SCIENTIFIC COMMITTEE
Second Regular Session

7-18 August 2006
Manila, Philippines

ANNUAL REPORT- PART I

CHINESE TAIPEI

August, 2006

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1.1 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.

1.1.1Annual Catch by species, gear in the WCPFC Convention Area

1.1.1.1 LTLL

The major fishing grounds of LTLL fleets 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 (2001-2005) in WCPFC Convention Area.

1.1.1.2 DWPS

Total catch and major species caught by this fishery in WCPFC Convention Area during 2001-2005 are shown in Table 2. The most dominant species remained to be skipjack, accounting for about 86% of the total catch, followed by yellowfin tuna 13%, and bigeye 1%. In 2005, catches of skipjack, yellowfin and bigeye tunas were 165,298 MT, 27,572 MT and 2,178 MT, respectively (Figure 3).

1.1.1.3 STLL

The STLL vessels refer to those vessels smaller than 100 GRT. Most of them operate in the area west of 130 E, though some of them have been fishing in distant waters in a pattern similar to that of LTLL vessels. In addition, they may change their fishing grounds and target species depending on fishing season or market price.

Lacking freezer facilities, the STLL vessels land their fish which is chilled by flake ice or icy seawater, at domestic or foreign ports. Considering the geographical location,

catches landed at homeport are believed to be caught mostly from the areas near their homeport, including the domestic waters. The dominant species caught include yellowfin tuna, billfish and swordfish. As to those landed at foreign ports, yellowfin and bigeye are the main species caught and the size of the catch is estimated from the commercial data available.

The catches of tuna and tuna-like species landed at domestic or foreign ports by this fleet from 2001 to 2005 in WCPFC Convention Area are shown in Table 3. The dominant species caught included yellowfin tuna, billfish, bigeye tuna and swordfish.

1.1.2 Fleet structure (Table 4)

1.1.2.1 LTLL

The LTLL vessels refer to those vessels mostly greater than 24 meters LOA and operating in the waters of foreign EEZ and high seas. The number of LTLL vessels authorized to fish in WCPFC Convention Area in 2005 was 133, a slight decrease from 137 in 2004.

1.1.2.2 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 2003, and maintained at this level ever since.

1.1.2.3 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 2005, there were about 1,421 STLL vessels operating actively in WCPFC Convention Area.

1.1.3 Fishing Patterns

1.1.3.1 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 of catch, receiving fuel and supply. The fishing effort distribution in the recent 4 years (2001-2004) is shown in Figure 1.

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 the 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 2005, more than 50% sets were deployed on free school.

The fishing effort distribution in recent 5 years (2001-2005) is shown in Figure 4. The fishing effort is more concentrated in western Pacific Ocean, and more than 65% sets made in PNG and FSM waters.

1.1.3.3 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 Philippines), 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.

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

Additional columns have been included in the logbooks 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 species since 2001.

1.1.5. 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 26 from Pacific Ocean, a reduction of 26% from 614 vessels in the early 2005. Compliant from the environmental group has pushed the government to sink a number of the vessels meant to be scrapped for use as artificial reef. In view of the decline of the stocks of some 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 built 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. As for DWPS fishery, in view of the resolutions adopted during the MHLC process as well as in the Preparatory Conference of WCPFC, calling for the restraint on the expansion of the overall fishing capacity in the region, the policy of the government is to maintain the fleet size of DWPS at 34 vessels, without considering reinstating the numbers reduced since 2003.

1.1.6.Associated social-economic factors

The tuna fisheries account for approximately 55% of the marine fisheries, in terms of production value, or approximately 0.42% 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 96,000, 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.

1.1.7. 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 tunas landed by STLL at foreign base ports are shipped to Japan by airfreight for fresh sashimi market.

1.1.8 On-shore development

1.1.8.1 Shipyards

There are 2 shipyards in the port city of Kaohsiung having the capacity of building reefers and purse seiners, and several shipyards capable of building large longline fishing vessel. There are a number of smaller shipyards having the capacity of building small-scale longline fishing vessel with FRP hull.

1.1.8.2 Frozen and cold storages

There are about 144 frozen and cold storages in the port city of Kaohsiung for storing the catches from distant water fishery shipped back home, as well as for storing squid and saury, including those used as the bait for longline fishery. Building of an ultra-low temperature cold storage for sashimi grade frozen tuna has been in progress and ready for operation as from 2007.

1.1.8.3 Canneries

There are about 22 canneries in Taiwan, and tuna canning is not their main production item. Their annual production of tuna can is about 172,000 cases.

1.1.9 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.

1.2 Research and statistic

1.2.1 Summary of observer and port sampling programs

1.2.1.1 Observer program

For the purposes of better understanding 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 will be further increased to 31 in 2006. During 2002-2004 2 observers were dispatched to Pacific Ocean each year and the number was increased to 4 in 2005 for onboard observation on LTLL or DWPS vessels and collection of fishing and biological data.

1.2.1.2 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 port-samplings in Pago Pago, Suva and Levuka, where the fish size was measured, muscle tissues collected and skippers interviewed.

1.2.2 Research activities

1.2.2.1 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.

1.2.2.2 Acoustic pinger experiment

The acoustic pinger experiment has been conducted since 2003, and its main objective is to develop pinger suitable for marine fisheries to scare off 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.

1.2.3 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 at 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 and DWPS fishing vessels authorized to operate in WCPFC Convention Area are collected 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.

1.2.4 Data coverage of catches, effort and size data for all species

1.2.4.1 Longline fishery

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.

1.2.4.2 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 2001-2005 period.

Species / Year	N-ALB**	S-ALB***	BET	YFT	SWO	MLS	BUM	BLM	SKJ	TOTAL
2001	7,852	12,330	3,142	2,479	767	210	257	28	276	27,341
2002	7,055	12,796	8,741	4,953	1,274	386	231	8	143	35,587
2003	6,454	14,105	7,540	4,981	1,038	395	807	3	283	35,606
2004	4,061	13,307	16,888	9,018	2,382	695	1,226	5	672	48,254
2005*	4,210	9,248	9,855	6,354	1,009	411	1,267	52	433	32,839

* 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 2001-2005 period.

Species / Year	SKJ	YFT	BET	Total
2001	182,531	45,853	2,284	230,668
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

* Preliminary estimate

Table 3. Catch (in MT, round weight) statistics of major tuna and tuna-like species caught by STLL fishery in WCPFC Convention Area during 2001-2005 period.

Species / Year	ALB	BET	YFT	SWO	BILL	TOTAL
2001	(832)	9,293	19,847	(3,694)	(15,892)	49,558
2002	(910)	7,904	17,040	(2,511)	(10,732)	39,097
2003	3,412	5,805	15,381	4,562	15,553	44,713
2004	3,827	4,104	13,957	4,671	15,760	42,319
2005*	2,177	5,415	13,816	5,722	17,073	44,203

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

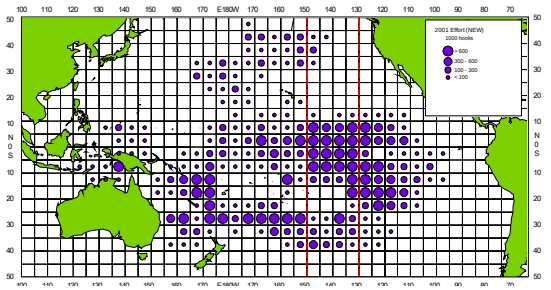
( ) Catch statistics are from domestic ports and not including foreign ports' data, because of the lack of sufficient foreign ports' data.

* Preliminary estimate

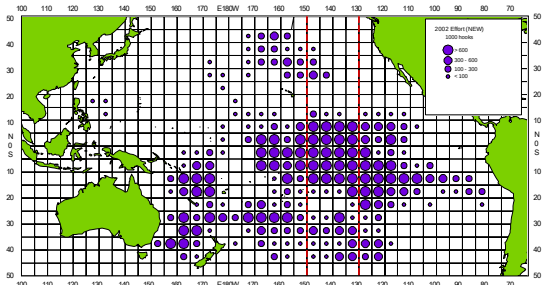
Table 4. The number of fishing vessel by fishery operating in WCPFC Convention Area during 2001-2005 period.

Fishery / Year	LTLL	DWPS	STLL
2001	101	41	1980
2002	133	41	1980
2003	142	34	1444
2004	137	34	1387
2005*	133	34	1421

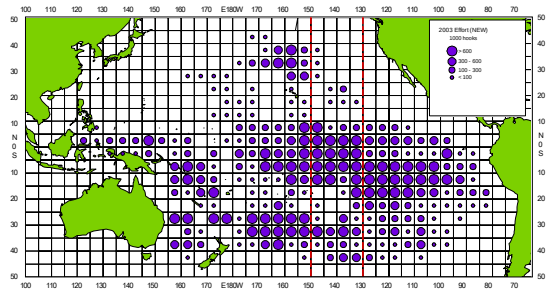
* Preliminary estimate



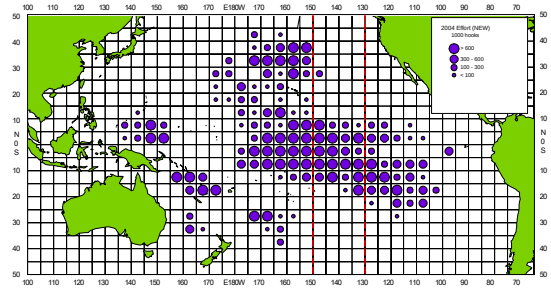
2001



2002



2003



2004* preliminary

Figure 1. The effort distribution of Taiwanese LTLL fleet operating in Pacific Ocean during 2001-2004 period.

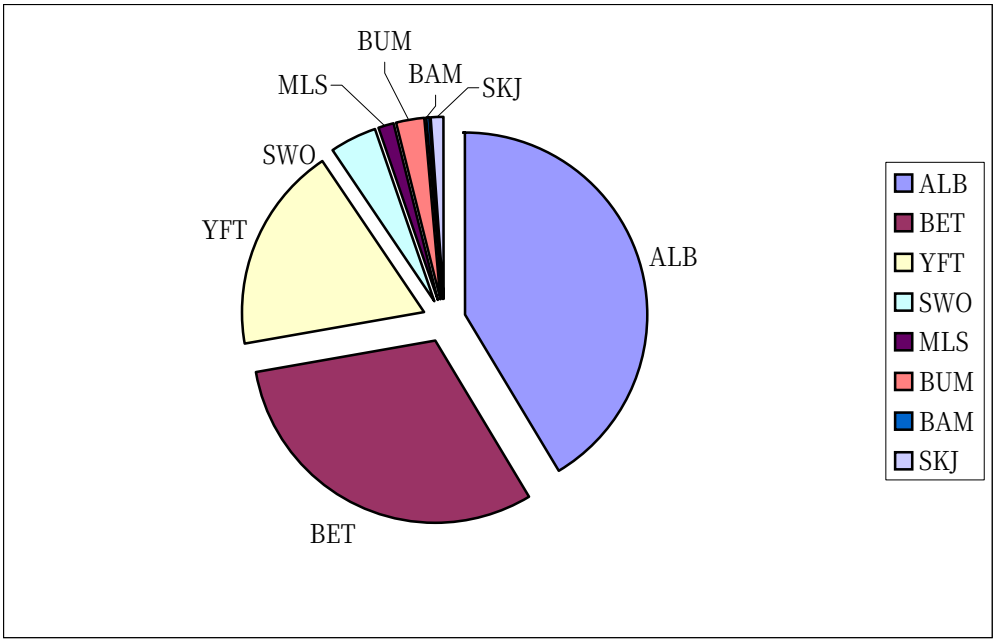


Figure 2. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese LTLL fishery in the WCPFC Convention Area during 2001-2005 period.

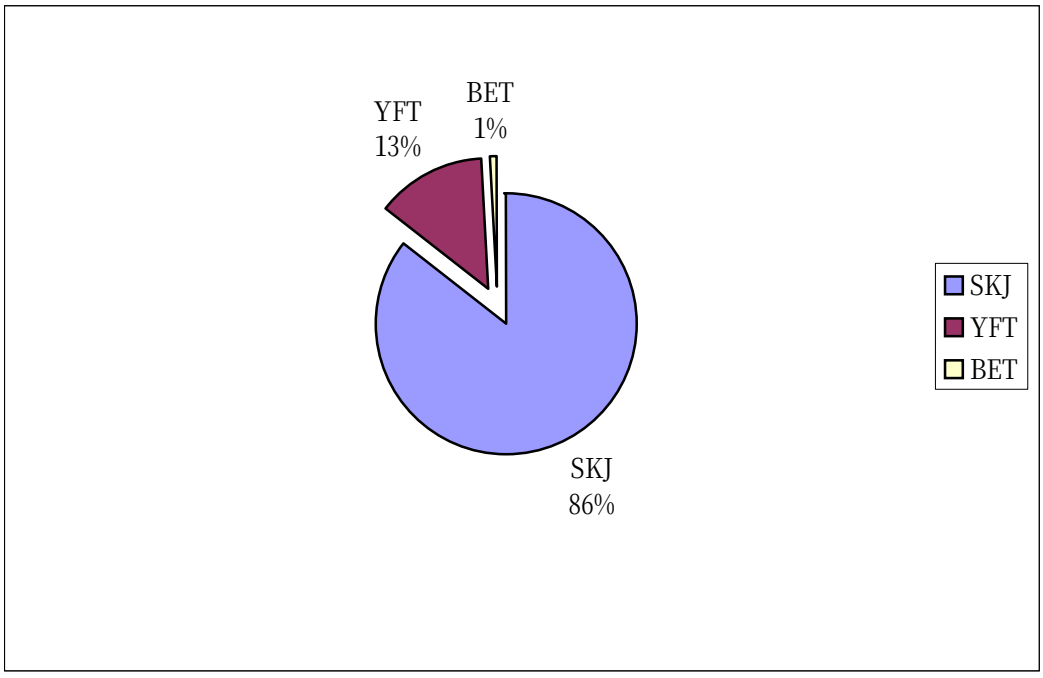


Figure 3. Mean catch percentage of major tuna and tuna-like species caught by Taiwanese DWPS fishery in the WCPFC Convention Area during 2001-2005 period.

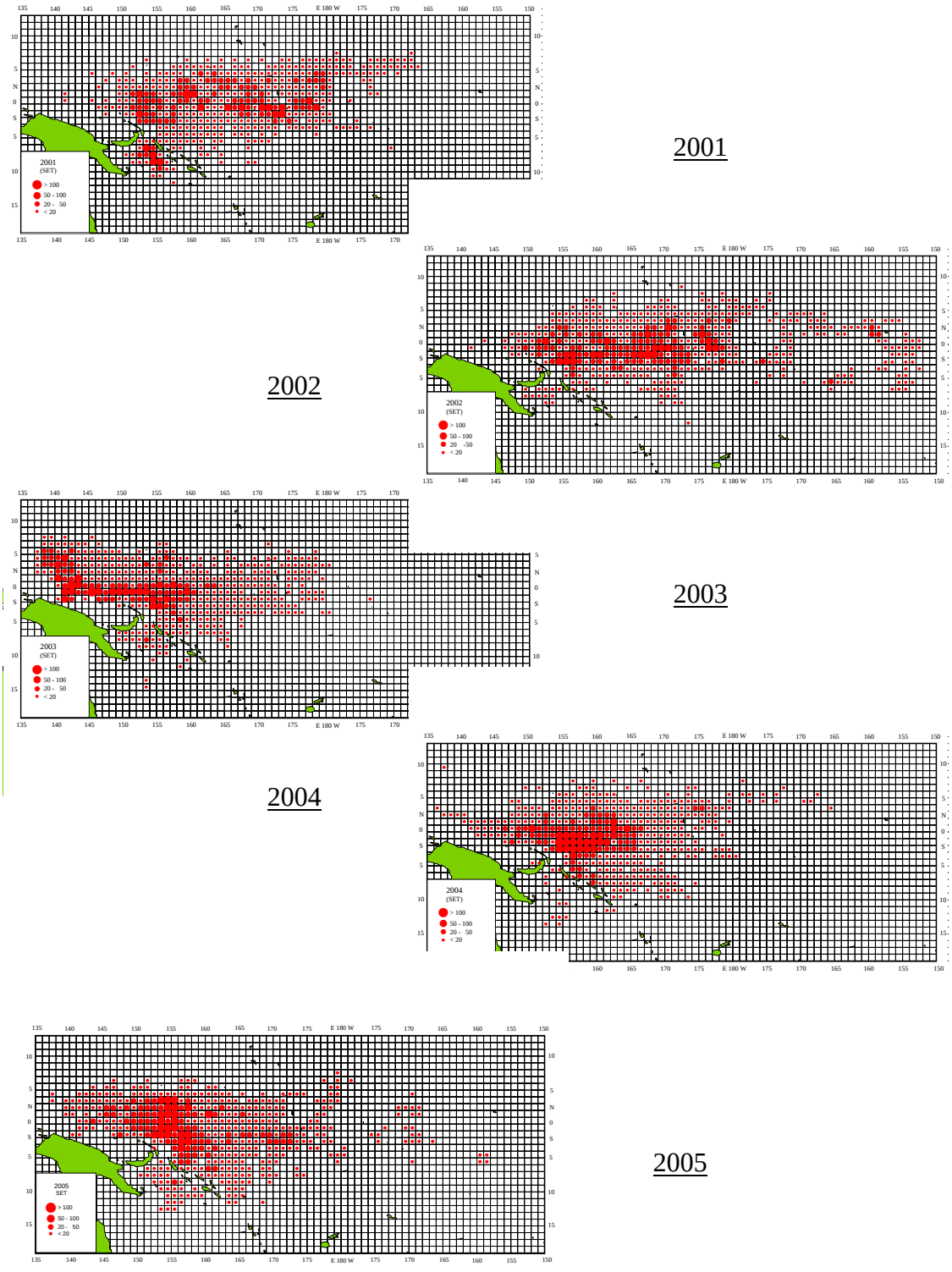


Figure 4. The effort distribution of Taiwanese DWPS fleet operating in WCPFC Convention Area during 2001-2005 period.