

National Report

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

August, 2007

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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). Good catch of northern albacore has driven more vessels to the fishing grounds in the northern Pacific for seasonal fishing from the middle of 1990s. Table 1 shows the catch estimate of major tuna and tuna-like species caught by LTLL fishery in recent five years (2002-2006) in WCPFC Convention Area.

1.1.2 DWPS

Total catch and major species caught by this fishery in WCPFC Convention Area during 2002-2006 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 2006, catches of skipjack, yellowfin and bigeye tunas were 189,392 MT, 19,793 MT and 987 MT, respectively. (Figure 3)

1.1.3 STLL

The STLL fishing vessels land their catches both in Taiwan or 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 (2002-2006) with an average of about 25,000 MT. The dominant species caught include yellowfin tuna, billfish and swordfish. As to those landed in foreign ports, yellowfin and bigeye are the main species caught and the size of the catch is estimated from the commercial data

available.

The main catches by 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 2006 was 117, a decrease from 133 in 2005.

1.2.2 DWPS

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 refer to those vessels smaller than 100 GRT and 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 2006 there were about 1,490 STLL vessels operating actively in WCPFC Convention Area .

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 have to enter into port twice a year for landing, fuel and supply. The fishing effort distribution in recent 4 years (2002-2005) is shown in Figure 1.

1.3.2 DWPS

The DWPS vessels mainly operate in the tropical waters close to the equator shifting eastward or westward 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 2006, more than 64% sets were deployed on free school.

The fishing effort distribution in recent 5 years (2002-2006) is shown in Figure 4. The fishing effort is more concentrated in western Pacific Ocean, and more than 60% sets made in PNG and FSM waters.

1.3.3 STLL

Owing to the low fishing capacity of STLL vessels, their fishing days in a trip are usually less than 30 days. 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. Estimation is not available this year due to insufficient data and information. The scientific observer program has collected the catches data of non-target, associated and dependent since 2001.

1.5. Developments/trends in 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. The vessels fishing for bigeye tuna will be the main target for this program. In 2007, the government plans to carry out the third phase of fleet reduction program. By end of this year, we will scrap 23 LTLL vessels, among which 10 will be from Pacific Ocean. Compliant from the environmental

group has pushed the government to sink a number of the vessels scrapped for use as artificial reef. In view of the decline of the stocks of the major 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. In addition, to prevent expansion of global fishing capacity, the Regulations on the Permission of Export of Fishing Vessels were promulgated on 29 June 2005, prohibiting export of any fishing vessel either newly or used, unless the vessel is for the replacement of a decommissioned vessel of same tonnage, sunk or scrapped, as declared by the importing country.

1.6. Associated social-economic factors

The tuna fisheries account for approximately 43% of the marine fisheries, in terms of production value, or approximately 0.3% of our GDP. The tuna fisheries have helped to promote peripheral industries particularly in the port cities, such as shipbuilding, ship repairs, fishing gear production, transportation, banking, cold storages, bait supply, electronic devices supply, ice supply, fish processing and fish trading. The population engaged directly in distant water and offshore tuna fisheries is estimated to be about 89,000, and when those engaging in the peripheral industries are taken into account, the number of people benefited from the tuna fisheries will be of significant importance.

1.7. Disposal of catch/ market destination

Most of the albacore catches from LTLL vessels are landed at the canneries in American Samoa and Fiji, while the tropical tuna catches sent to Japan for sashimi market. Catches of DWPS fishery were mostly shipped to Thailand for canning, with only a small portion sold to Japan for katsuobushi and sashimi. Fish caught by local STLL vessels, however, is mostly sold in the domestic market or shipped to Japan by airfreight for fresh sashimi market. Most of the tropical tuna landed by STLL at foreign base ports are shipped to Japan by airfreight for fresh sashimi market.

1.8 On-shore development

1.8.1 Shipyards

There are 2 shipyards having the capacity to build reefer, purse seiners and large longline fishing vessel. There are a number of smaller shipyards having the capacity of building small-scale longline fishing vessel with FRP hull.

1.8.2 Frozen and cold storages

There are about 146 frozen and cold storages not only for storing the catches shipped back home, but also for bait, such as squid and saury, for longline fishery.

1.8.3 Canneries

There are about 22 canneries in Taiwan, and tuna canning is not their main production item. Their annual production of tuna can is 222,000 cases.

1.9 Future prospects of the fishery

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 and port sampling programs

2.1.1 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 2002 and 2003, 6 observers each year were dispatched to engage in observer mission in the three Oceans. The number of observer has increased to 9 and 25 for 2004 and 2005 respectively and increased to 31 in 2006. During 2002-2004 period, 2 observers were dispatched to Pacific Ocean each year and the number was increased to 4 and 6 in 2005 and 2006 for onboard observation on LTLL or DWPS vessels and collection of fishing and biological data.

2.1.2 Port sampling program

Launched in 1997, the domestic port-sampling program was carried out. The purposes of the program are to collect fishing activities information through the interview of STLL boat owners, and measurements of the fork-length of tuna landed at domestic ports.

In 2004, we carried out a pilot port sampling in Davao, Philippines and Phuket, Thailand for the collection of the information of STLL activities and measurement of tunas. In 2005, 4 port samplers were sent to carry out the port-sampling in Pago Pago, Suva and Levuka, where the fish size was measured, muscle tissues collected and skippers interviewed. In 2006, 2 port samplers were sent to carry out the port-sampling in Pago Pago.

2.2 Research activities

2.2.1 Circle hook

To reduce the incidental catch of sea turtles, a short term experimental program was conducted on the use of circle hooks during the observer trip in EPO in 2004 and 2005. In 2006, promotion on the use of circle hooks will continue and hooks exchange program will be carried out.

2.2.2 Acoustic pinger experiment

The acoustic pinger experiment has been conducted since 2003, and its main objective is to develop pinger suited for marine fisheries to disperse marine mammals in operation. In its initial stage, the program was focused on the domestic fisheries. In 2005, the research extended to deep-sea tuna longline fisheries in the Pacific and Indian Oceans.

2.2.3 Tagging

A billfish tagging program has also being conducted by Fisheries Research Institute (FRI) of Council of Agriculture (COA). Two pop-up tags were deployed on sailfish at the set net off eastern Taiwan on May, 2006. One tag popped up after seven days and transmitted its location via Argos satellite. The other tag disappeared after 40 days with an unknown fate. More PAT tagging experiments are needed to understand the vertical structure and physical characteristics of sailfish ecology. More results from billfish studies are expected in the near future.

Tagging and recapture study on Pacific bigeye tuna was launched in 2006. Environmental data including remote sensing and IRI data base will be used to find the correlation between the migratory route and marine environmental factors. Scientific observers will conduct the tagging experiment board at sea. 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.

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 logbook system, the LTLL fishing vessels are required to submit weekly catch reports.

To improve the coverage of logbook, Fisheries Agency has launched a data improvement program on domestic STLL fishery. By the program, additional manpower- the statisticians, will be deployed to local ports to collect logbooks, interview with fishermen, and conduct port-sampling program. Logbook coverage rate will be improved in the near future in consequence.

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 2002-2006 period.

Year \ Species	N-ALB**	S-ALB***	BET	YFT	SWO	MLS	BUM	BAM	SKJ
2002	7,055	12,796	8,741	4,953	1274	386	231	8	143
2003	6,454	14,105	7,540	4,981	1,038	395	807	3	283
2004	4,061	13,307	16,888	9,018	2,382	695	1226	5	672
2005	3,990	9,468	10,083	5,755	1,057	404	1,196	54	438
2006*	3,848	6,365	7,841	3,583	863	304	1,255	19	207

* Preliminary estimate

** The albacore catch is for northern Pacific Ocean

*** The albacore catch is for southern Pacific Ocean

Table 2. Catch (in MT, round weight) statistics of major tuna species caught by DWPS fishery in WCPFC Convention Area during 2002-2006 period.

species \ year	SKJ	YFT	BET	Total
2002	229,415	26,068	2,643	258,126
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	987	210,172

* 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 2002-2006 period.

Year \ Species	ALB	BET	YFT	SWO	BILL
2002	(910)	7,904	17,040	(2,511)	(10,732)
2003	3,412	5,805	15,381	4,562	15,553
2004	3,827	4,104	13,957	4,671	15,760
2005	2,177	5,415	13,816	3,523	10,353
2006*	4,550	6,454	15,071	4,908	9,790

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

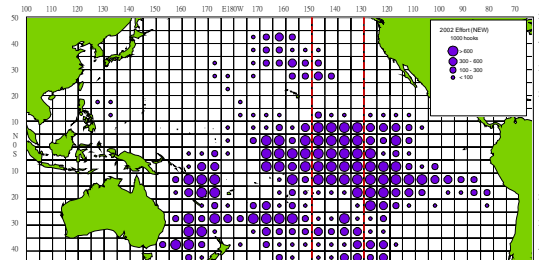
* Preliminary estimate

() Catch statistics are from domestic ports and not including foreign ports' data, because of the lack of sufficient foreign ports' data.

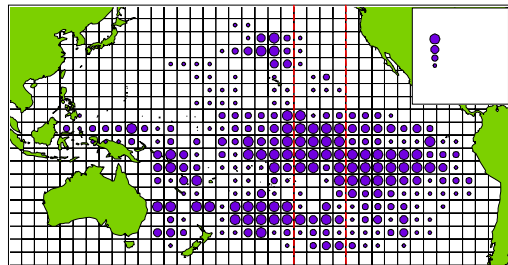
Table 4. The number of fishing vessel by fishery operating in WCPFC Convention Area during 2002-2006 period.

Year \ Fishery	LTL	DWPS	STLL
2002	133	41	1,980
2003	142	36	1,444
2004	137	34	1,387
2005	133	34	1,420
2006*	117	34	1,490

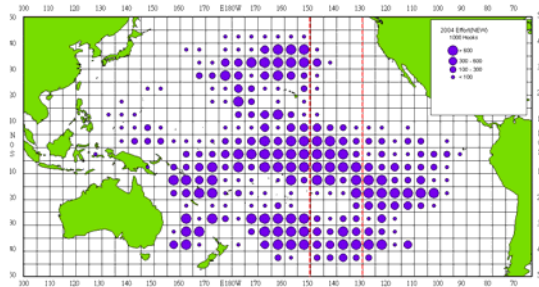
* Preliminary estimate



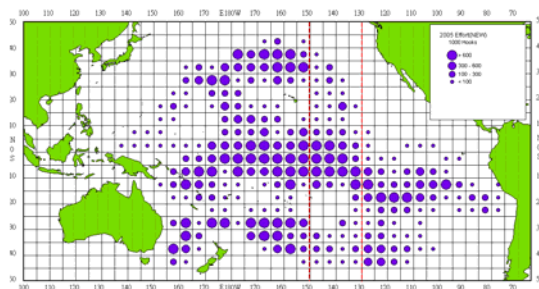
2002



2003



2004



2005* preliminary

Figure 1. The effort distribution of Taiwanese LTLL fleet operating in Pacific Ocean during 2002-2005 period

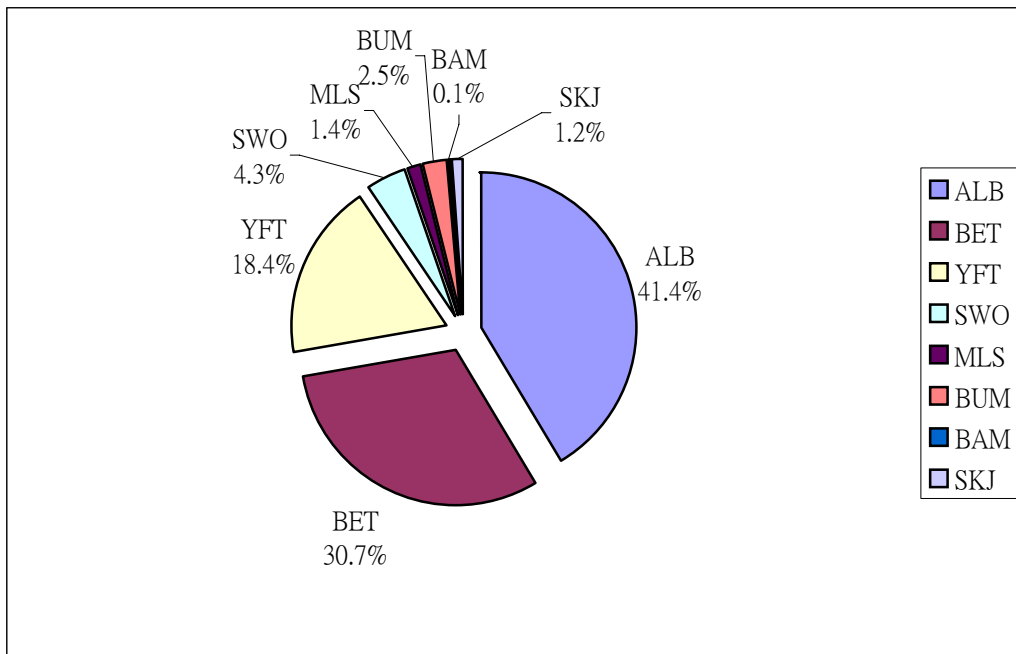


Figure 2. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese LTLL fishery in the WCPFC Convention Area during 2002-2006 period.

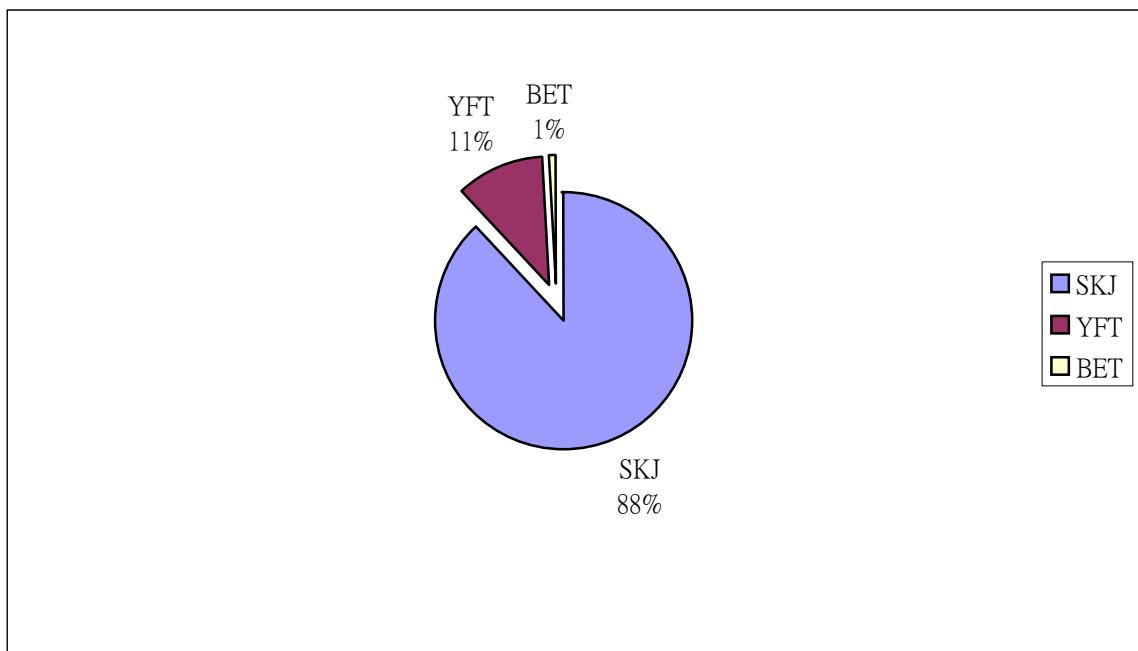
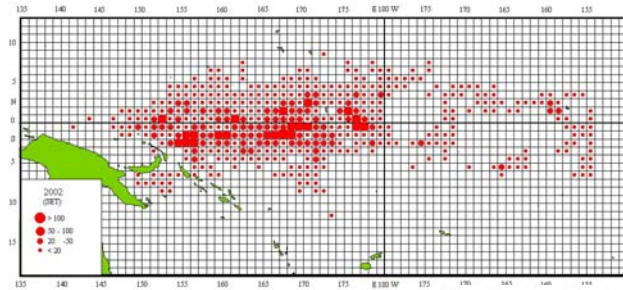
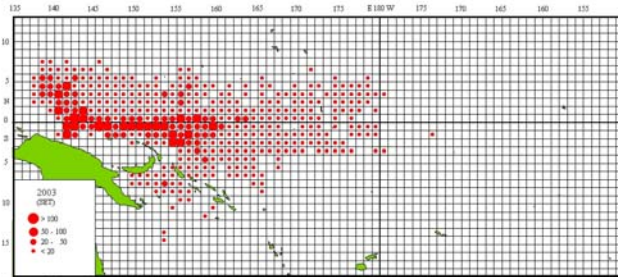


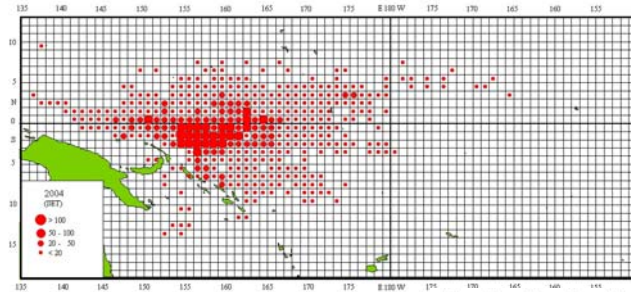
Figure 3. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese DWPS fishery in the WCPFC Convention Area during 2002-2006 period.



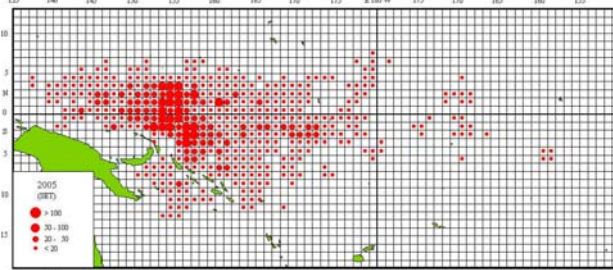
2002



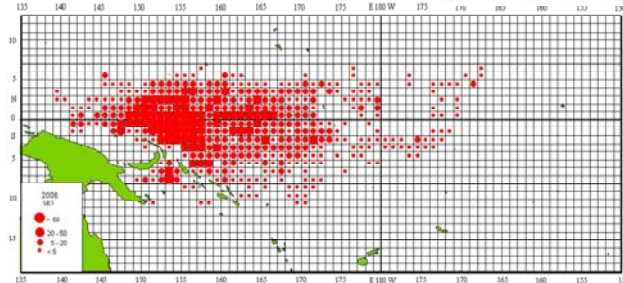
2003



2004



2005



2006

Figure 4. The effort distribution of Taiwanese DWPS fleet operating in WCPFC Convention Area during 2002-2006 period