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WCPFC-SC8-AR/CCM-22

CHINESE TAIPEI

National Report

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

Fisheries Agency, Council of Agriculture, Chinese Taipei
and
Overseas Fisheries Development Council, Chinese Taipei

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This paper is prepared for the Eighth meeting of the WCPFC Scientific Committee held in Busan, Republic of Korea, from 7 to 15 August, 2012.

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 2012	Yes

Summary

There are 3 Chinese Taipei's tuna fishing fleets operating in 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 2011, the total catches of main tuna and tuna-like species for these 3 fleets were 22,402 MT for LTLL, 175,935 MT for DWPS and 42,410 MT for STLL, respectively. In 2011, 15 observers were deployed on the LTLL fishing vessels in the Pacific Ocean.

1 Annual fisheries' information

The Pacific Ocean is one of the earliest fishing grounds exploited by Chinese Taipei's tuna fisheries. Currently, there are three Chinese Taipei's tuna fishing fleets operating in WCPFC Convention Area: large scale tuna longliners (LTLL, previous named FTLL), distant-water purse seiners (DWPS) and small scale tuna longliners (STLL, previous named CTLL). All LTLL and DWPS vessels operate outside the EEZ of Chinese Taipei; most of the STLL vessels operate in the EEZ of Chinese Taipei 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 (2007-2011) in WCPFC Convention Area.

1.1.1 LTLL

The LTLL vessels refer to those vessels larger than 100 GRT and the length over all (LOA) greater than 24 meters which operate in the waters of foreign EEZ or on the high seas. The number of fishing vessels authorized fishing in WCPFC Convention Area in 2011 was 96 with 95 vessels operating actively; the number of vessels authorized decreased from 115 in 2006. The number of active vessels decreased to lower than 90 in 2008 and 2009 for high fuel price with some fishing vessels ceasing operation temporarily, and number of active fishing vessels returned to 90 in 2010 and slight increased to 95 in 2011.

1.1.2 DWPS

Tuna purse seine fishery was introduced into Chinese Taipei in 1982 and has become one of the major Chinese Taipei's 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 vessels 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.

1.1.3 STLL

The STLL fleet operates both within and beyond the EEZ of Chinese Taipei. Vessels 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 2011 there were about 1376 STLL vessels operating actively in WCPFC Convention Area. Parts of them operate seasonally between the Indian Ocean or the Eastern Pacific Ocean and the Western and Central Pacific Ocean.

1.2 Annual Catch in the WCPFC Convention Area

1.2.1 LTLL

The fishing grounds of LTLL fleet distribute extensively in WCPFC Convention Area (Figure 1). Historically, most of the LTLL fishing vessels targeted albacore in the South Pacific Ocean for canning, and some fishing vessels started shifting fishing ground seasonally to the North Pacific Ocean to fish northern albacore from mid 1990s. Since late 1990s, a higher proportion of fishing fleet changed to target tropical tuna in equatorial areas for Japanese frozen sashimi market (Figure 2). Table 2 shows the catch estimate of major tuna and tuna-like species caught by LTLL fishery in the recent five years (2007-2011) in WCPFC Convention Area.

1.2.2 DWPS

The catch of major tuna species in WCPFC Convention Area during 2007-2011 are shown in Table 3. The most dominant species remained to be skipjack, accounting for about 86.7% of the total catch, followed by yellowfin tuna and bigeye, which accounts for 12.0% and 1.3% of the total catch, respectively (Figure 3). In 2011, catches of skipjack, yellowfin and bigeye tunas were 155,641 MT, 18,143 MT and 2,151 MT, respectively.

1.2.3 STLL

The STLL fishing vessels land their catches both in Chinese Taipei and foreign ports. Considering the geographical location of Chinese Taipei, catches landed in domestic ports are believed to be mostly from WCPO including the EEZ of Chinese Taipei.

Total catch of tuna and tuna-like species landed in Chinese Taipei by this fleet was stable in the recent five years (2007-2011) with an average of about 16,983 MT. The dominant species caught included yellowfin tuna (49%), billfish (25%), swordfish (14%) and bigeye tuna (4%). As to those landed in foreign ports, yellowfin and bigeye are the main species caught. Catches of main species by STLL from 2006 to 2011 in WCPFC Convention Area were shown in Table 4.

1.3 Fishing Patterns

1.3.1 LTLL

LTLL fleet can be divided into two groups in accordance with the target species: one operates mainly in tropical area (between 15°N and 15°S) targeting on bigeye tuna, and the other operates in subtropical and temperate waters targeting on albacore. Vessels targeting on bigeye tuna usually conduct a year round operation, and transship their catches to carriers and receive fuel and supplies during transshipment. Those fishing for albacore usually entered fishing ports in the Pacific twice a year for landing, fuel and supply. The fishing effort distribution in recent 5 years (2007-2011) is shown in Figure 1. The LTLL catch and effort data, aggregated by periods of month and areas of 5° longitude and 5° latitude, have already been provided to the Commission with other scientific data.

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 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 the mid 1990s has made free school setting to be the most prevailing fishing method. In 2011, about 55% sets were deployed on free school.

The fishing effort distribution in recent 5 years (2007-2011) is shown in Figure 4. The fishing effort is more concentrated in the western Pacific Ocean.

The DWPS catch and effort data, aggregated by periods of month and areas of 1° longitude and 1° latitude, already provided to the Commission with other scientific data.

1.3.3 STLL

Fishing days per trip are usually less than 30 days owing to smaller fishing capacity for STLL vessels. Most of them, whether based at domestic or foreign ports (e.g. Davao in Philippine), target on YFT for fresh sashimi markets, while a few Suva

based STLL vessels target on albacore for canning. Flake ice is used as coolant on the STLL vessels, but some are equipped with freezing equipment for better preservation of their catches. The STLL catch and effort data, aggregated by periods of month and areas of 5° longitude and 5° latitude, already provided to the Commission with other scientific data.

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

The LTLL logbook format had been revised in 2003 to accommodate 4 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, probeagle, crocodile shark, hammerhead shark and oceanic white tip shark) into logbook recording items.

According to the "ANNUAL REPORT TO THE COMMISSION PART 1: INFORMATION ON FISHERIES, RESEARCH AND STATISTICS" format approved by Commission meeting, the bycatch information is revealed in the following paragraph. In 2010, observers recorded 12 sea turtles and 1 cetacean were taken and 7 species of seabirds and 2 species of cetaceans were sighted. In 2011, observers recorded 32 sea turtles, 127 seabirds and 2 cetaceans were taken and 1 species of seabird, 6 species of cetaceans and 1 species of sea turtle were sighted. Annual catch of key shark species of LTLL and STLL in 2011 is shown in Table 5. Table 6 shows shark catch statistics (by species) for DWPS fishery in 2011.

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

The observer program of Chinese Taipei had received interim authorization in 2009 and received full authorization after auditing in November 2011. The forms used in Chinese Taipei's 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.

During 2002-2011, the numbers of LTLL and DWPS fisheries of observation trips is shown in Table 7. In accordance with the government's policy in establishing an observers program and supporting the increase of observers, the observational trips gradually increased year by year. In 2011, totaled 15 observation trips were conducted on LTLL vessels.

2.2 Research activities

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

- Stock assessment of Pacific bluefin tuna.
- Age and growth of Pacific bluefin tuna revealed by otolith microstructure.
- Impact of climate change on Pacific albacore stock and fishing ground.
- Studies on the assessment of south Pacific albacore stock.
- Age and growth study of south Pacific albacore.
- Study on the north Pacific albacore resource.
- Integrating environmental effort in CPUE standardization of swordfish in the Pacific Ocean.
- Studies on CPUE standardization and stock status for Pacific blue marlin, north Pacific striped marlin.
- Billfish and tuna tagging program.
- Estimation on the ratio between fins and body weight, and life history parameters for shark by-catch species in Pacific Ocean.
- Research on Ecological Related Species bycatch of distant water tuna longline fisheries.

The scientific papers presented at recent Pacific Ocean RFMOs meetings were as follows:

- Reproductive biology of the blue shark, Prionace glauca, in the northwestern Pacific. (ISC/11/SHARKWG-2/12)
- Stock assessment of striped marlin (Kajikia audax) in the western and central North Pacific Ocean using an age-structured model. (ISC/11/BILLWG-3/02)
- A sensitivity study for striped marlin (Kajikia audax) in the western and centeral North Pacific Ocean using an age - structured model (ASPM). (ISC/11/BILLWG-3/06)
- A review of Chinese Taipei's blue marlin fisheries in the Pacific Ocean, 1958-2010. (ISC/12/BILLWG-1/04)
- Standardized catch-rates of blue marlin for Chinese Taipei's distant-water

longline fishery in the Pacific Ocena for 1964-2010. (ISC/12/BILLWG-1/05)

— A review of life history parameters for the Pacific Blue Marlin. (ISC/12/BILLWG-1/06)

— Activities and data collection of Pacific Bluefin tuna by Chinese Taipei's fishery. (ISC/12/PBFWG-2/13)

— Abundance index of Pacific Bluefin tuna (Thunnus orientalis) by Chinese Taipei's mall-scale longline fleet in the southwestern North Pacific Ocean. (ISC/12/PBFWG-2/14)

— The catch of shark caught by Chinese Taipei's offshore longline fisheries in 2001-2010 (ISC/12/SHARKWG-1/10)

— Age and growth of the blue shark, Prionace glauca, in the central and south Pacific (ISC/12/SHARKWG-1/16)

The scientific papers published on scientific journal were as follows:

— Huang, H.-W. 2011. Bycatch of high sea longline fisheries and measures taken by Chinese Taipei: Actions and challenges. Marine Policy 35 (5): 712-720.

— Su, N.J., C.L. Sun, A.E. Punt, S.Z. Yeh, and G.. DiNardo, 2011. Evaluation of a spatially sex-specific assessment method incorporating a habitat preference model for blue marlin (Makaira nigricans) in the Pacific Ocean. Fish. Oceanogr. 20(5): 415-433.

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 at sea. All fleets are required to submit catch reports periodically while fishing: fishing vessels of larger than 100 GRT report weekly and the ones of less than 100 GRT report monthly.

To collect complete catch data, 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 landed 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. Port-sampling program, which is only in its

experimental stage, has a low sampling coverage, and insufficient for use as source of data. The observer program has been collecting size data for all species. The coverage has gradually increased. 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 BET and YFT.

3. Implementation of Conservation and Management Measure 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 number of Chinese Taipei's longline vessels fishing for swordfish and the catch of swordfish in the convention area south of 20°s during the period 2000-2011 are shown in Table 8. In 2011, there were 69 fishing vessels, including 3 seasonal target and 27 non-target LTLL vessels, and 39 non-target STLL vessels.

4. Implementation of Conservation and Management Measure 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 9 shows the statistics of transshipment activities of Chinese Taipei's fishing fleets in 2011.

Table 1. The number of active vessels by fishery in WCPFC Convention Area during 2007-2011.

Year \ Fishery	LTLL	DWPS	STLL
2007	90	34	1,750
2008	84	34	1,260
2009	75	32	1,220
2010	90	34	1,235
2011	95	34	1,376

Table 2. The catch (in MT, round weight) of major tuna and tuna-like species of LTLL fishery in WCPFC Convention Area during 2007-2011.

	N-ALB**	S-ALB***	BET	YFT	SWO	MLS	BUM	BLM	SKJ	TOTAL
2007	2,465	5,021	9,108	2,657	1,134	351	1061	5	65	21,867
2008	2,490	3,071	8,777	1,759	1,079	173	812	5	174	18,340
2009	1,866	5,384	8,863	3,111	1,278	187	1,111	12	506	22,318
2010	2,281	7,384	8,000	3,569	1,339	239	1,269	61	104	24,246
2011*	2,972	6,529	6,579	3,167	1,554	257	1,166	22	155	22,402

* Preliminary estimate

** from northern Pacific Ocean

*** from southern Pacific Ocean

Table 3. The catch (in MT, round weight) of major tuna species of DWPS fishery in WCPFC Convention Area during 2007-2011.

	SKJ	YFT	BET	Total
2007	209,002	21,147	2,386	232,535
2008	165,007	35,770	3,196	203,973
2009	173,725	16,237	2,113	192,075
2010	166,211	29,203	3,437	198,851
2011*	155,641	18,143	2,151	175,935

* 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 2007-2011.

	ALB	BET	YFT	SWO	BILL**
2007	5,308	5,652	14,011	3,983	7,670
2008	5,337	6,452	14,652	3,638	7,460
2009	8,288	4,456	16,582	3,261	6,117
2010	12,652	3,874	18,656	2,740	7,861
2011*	9,276	4,696	18,153	3,239	7,046

* Preliminary estimate

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

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Table 5. The catches (in MT, round weight) of key shark species of LTLL and STLL fisheries in WCPFC Convention Area in 2011 (preliminary estimate).

	BSH	FAL	SMA	OCS	PTH	BTH	SPZ	SPL	POR	SKX
LTLL	1,522	656	472	122	65	33	13	8	0	66
STLL	17,375	332	1,196	3	330	474	136	291	0	5,179

Table 6. The catch of key shark species of DWPS fishery in WCPFC Convention Area in 2011.

SPECIES	CATCH (MT)
FAL	108.285
SMA	0.275
OCS	0.015
PTH	0.16
SPN	0.03
SKX	39.0405

Table 7. The Observation trips of LTLL and DWPS fisheries during 2002-2011.

	LTLL	DWPS
2002	1	6
2003	3	2
2004	4	2
2005	5	2
2006	10	0
2007	15	11
2008	14	7
2009	22	- *
2010	17	- *
2011	15	- *

*In accordance with CMM 2008-01, all Chinese Taipei's coverage of observers for DWPS has reached 100% during July and September of 2009, and the coverage of observers for DWPS has also reached 100% from 2010 to 2011.

Table 8. The catch of swordfish and the number of the fishing vessels in Convention Area in south of 20°S during 2000-2011.

Year	Catch (tonnes)	Vessel numbers	
		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

* Preliminary estimate

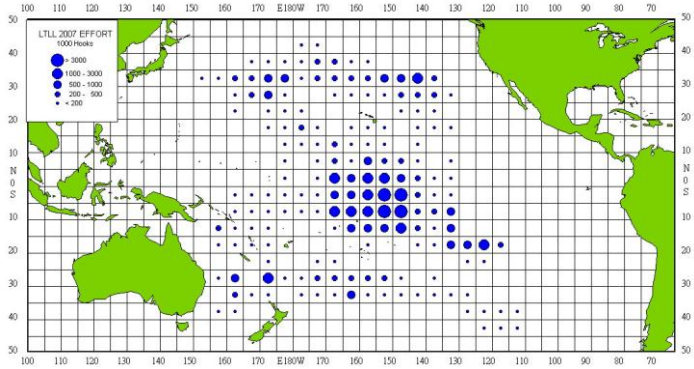
Table 9. The statistics of transshipment of Chinese Taipei's fishing fleets in 2011.

Offloaded / Received	Location of transshipment	Area of transshipment	Area of catch	Product Form	Gear Type	Number of Transshipment	BET	ALB	YFT	SKJ	SWO	BUM	MLS	SKX	OTH
Offloaded	In port	Inside*	Inside	Fresh	STLL	469	1,648	6,546	6,256	0	256	981	82	2,905	2,325
Offloaded	In port	Inside	Inside	Frozen	LTLL	76	1,103	2,314	1,083	0	139	219	18	405	369
Offloaded	In port	Inside	Outside	Fresh	STLL	14	41	705	33	0	18	27	6	2	112
Offloaded	In port	Inside	Outside	Frozen	LTLL	3	33	0	1	0	2	0	1	0	0
Offloaded	In port	Outside**	Outside	Fresh	STLL	1	0	0	3	0	32	3	6	0	4
Offloaded	beyond EEZ	Inside	Inside	Fresh	STLL	43	87	1,381	160	0	15	31	6	116	112
Offloaded	beyond EEZ	Inside	Inside	Frozen	LTLL	218	6,129	3,257	1,588	0	896	474	131	779	981
Offloaded	beyond EEZ	Inside	Outside	Fresh	STLL	1	0	50	0	0	0	0	0	0	0
Offloaded	beyond EEZ	Inside	Outside	Frozen	LTLL	3	4	182	0	0	1	0	0	0	0
Offloaded	beyond EEZ	Outside	Inside	Fresh	STLL	7	2	353	3	0	7	1	5	53	6
Offloaded	beyond EEZ	Outside	Inside	Frozen	LTLL	9	99	108	26	0	20	6	72	4	18
Offloaded	beyond EEZ	Outside	Outside	Fresh	STLL	4	19	45	8	0	6	8	1	4	14
Offloaded	beyond EEZ	Outside	Outside	Frozen	LTLL	36	735	928	68	0	60	31	89	69	178
Offloaded	In port	Inside	Inside	Frozen	PS	260	1,306	0	15,755	152,745	0	0	0	0	0

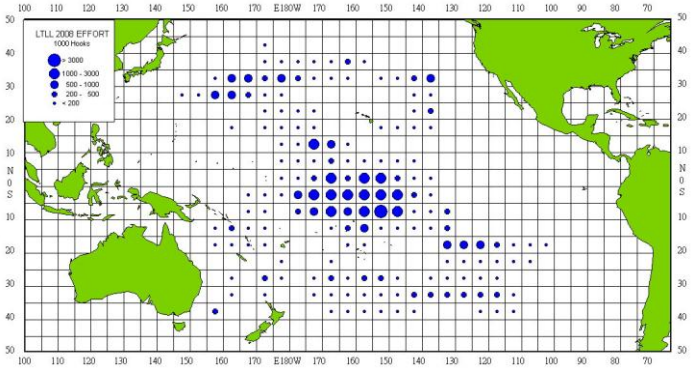
* Inside the WCPFC Convention Area

** Outside the WCPFC Convention Area

2007



2008



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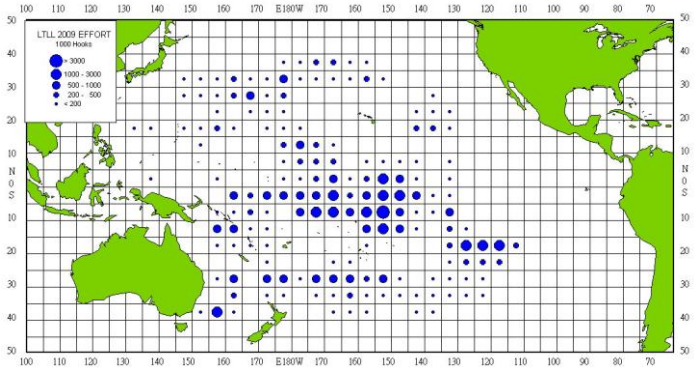
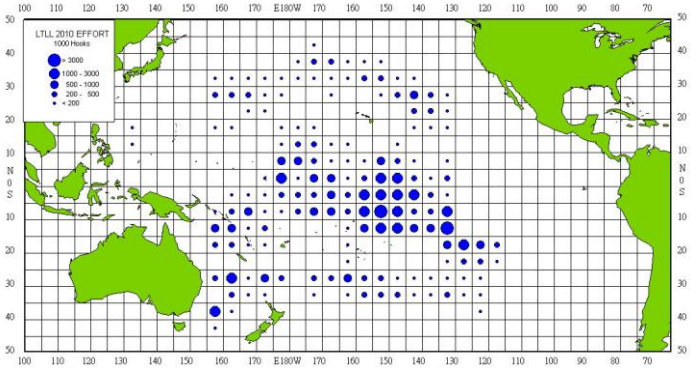


2010* preliminary



2011* preliminary

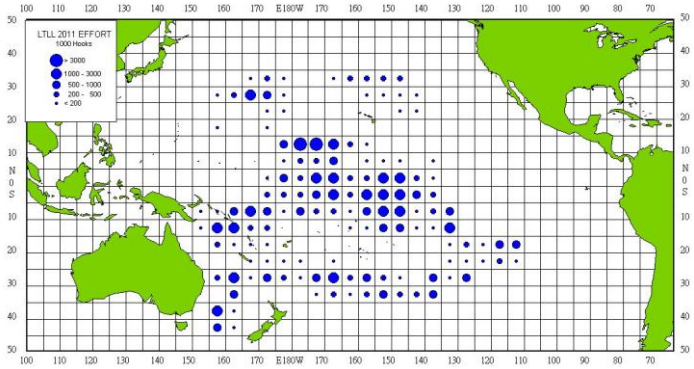


Figure 1. The effort distributions of Chinese Taipei's LTLL fishery during 2007-2011. The figures of 2010 and 2011 are still in preliminary.

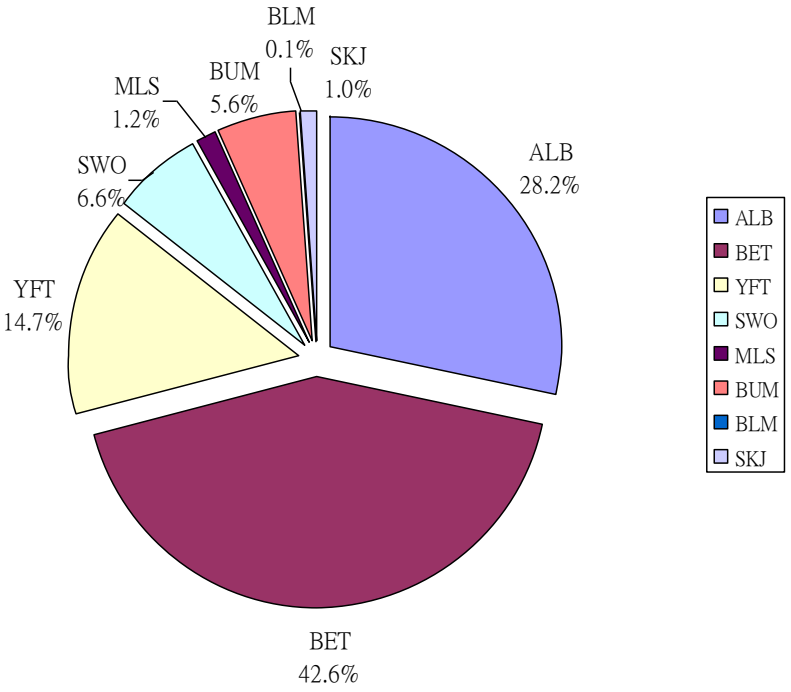


Figure 2. Mean catch percentage of major tuna and tuna-like species of Chinese Taipei's LTLL fishery in the WCPFC Convention area during 2007-2011.

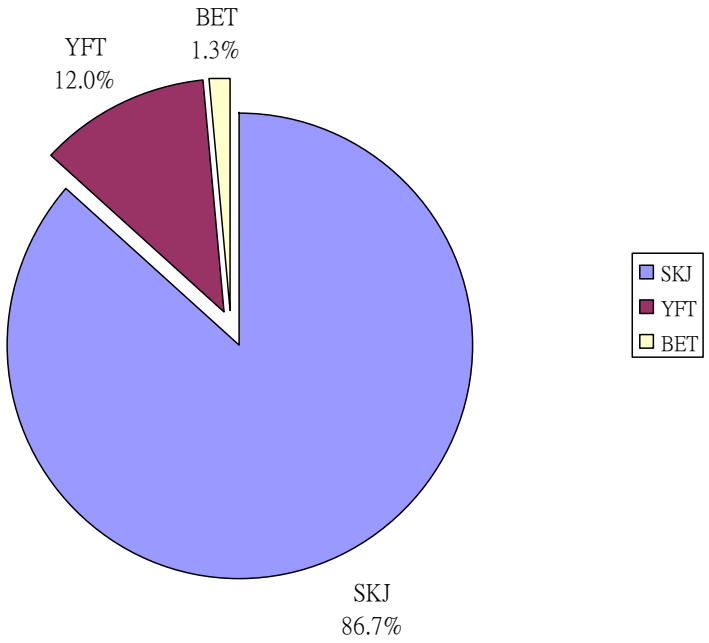
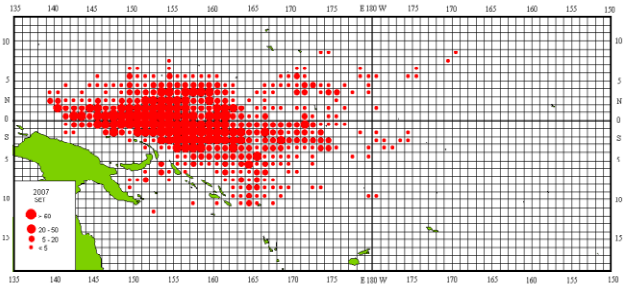
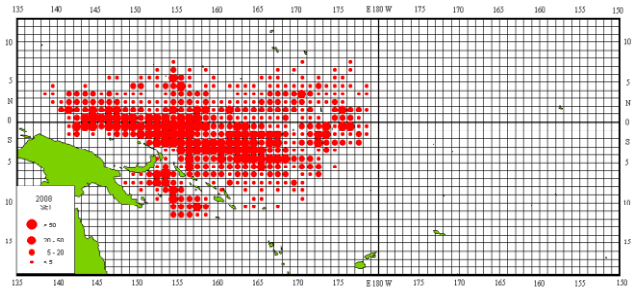


Figure 3. Mean catch percentage of major tuna and tuna-like species of Chinese Taipei's DWPS fishery in the WCPFC Convention area during 2007-2011.



2007



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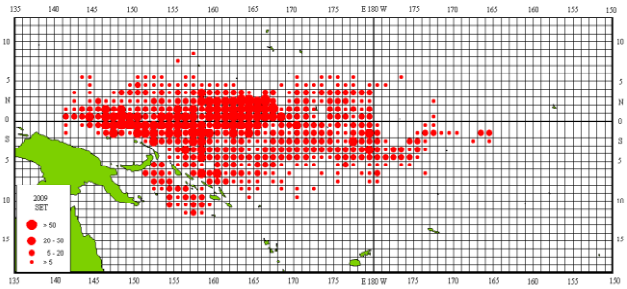

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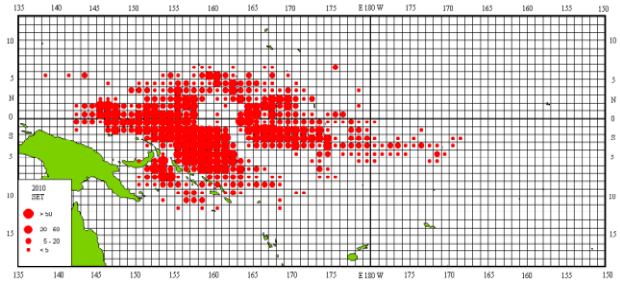
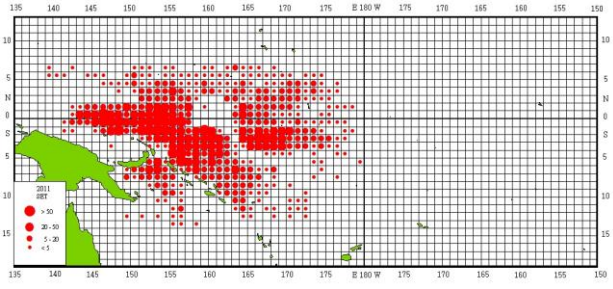


2010



2011

Figure 4. The effort distributions of Chinese Taipei's DWPS fleet during 2007-2011.