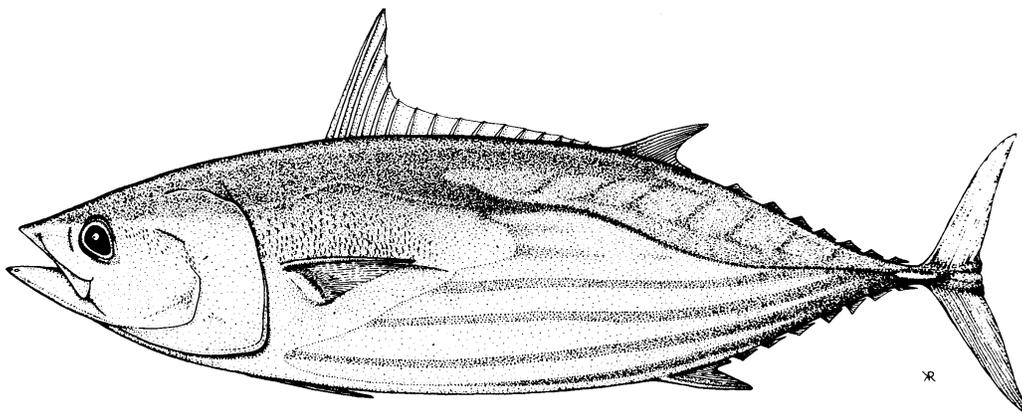




COMPARISON OF TUNA CATCH STATISTICS FOR THE WESTERN AND CENTRAL PACIFIC OCEAN HELD BY FAO AND SPC

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INTRODUCTION

From 6 to 9 December 1999, the SPC Fisheries Statistician collaborated with the Fishery Information, Data and Statistics Unit (FIDI) of the Food and Agriculture Organization (FAO) at FAO headquarters in Rome, Italy. Travel expenses for this and related work were funded by FAO. Among the subjects of collaboration was the comparison of annual catch statistics held by FAO and SPC for tuna species in the western and central Pacific Ocean. The tables presented below compare catch statistics for three distant-water fishing nations (Japan, Korea and Taiwan¹) in FAO Area 71 (Figure 1). Four species are examined: albacore (*Thunnus alalunga*), bigeye (*Thunnus obesus*), skipjack (*Katsuwonus pelamis*) and yellowfin (*Thunnus albacares*).

FAO collects capture fishery statistics through the FAO FISHSTAT NS1 questionnaire, which is sent to national correspondents of governmental institutions. The FAO statistics presented below were taken from the FAO FISHDAB database in December 1999.

The SPC statistics were determined from catch and effort data grouped by time-area strata, which were provided by the fishing nations, and estimates of annual catches, which were either provided by the fishing nations or, when not available from the fishing nation, estimated from other sources of information. The SPC statistics were determined from information available in April 2000.

The tables show that there are many significant discrepancies between the FAO and SPC statistics. In particular, the statistics for all four species combined for two distant-water fishing nations, Japan and Taiwan, exceed 100,000 t in some years.

While the reasons for the discrepancies are, in most cases, unknown, there is no doubt that the problems are related in part to the difference in the sources of the statistics. For Japan, FAO receives statistics from the Fishery Planning Section of the Department of Statistics and Information, Ministry of Agriculture, Forestry and Fisheries, in Tokyo, whereas SPC receives data from the National Research Institute for Far Seas Fisheries in Shimizu. For Korea, FAO receives statistics from the International Organisation Division of the Ministry of Maritime Affairs and Fisheries, Seoul, whereas SPC receives data from the National Fisheries Research and Development Institute in Busan. For Taiwan, FAO receives statistics from the Fisheries Administration, Council of Agriculture, Executive Yuan, whereas SPC receives data from the Overseas Fisheries Development Council.

Since, in most cases, the causes of the discrepancies are not known, it is intended that this document be circulated to the sources of the FAO and SPC statistics in order to obtain the information necessary to explain and resolve the discrepancies. It is intended that this document will be revised, at a later date, in order to further monitor the status of the FAO and SPC statistics for Japan, Korea and Taiwan. Comparisons of statistics for several other countries and territories in the western and central Pacific Ocean may also be included.

JAPAN

Tables 1–4 presents a comparison of fishery statistics of annual catches of albacore, bigeye, skipjack and yellowfin taken by Japanese fleets in FAO Area 71. Table 5 compares statistics of the total catch of the four species.

¹ In the FAO list of countries this entity is referred to as “Taiwan Province of China”.

- The FAO statistics were provided by the Fishery Planning Section, Department of Statistics and Information, Ministry of Agriculture, Forestry and Fisheries, Tokyo, Japan.
- The SPC estimates for longline (LL), pole-and-line (PL) and purse seine (PS) were determined from catch data, grouped by time and area, that were provided by the National Research Institute of Far Seas Fisheries (NRIFSF), Shimizu, Japan. Longline catch data were provided by NRIFSF in units of numbers of fish; these estimates were converted to units of kilograms by the SPC Oceanic Fisheries Programme. Pole-and-line catch data do not represent complete coverage, although coverage is high.

Table 1. Annual albacore catch statistics (tonnes) for Japanese fleets in FAO Area 71

YEAR	SPC				FAO	DIFF
	LL	PL	PS	TOTAL		
1970	1,336	...	...	1,336	8,500	-7,164
1971	897	...	...	897	1,600	-703
1972	1,170	...	...	1,170	2,000	-830
1973	790	...	...	790	2,300	-1,510
1974	1,503	...	...	1,503	22,416	-20,913
1975	999	...	...	999	14,462	-13,463
1976	820	...	...	820	9,424	-8,604
1977	480	...	...	480	4,650	-4,170
1978	530	...	...	530	6,755	-6,225
1979	396	...	...	396	1,056	-660
1980	1,203	...	...	1,203	3,161	-1,958
1981	2,760	...	...	2,760	4,901	-2,141
1982	2,708	...	...	2,708	7,181	-4,473
1983	1,906	...	...	1,906	4,252	-2,346
1984	1,782	...	...	1,782	3,248	-1,466
1985	1,478	...	...	1,478	8,282	-6,804
1986	1,576	...	...	1,576	9,772	-8,196
1987	611	...	...	611	9,289	-8,678
1988	1,747	...	...	1,747	4,824	-3,077
1989	1,326	...	...	1,326	6,542	-5,216
1990	1,065	...	...	1,065	7,021	-5,956
1991	770	...	...	770	4,352	-3,582
1992	888	...	...	888	8,405	-7,517
1993	3,455	...	...	3,455	12,173	-8,718
1994	4,115	...	...	4,115	19,144	-15,029
1995	3,477	...	...	3,477	17,490	-14,013
1996	1,832	...	...	1,832	2,124	-292
1997	2,012	...	...	2,012	2,846	-834

Albacore

Fields for albacore catches are not included in the grouped pole-and-line and purse-seine catch data provided to SPC by NRIFSF; instead, catches of albacore are covered under the field for “other” species. Hence, estimates of albacore catches for pole-and-line and purse seine are unavailable. Purse-seine catches of albacore are known to be negligible in Area 71. Estimates of pole-and-line catches of albacore in the WCPO, rather than Area 71, have been provided by NRIFSF for 1960–1996; these values range from 0 to 49 t. It would therefore appear that pole-and-line catches in Area 71 are also negligible. Albacore have, in the past, been taken by drift gillnet, but these catches are believed to have occurred well to the north and to the south of Area 71.

The SPC estimates of total albacore catches are all lower than the FAO statistics, usually much lower, with some discrepancies greater than 10,000 t (i.e. 1974, 1975, 1994 and 1995). While the SPC estimates of longline catches may be biased because of the way in which the catches were converted by SPC from numbers of fish to metric tonnes, this would not, in itself, account for such

large discrepancies. Clearly, either (a) the longline data held by SPC do not, in fact, represent full coverage or (b) the FAO statistics are over-estimated.

Table 2. Annual bigeye catch statistics (tonnes) for Japanese fleets in FAO Area 71

YEAR	SPC				FAO	DIFF
	LL	PL	PS	TOTAL		
1970	6,778	...	14	...	12,000	...
1971	7,903	...	26	...	11,500	...
1972	14,409	982	27	15,418	20,100	-4,682
1973	10,570	405	78	11,052	14,400	-3,348
1974	14,515	274	108	14,898	19,916	-5,018
1975	15,589	429	209	16,227	25,704	-9,477
1976	13,654	656	411	14,720	22,376	-7,656
1977	16,796	895	591	18,282	26,474	-8,192
1978	12,661	359	922	13,942	22,274	-8,332
1979	16,234	322	1,282	17,838	21,590	-3,752
1980	19,548	420	1,131	21,099	21,681	-582
1981	14,726	261	2,814	17,801	18,409	-608
1982	16,111	693	3,101	19,906	21,041	-1,135
1983	15,099	534	2,890	18,523	19,105	-582
1984	16,285	177	3,214	19,676	15,684	3,992
1985	19,882	481	3,421	23,784	20,510	3,274
1986	17,184	234	3,923	21,341	22,548	-1,207
1987	21,259	178	3,534	24,971	25,937	-966
1988	14,981	206	2,075	17,262	14,551	2,711
1989	16,570	86	4,205	20,860	22,163	-1,303
1990	19,886	157	2,491	22,534	31,166	-8,632
1991	14,830	35	2,602	17,467	20,560	-3,093
1992	17,815	43	3,539	21,398	27,304	-5,906
1993	13,511	68	3,476	17,055	18,529	-1,474
1994	13,872	70	2,540	16,482	18,061	-1,579
1995	11,911	161	3,153	15,224	15,623	-399
1996	9,375	45	1,872	11,292	9,529	1,763
1997	12,395	64	6,027	18,485	16,651	1,834

Bigeye

The SPC and FAO statistics of bigeye catches are generally similar, although there are some years for which the discrepancies are greater than 5,000 t (i.e. 1974–1978, 1990 and 1992). While the SPC estimates are usually lower than the FAO statistics, this is not always the case.

Table 3. Annual skipjack catch statistics (tonnes) for Japanese fleets in FAO Area 71

YEAR	SPC				FAO	DIFF
	LL	PL	PS	TOTAL		
1970	0	...	333	...	53,400	...
1971	0	...	667	...	79,300	...
1972	0	60,106	539	60,645	79,700	-19,055
1973	0	111,495	1,602	113,097	106,900	6,197
1974	0	136,195	2,437	138,631	196,199	-57,568
1975	0	91,149	4,583	95,731	119,539	-23,808
1976	0	91,880	10,353	102,233	145,323	-43,090
1977	0	128,490	13,434	141,924	148,833	-6,909
1978	0	118,703	23,249	141,953	198,253	-56,300
1979	0	81,947	24,875	106,822	148,837	-42,015
1980	0	100,248	30,571	130,819	158,868	-28,049
1981	0	94,420	36,735	131,155	137,104	-5,949
1982	0	80,445	70,000	150,445	139,713	10,732
1983	0	113,011	109,830	222,841	187,527	35,314
1984	0	102,376	110,052	212,428	210,439	1,989
1985	0	83,891	103,585	187,476	95,133	92,343
1986	0	74,867	108,486	183,353	222,225	-38,872
1987	0	82,111	88,442	170,553	194,121	-23,568
1988	0	96,493	140,573	237,066	254,701	-17,635
1989	0	95,962	104,388	200,350	209,594	-9,244
1990	0	44,208	125,982	170,190	179,599	-9,409
1991	0	30,767	124,064	154,831	222,950	-68,119
1992	0	27,263	125,846	153,108	175,539	-22,431
1993	3	25,477	95,822	121,302	159,572	-38,270
1994	11	32,803	129,321	162,134	164,970	-2,836
1995	5	33,078	114,096	147,178	169,215	-22,037
1996	7	36,088	137,442	173,537	176,008	-2,471
1997	7	25,892	84,572	110,471	120,295	-9,824

Skipjack

The SPC estimates of total skipjack catches are usually lower than the FAO statistics, although there are some that are higher. Some discrepancies are greater in absolute value than 50,000 t (i.e. 1974, 1978, 1985 and 1991). Of particular note is the discrepancy of +92,343 t for 1985. The FAO statistic for 1985 is inconsistent with the FAO time series, in particular the statistics for the previous and subsequent years. According to FAO statistics, in 1985 there was a corresponding increase of catches in Area 77, which is adjacent to Area 71. FAO is therefore investigating with Japan to determine whether catches from Area 71 in 1985 could have been allocated to Area 77 in error.

Table 4. Annual yellowfin catch statistics (tonnes) for Japanese fleets in FAO Area 71

YEAR	SPC				FAO	DIFF
	LL	PL	PS	TOTAL		
1970	19,298	...	109	...	18,400	...
1971	21,228	...	200	...	24,600	...
1972	20,286	1,097	209	21,592	24,300	-2,708
1973	27,588	1,325	593	29,506	29,800	-294
1974	25,976	915	828	27,719	31,670	-3,951
1975	25,375	1,535	1,596	28,506	33,070	-4,564
1976	26,917	2,114	3,135	32,166	37,813	-5,647
1977	37,238	3,404	4,517	45,158	50,822	-5,664
1978	53,494	947	7,039	61,480	73,080	-11,600
1979	39,545	965	9,789	50,299	54,789	-4,490
1980	62,096	1,322	8,646	72,064	75,990	-3,926
1981	50,598	1,916	19,496	72,009	77,287	-5,278
1982	41,509	1,909	26,658	70,076	72,362	-2,286
1983	43,677	1,366	24,537	69,579	70,682	-1,103
1984	29,584	1,183	28,091	58,858	60,277	-1,419
1985	36,330	4,185	32,051	72,567	38,990	33,577
1986	26,684	926	36,716	64,326	72,234	-7,908
1987	25,083	783	37,860	63,727	74,503	-10,776
1988	31,391	647	23,768	55,806	53,669	2,137
1989	24,710	1,073	30,156	55,938	61,987	-6,049
1990	24,057	1,217	30,223	55,496	53,953	1,543
1991	17,351	959	43,193	61,502	62,371	-869
1992	20,231	1,562	45,508	67,301	74,217	-6,916
1993	18,501	559	51,806	70,866	76,876	-6,010
1994	22,554	278	35,808	58,641	63,999	-5,358
1995	20,418	378	36,821	57,617	60,469	-2,852
1996	16,353	122	18,137	34,611	34,663	-52
1997	13,094	186	54,543	67,824	63,609	4,215

Yellowfin

The SPC and FAO statistics of yellowfin catches are generally similar, although there are some years for which the discrepancies are greater than 10,000 t (i.e. 1978, 1985 and 1987). As for the FAO skipjack statistics for 1985, the FAO yellowfin statistics for 1985 is inconsistent with the FAO statistics for the previous and subsequent year and is almost certainly in error.

Table 5. Annual albacore, bigeye, skipjack and yellowfin catch statistics (tonnes) for Japanese fleets in FAO Area 71

YEAR	SPC				FAO	DIFF
	LL	PL	PS	TOTAL		
1970	27,412	...	456	...	92,300	...
1971	30,027	...	894	...	117,000	...
1972	35,864	62,185	775	98,825	126,100	-27,275
1973	38,948	113,224	2,272	154,445	153,400	1,045
1974	41,995	137,384	3,373	182,751	270,201	-87,450
1975	41,962	93,112	6,388	141,463	192,775	-51,312
1976	41,390	94,649	13,899	149,939	214,936	-64,997
1977	54,514	132,788	18,543	205,844	230,779	-24,935
1978	66,685	120,009	31,210	217,905	300,362	-82,457
1979	56,175	83,234	35,946	175,355	226,272	-50,917
1980	82,848	101,990	40,348	225,185	259,700	-34,515
1981	68,083	96,597	59,045	223,725	237,701	-13,976
1982	60,329	83,047	99,759	243,135	240,297	2,838
1983	60,682	114,910	137,257	312,849	281,566	31,283
1984	47,652	103,736	141,356	292,744	289,648	3,096
1985	57,690	88,557	139,058	285,305	162,915	122,390
1986	45,444	76,026	149,125	270,595	326,779	-56,184
1987	46,954	83,072	129,836	259,862	303,850	-43,988
1988	48,119	97,346	166,416	311,881	327,745	-15,864
1989	42,606	97,120	138,748	278,474	300,286	-21,812
1990	45,007	45,582	158,696	249,285	271,739	-22,454
1991	32,951	31,761	169,859	234,571	310,233	-75,662
1992	38,934	28,868	174,893	242,695	285,465	-42,770
1993	35,470	26,104	151,104	212,679	267,150	-54,471
1994	40,552	33,150	167,669	241,371	266,174	-24,803
1995	35,810	33,616	154,070	223,496	262,797	-39,301
1996	27,567	36,255	157,450	221,272	222,324	-1,052
1997	27,509	26,142	145,142	198,793	203,401	-4,608

Albacore, Bigeye, Skipjack and Yellowfin

For most years, the FAO statistics of the total catch of albacore, bigeye, skipjack and yellowfin by the Japanese fleets in Area 71 significantly exceed the estimates determined from grouped catch data held by SPC. However, the FAO statistics for 1983 and 1985 are considerably less than the SPC estimate, with the discrepancy for 1985 being equal to 122,390 t.

REPUBLIC OF KOREA

Tables 6–9 presents a comparison of statistics of annual catches of albacore, bigeye, skipjack and yellowfin taken by Korean fleets in FAO Area 71. Table 10 compares statistics of the total catch of the four species.

- The FAO statistics were provided by the International Organisation Division of the Ministry of Maritime Affairs and Fisheries, Seoul.
- The SPC estimates for longline (LL) were determined from catch data for the distant-water fleet, grouped by time and area, that were provided to SPC by the National Fisheries Research and Development Institute (NFRDI). The grouped catch data provided by NFRDI were raised by SPC to represent the total catch on the basis of total catch estimates for the SPC Statistical Area provided by NFRDI. The SPC estimates for longline also cover a small amount taken by offshore longliners.

- The SPC statistics for purse seine (PS) were provided by NFRDI. The 1997 statistics provided by NFRDI include catches taken in FAO Area 77. Therefore, these estimates were adjusted to represent catches in FAO Area 71 only. According to logsheet data held at SPC, the proportion of the Korean purse-seine catch of skipjack during 1997 taken in FAO Area 71 was 73.2 percent for skipjack and 76.9 percent for bigeye and yellowfin. The NFRDI estimates of purse-seine catches of yellowfin and bigeye were adjusted by SPC for the mis-identification of bigeye as yellowfin.

Table 6. Annual albacore statistics (tonnes) for Korean fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	...	0	...	0	...
1971	...	0	...	0	...
1972	...	0	...	0	...
1973	...	0	...	0	...
1974	...	0	...	0	...
1975	669	0	669	40	629
1976	2,027	0	2,027	854	1,173
1977	1,787	0	1,787	574	1,213
1978	2,327	0	2,327	771	1,556
1979	1,600	0	1,600	227	1,373
1980	2,533	...	2,533	541	1,992
1981	1,613	...	1,613	1,086	527
1982	2,108	...	2,108	207	1,901
1983	1,087	...	1,087	509	578
1984	445	...	445	567	-122
1985	444	...	444	365	79
1986	500	...	500	294	206
1987	266	...	266	167	99
1988	820	...	820	179	641
1989	495	...	495	302	193
1990	311	...	311	391	-80
1991	130	...	130	13	117
1992	600	...	600	15	585
1993	235	...	235	26	209
1994	80	...	80	0	80
1995	384	...	384	20	364
1996	497	...	497	114	383
1997	402	...	402	666	-264

Albacore

The long-term trends in the two sets of estimates are similar, although the FAO statistics tend to be lower than the SPC estimates. The discrepancies may be due to the manner in which the catch data were raised by SPC.

Table 7. Annual bigeye statistics (tonnes) for Korean fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	...	0	...	0	...
1971	...	0	...	0	...
1972	...	0	...	0	...
1973	...	0	...	0	...
1974	...	0	...	0	...
1975	2,812	0	2,812	412	2,400
1976	4,193	0	4,193	4,664	-471
1977	5,961	0	5,961	5,905	56
1978	2,985	0	2,985	3,514	-529
1979	4,218	0	4,218	4,533	-315
1980	4,260	5	4,265	5,183	-918
1981	1,350	43	1,393	2,200	-807
1982	1,274	270	1,544	696	848
1983	865	100	965	319	646
1984	532	54	586	678	-92
1985	1,175	161	1,336	1,105	231
1986	229	164	393	536	-143
1987	1,132	1,321	2,453	1,985	468
1988	3,436	1,042	4,478	1,900	2,578
1989	4,480	1,869	6,349	2,506	3,843
1990	4,408	2,042	6,450	3,742	2,708
1991	984	2,426	3,410	1,986	1,424
1992	3,872	4,427	8,299	3,764	4,535
1993	2,178	2,481	4,659	2,235	2,424
1994	932	2,262	3,194	1,980	1,214
1995	3,486	2,306	5,792	1,483	4,309
1996	1,255	898	2,153	1,120	1,033
1997	1,205	1,947	3,152	2,624	528

Bigeye

From 1982 onwards, the FAO statistics tend to be lower than the SPC estimates, probably due to purse-seine catches being under-estimated in the statistics provided to FAO. Bigeye are usually reported as yellowfin on logsheets and in landings data. SPC has estimated bigeye catches for the Korean and other fleets based on port sampling data. The discrepancies may also be due to the manner in which the longline catch data were raised by SPC.

Table 8. Annual skipjack statistics (tonnes) for Korean fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	...	0	...	0	...
1971	...	0	...	0	...
1972	...	0	...	0	...
1973	...	0	...	0	...
1974	...	0	...	0	...
1975	23	0	23	357	-334
1976	66	0	66	6,189	-6,123
1977	50	0	50	2,400	-2,350
1978	56	0	56	5,856	-5,800
1979	0	0	0	6,242	-6,242
1980	22	476	498	1,550	-1,052
1981	12	1,462	1,474	3,006	-1,532
1982	7	10,167	10,174	10,670	-496
1983	3	15,417	15,420	15,419	1
1984	7	13,767	13,774	13,711	63
1985	4	9,655	9,659	11,270	-1,611
1986	3	25,305	25,308	25,573	-265
1987	2	40,918	40,920	40,724	196
1988	11	64,032	64,043	63,973	70
1989	8	80,903	80,911	80,711	200
1990	2	138,460	138,462	138,462	0
1991	0	171,951	171,951	171,959	-8
1992	1	115,290	115,291	113,954	1,337
1993	0	73,989	73,989	73,989	0
1994	0	145,541	145,541	145,541	0
1995	0	137,848	137,848	137,848	0
1996	0	129,888	129,888	128,434	1,454
1997	0	84,859	84,859	114,042	-29,183

Skipjack

For 1975–1981, the period prior to the purse-seine fishery, the FAO statistics are much greater than the SPC estimates. Given that the longline fishery takes negligible quantities of skipjack, the FAO statistics are probably over-estimated. For 1982–1996, when the purse-seine fleet was responsible almost all of the skipjack catch, the SPC and FAO statistics are in agreement. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics. For several years, the data are identical, which indicates that the source of the data provided to FAO by the International Organisation Division and to SPC are the same, i.e. the National Fisheries Research and Development Institute.

Table 9. Annual yellowfin statistics (tonnes) for Korean fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	...	0	...	0	...
1971	...	0	...	0	...
1972	...	0	...	0	...
1973	...	0	...	0	...
1974	...	0	...	0	...
1975	2,640	0	2,640	259	2,381
1976	6,107	0	6,107	3,664	2,443
1977	13,096	0	13,096	5,462	7,634
1978	8,567	0	8,567	5,088	3,479
1979	10,555	0	10,555	6,881	3,674
1980	13,297	63	13,360	7,424	5,936
1981	3,715	539	4,254	2,712	1,542
1982	2,900	1,772	4,672	2,528	2,144
1983	2,491	699	3,190	1,156	2,034
1984	1,108	362	1,470	1,373	97
1985	1,950	1,463	3,413	1,893	1,520
1986	464	2,263	2,727	3,251	-524
1987	1,362	16,472	17,834	18,279	-445
1988	5,323	14,323	19,646	15,710	3,936
1989	4,324	32,897	37,221	36,026	1,195
1990	4,385	32,841	37,226	38,212	-986
1991	1,100	52,994	54,094	56,851	-2,757
1992	4,673	62,570	67,243	68,633	-1,390
1993	2,096	50,178	52,274	54,224	-1,950
1994	664	47,201	47,865	51,985	-4,120
1995	2,183	35,310	37,493	38,545	-1,052
1996	2,420	18,030	20,450	20,163	287
1997	1,242	31,156	32,398	43,885	-11,487

Yellowfin

Discrepancies for 1975–1985 may be due to the manner in which the longline data were raised by SPC. For 1987–1996, the data are similar, although higher SPC longline estimates, due to raising, probably offset lower SPC purse-seine estimates, due to corrections made by SPC for the mis-identification of bigeye as yellowfin. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics.

Table 10. Annual albacore, bigeye, skipjack and yellowfin statistics (tonnes) for Korean fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	...	0	...	0	...
1971	...	0	...	0	...
1972	...	0	...	0	...
1973	...	0	...	0	...
1974	...	0	...	0	...
1975	6,145	0	6,145	1,068	5,077
1976	12,393	0	12,393	15,371	-2,978
1977	20,894	0	20,894	14,341	6,553
1978	13,935	0	13,935	15,229	-1,294
1979	16,374	0	16,374	17,883	-1,509
1980	20,112	544	20,656	14,698	5,958
1981	6,690	2,044	8,734	9,004	-270
1982	6,290	12,209	18,499	14,101	4,398
1983	4,446	16,216	20,662	17,403	3,259
1984	2,092	14,183	16,275	16,329	-54
1985	3,573	11,279	14,852	14,633	219
1986	1,195	27,732	28,927	29,654	-727
1987	2,761	58,711	61,472	61,155	317
1988	9,590	79,397	88,987	81,762	7,225
1989	9,306	115,669	124,975	119,545	5,430
1990	9,106	173,343	182,449	180,807	1,642
1991	2,215	227,371	229,586	230,809	-1,223
1992	9,145	182,287	191,432	186,366	5,066
1993	4,509	126,648	131,157	130,474	683
1994	1,677	195,004	196,681	199,506	-2,825
1995	6,054	175,464	181,518	177,896	3,622
1996	4,172	148,816	152,988	149,831	3,157
1997	2,848	117,962	120,810	161,217	-40,407

Albacore, Bigeye, Skipjack and Yellowfin

The SPC and FAO statistics for the four species combined are in agreement for most years. This is due to the almost exact agreement of statistics of skipjack catches. Skipjack dominates the combined catch; hence, discrepancies in albacore, bigeye and yellowfin are less apparent in statistics of the combined catch. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics.

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Tables 11–14 presents a comparison of estimates of annual catches of albacore, bigeye, skipjack and yellowfin taken by Taiwanese fleets in FAO Area 71. Table 15 compares statistics of the total catch of the four species.

- The FAO statistics were provided by the Fisheries Administration, Council of Agriculture, Executive Yuan, Taipei, Taiwan.
- The SPC estimates for longline (LL) were determined from catch data for the distant-water fleet, grouped by time and area, that were provided to SPC by the National Taiwan University (NTU) and the Overseas Fisheries Development Council (OFDC). The grouped catch data provided by NTU, for 1967–1993, were raised by SPC, on the basis of landings, to represent the total catch. The grouped catch data provided by OFDC, for 1994–1997, were raised by OFDC. The SPC estimates for longline also cover offshore longliners.

- The SPC statistics for purse seine (PS) were taken from the SPC Tuna Fishery Yearbook, 1998. The 1997 statistics in the SPC Yearbook include catches taken in FAO Area 77. Therefore, these estimates were adjusted to represent catches in FAO Area 71 only. According to logsheet data held at SPC, the proportion of the Taiwanese purse-seine catch of skipjack during 1997 taken in FAO Area 71 was 87.3 percent for skipjack and 82.5 percent for bigeye and yellowfin. The SPC Yearbook estimates of purse-seine catches of yellowfin and bigeye have been adjusted for the mis-identification of bigeye as yellowfin.

Table 11. Annual albacore statistics (tonnes) for Taiwanese fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	10,014	...	10,014	3,000	7,014
1971	8,512	...	8,512	2,935	5,577
1972	8,852	...	8,852	1,817	7,035
1973	7,198	...	7,198	1,832	5,366
1974	4,102	...	4,102	492	3,610
1975	3,781	...	3,781	427	3,354
1976	4,670	...	4,670	543	4,127
1977	5,789	...	5,789	3,723	2,066
1978	6,753	...	6,753	5,588	1,165
1979	5,540	...	5,540	4,712	828
1980	5,504	...	5,504	7,632	-2,128
1981	4,446	...	4,446	3,553	893
1982	3,765	...	3,765	12,680	-8,915
1983	3,131	...	3,131	12,083	-8,952
1984	3,394	...	3,394	11,155	-7,761
1985	2,106	...	2,106	9,624	-7,518
1986	2,182	...	2,182	11,913	-9,731
1987	3,675	...	3,675	15,101	-11,426
1988	5,470	...	5,470	18,290	-12,820
1989	3,936	...	3,936	30,565	-26,629
1990	4,894	...	4,894	6,343	-1,449
1991	1,958	...	1,958	2,158	-200
1992	1,552	...	1,552	2,084	-532
1993	3,583	...	3,583	4,455	-872
1994	4,902	...	4,902	11,943	-7,041
1995	8,652	...	8,652	8,891	-239
1996	5,444	...	5,444	5,810	-366
1997	2,969	...	2,969	6,298	-3,329

Albacore

For 1970–1979, the FAO statistics are lower than the SPC estimates, whereas for 1982–1989, the FAO statistics are much greater than the SPC estimates. For 1990 onwards, the statistics are in agreement, except for 1994 and 1997. The discrepancies may be due to the use of distant-water longline data prepared by NTU, covering 1967–1993, which were raised on the basis of rough estimates of effort and are known to be unreliable.

Table 12. Annual bigeye statistics (tonnes) for Taiwanese fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	2,402	0	2,402	1,300	1,102
1971	2,368	0	2,368	489	1,879
1972	2,819	0	2,819	372	2,447
1973	2,961	0	2,961	303	2,658
1974	3,058	0	3,058	160	2,898
1975	3,935	0	3,935	70	3,865
1976	2,053	0	2,053	74	1,979
1977	1,465	0	1,465	478	987
1978	2,129	0	2,129	474	1,655
1979	2,502	0	2,502	485	2,017
1980	1,350	0	1,350	855	495
1981	1,448	0	1,448	320	1,128
1982	930	0	930	233	697
1983	891	276	1,167	735	432
1984	1,122	427	1,549	257	1,292
1985	1,801	508	2,309	265	2,044
1986	736	724	1,460	252	1,208
1987	970	955	1,925	290	1,635
1988	1,923	779	2,702	320	2,382
1989	753	2,268	3,021	100	2,921
1990	3,929	2,546	6,475	200	6,275
1991	4,076	3,174	7,250	300	6,950
1992	4,569	4,325	8,894	1,686	7,208
1993	4,915	2,733	7,648	501	7,147
1994	4,902	1,762	6,664	4,305	2,359
1995	2,806	1,387	4,193	5,260	-1,067
1996	1,941	841	2,782	4,748	-1,966
1997	3,766	2,419	6,185	13,523	-7,338

Bigeye

The FAO statistics for 1970–1994 are all lower than the SPC estimates. This may be due to (a) the inclusion of offshore longline catches in the SPC estimates and their possible exclusion in the statistics provided to FAO; (b) under-reporting in purse-seine logsheet data for 1983–1992, which may have been used to determine the statistics provided to FAO; and (c) adjustment upwards by SPC of the purse-seine estimates, due to the mis-identification of bigeye as yellowfin. The FAO statistics for 1997 would appear to be inconsistent with previous years.

Table 13. Annual skipjack statistics (tonnes) for Taiwanese fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	13	0	13	0	13
1971	1	0	1	4	-3
1972	17	0	17	3	14
1973	57	0	57	4	53
1974	242	0	242	4	238
1975	61	0	61	3	58
1976	107	0	107	22	85
1977	105	0	105	20	85
1978	339	0	339	119	220
1979	220	0	220	139	81
1980	169	0	169	35	134
1981	306	0	306	79	227
1982	390	0	390	221	169
1983	358	9,840	10,198	4,687	5,511
1984	223	20,160	20,383	6,925	13,458
1985	198	23,520	23,718	15,355	8,363
1986	146	34,400	34,546	15,922	18,624
1987	192	44,720	44,912	20,880	24,032
1988	213	66,880	67,093	29,717	37,376
1989	559	84,800	85,359	43,174	42,185
1990	187	104,960	105,147	76,331	28,816
1991	593	140,800	141,393	60,834	80,559
1992	135	169,400	169,535	81,586	87,949
1993	65	109,324	109,389	113,190	-3,801
1994	132	134,736	134,868	136,358	-1,490
1995	106	142,604	142,710	155,167	-12,457
1996	86	169,734	169,820	170,949	-1,129
1997	83	101,210	101,293	116,862	-15,569

Skipjack

Discrepancies for 1970–1982 may be due to (a) the fact that the grouped catch data for the distant-water fleet held by SPC were raised on the basis of landings, while the grouped catch data prepared by NTU were raised on the basis of rough estimates of effort and (b) the inclusion of offshore longline catches in the SPC estimates and their possible exclusion in the statistics provided to FAO. Discrepancies for 1983–1992, which are large, are probably due to errors in the purse-seine logsheet data that may have been used to determine the statistics provided to FAO. It is known that the purse-seine logsheet data were under-reported until the transshipment of catches at sea was banned in 1993, whereupon all catches were unloaded at ports within the region and landings data were collected by coastal states and used to verify logsheet data. The FAO and SPC statistics for 1993–1994 and 1996 are similar. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics.

Table 14. Annual yellowfin statistics (tonnes) for Taiwanese fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	8,523	0	8,523	2,900	5,623
1971	10,954	0	10,954	2,603	8,351
1972	8,086	0	8,086	1,630	6,456
1973	14,466	0	14,466	1,083	13,383
1974	10,726	0	10,726	439	10,287
1975	14,294	0	14,294	325	13,969
1976	13,662	0	13,662	288	13,374
1977	16,765	0	16,765	2,289	14,476
1978	20,730	0	20,730	2,793	17,937
1979	23,689	0	23,689	2,412	21,277
1980	19,933	0	19,933	378	19,555
1981	17,924	0	17,924	1,198	16,726
1982	15,903	0	15,903	720	15,183
1983	15,337	1,884	17,221	433	16,788
1984	15,377	3,413	18,790	1,031	17,759
1985	13,241	3,972	17,213	4,403	12,810
1986	10,342	4,876	15,218	3,667	11,551
1987	13,609	6,325	19,934	4,376	15,558
1988	15,195	8,341	23,536	7,566	15,970
1989	11,937	13,732	25,669	5,573	20,096
1990	11,613	20,494	32,107	7,870	24,237
1991	7,920	32,026	39,946	7,780	32,166
1992	9,977	46,275	56,252	19,130	37,122
1993	10,643	58,642	69,285	39,000	30,285
1994	10,735	43,061	53,796	58,914	-5,118
1995	11,485	30,506	41,991	48,801	-6,810
1996	8,224	17,882	26,106	35,703	-9,597
1997	7,869	39,741	47,610	64,215	-16,605

Yellowfin

The FAO statistics are lower than the SPC estimates for 1970–1993 and higher for 1994–1997. The discrepancies may be due to (a) the inclusion of offshore longline catches in the SPC longline estimates and their exclusion in the statistics provided to FAO; (b) under-reporting in purse-seine logsheet data for 1983–1992, which may have been used to determine the statistics provided to FAO; and (c) adjustment downwards by SPC of the purse-seine estimates, due to the mis-identification of bigeye as yellowfin. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics.

Table 15. Annual albacore, bigeye, skipjack and yellowfin statistics (tonnes) for Taiwanese fleets in FAO Area 71

YEAR	SPC			FAO	DIFF
	LL	PS	TOTAL		
1970	20,952	0	20,952	7,200	13,752
1971	21,834	0	21,834	6,031	15,803
1972	19,774	0	19,774	3,822	15,952
1973	24,681	0	24,681	3,222	21,459
1974	18,127	0	18,127	1,095	17,032
1975	22,071	0	22,071	825	21,246
1976	20,492	0	20,492	927	19,565
1977	24,124	0	24,124	6,510	17,614
1978	29,951	0	29,951	8,974	20,977
1979	31,952	0	31,952	7,748	24,204
1980	26,956	0	26,956	8,900	18,056
1981	24,124	0	24,124	5,150	18,974
1982	20,988	0	20,988	13,854	7,134
1983	19,718	12,000	31,718	17,938	13,780
1984	20,116	24,000	44,116	19,368	24,748
1985	17,346	28,000	45,346	29,647	15,699
1986	13,406	40,000	53,406	31,754	21,652
1987	18,445	52,000	70,445	40,647	29,798
1988	22,801	76,000	98,801	55,893	42,908
1989	17,186	100,800	117,986	79,412	38,574
1990	20,624	128,000	148,624	90,744	57,880
1991	14,548	176,000	190,548	71,072	119,476
1992	16,233	220,000	236,233	104,486	131,747
1993	19,205	170,699	189,904	157,146	32,758
1994	20,671	179,559	200,230	211,520	-11,290
1995	23,049	174,497	197,546	218,119	-20,573
1996	15,695	188,457	204,152	217,210	-13,058
1997	14,687	143,370	158,057	200,898	-42,841

Albacore, Bigeye, Skipjack and Yellowfin

For 1970–1993, the FAO statistics are much lower than the SPC estimates, with discrepancies for 1991 and 1992 in excess of 100,000 t. As discussed above, this is probably due primarily to (a) the raising by SPC of the estimates of albacore catches by distant-water longliners on the basis of landings; (b) the inclusion of bigeye and yellowfin catches by offshore longliners in the SPC estimates; and (c) under-reporting of skipjack in the purse-seine logsheet data for 1983–1993 that may have been used to determine the statistics provided to FAO. The discrepancy for 1997 may be due to the inclusion of purse-seine catches in FAO Area 77 in the FAO statistics.

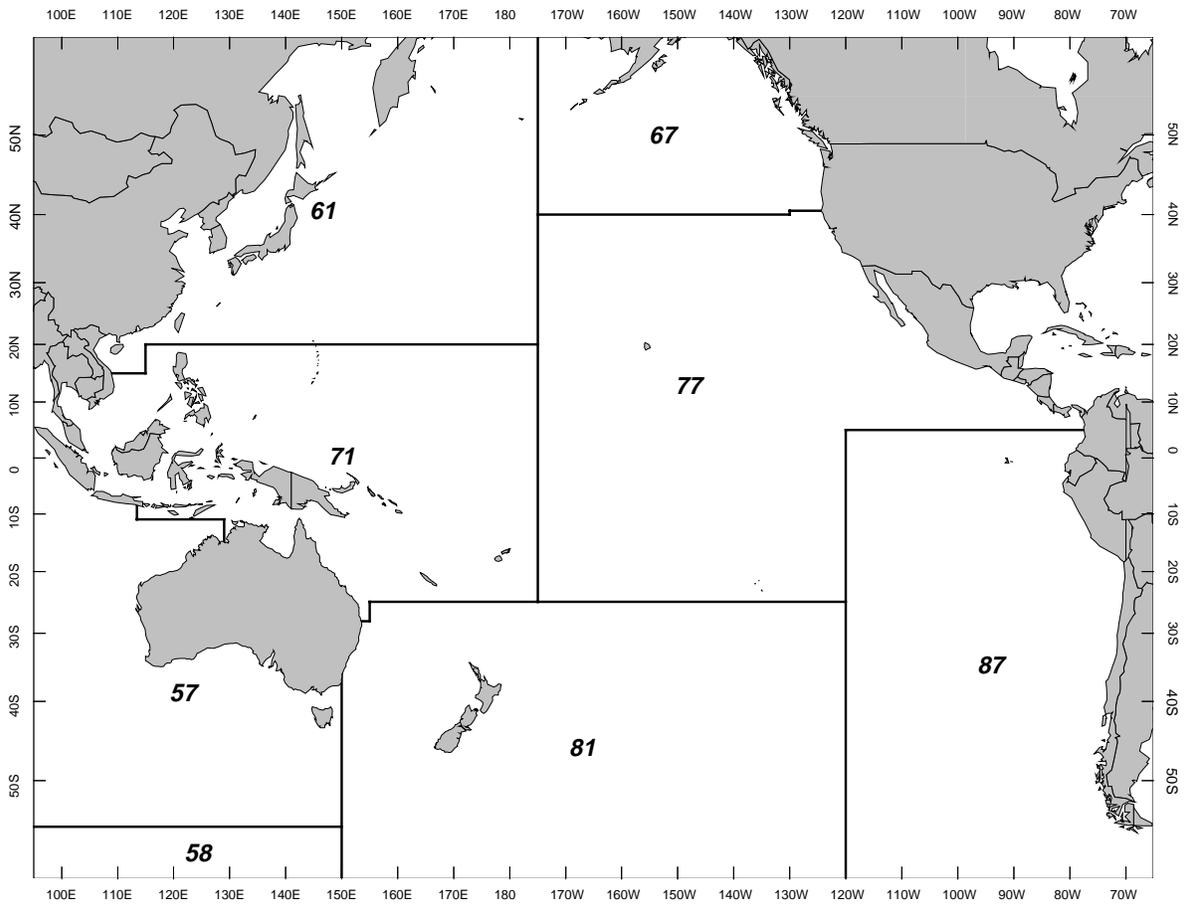


Figure 1. FAO Major Fishing Areas in the Pacific Ocean