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**ANNUAL REPORT – PART 1  
INFORMATION ON FISHERIES, RESEARCH, AND STATISTICS**

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**WCPFC-SC4-AR PART 1/WP-27**

**CHINESE TAIPEI**

## **National Report**

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

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and  
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## ***Summary***

There are three types of Taiwanese tuna fishing vessels operating in WCPFC Convention Area: large tuna longline (LTLL, previous named FTLL) fishery, distant-water purse seine (DWPS) fishery and small tuna longline (STLL, previous named CTLL) fishery. In 2007, total catches of LTLL and DWPS were 10,538 MT and 232,535 MT, respectively. The total catches of tuna and tuna-like species of the STLL fishery was 36,624 MT in 2007. In 2007, 23 LTLL vessels have been scraped, among which 10 were from the Pacific Ocean. In order to monitor and control the fishing activity of its vessels, LTLL vessels are requested to install 2 sets of Vessel Monitoring Systems. In 2007, 20 observers were dispatched to Pacific Ocean for onboard observation on LTLL or DWPS vessels and collection of fishing and biological data. Regarding to research activities in 2007, three programs were carried out, include experiments of circle hook, acoustic method to evaluate fish school and tagging and recapture study.

## ***1 Annual fisheries' information***

The Pacific Ocean is one of the earliest fishing grounds exploited by Taiwanese tuna fisheries. Currently, there are three types of tuna fisheries operating in WCPFC Convention Area: large tuna longline (LTLL, previous named FTLL) fishery, distant-water purse seine (DWPS) fishery and small tuna longline (STLL, previous named CTLL) fishery. All LTLL and DWPS vessels operate outside its EEZ; most of the STLL vessels operate in its EEZ, some of them operate in the high sea or in the PICS' EEZ through relevant agreements.

### **1.1 Annual Catch by species, gear in the WCPFC Convention Area**

#### **1.1.1 LTLL**

The major fishing grounds of LTLL fleet are located in the central and southern regions (Figure 1). Historically, most of the LTLL fleets targeted on albacore for canning, but in recent years, 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 1 shows the catch estimate of major tuna and tuna-like species caught by LTLL fishery in the recent five years (2003-2007) in WCPFC Convention Area.

### **1.1.2 DWPS**

Total catch and major species caught by this fishery in WCPFC Convention Area during 2003-2007 are shown in Table 2. The most dominant species remained to be skipjack, accounting for about 88% of the total catch, followed by yellowfin tuna 11%, and bigeye 1%. In 2007, catches of skipjack, yellowfin and bigeye tunas were 209,002 MT, 21,147 MT and 2,386 MT, respectively. (Figure 3)

### **1.1.3 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 in the EEZ of Taiwan. Total catch of tuna and tuna-like species landed in Taiwan by this fleet was stable in recent five years (2003-2007) with an average of about 22,303 MT. The dominant species caught included yellowfin tuna (30%), billfish (30%) and swordfish (8%). As to those landed in foreign ports, yellowfin and bigeye are the main species caught. Catches by main species of STLL from 2002 to 2006 in WCPFC Convention Area show in Table 3.

## **1.2 Fleet structure (Table 4)**

### **1.2.1 LTLL**

The LTLL vessels refer to those vessels larger than 100 GRT. All of them are greater than 24 meters LOA and mostly operating in the waters of foreign EEZ and high seas. The number of LTLL vessels authorized to fish in WCPFC Convention Area in 2007 was 97, a decrease from 117 in 2006, which is mostly because of the compulsory fleet reduction program carried out by the government.

### **1.2.2 DWPS**

Tuna purse seine fishery was introduced into Taiwan in 1982 and has become one of the major fleets 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 in 2004, and maintained at this level ever since.

### **1.2.3 STLL**

The STLL vessels operate 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 vessels. They change their fishing grounds and target species

based on fishing season and market price. In 2007 there were about 1,750 STLL vessels operating actively in WCPFC Convention Area, and among which around 568 vessels are over 24 meters LOA among them. 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 not reflected in reports of the past years.

## **1.3 Fishing Patterns**

### **1.3.1 LTLL**

LTLL fleet can be divided into two groups in accordance with the target species: those operate mainly in tropical area (between 15°N and 15°S) targeting on bigeye tuna, and those operate 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 4 years (2003-2006) 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 the most prevailing fishing method. In 2007, more than 48% (sets were deployed on free school.

The fishing effort distribution in recent 5 years (2003-2007) 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 have equipped with freezing equipment for better preservation of their catches.

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

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. Estimation is still not available due to insufficient data and information. The scientific observer program has been collecting the catches data of non-target, associated and dependent since 2002 in the Pacific.

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

The government has implemented a compulsory fleet reduction program in 2005 and 2006 for scrapping 160 LTLL vessels, among them there are 25 from Pacific Ocean, a reduction of 26% from 614 vessels in the early 2005. In 2007, 23 LTLL vessels have been scraped, among which 10 were from the Pacific Ocean.

In view of the decline of the stocks size of the major tuna species, it is the policy of the government to maintain the size of its LTTL 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. In addition, in order to monitor and control the fishing activity of its vessels, LTLL vessels are requested to install 2 sets of Vessel Monitoring Systems.

With the sharp increase in fuel price, some LTLL fishing vessels have been compelled to suspend operation and return to their homeport. If the price of fuel stands at the high level, more fishing vessels are expected to withdraw from fishing. The government has implemented area- and species-specific policy for LTLL, with quota allocation of BET to individual vessel. Some boat owners feel pessimistic on the prospects of the fishery. The vessel reduction program with reasonable compensation from the government and surviving boat owners, has given incentive for those who consider leaving the fishery for good.

## ***2 Research and statistic***

## **2.1 Summary of observer program**

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. In 2002-05 the program was extended to cover all three oceans, with deployment of 5, 6, 9 and 16 observers respectively, and the number of observers increased to 31 in 2006. The number of observer has further increased to 58 for 2007. During 2002-2004, 2 observers were dispatched to Pacific Ocean each year and the number was increased to 5, 7 and 20 in 2005, 2006 and 2007 respectively for onboard observation on LTLL or DWPS vessels and collection of fishing and biological data.

## **2.2 Research activities**

### **2.2.1 Circle hook**

Experiments of circle hook on catch rates of longline vessels have been conducted in the Atlantic and Pacific Ocean in 2007. Preliminary results based on observers records indicated that using circle hooks has no negative effect on tuna catch rate, instead the survival rate of tunas has significantly increased.

### **2.2.2 Acoustic method to evaluate fish school**

A pilot acoustic study on the possibility to distinguish different species schools aggregated by FAD was conducted in 2007. The program was to provide information on distinguishing small bigeye/yellowfin tunas from skipjack through echo sounder to purse seiners to reduce bycatch. Only some preliminary data were collected however because two devices were stolen consecutively during the experiments at sea in the central Pacific.

### **2.2.3 Tagging**

Tagging and recapture study on Pacific bigeye tuna was launched in 2006. The small-scale tagging program for bigeye was conducted by scientific observers between 136° and 167°W during 2006-2008. The objectives of this study are stock identification of Pacific bigeye tuna, estimation of life history parameters, finding the migratory route of bigeye tuna and their correlation to marine environmental factors. Thirty-five archival tags and 2 pop-up tags have been deployed in bigeye tuna (12-35 kg) by experienced observers.

## **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.

We collect the logbooks of LTLL and DWPS fishing vessels authorized to operate in WCPFC Convention Area at the time of their unloading in port. These logbook data will be crosschecked with VMS location records for verifying the fishing activities. Besides the LTLL logbook system, the LTLL fishing vessels 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 sources of catch and effort for all species, supplemented by trade data. The size data of all species is mainly from the first 30 pieces fish caught for each setting recording 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, but the coverage is yet to be improved.

### **2.4.2 DWPS fishery**

The logbook is the sources of catches of SKJ, YFT and BET and effort data. Trade data has been collected for estimating the catch composition of BET and YFT. Observer program is the main source of size data of SKJ, though coverage is still low.



Table 1. Catch (in MT, round weight) statistics of major tuna and tuna-like species caught by LTLL fishery in WCPFC Convention Area during 2003-2007 period.

Year \ Species	N-ALB**	S-ALB***	BET	YFT	SWO	MLS	BUM	BAM	SKJ	TOTAL
2003	6,454	14,105	7,540	4,981	1,038	395	807	3	283	29,152
2004	4,061	13,307	16,888	9,018	2,382	695	1,226	5	672	42,705
2005	3,990	9,468	10,083	5,755	1,057	404	1,196	54	438	32,445
2006	3,848	6,365	7,841	3,583	863	304	1,255	19	207	24,285
2007*	2,465	5,021	1,796	659	238	81	242	3	33	10,538

\* Preliminary estimate

\*\* from northern Pacific Ocean

\*\*\* from southern Pacific Ocean

Table 2. Catch (in MT, round weight) statistics of major tuna species caught by DWPS fishery in WCPFC Convention Area during 2003-2007 period.

year \ species	SKJ	YFT	BET	Total
2003	169,492	29,058	2,676	201,226
2004	181,524	15,968	730	198,222
2005	165,289	27,572	2,178	195,039
2006	189,392	19,793	978	210,163
2007*	209,002	21,147	2,386	232,535

\* Preliminary estimate

Table 3. The catches (in MT, round weight) of tuna and tuna-like species of the STLL fishery in WCPFC Convention Area during 2003-2007 period.

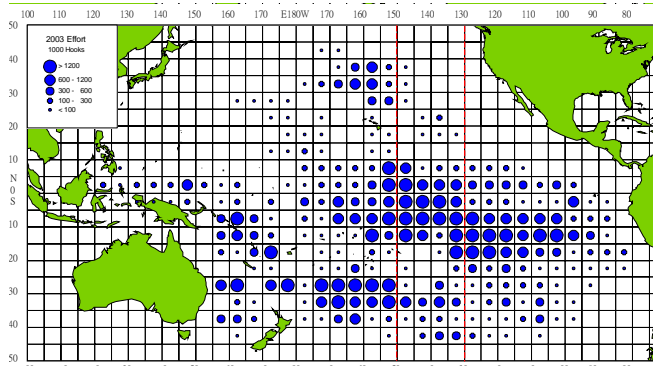
Year \ Species	ALB	BET	YFT	SWO	BILL
2003	3,412	6,889	17,168	3,594	13,556
2004	2,027	4,104	13,957	3,576	13,751
2005	2,177	5,415	13,816	3,523	10,353
2006	4,550	6,454	15,071	4,045	7,811
2007*	5,308	5,652	14,011	3,983	7,670

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

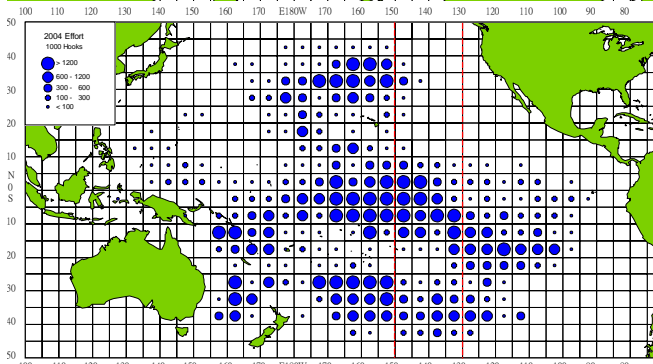
\* Preliminary estimate

Table 4. The fishing vessel number by fishery operating in WCPFC Convention Area during 2003-2007 period.

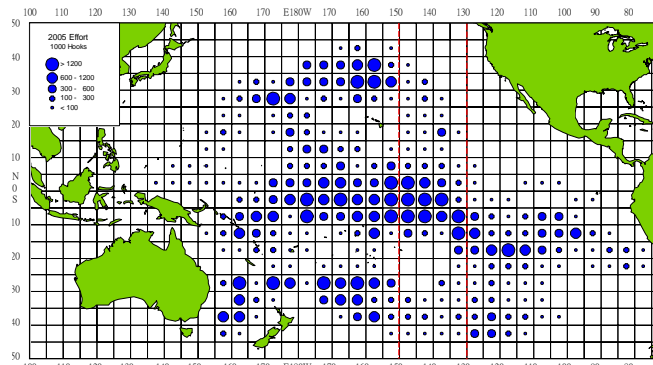
Year \ Fishery	LTL	DWPS	STL
2003	142	36	1,444
2004	137	34	1,387
2005	133	34	1,420
2006	117	34	1,490
2007	97	34	1,750



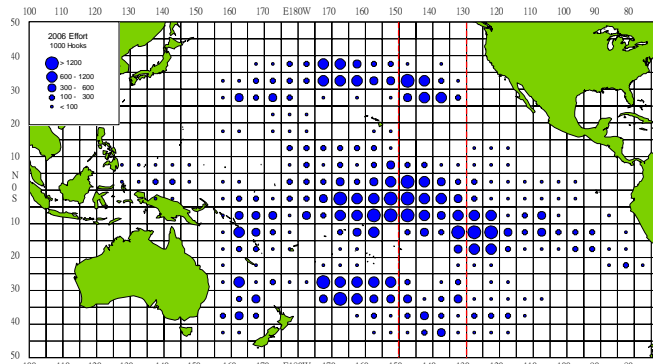
2003



2004



2005



2006\* preliminary

Figure 1. The effort distribution of Taiwanese LTLL fleet operating in Pacific Ocean during 2003-2006 period.

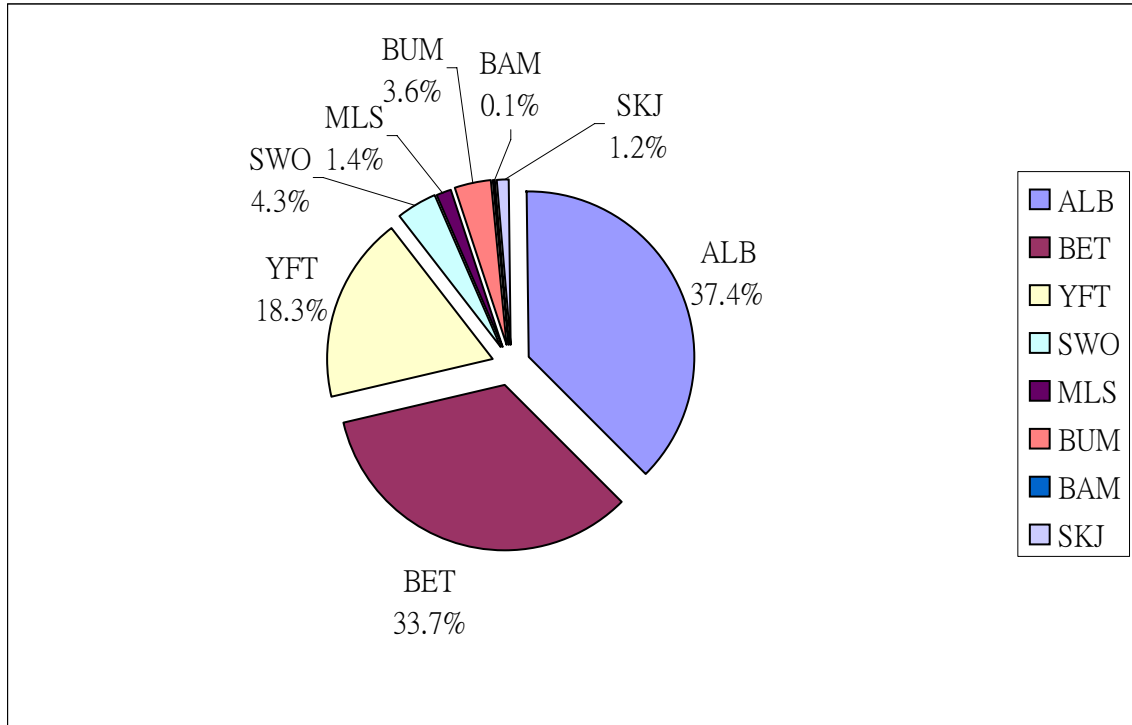


Figure 2. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese LTLL fishery in the WCPFC Convention area during 2003-2007 period.

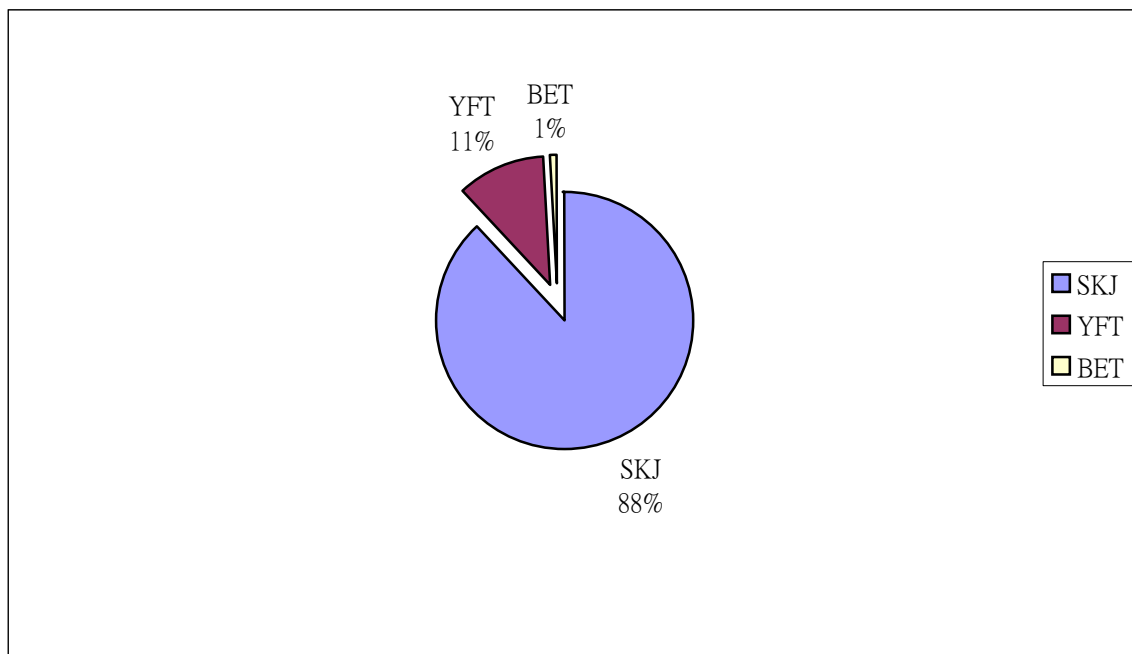
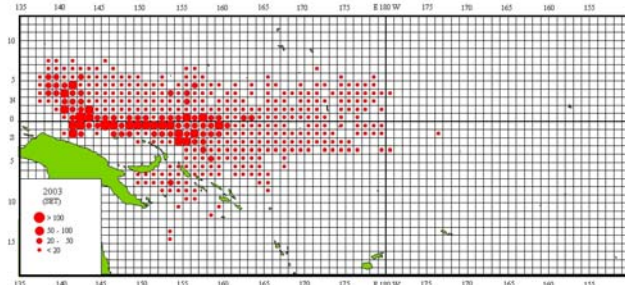
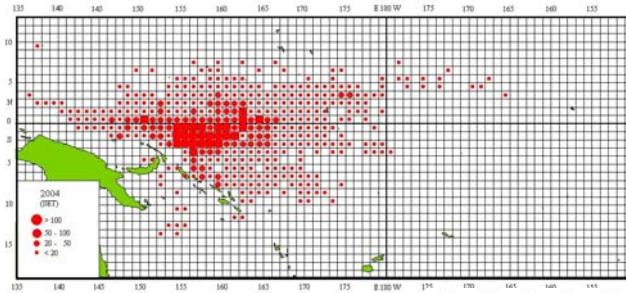


Figure 3. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese DWPS fishery in the WCPFC Convention area during 2003-2007 period.

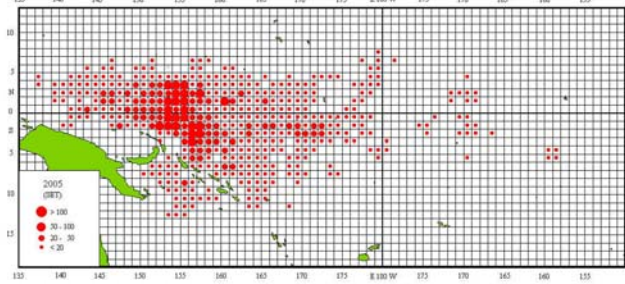
2003



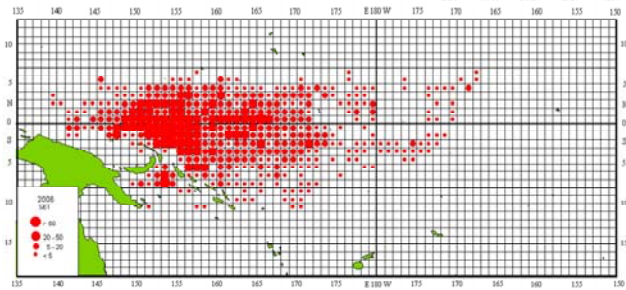
2004



2005



2006



2007

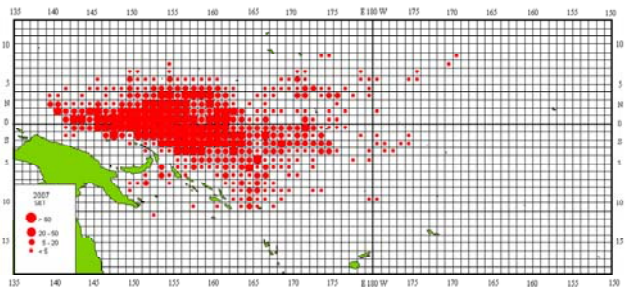


Figure 4. The effort distribution of Taiwanese DWPS fleet operating in WCPFC Convention area during 2003-2007 period