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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, Chinese Taipei
and
Overseas Fisheries Development Council, Chinese Taipei

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This paper is prepared for the Seventh meeting of the WCPFC Scientific Committee held in Pohnpei, Federated States of Micronesia, from 9 to 17 August, 2011.

Scientific data was provided to the Commission in accordance with the decision relating to the provision of scientific data to the Commission by the 30th April 2011	Yes

Summary

There are 3 Taiwanese 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 2010, total catches of main tuna and tuna-like species for these 3 fleets were 24,246 MT for LTLL, 198,851 MT for DWPS and 45,783 MT for STLL, respectively. In 2010, 31 observers, 25 on LTLL vessels and 6 on DWPS vessels, were deployed in the Pacific Ocean.

1 Annual fisheries' information

The Pacific Ocean is one of the earliest fishing grounds exploited by Taiwanese tuna fisheries. Currently, there are three Taiwanese 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 Taiwan; most of the STLL vessels operate in the EEZ of Taiwan, some of them operate in the high sea 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 the recent five years (2006-2010) 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 mostly operate in the waters of foreign EEZ and high seas. The vessel number of LTLL authorized fishing in WCPFC Convention Area in 2010 was 94, a significant decrease from 115 in 2006, but increased from the previous year for some vessels shift from Indian Ocean for pirate issue.

1.1.2 DWPS

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

1.1.3 STLL

The STLL fleet operates both within and beyond the EEZ of Taiwan. 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 2010 there were about 1123 STLL vessels operating actively in WCPFC Convention Area. Parts of these vessels are seasonally operating between the Indian Ocean or the Eastern Pacific Ocean and the Western and Central Pacific Ocean, which were only reflected in reports in 2007.

1.2 Annual Catch in the WCPFC Convention Area

1.2.1 LTLL

The fishing grounds of LTLL fleet are distributed extensively in WCPFC Convention Area (Figure 1). Historically, most of the LTLL fleets targeted on albacore for canning, but since late 1990s, a higher proportion targeted on tropical species for Japanese frozen sashimi market (Figure 2). Since middle of 1990s a seasonal fishing ground has been developed in the northern Pacific for northern albacore. Table 2 shows the catch estimate of major tuna and tuna-like species caught by LTLL fishery in the recent five years (2006-2010) in WCPFC Convention Area.

1.2.2 DWPS

Total catch and major species caught by this fishery in WCPFC Convention Area during 2006-2010 are shown in Table 3. The most dominant species remained to be skipjack, accounting for about 87.0% of the total catch, followed by yellowfin tuna and bigeye, which accounts for 11.8% and 1.2% of the total catch, respectively (Figure 3). In 2010, catches of skipjack, yellowfin and bigeye tunas were 166,211 MT, 29,203 MT and 3,437 MT, respectively.

1.2.3 STLL

The STLL fishing vessels land their catches both in Taiwan and foreign ports. Considering the geographical location of Taiwan, catches landed in domestic ports are believed to be mostly from WCPO including the EEZ of Taiwan. Total catch of tuna and tuna-like species landed in Taiwan by this fleet was stable in the recent five years (2006-2010) with an average of about 17,042 MT. The dominant species caught included yellowfin tuna (48%), billfish (25%), swordfish (14%) and bigeye tuna (5%). As to those landed in foreign ports, yellowfin and bigeye are the main species caught. Catches of main species by STLL from 2006 to 2010 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: 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. Vessels targeting on bigeye tuna usually conduct 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 landing, fuel and supply. The fishing effort distribution in recent 5 years (2006-2010) is shown in Figure 1.

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 2010, more than 72% sets were deployed on free school.

The fishing effort distribution in recent 5 years (2006-2010) is shown in Figure 4. The fishing effort is more concentrated in the western Pacific Ocean.

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.

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

In order to collect the catches data of non-target, associated and dependent species from fishermen, additional columns have been included in the logbook for recording catches of non-target species since 2003 (for the use of 2004 trips), including 4 shark species (Blue Shark, Silky Shark, Shortfin Mako Shark, and other sharks), sea birds, sea turtles and marine mammals. And in 2009, the logbook applied to the LTLL fishery had modified 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.

The scientific observer program also has been collecting the catches data of non-target, associated and dependent species since 2002 in the Pacific. As for the bycatch, 10 seabirds、16 sea turtles and 2 cetaceans were bycatch from 23 trips observer data (one observer was deployed in 2008 and the observation trip lasted to 2009) on Taiwanese LTLL fishing vessels in Pacific Ocean in 2009. Furthermore, 6 species of seabirds and 3 species of cetaceans were sighted during these observations.

Annual catch of main shark species of LTLL and STLL in 2010 is shown in Table 5.

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

The government has implemented a fleet reduction program from 2005 to 2008 for scrapping 215 LTLL vessels. In view of conservation of tuna species, it is the policy of the government to maintain the size of its LTLL fleet 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 the purposes of better understanding the fishing activities of the longline fishery, including target and non-target fish species and to be in line with the international requirement for conserving marine resources, FA has launched a pilot observer program since 2001 in the Indian Ocean. The observer program has been carried out in Pacific Ocean since 2002. During 2002-2010, the numbers of LTLL and DWPS fisheries of observation trips is shown in Table 6. In accordance with the government's policy in establishing an observers program and availability of budgets to support the increase of observers, the observational trips gradually increased year by year. In 2010, 25 trips were assigned to LTLL vessels and 6 trips were assigned to DWPS vessels.

The observers were trained to collect fishery data on target species and bycatch species. The data recorded 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

as follows：

— Age and growth study with its applications of south pacific albacore resources.
— Research on the catch at size/age and CPUE standardization of North Pacific albacore.
— Research on CPUE standardization of pacific bluefin tuna.
— Studies on CPUE standardization of swordfish, sailfish, and blue marlin.
— Research on CPUE of bigeye and yellow fin tuna.
— Billfish tagging program.

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

— Standardizations of Taiwanese distant-water longline CPUE up to 2010 for yellowfin and bigeye tunas in Region 6 of WCPO. (WCPFC-SC7-2011/SA-IP-11)
— Standardized CPUE and catch-at-age time series of North Pacific albacore exploited by Taiwanese longline fisheries, 1995-2008.（ISC/10/ALBWG-3/09）
— An update of stock assessment or North Pacific Swordfish based on two-stock scenario using age-structured models.（ISC/10/BILLWG-1/03）
— The update of input data of stock assessment of Pacific Bluefin Tuna for Stock Synthesis III.（ISC/10-1/PBFWG/09）
— Standardized CPUE trend and age composition of North Pacific albacore exploited by Taiwanese longline fisheries, 1995-2008. (ISC/10/ALBWG-2/07)
— A review of Taiwan's billfish fisheries in the North Pacific,1997-2009. (ISC/11/BILLWG-1/01)
— Standardized catch-rates for striped marlin (Kajikia audax) for Taiwanese distant-water longline fishery in the North Pacific Ocean for 1967-2009. (ISC/11/BILLWG-1/07)
— Age and growth of striped marlin (Kajikia audax) in waters off Taiwan. (ISC/11/BILLWG-1/09)
— Reproductive biology of female striped marlin (Kajikia audax) in the waters off Taiwan (preliminary). (ISC/11/BILLWG-1/11)
— Catch and life history parameters of pelagic sharks in the Northwestern Pacific. (ISC/11/SHARKWG/06)
— Age and growth of striped marlin (Kajikia audax) in the waters off Taiwan: A revision. (ISC/11/BILLWG-2/07)
— Reproductive biology of male striped marlin, Kajikia audax, in the waters off Taiwan. (ISC/11/BILLWG-2/09)
— Recent Aspects of Taiwanese Albacore-targeting Longline Fisheries in the North Pacific Ocean, 2011. (ISC/11/ALBWG/07)

2.3 Statistics data collection system in use

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.

Logbooks of LTLL, STLL and DWPS fishing vessels authorized to operate in WCPFC Convention Area are collected while vessels call port. All fleets are required to submit weekly catch reports.

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 09-03, 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 Taiwanese longline vessels fishing for swordfish and the catch of swordfish in the convention area south of 20°s during the period 2000-2010 are shown in Table 7. In 2010, there were 44 fishing vessels, including 4 seasonal target and 15 non-target LTLL vessels, and 25 non-target STLL vessels.

Table 1. The fishing vessel number by fishery operating actively in WCPFC Convention Area during 2006-2010.

Year \ Fishery	LTLL	DWPS	STLL
2006	104	34	1,490
2007	90	34	1,750
2008	84	34	1,260
2009	75	32	1,220
2010	90	34	1,123

Table 2. Catch (in MT, round weight) statistics of major tuna and tuna-like species caught by LTLL fishery in WCPFC Convention Area during 2006-2010.

	N-ALB**	S-ALB***	BET	YFT	SWO	MLS	BUM	BLM	SKJ	TOTAL
2006	3,848	6,365	7,841	3,583	863	304	1255	19	207	24,285
2007	2,465	5,021	9,108	2,657	1,134	351	1,061	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

* Preliminary estimate

** from northern Pacific Ocean

*** from southern Pacific Ocean

Table 3. Catch (in MT, round weight) statistics of major tuna species caught by DWPS fishery in WCPFC Convention Area during 2006-2010.

year \ specie	SKJ	YFT	BET	Total
2006	189,392	19,793	978	210,163
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

* Preliminary estimate

Table 4. The catches (in MT, round weight) of tuna and tuna-like species of the STLL fishery in WCPFC Convention Area during 2006-2010.

specie / year	ALB	BET	YFT	SWO	BILL
2006	4,550	6,454	15,071	4,045	7,811
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

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

. * Preliminary estimate

Table 5. The catches (in MT, round weight) of main shark species were caught by LTLL and STLL fishery in WCPFC Convention Area in 2010 (preliminary estimate).

	Blue shark	Silky shark	Shortfin mako shark	Oceanic whitetip shark	Pelagic thresher shark	Bigeye thresher shark	Smooth hammerhead shark	Scalloped hammerhead shark	Porbeagle shark	other sharks
LTLL	912	417	206	80	9	25	5	6	0	43
STLL	10,077	233	731	7	237	279	104	365	0	3,380

Table 6. Observation trips of LTLL and DWPS fisheries deployed in Pacific Ocean during 2002-2010.

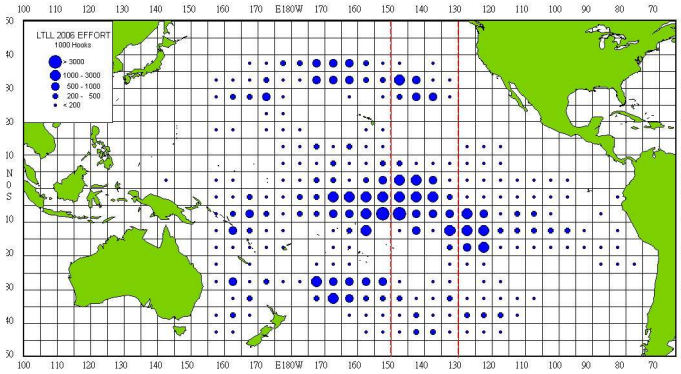
	LTLL	DWPS
2002	1	6
2003	3	2
2004	4	2
2005	5	2
2006	10	-
2007	15	11
2008	14	7
2009	22	4
2010	25	6

Table 7. The annual catch of swordfish and the number of the fishing vessels in the Convention Area south of 20°S during 2000-2010.

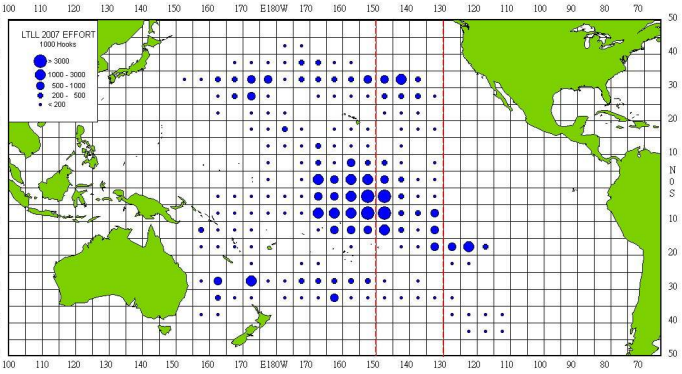
Year	Catch (tonnes)	Vessel numbers
2000	54	68
2001	208	68
2002	233	69
2003	248	84
2004	466	64
2005	202	65
2006	198	57
2007	217	49
2008	61	53
2009	133	53
2010	105*	44

* Preliminary estimate

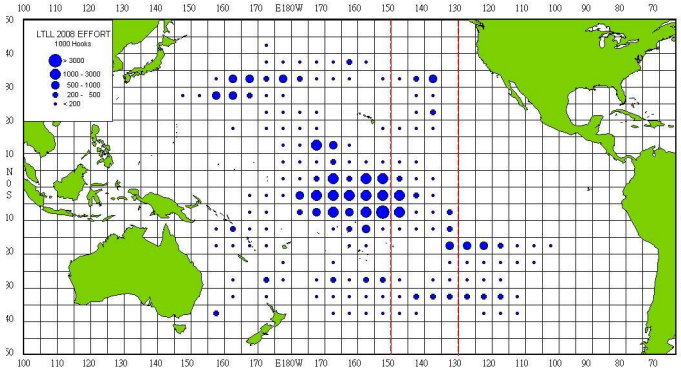
2006



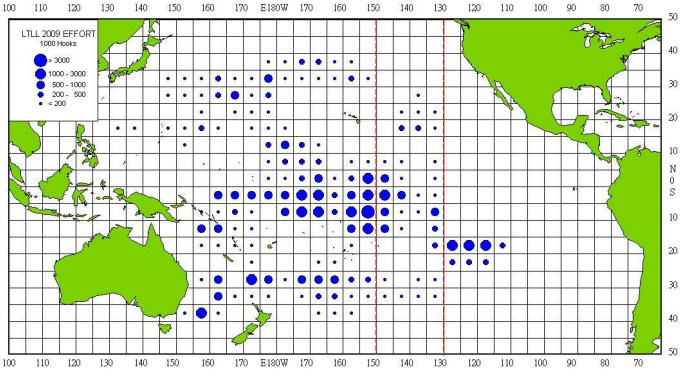
2007



2008



2009* preliminary



2010* preliminary

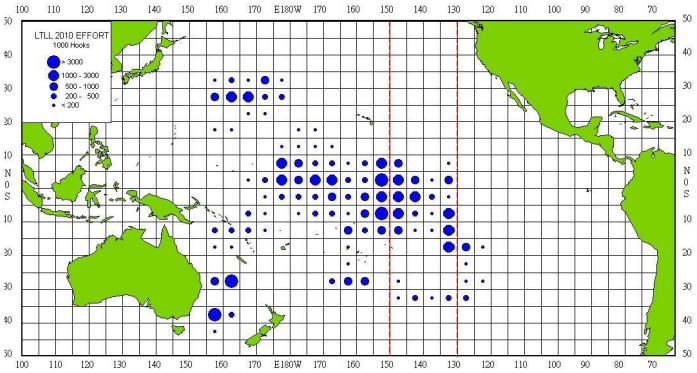


Figure 1. The effort distribution of Taiwanese LTLL fleet operating in Pacific Ocean during 2006-2010. Map of 2009 and 2010 is still preliminary and will be revised shortly.

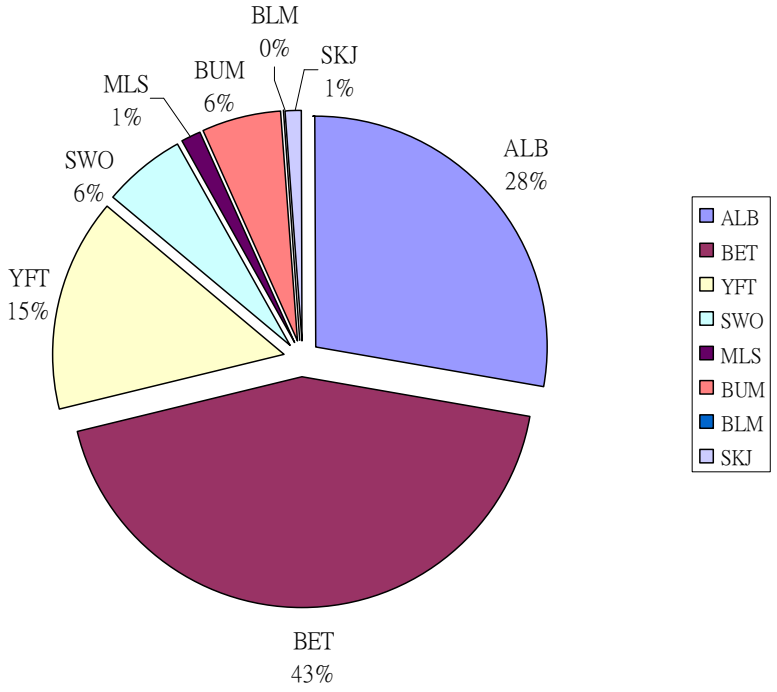


Figure 2. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese LTLL fishery in the WCPFC Convention area during 2006-2010.

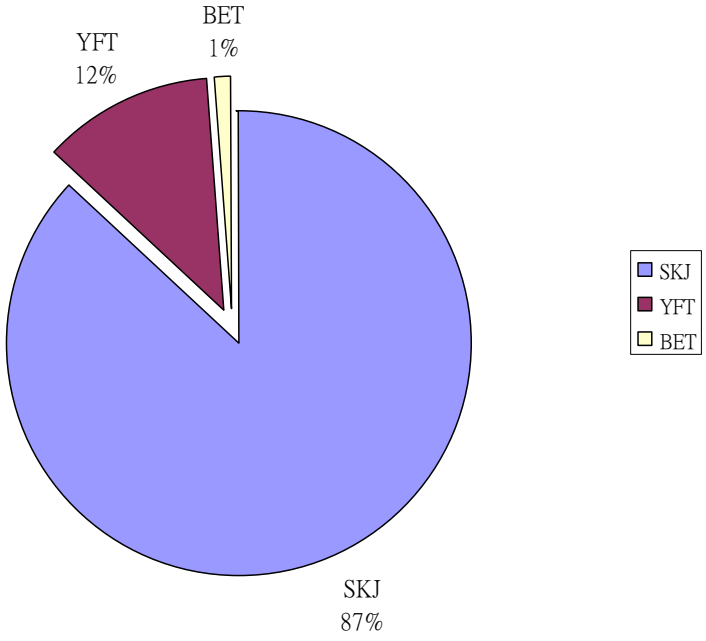
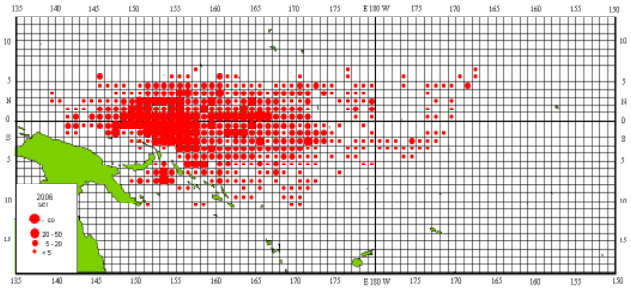
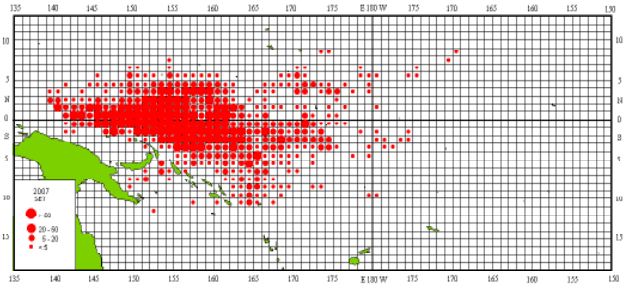


Figure 3. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese DWPS fishery in the WCPFC Convention area during 2006-2010.

2006





2007

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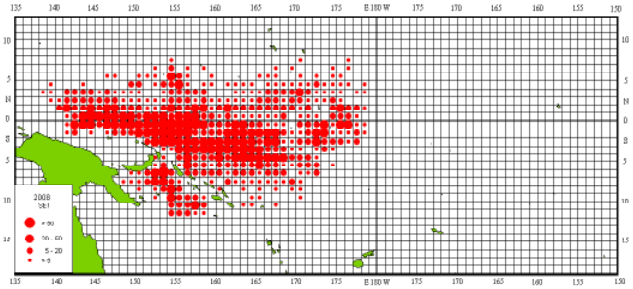

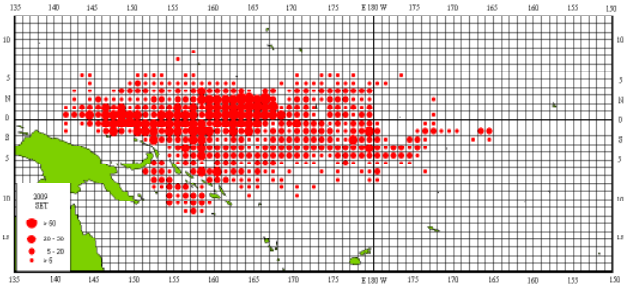

2009

2010

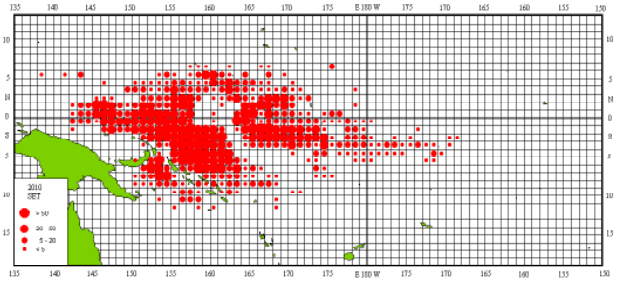

Figure 4. The effort distribution of Taiwanese DWPS fleet operating in WCPFC Convention area during 2006-2010