SCTB14 Working Paper

SWG–4

A REVIEW OF CATCHES OF TUNA AND TUNA-LIKE SPECIES IN THE SOUTH CHINA SEA

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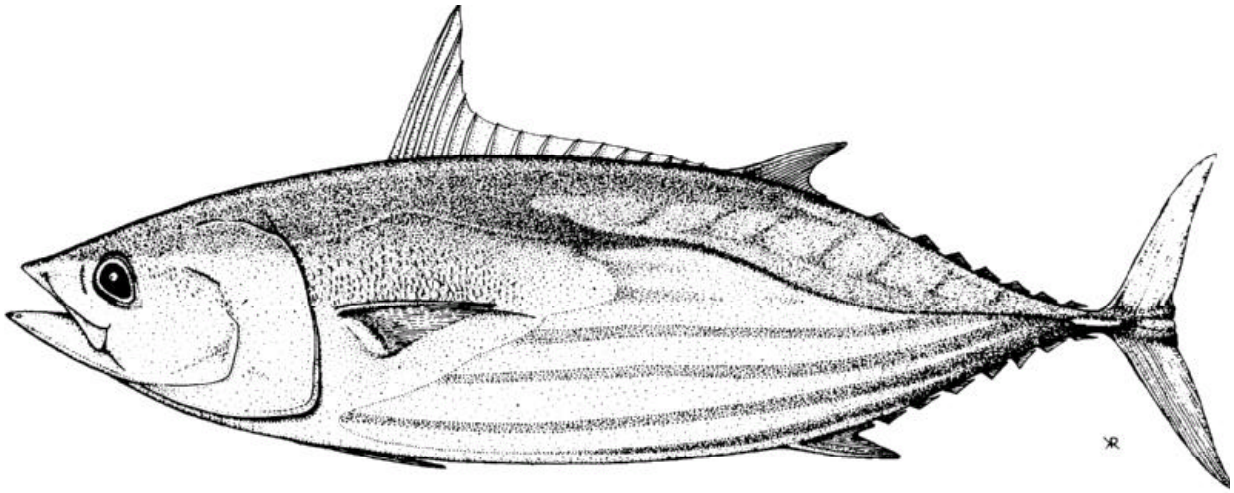

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1 INTRODUCTION

Meetings of Multilateral High-level Conference on the Conservation and Management of Highly Migratory Fish Stocks (MHLC) in the western and central Pacific Ocean (WCPO) held to date have made significant progress towards the establishment of a Convention for the highly migratory fish stocks in the WCPO.

Article 10(3) of the draft Convention infers that target tuna species (skipjack, yellowfin, bigeye and albacore) are of prime consideration for the future Commission. However, it also notes that the highly migratory species (HMS) listed in Annex 1 of the United Nations Convention on the Law of the Sea (UNCLOS–10th December 1982) would also be included.

For the purpose of this review, we refer to two categories of HMS, the first comprising those species which are truly ***oceanic,*** being capable of traveling long distances throughout the ocean and, due to their physiological and biological characteristics, are prevalent in deeper, oceanic waters (> 200 metres). The *oceanic* species of particular interest to this review include those considered of prime interest in the draft Convention, namely skipjack, yellowfin and bigeye tuna.

The second category comprises those species that are more prevalent in the shallower waters of continental shelves or coastal fringes (i.e. ***neritic*** species). The *neritic* tuna and tuna-like species mentioned in this review (and are included in the UNCLOS list of HMS–Annex 1) include kawakawa (*Euthynnus affinis*), frigate tuna (*Auxis thazard*) and bullet tuna (*A. rochei*). Several other *neritic* species not listed as HMS in Annex 1 of UNCLOS, but are taken in considerable quantities in the western areas of the WCPO, have been included in the *neritic* species category for this review; these include longtail tuna (*Thunnus tonggol*) and the narrow-barred spanish mackerel (*Scomberomorus commerson*).

Recent MHLC meetings have discussed the area over which this Convention would apply, including specific reference to the applicability of the South China Sea (SCS). In response to questions raised in these discussions, this review attempts to shed some light on the catches of *oceanic* species in the SCS, as a primary objective, but also considering to some extent the catches of *neritic* tuna and tuna-like species in this area.

The SCS is a body of water bounded by mainland China, Cambodia and Vietnam in the west, Malaysia and Brunei to the south and the western land boundary of the Philippines (Palawan and the 120°E longitude) and Taiwan in the east (Figure 1). Broad continental shelves occupy much of the west and south of this area; these areas (i.e. with a depth of less than 200 metres) are not the normal habitat of the *oceanic* tuna species. On the other hand, the shallow "shelf" waters are known to be highly productive with various *neritic* species (e.g. longtail tuna, frigate and bullet tunas), and their proximity to the coastal fringes make them a more readily exploitable food source than the *oceanic* tuna species encountered in this area.

Commercial fisheries taking *oceanic* tunas (i.e. skipjack, bigeye and yellowfin) have operated in the SCS for at least 4 decades, but available catch data are generally in a form where only broad catch estimates can be determined. The main fleets that have operated in this area over the past four decades, and for which catch estimates can be determined, have been identified as

- The Taiwanese offshore longline fleet (based out of Taiwan).
- The Japanese distant-water longline fleet
- The Philippines domestic purse seine fleet

There are no doubt other commercial fleets that have operated, or are currently operating, in the SCS which take *oceanic* tuna species. Unfortunately, *oceanic* tuna species catch in the SCS for these fleets can not be determined at this stage.

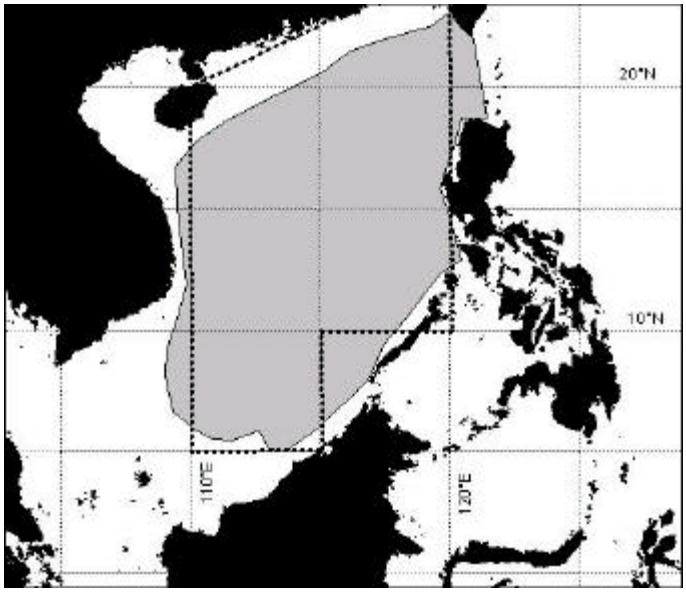

Figure 1. Map showing the South China Sea (SCS).
Also shown is the area deeper than 200 metres in the SCS (shaded in grey) and the designated area (dashed line) used to determine annual longline catch estimates presented herein.

Catch estimates for the *oceanic* and *neritic* tuna and tuna-like species exist for broadly defined areas of the western Pacific Ocean, including the waters of the South China Sea. The Food and Agriculture Organisation (FAO) of the United Nations (UN) and the Southeast Asian Fisheries Development Center (SEAFDEC) compile annual catch estimates for FAO Areas 61 and 71 (Figure 2). While the areas covered by these estimates extend far beyond the SCS, it is possible to roughly differentiate catches of *oceanic* and *neritic* species in the SCS by considering the fleets in operation and the spatial distribution of the species in question.

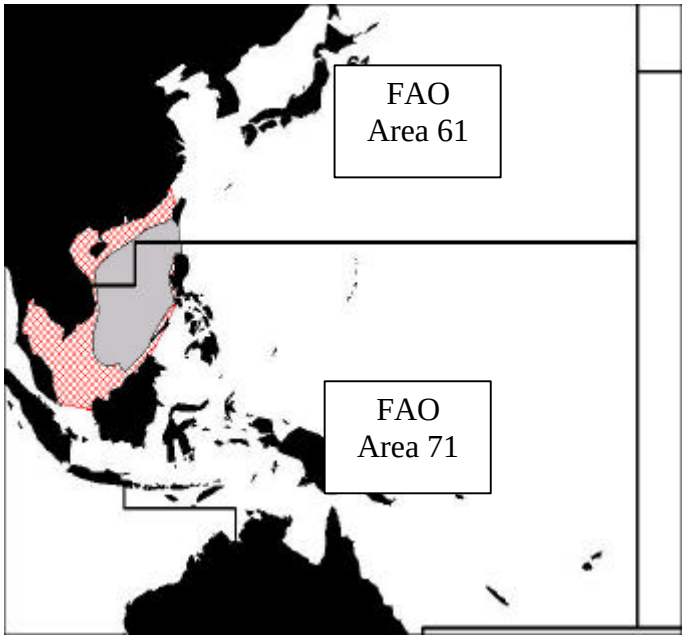

Figure 2. Map showing FAO areas 61 and 71 in relation to the SCS (hatched) and the area deeper than 200 metres in the SCS (shaded in grey),

2 METHODOLOGY

Due to the paucity of the catch data available specifically for the SCS, and the objective of identifying the catch of *oceanic* tuna in this area, it was decided to undertake this review as two separate components. The first component required the determination of annual estimates of *oceanic* tuna (from commercial fleets) in the SCS based on information currently available to the OFP. The second component required a qualitative review of *oceanic* and *neritic* tuna and tuna-like species catches in the SCS, based on FAO and SEAFDEC statistics for FAO Areas 61 and 71, both of which include parts of the SCS.

3 ANNUAL ESTIMATES OF OCEANIC TUNA SPECIES TAKEN IN THE SOUTH CHINA SEA

Sufficient data are only currently available to determine catch estimates for four commercial fleets operating in the SCS– the Taiwanese offshore longline fleet, the Japanese distant-water longline fleet, the Philippines domestic purse seine fleet and Vietnamese tuna fleets. The sources of data used to prepare catch estimates are described below, and tables of annual catch estimates for each of these three fleets are presented in ANNEX 1 (Tables 1–4).

3.1 Sources of Data

3.1.1 Taiwanese domestically-based offshore longline fleet

Points to note regarding these data.:

- This fleet operates out of ports in Taiwan (primarily Tung Kang).
- Data from 1970 to 1997 have been compiled.
- Annual estimates for total catch have been obtained from the Taiwan Fisheries Bureau Yearbooks and used to generate catch and effort data stratified by 5°x5° grids and month for this fleet.
- The distribution and seasonality of the catch were determined from information provided in a paper titled "The Inshore Tuna Longline Fishery of Taiwan (1983) by Chi-lu Sun and Rong-Tszong Yang". This paper looked, in detail, at the activities of this fleet for the years 1981–1982. The seasonal distribution of the catch/effort for these years (both over time/months and area) has been assumed to roughly represent catch/effort for all other years. This has been confirmed to some extent by Taiwanese fisheries scientists. They indicated that there is a definite seasonal pattern with this fleet and that it tends to operate nearly exclusively in the SCS during the first quarter of each year.

3.1.2 Japanese distant-water longline fleet

Points to note regarding these data.:

- Based on data provided by National Research Institute of Far Seas Fisheries (NRIFSF), Japan Fisheries Agency, for the Japanese longline fleet operating in the Pacific Ocean. The original data were stratified in 5°x5°grids and month.
- Data from 1970 to 1997 have been compiled.
- Data for years 1970-1980 are available from published bulletins of catch and effort statistics (the "Yellow" books), and are therefore public domain. Data provided at the original stratification for years after 1980 have been provided specifically for SPC use and, therefore, are not available to parties outside of SPC without prior authorisation from Japan.
- Catch by weight was not provided in the aggregate data, but has been determined by estimating the average weight by species, year and month from available logsheet data. These estimates have been applied to the catch by number to give the estimated catch by weight for each species.

3.1.3 Philippines domestic purse-seine fleet

Points to note regarding these data.:

- These estimates are based on data collected under the Landed Catch and Effort Monitoring Programme (LCEM) of the Philippines Tuna Research Project (PTRP), for which the OFP provided input during the years 1993–1994. This project attempted to obtain, *inter alia*, representative commercial landings data from key ports throughout the Philippines.
- Purse seine effort in the South China Sea is considered to be seasonal.
- Data for 1994 were selected, as it represents the best coverage of the Philippines domestic purse-seine fishery currently available.
- For 1994, estimated landings of the domestic Philippine purse seine fleet, according to the LCEM data, was approximately 5%. This level of catch (5%) is in line with information provided by the Philippines Bureau of Fisheries and Agricultural Research (Barut, pers. comm. November 2000).

3.1.4 Vietnamese tuna fleets

The western coast of Vietnam is readily accessible to the SCS via areas of steep continental shelf, but there are currently no catch estimates available for their fleets. Indeed, there appears to be very few Vietnamese vessels (about 100 vessels only–Bui 1994) that are capable of engaging in offshore fishing, and therefore *oceanic* tuna catch in the SCS by commercial Vietnamese vessels has historically considered to be insignificant.

However, recent trade information suggests that the Vietnamese tuna catch in recent years has increased and may be a significant contributor to the overall South China Sea catch in the future.

Table 4 presents exports of tuna and billfish by Vietnam obtained from the FAO Fishstat Plus Commodities, Production and Trade database and the Ministry of Fisheries (Vietnam) web site.

Bui Dinh Chung (pers. comm. December 2000) indicated that oceanic tunas are taken by longline, purse seine, gillnet and pole line vessels from Vietnam in the South China Sea, but that fleet details are not yet available. This would suggest that the actual tuna catches by the Vietnamese tuna fleets operating in the SCS are likely to exceed the export figures provided by FAO.

3.2 Summary

According to the data available, the total estimated oceanic tuna catch in the SCS for these four fleets has for most years been well under 10,000 mt. For 1997 (the most recent year for which estimates are available for these four fleets), the catch (~10,000 mt) represents less than 0.4% of the total WCPO catch of oceanic tunas (Lawson, 2000). However, this could have more than doubled in recent years with the increase in activity of Vietnamese tuna fleets.

4 INFORMATION AVAILABLE FROM FAO AND SEAFDEC

Annex 2 (Tables 5–8) present catch statistics compiled by the FAO for domestic fishing nations other than Indonesia, the Philippines, Taiwan and Vietnam that have fished in the SCS.

Neither FAO nor SEAFDEC have any catch statistics for tuna and tuna-like species from Cambodia. The marine fisheries of Cambodia is confined to inshore and coastal waters because of the small size and capacity of fishing vessels, with only very few larger vessels venturing into deeper waters.

Statistics covering catches of tuna-like species by China, including Hong Kong, in FAO Area 61, i.e. the northwest Pacific (Figure 2), are given in Table 5. The amount of fishing done by China in the relatively small part of Area 61 that includes the SCS is unknown. However, an unknown but probably small part of the catch, which amounted to 532,946 tonnes of tuna-like species in 1998, may have been taken there.

The FAO database does not include any catches of *oceanic* tunas by China in Area 61. The catches of *oceanic* tunas by China in Area 71, i.e. the western and central Pacific (WCPO), in the FAO database represent catches by Chinese longliners in Micronesia, and not the SCS.

Statistics covering catches of tuna-like species and billfish by Malaysia in FAO Area 71 are given in Table 6. There were 54,871 tonnes of tuna-like species and billfish caught adjacent to the SCS, but no catches of *oceanic* tunas by Malaysia are included in the FAO database.

Table 7 presents catches of skipjack and tuna-like species by Singapore in FAO Area 71. Only 12 tonnes of skipjack are reported for 1998 and only 70 tonnes of seerfishes.

Table 8 presents catches of longtail tuna and tuna-like species by Thailand in FAO Area 71. The catch of longtail, which is a *neritic* tuna, rather than *oceanic*, was 29,418 tonnes in 1998. The total catch of longtail and tuna-like species was 81,365 tonnes in 1998.

Annex 3 (Tables 9–15) present catch statistics published by SEAFDEC in its *Fishery Statistical Bulletin for the South China Sea*. The tables cover catches by Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand in FAO Area 71, the western central Pacific.

Most of the catch of the *oceanic* tunas (skipjack, yellowfin and bigeye) was taken by Indonesia and the Philippines, with a small amount of skipjack and yellowfin taken by Singapore. However, the proportion taken by Indonesia and the Philippines beyond their archipelagic waters and in the South China Sea, though not known precisely, is considered to be very small. In Malaysia, large amounts of longtail tuna and narrow-barred Spanish mackerel are taken, while in Thailand, large amounts of longtail, kawakawa and narrow-barred Spanish mackerel are caught. All three species are *neritic*, rather than *oceanic*; hence, the amount taken beyond archipelagic waters is probably small.

4.2 Summary

When excluding domestic fisheries of Indonesia, the Philippines, Taiwan and Vietnam, the catch statistics compiled by FAO indicate that only a minor amount of *oceanic* tunas – 12 tonnes of skipjack taken by Singapore in 1998 – were taken in the South China Sea. In contrast, the FAO statistics indicate that 136,306 tonnes of *neritic* tuna, tuna-like species and billfish were taken by Malaysia, Singapore and Thailand in or adjacent to the South China Sea. In addition, an unknown, but small amount of tuna-like species may have been caught by China in the South China Sea.

According to the SEAFDEC statistics, the countries bordering the South China Sea (excluding China and Vietnam) caught 1.0 million tonnes of tuna, tuna-like species and billfish during 1996 (Table 14), although the amount of *oceanic* tunas taken beyond archipelagic waters was probably small.

5 CONCLUSIONS

Although the SCS is clearly a highly productive area for *neritic* tuna and tuna-like species, the best available information suggests that catch of *oceanic* tuna has historically been much lower (estimated to be less than 10,000 mt for most years), and only a very small proportion of the total WPCO *oceanic* tuna catch (< 0.4%).

However, export data and anecdotal trade information show there are recent significant increases in the catch by Vietnamese tuna fleets. This suggests that the total oceanic tuna catch in the south China Sea may have exceeded 20,000 mt in recent years, and will continue to increase in the future.

6 REFERENCES

Lawson, T. A. (2000) Estimates of annual catches of target species in the western and central Pacific Ocean. Working Paper SWG–2. Thirteenth Meeting of the Standing Committee on Tuna and Billfish. Noumea, New Caledonia. 5th–12th July 2000

Bui Dinh Chung (1994) Socio-economic issues in the management of coastal fisheries in Vietnam. **In** proceedings of the IPFC Symposium on Socio-economic Issues in Coastal Fisheries Management, Bangkok, Thailand, 23–26 November 1993. RAPA Publication 1994/8: 176–182.

Menasveta, D. (1997) Fisheries Management Frameworks of the Countries bordering the South China Sea. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. RAPA Publication 1997/33: 151 p.

ANNEX 1. ANNUAL CATCHES OF *OCEANIC* TUNA IN THE SOUTH CHINA SEA

Table 1. Annual longline estimates for the domestic-based Taiwanese offshore fleet operating in the South China Seas

Year	Bigyeye MT	Yellowfin MT	Bigeye + Yellowfin MT	Others MT	Total MT
1970	377	2,019	2,396	6,561	8,957
1971	431	1,642	2,073	7,485	9,558
1972	586	1,074	1,659	8,703	10,362
1973	611	3,352	3,963	9,369	13,332
1974	616	2,513	3,129	11,150	14,279
1975	1,224	4,375	5,599	14,023	19,621
1976	526	4,015	4,541	13,937	18,478
1977	378	5,323	5,700	10,396	16,096
1978	575	6,193	6,768	7,130	13,898
1979	678	7,312	7,991	5,653	13,644
1980	297	6,176	6,473	6,500	12,973
1981	372	5,745	6,116	4,262	10,378
1982	251	5,334	5,586	5,431	11,017
1983	283	5,254	5,537	5,499	11,036
1984	334	5,205	5,539	4,943	10,482
1985	561	4,380	4,941	3,623	8,564
1986	234	3,517	3,751	2,789	6,540
1987	259	4,544	4,803	6,219	11,022
1988	412	4,633	5,045	6,111	11,156
1989	121	3,856	3,977	5,758	9,735
1990	132	2,536	2,669	4,212	6,880
1991	365	1,887	2,251	5,481	7,732
1992	356	2,212	2,567	5,930	8,497
1993	388	2,739	3,127	5,868	8,995
1994	509	2,629	3,138	4,197	7,335
1995	406	3,118	3,524	7,040	10,564
1996	267	2,024	2,291	4,901	7,193
1997	690	1,949	2,639	7,421	10,060

Table 2. Annual longline estimates for the Japanese DWFN fleet operating in the South China Seas

Year	Bigyeye MT	Yellowfin MT	Bigeye + Yellowfin MT	Others MT	Total MT
1970	483	1,041	1,523	110	1,633
1971	684	1,439	2,123	135	2,258
1972	813	1,617	2,430	86	2,515
1973	1,402	1,828	3,230	286	3,517
1974	1,107	1,049	2,156	144	2,301
1975	1,398	1,965	3,362	157	3,519
1976	1,305	2,238	3,543	215	3,758
1977	847	806	1,653	84	1,737
1978	351	365	716	44	760
1979	287	134	421	32	453
1980	536	188	724	69	793
1981	158	102	261	47	308
1982	143	121	263	45	309
1983	35	18	53	8	61
1984	22	18	40	7	47
1985	10	3	13	2	14
1986	45	16	61	4	65
1987			0		0
1988	13	6	19	1	21
1989			0		0
1990			0		0
1991	176	30	205	8	213
1992	564	93	657	25	682
1993	55	15	69	2	71
1994	78	7	86	0	86
1995	91	15	106	2	108
1996	9	0	9	0	9
1997	25	4	28	1	29

Table 3. Annual purse seine estimates for the domestic Philippine fleet operating in the South China Seas. An estimate of 5% of total domestic Philippine purse seine catch is taken in south China Sea (seasonal fishery), was obtained from landings data collected under the Philippines Tuna Research Project (PTRP) Landed Catch and Effort Monitoring Programme (LCEM) for the year 1994.

	Total Philippine domestic Purse seine catch				Estimated south China Sea catch (at 5% of total)
Year	SKJ MT	YFT MT	Others MT	TOTAL MT	TOTAL MT
1970	2,811	4,277	475	7,563	**378**
1971	3,007	4,784	532	8,323	**416**
1972	3,303	4,972	552	8,827	**441**
1973	3,710	5,947	661	10,318	**516**
1974	4,140	6,914	768	11,822	**591**
1975	4,449	7,055	784	12,288	**614**
1976	4,444	5,945	661	11,050	**553**
1977	15,647	8,428	936	25,011	**1,251**
1978	6,987	3,720	413	11,120	**556**
1979	22,426	7,884	679	30,989	**1,549**
1980	13,240	7,369	737	21,346	**1,067**
1981	14,048	12,909	1,398	28,355	**1,418**
1982	26,607	14,184	2,084	42,875	**2,144**
1983	36,645	15,186	2,231	54,063	**2,703**
1984	24,247	16,671	2,057	42,975	**2,149**
1985	28,477	13,813	1,548	43,839	**2,192**
1986	38,982	11,334	1,307	51,623	**2,581**
1987	39,125	13,700	1,471	54,296	**2,715**
1988	29,677	13,112	1,109	43,897	**2,195**
1989	34,300	13,466	2,059	49,826	**2,491**
1990	53,751	14,414	1,714	69,879	**3,494**
1991	62,078	17,602	1,408	81,088	**4,054**
1992	43,607	10,707	1,399	55,713	**2,786**
1993	34,555	4,046	400	39,001	**1,950**
1994	48,469	12,848	791	62,108	**3,105**
1995	61,185	13,216	1,675	76,076	**3,804**
1996	61,126	13,235	1,736	76,096	**3,805**
1997	61,178	14,342	2,109	77,629	**3,881**
1998	61,185	14,466	1,988	77,640	**3,882**

Table 4 Annual exports (tonnes) of tuna-like species by Vietnam in FAO Area 71, Western Central Pacific, obtained from the FAO FISHSTAT commodities production and trade database and the Ministry of Fisheries (Vietnam) web site

	EXPORT QUANTITY (Metric tonnes)						
Commodity	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001 (to June)**
Bigeye tuna, fresh or chilled	122	186	-	-	-	-	-
Skipjack tuna, fresh or chilled	<0.5	3	-	-	-	-	-
Skipjack tuna, frozen	.	3	-	-	-	-	-
Swordfish, fresh or chilled	3	1	-	-	-	-	-
Tunas nei, canned	178	65	-	-	-	-	-
Tunas nei, frozen	129	91	2,925	6,769	6,388	5,912	9,983
Tunas, fresh or chilled, nei	.	1	-	-	-	-	-
Yellowfin tuna, fresh or chilled	63	262	-	-	-	-	-
Yellowfin tuna, frozen	.	1	-	-	-	-	-
Yellowfin tuna, gilled, gutted, frozen	.	9	-	-	-	-	-
TOTAL Frozen	129	104	2,925	6,769	6,388	5,912	9,983
TOTAL Fresh or chilled	366	518	0	0	0	0	0
TOTAL tuna and billfish	**495**	**622**	**2,925**	**6,769**	**6,388**	**5,912**	**9,983**

ANNEX 2. CATCH STATISTICS COMPILED BY FAO FOR AREAS 61 AND 71

Table 5. Annual catches (tonnes) of tuna-like species by China in FAO Area 61, Northwest Pacific, determined from the FAO FISHSTAT database of 7 April 2000

Year	China Japanese Spanish mackerel	China Tuna-like fishes nei	Hong Kong SAR Seerfishes nei	Hong Kong SAR Tuna-like fishes nei	Total
1950			500		500
1951			500		500
1952			700		700
1953			700		700
1954			900		900
1955			900		900
1956			900		900
1957			1,000		1,000
1958			1,000		1,000
1959			1,000		1,000
1960			1,100		1,100
1961			1,400		1,400
1962			1,700		1,700
1963			1,000		1,000
1964			1,100		1,100
1965			1,600		1,600
1966			1,300		1,300
1967			1,700		1,700
1968			2,000		2,000
1969			1,900		1,900
1970	26,600		2,400		29,000
1971			2,400		2,400
1972	32,800		2,700		35,500
1973	36,500		2,400		38,900
1974	39,183		2,403		41,586
1975	33,537		2,734		36,271
1976	28,206		3,639		31,845
1977	38,223		3,047	93	41,363
1978	15,576		3,211	99	18,886
1979	42,427		3,058	20	45,505
1980	51,457		2,136	14	53,607
1981	48,148		2,525	8	50,681
1982	60,935		2,693	9	63,637
1983	62,102		2,767	16	64,885
1984	74,937		3,287	14	78,238
1985	90,623		3,161		93,784
1986	94,218		3,138	26	97,382
1987	99,006		3,437	33	102,476
1988	124,810		3,706	11	128,527
1989	148,079		4,805	33	152,917
1990	208,569		4,169	31	212,769
1991	200,643		4,654	36	205,333
1992	146,756		4,252	15	151,023
1993	145,480		3,093		148,573
1994	202,811		2,665		205,476
1995	226,520	23,477	2,790	18	252,805
1996	283,784	15,556	2,036	18	301,394
1997	340,302	14,203	1,711	1	356,217
1998	517,528	13,691	1,723	4	532,946

Table 6. Annual catches (tonnes) of tuna-like species and billfish by Malaysia in FAO Area 71, Western Central Pacific, determined from the FAO FISHSTAT database of 7 April 2000

Year	Kawakawa	Marlins, sailfishes, etc. nei	Seerfishes nei	Tuna-like fishes nei	Total
1950	1,200		1,700		2,900
1951	800		1,400		2,200
1952	800		1,400		2,200
1953	800		1,400		2,200
1954	800		1,400		2,200
1955	800		1,400		2,200
1956	800		1,400		2,200
1957	800		1,400		2,200
1958	800		1,400		2,200
1959	800		1,400		2,200
1960	1,200		1,400		2,600
1961	1,200		1,700		2,900
1962	1,100		1,700		2,800
1963	1,100		1,700		2,800
1964	2,100		3,800	400	6,300
1965	2,500		4,700	500	7,700
1966	3,400	100	5,300	500	9,300
1967	4,500	100	4,300	700	9,600
1968	3,700		4,800	700	9,200
1969	2,800		4,600	700	8,100
1970	4,140		5,370	800	10,310
1971	3,820	90	5,370	600	9,880
1972	4,950	90	5,020	600	10,660
1973	4,060	180	4,320	600	9,160
1974	6,617	269	5,279	800	12,965
1975	8,091	18	5,713	900	14,722
1976	6,342	86	5,477	800	12,705
1977	11,626	205	6,969	1,218	20,018
1978	11,501	168	7,821	1,000	20,490
1979	7,824	590	6,911	2,000	17,325
1980	7,303	579	9,795	1,500	19,177
1981	22,870	881	16,455	1,700	41,906
1982	15,541	438	9,467	1,290	26,736
1983	19,121	516	8,137	2,177	29,951
1984	19,384	156	7,720	6,977	34,237
1985	20,105	261	6,343	3,377	30,086
1986	18,049	309	9,079	2,747	30,184
1987	19,528	41	12,128		31,697
1988	21,606	147	6,943		28,696
1989	13,457	133	7,984		21,574
1990	13,186	659	6,979		20,824
1991	23,006	379	15,691		39,076
1992	26,809	598	22,112		49,519
1993	30,520	469	16,424		47,413
1994	22,881	230	11,225		34,336
1995	24,948	450	11,858		37,256
1996	29,810	274	11,070		41,154
1997	44,201	357	10,082		54,640
1998	43,126	324	11,421		54,871

Table 7. Annual catches (tonnes) of tuna and tuna-like species by Singapore in FAO Area 71, Western Central Pacific, determined from the FAO FISHSTAT database of 7 April 2000

Year	Seerfishes nei	Skipjack tuna	Tuna-like fishes nei	Total
1950				0
1951				0
1952				0
1953				0
1954				0
1955				0
1956		300		300
1957		400		400
1958		400		400
1959		400		400
1960		400		400
1961		500		500
1962		500		500
1963		500		500
1964		500		500
1965		500		500
1966	200	800		1,000
1967	200	800		1,000
1968	200	800		1,000
1969	200	700		900
1970	200	800		1,000
1971	100			100
1972	100			100
1973	100			100
1974	106			106
1975	93			93
1976	28	4		32
1977	6			6
1978	109	40		149
1979	150	39	429	618
1980	137	35	1,413	1,585
1981	138	55	504	697
1982	184	25	585	794
1983	197	7	469	673
1984	338	81	417	836
1985	285	36	675	996
1986	277	32	455	764
1987	144	16	330	490
1988	26		549	575
1989	24		205	229
1990	34		130	164
1991	33		47	80
1992	47			47
1993	98			98
1994	90	6		96
1995	76	5		81
1996	76	5		81
1997	71	47		118
1998	70	12		82

Table 8. Annual catches (tonnes) of tuna-like species by Thailand in FAO Area 71, Western Central Pacific, determined from the FAO FISHSTAT database of 7 April 2000

Year	Frigate and bullet tunas	Kawakawa	Longtail tuna	Seerfishes nei	Total
1950					0
1951					0
1952					0
1953					0
1954					0
1955					0
1956					0
1957					0
1958					0
1959					0
1960					0
1961					0
1962					0
1963					0
1964					0
1965					0
1966					0
1967					0
1968					0
1969					0
1970		4,315		2,813	7,128
1971		5,424		8,670	14,094
1972		5,508		2,869	8,377
1973		6,519		4,455	10,974
1974		8,715		4,602	13,317
1975		11,163		7,824	18,987
1976		8,890		7,317	16,207
1977		11,296		10,808	22,104
1978		8,258		8,119	16,377
1979		4,130	10,583	10,120	24,833
1980		4,933	7,962	9,336	22,231
1981		10,240	9,958	11,207	31,405
1982		23,355	16,306	8,365	48,026
1983		31,550	50,451	8,177	90,178
1984		30,999	38,470	9,373	78,842
1985		35,644	45,589	9,683	90,916
1986		43,976	46,408	12,474	102,858
1987	18,060	35,341	37,360	11,307	102,068
1988	26,070	23,799	91,628	13,319	154,816
1989	13,305	31,045	80,596	10,395	135,341
1990	20,000	30,071	101,397	9,995	161,463
1991	22,500	36,263	79,227	7,549	145,539
1992	33,700	51,187	72,277	8,414	165,578
1993	26,800	40,602	39,396	11,085	117,883
1994	26,900	40,927	32,006	9,904	109,737
1995	19,250	28,871	38,824	10,660	97,605
1996	18,850	28,275	32,347	9,360	88,832
1997	17,000	25,557	29,127	8,875	80,559
1998	17,200	25,783	29,418	8,964	81,365

ANNEX 3. CATCH STATISTICS COMPILED BY SEAFDEC FOR FAO AREA 71

Table 9. Annual catches (tonnes) of tuna, tuna-like species and bilfish by Hong Kong in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. Key: SKJ = skipjack (*Katsuwonus pelamis*); YFT = yellowfin (*Thunnus albacares*); BET = bigeye (*T. obesus*); LOT = longtail tuna (*T. tonggol*); ALB = albacore (*T. alalunga*); KAW = kawakawa or eastern little tuna (*Euthynnis affinis*); FRZ= frigate tuna (*Auxis thazard*) and bullet tuna (*A. rochei*); BIL = swordfish, sailfish & marlins (*Istiophoridae* & *Xiphiidae*); COM = narrow-barred Spanish mackerel or narrow-barred king mackerel (*Scomberomorus commerson*); GUT = king mackerel (*S. guttatus*); '–' = zero catch; '…' = missing data.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	-	-	-	-	-	93	-	-	-	3,047	3,140
1978	-	-	-	-	-	99	-	-	3,211	-	3,310
1979	-	-	-	-	-	20	-	-	3,058	-	3,078
1980	-	-	-	-	-	14	-	-	2,136	-	2,150
1981	-	-	-	-	-	8	-	-	2,525	-	2,533
1982	-	-	-	-	-	9	-	-	2,693	-	2,702
1983	-	-	-	-	-	16	-	-	2,767	-	2,783
1984	-	-	-	-	-	14	-	-	3,290	-	3,304
1985	-	-	-	-	-	12	-	-	3,161	-	3,173
1986	-	-	-	-	-	26	-	-	3,177	-	3,203
1987	-	-	-	-	-	33	-	-	3,490	-	3,523
1988	-	-	-	-	-	11	-	-	3,706	-	3,717
1989	-	-	-	-	-	33	-	-	4,806	-	4,839
1990	-	-	-	-	-	31	-	-	4,169	-	4,200
1991	-	-	-	-	-	36	-	-	4,654	-	4,690
1992	-	-	-	-	-	9	-	-	2,542	-	2,551
1993	...	...	...	...	...	...	...	...	...	...	...
1994	-	-	-	-	-	-	-	-	2,665	-	2,665
1995	-	-	-	-	-	18	-	-	2,790	-	2,808
1996	-	-	-	-	-	18	-	-	2,036	-	2,054

Table 10. Annual catches (tonnes) of tuna, tuna-like species and billfish by Indonesia in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key. These statistics exclude West Sumatra, South Java and the Malacca Straits, except for 1981, 1982, 1986 and 1994–1996, which includes these areas. YFT for 1981–1982 and 1987–1992 include ALB, BET and LOT.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	23,774	-	8,037	-	-	32,990	-	-	20,021	2,724	87,546
1978	28,239	-	10,148	-	-	39,263	-	3,709	18,022	-	99,381
1979	...	...	...	...	...	...	...	...	...	...	...
1980	34,247	14,207	-	-	-	49,571	-	-	21,091	4,292	123,408
1981	53,498	25,239	-	-	-	87,667	-	-	37,382	5,249	209,035
1982	47,140	19,530	-	-	-	78,190	-	-	36,781	-	181,641
1983	63,349	22,102	-	-	-	73,367	-	-	37,444	-	196,262
1984	19,395	-	26,299	-	-	69,563	-	-	34,262	-	149,519
1985	76,030	-	29,510	-	-	75,612	-	-	33,509	-	214,661
1986	98,500	37,410	-	-	-	116,975	-	-	44,930	7,240	305,055
1987	90,529	33,080	-	-	-	84,384	-	-	34,909	-	242,902
1988	113,794	35,694	-	-	-	75,571	-	-	33,794	7,678	266,531
1989	94,684	54,969	-	-	-	88,808	-	-	34,781	9,100	282,342
1990	99,454	80,363	-	-	-	93,893	-	-	39,110	7,440	320,260
1991	117,550	69,754	-	-	-	100,259	-	-	41,408	7,350	336,321
1992	135,043	80,066	-	-	-	111,130	-	-	45,065	-	371,304
1993	...	...	...	...	...	...	...	...	...	...	...
1994	157,663	-	3,511	-	-	186,486	89,330	-	60,134	-	497,124
1995	159,667	-	-	-	-	184,400	101,688	-	63,432	-	509,187
1996	182,147	...	...	...	...	208,504	115,549	...	68,453	...	574,653

Table 11. Annual catches (tonnes) of tuna, tuna-like species and billfish by Malaysia in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	-	-	-	12,446	-	3,080	-	232	11,374	-	27,132
1978	-	-	-	12,147	-	3,755	-	191	12,655	-	28,748
1979	-	-	-	8,902	-	3,088	-	635	13,144	34,153	59,922
1980	-	-	-	11,087	-	2,716	-	649	15,111	-	29,563
1981	-	-	-	17,725	-	1,878	-	674	15,974	-	36,251
1982	-	-	-	14,603	-	3,106	-	484	16,840	-	35,033
1983	-	-	-	18,838	-	3,372	-	594	14,316	-	37,120
1984	-	-	-	17,723	-	6,871	-	201	9,268	-	34,063
1985	-	-	-	19,151	-	3,315	-	339	8,687	-	31,492
1986	-	-	-	16,590	-	2,713	-	318	12,241	-	31,862
1987	-	-	-	25,484	-	4,528	-	41	12,798	-	42,851
1988	-	-	-	20,730	-	6,322	142	147	10,398	-	37,739
1989	-	-	-	13,625	-	4,058	1,057	133	8,509	-	27,382
1990	-	-	-	14,640	-	3,336	1,955	117	8,333	-	28,381
1991	-	-	-	25,931	-	1,994	-	372	17,217	-	45,514
1992	-	-	-	35,003	-	-	-	598	27,777	-	63,378
1993	...	...	...	...	...	...	...	...	...	...	...
1994	-	-	-	25,821	-	-	-	232	15,607	-	41,660
1995	-	-	-	28,674	-	-	-	453	14,902	-	44,029
1996	-	-	-	35,988	-	-	-	274	14,400	-	50,662

Table 12. Annual catches (tonnes) of tuna, tuna-like species and billfish by the Philippines in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	55,090	62,203	-	-	856	54,744	43,007	2,103	15,718	-	233,721
1978	34,597	69,535	-	-	-	26,452	49,315	5,732	13,641	-	199,272
1979	45,084	49,224	-	-	-	23,094	79,909	4,736	14,821	-	216,868
1980	31,178	48,017	-	-	-	24,730	96,874	3,358	13,549	-	217,706
1981	38,439	94,615	-	-	-	30,891	78,248	3,382	16,897	-	262,472
1982	50,795	52,913	-	-	-	45,533	67,363	5,815	17,269	-	239,688
1983	57,151	62,036	-	-	-	48,880	74,219	7,350	18,266	-	267,902
1984	44,671	58,924	-	-	-	41,899	80,305	5,281	13,725	-	244,805
1985	60,536	64,293	-	-	-	41,060	95,725	4,468	12,739	-	278,821
1986	77,031	59,510	-	-	-	42,445	87,225	4,607	15,150	-	285,968
1987	73,751	51,809	-	-	-	46,934	98,032	4,613	17,852	-	292,991
1988	55,940	57,060	-	-	-	56,266	105,436	7,560	13,796	-	296,058
1989	64,654	62,146	-	-	-	57,899	117,545	7,863	17,908	-	328,015
1990	99,705	81,103	-	-	-	43,762	88,801	7,291	14,995	-	335,657
1991	102,394	95,594	-	-	-	47,850	93,236	8,624	16,187	-	363,885
1992	83,179	45,026	-	-	-	31,943	125,655	8,846	9,072	-	303,721
1993	...	...	...	...	...	...	...	...	...	...	...
1994	84,560	64,080	-	-	-	46,221	109,887	7,058	9,234	-	321,040
1995	110,111	60,957	-	-	-	27,308	88,426	10,028	10,593	-	307,423
1996	110,004	61,280	-	-	-	24,345	88,959	9,510	10,557	-	304,655

Table 13. Annual catches (tonnes) of tuna, tuna-like species and bilfish by Singapore in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key. YFT for 1982 includes ALB, BET and LOT.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	40	-	-	-	-	-	-	-	-	76	116
1978	40	-	-	-	-	-	-	-	-	109	149
1979	39	-	-	-	-	-	-	-	-	150	189
1980	35	1,413	-	-	-	-	-	-	-	137	1,585
1981	55	504	-	-	-	-	-	-	-	138	697
1982	25	585	-	-	-	-	-	-	-	184	794
1983	7	469	-	-	-	-	-	-	-	197	673
1984	81	417	-	-	-	-	-	-	-	338	836
1985	36	675	-	-	-	-	-	-	-	285	996
1986	32	455	-	-	-	-	-	-	-	277	764
1987	16	330	-	-	-	-	-	-	-	144	490
1988	-	549	-	-	-	-	-	-	-	26	575
1989	-	205	-	-	-	-	-	-	-	24	229
1990	130	-	-	-	-	-	-	-	-	34	164
1991	47	-	-	-	-	-	-	-	-	33	80
1992	-	-	-	-	-	-	-	-	-	47	47
1993	...	...	...	...	...	...	...	...	...	...	...
1994	6	-	-	-	-	-	-	-	-	90	96
1995	5	-	-	-	-	-	-	-	-	76	81
1996	5	-	-	-	-	-	-	-	-	76	81

Table 14. Annual catches (tonnes) of tuna, tuna-like species and billfish by Thailand in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key. KAW for 1978 includes LOT and FRZ. COM for 1978 includes GUT.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	-	-	-	-	-	11,296	-	-	10,415	-	21,711
1978	-	-	-	-	-	8,258	-	-	8,090	-	16,348
1979	-	-	-	10,583	-	4,130	-	-	10,120	-	24,833
1980	-	-	-	7,962	-	4,933	-	-	9,336	-	22,231
1981	-	-	-	9,958	-	10,240	-	-	11,207	-	31,405
1982	-	-	-	16,306	-	23,355	-	-	8,365	-	48,026
1983	-	-	-	50,449	-	31,543	-	-	8,177	-	90,169
1984	-	-	-	38,556	-	31,247	-	-	9,373	-	79,176
1985	-	-	-	45,589	-	35,644	-	-	9,773	-	91,006
1986	-	-	-	46,404	-	43,976	-	-	12,467	-	102,847
1987	-	-	-	63,877	-	32,477	-	-	13,110	-	109,464
1988	-	-	-	91,628	-	49,869	-	-	13,319	-	154,816
1989	-	-	-	80,596	-	44,350	-	-	10,395	-	135,341
1990	-	-	-	101,397	-	54,915	-	-	9,995	-	166,307
1991	-	-	-	79,227	-	58,763	-	-	7,549	-	145,539
1992	-	-	-	72,277	-	84,887	-	-	8,414	-	165,578
1993	...	...	...	...	...	...	...	...	...	...	...
1994	-	-	-	32,006	-	67,827	-	-	9,904	-	109,737
1995	-	-	-	38,824	-	48,121	-	-	10,660	-	97,605
1996	-	-	-	32,347	-	47,125	-	-	9,360	-	88,832

Table 15. Annual catches (tonnes) of tuna, tuna-like species and billfish by Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand in FAO Area 71, Western Central Pacific, determined from SEAFDEC statistics. See Table 8 for key. KAW for 1978 includes LOT and FRZ. COM for 1978 includes GUT.

YEAR	SKJ	YFT	BET	LOT	ALB	KAW	FRZ	BIL	COM	GUT	Total
1977	78,904	62,203	8,037	12,446	856	102,203	43,007	2,335	57,528	5,847	373,366
1978	62,876	69,535	10,148	12,147	0	77,827	49,315	9,632	55,619	109	347,208
1979	45,123	49,224	0	19,485	0	30,332	79,909	5,371	41,143	34,303	304,890
1980	65,460	63,637	0	19,049	0	81,964	96,874	4,007	61,223	4,429	396,643
1981	91,992	120,358	0	27,683	0	130,684	78,248	4,056	83,985	5,387	542,393
1982	97,960	73,028	0	30,909	0	150,193	67,363	6,299	81,948	184	507,884
1983	120,507	84,607	0	69,287	0	157,178	74,219	7,944	80,970	197	594,909
1984	64,147	59,341	26,299	56,279	0	149,594	80,305	5,482	69,918	338	511,703
1985	136,602	64,968	29,510	64,740	0	155,643	95,725	4,807	67,869	285	620,149
1986	175,563	97,375	0	62,994	0	206,135	87,225	4,925	87,965	7,517	729,699
1987	164,296	85,219	0	89,361	0	168,356	98,032	4,654	82,159	144	692,221
1988	169,734	93,303	0	112,358	0	188,039	105,578	7,707	75,013	7,704	759,436
1989	159,338	117,320	0	94,221	0	195,148	118,602	7,996	76,399	9,124	778,148
1990	199,289	161,466	0	116,037	0	195,937	90,756	7,408	76,602	7,474	854,969
1991	219,991	165,348	0	105,158	0	208,902	93,236	8,996	87,015	7,383	896,029
1992	218,222	125,092	0	107,280	0	227,969	125,655	9,444	92,870	47	906,579
1993	...	...	...	...	...	...	...	...	...	...	...
1994	242,229	64,080	3,511	57,827	0	300,534	199,217	7,290	97,544	90	972,322
1995	269,783	60,957	0	67,498	0	259,847	190,114	10,481	102,377	76	961,133
1996	292,156	61,280	0	68,335	0	279,992	204,508	9,784	104,806	76	1,020,937