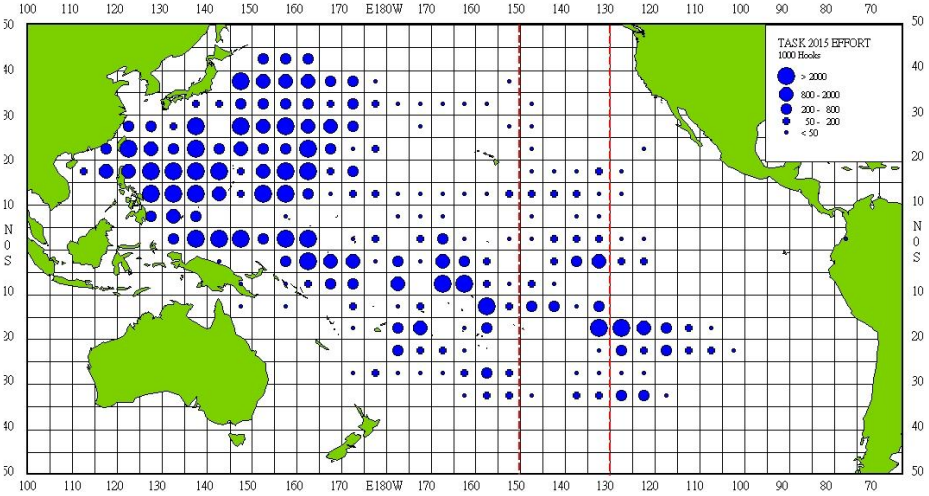
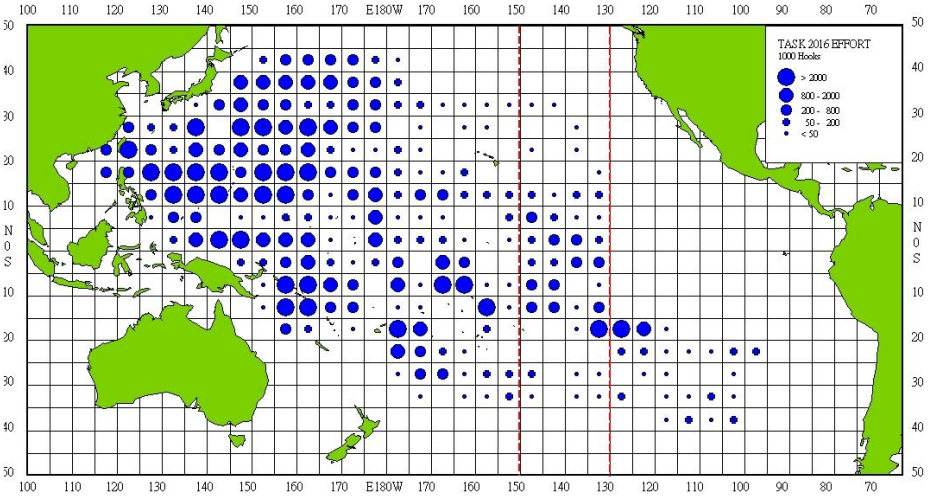


Figure 7. The effort distributions of DWPS fleet during 2013-2017.

2015



2016



2017

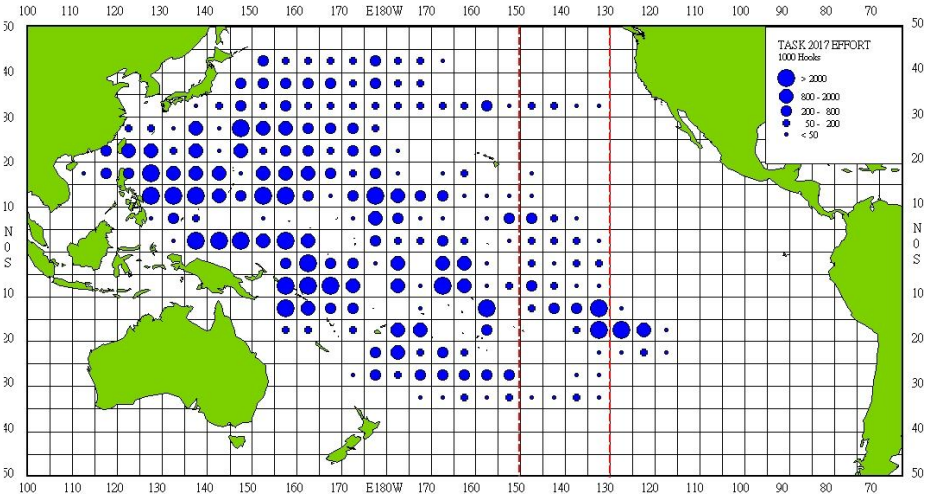


Figure 8. The effort distributions of STLL fishery during 2015-2017. The figures of 2016 and 2017 are still in preliminary.