REVIEW OF ANNUAL CATCH ESTIMATES FOR TUNA FISHERIES OF THE PHILIPPINES

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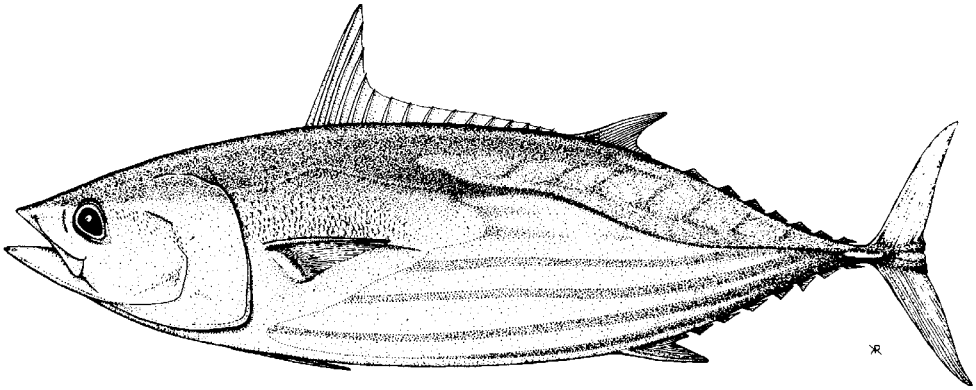

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INTRODUCTION

The estimated catch of skipjack (*Katsuwonus pelamis*) by fisheries of the Philippines in 1996, 110,004 mt, represented 12.5 per cent of the total catch in the central and western Pacific Ocean, while the estimated catch of yellowfin (*Thunnus albacares*) in the Philippines, 61,280 mt, represented 24.5 per cent of the total. Accurate estimates of the annual catches of skipjack and yellowfin, by gear type, are therefore essential for stock assessment.

Annual catch estimates have been compiled by the Oceanic Fisheries Programme (OFP) of the Secretariat of the Pacific Community (SPC) and by the National Marine Fisheries Service (NMFS) of the United States of America. SPC compiled the estimates for publication in the SPC Tuna Fishery Yearbook, while NMFS compiled the estimates for use by the Western Pacific Yellowfin Research (WPYR) group.

The annual catch estimates were originally prepared by the Bureau of Fisheries and Aquatic Resources (BFAR) and the Bureau of Agricultural Statistics (BAS) of the Philippines. Each agency was responsible for preparation of the statistics during different time periods. SPC compiled the statistics from publications of the Indo-Pacific Tuna Programme, which received the estimates from BFAR, and directly from the Fishery Statistics Section of BAS. NMFS compiled some of the statistics directly from BFAR, others from the Tuna Fishery Yearbook, and determined others by adjusting statistics from BFAR and the Tuna Fishery Yearbook based on information provided by BFAR.

This report examines, and attempts to resolve, discrepancies between the SPC and the NMFS estimates. Revised estimates, based on both sets of statistics, are presented. The annual catch estimates are further adjusted for the inclusion of bigeye in estimates of yellowfin catches, and estimates of annual bigeye catches, by gear type, are developed.

STATISTICS COMPILED BY THE SECRETARIAT OF THE PACIFIC COMMUNITY

Catch statistics compiled by for the SPC Tuna Fishery Yearbook are presented in Tables 1 and 2 (Lawson 1997). These statistics were prepared by the Bureau of Fisheries and Aquatic Resources (BFAR) for 1970–1981, and the Bureau of Agricultural Statistics (BAS), for 1988–1996, for FAO area 71, The statistics for 1970–1991 were taken from Indo-Pacific Tuna Programme (1991a, 1991b), while statistics for 1992–1996 were provided by the Bureau of Agricultural Statistics (Ramos, personal communication, April 1993, April 1994, May 1995, May 1996, May 1997).

The following points are of interest:

(1) The statistics for 1970–1975 and 1988–1989 in Table 1 and 2 are not broken down by gear type; hence, the total catch for these years is listed as “unclassified”.

(2) In addition, statistics are missing for gillnet for 1977; handline for 1976 (skipjack only); longline for 1976 (skipjack only), 1977, 1979–1980 and 1983; ringnet for 1979–1980 and 1983–1984; and seine net for 1990–1991 and 1993–1994.

(3) While catches by most gear types have been estimated in Tables 1 and 2 for 1976–1977 and 1990–1991, there are still large unclassified catches. The catch by gillnet in 1976 and the catch by handline in 1977 are not consistent with the rest of the time series.

(4) Other statistics do not appear to be consistent with previous or subsequent periods. The statistics for 1990 show low skipjack and yellowfin catches by gillnet, handline and longline, and the statistics for 1991 show low skipjack catches by gillnet and handline and low yellowfin catches by gillnet and longline. Bagnet and seine net catches appear to have fluctuated erratically.

(5) Estimates of the total catch show large changes in certain years. For example, the total catch of yellowfin appears to have declined by 53 per cent from 1991 to 1992.

STATISTICS COMPILED BY THE NATIONAL MARINE FISHERIES SERVICE

Table 3 and 4 present similar, but not identical, statistics which have been compiled by NMFS for the Western Pacific Yellowfin Research (WPYR) group (Coan, personal communication, March 1998). NMFS compiled some of these statistics directly from BFAR, others from the Tuna Fishery Yearbook, and determined others by adjusting statistics from BFAR and the Tuna Fishery Yearbook based on information provided by BFAR.

The following points are of interest:

Table 3: WPYR skipjack

(6) In notes accompanying the WPYR tables, it is reported that the catches of skipjack by gear type, in Table 3, for 1988, 1989 and 1994 have been estimated by applying the proportion caught by gear type in 1987, 1990 and 1992, respectively, to the estimate of the total catches. However, the statistics for 1994 are identical to those in Table 1; hence, the catches by gear type have been estimated only for 1988 and 1989.

(7) The notes report that the estimates of the purse-seine catch of skipjack, in Table 3, for 1982–1994 include catches in the waters of SPC member countries. However, the estimates in Table 3 for 1982–1987 and 1990–1994 are identical to those in Table 1, which do not include the catches in SPC waters; hence, catches in the waters of SPC member countries have been included only for 1988–1989.

(8) For 1995, the estimate of the skipjack catches by gillnet, handline, longline and purse seine, in Table 3, are identical to those in Table 1, while estimates for ringnet and unclassified are different from those in Table 1. The estimate for ringnet and unclassified in Table 3 were taken from the SPC Tuna Fishery Yearbook, 1995. These statistics were updated for the SPC Tuna Fishery Yearbook, 1996, which are presented in Table 1.

Table 4: WPYR yellowfin

(9) The notes report that the catches of yellowfin by gear type in Table 4 for 1970–1977 in Table 3 have been estimated by applying the proportion caught by gear type in 1978–1979 to the estimate of the total catches. The proportion used was the average proportion, weighted by the total catch, for 1978–1979.

(10) The estimates of the total yellowfin catch for 1976 and 1977 in Table 4 are equal to the unclassified catch in Table 2; hence, it appears that the unclassified catch was apportioned by gear type, rather than the total catch.

(11) The notes report that bagnet and seine net were included under unclassified. However, the unclassified catches in Table 4 for 1978–1987 are identical to those in Table 2, which do not include bagnet and seine net; hence it does not appear that catches by bagnet and seine net have been included in Table 4 for these years, and, hence, for 1970–1977 (see point 9) and 1988–1989 (see point 21). On the other hand, bagnet and seine net have been included in unclassified for 1990–1995.

(12) For 1978, all yellowfin catches in Table 4 are different from those in Table 2, except for unclassified. The total catch and catches for gillnet and handline have each been revised downwards by 23.5 per cent. The difference between the estimates of the total catch in Tables 2 and 4 for 1978 is relatively large, 11,738 mt. The reasons for these differences are unknown.

(13) For 1979, the estimate for handline in Table 2 has been broken down into handline and longline in Table 4, while the estimate for purse seine in Table 2 has been broken down into purse seine and ringnet. The breakdowns are exact. The difference in the total catch for 1979 is therefore attributable to the catches of bagnet and seine net, which are not included in Table 4.

(14) For 1980, the estimate for handline in Table 2 has been broken down into handline and longline in Table 4, while the estimate for purse seine in Table 2 has been broken down into purse seine and ringnet. The total of handline and longline catches for 1980 in Table 4 is 1,696 mt less than the handline catch in Table 2, whereas the other breakdown is exact.

(15) For 1981, while the estimates in Tables 2 and 4 are different, the total of handline and longline in Table 2 is equal to the total of handline and longline in Table 4, and similarly for the total of purse seine and ringnet. The difference in the total catch is therefore attributable to the catches of bagnet and seine net, which are not included in Table 4.

(16) For 1982, the handline catch in Table 4 is slightly greater than the estimate in Table 2. While the estimates in Tables 2 and 4 are different, the total of purse seine and ringnet in Table 2 is equal to the total of handline and longline in Table 4.

(17) For 1983, the estimate for handline in Table 2 has been broken down into handline and longline in Table 4, while the estimate for purse seine in Table 2 has been broken down into purse seine and ringnet. The total of handline and longline catches for 1983 in Table 4 is 658 mt less than the handline catch in Table 2, whereas the other breakdown is exact.

(18) For 1984, the estimate for purse seine in Table 2 has been broken down into purse seine and ringnet. The breakdown is exact. The difference in the total catch is therefore attributable to the catches of bagnet and seine net, which are not included in Table 4.

(19) For 1985 and 1986, while the estimates in Tables 2 and 4 are different, the total of purse seine and ringnet in Table 2 is equal to the total of purse seine and ringnet in Table 4. The difference in the total catch is therefore attributable to the catches of bagnet and seine net, which are not included in Table 4.

(20) For 1987, the yellowfin catches by gillnet, handline and longline in Table 4 are each 1 mt less than those from Table 2. Except for these minor differences, the difference in the total catch is attributable to the catches of bagnet and seine net, which are not included in Table 4.

(21) The notes report that the catches of yellowfin by gear type in Table 4 for 1988–1989 in Table 3 have been estimated by applying the proportion caught by gear type in 1986–1987, respectively, to the estimate of the total catches. The proportion used was the average proportion, weighted by the total catch, for 1986–1987.

REVISED ESTIMATES OF ANNUAL CATCHES OF SKIPJACK AND YELLOWFIN

Revised statistics based on Tables 1–4 are presented in Tables 5 and 6. The following revisions were included:

(22) For all years, bagnet and seine net catches have been included in unclassified catches in Tables 5 and 6.

(23) For the purposes here, catches outside the Philippines EEZ have not been included in Tables 5 and 6.

Table 5: Skipjack, revised

(24) Skipjack catch estimates by gear type, in Table 5, for 1970–1975 have been estimated by apportioning the total catch using the proportions caught by each gear type during 1978. Weighted average proportions based on the catches during 1978–1979 were not used because of missing estimates for longline and ringnet for 1979. It is recognised that the proportions caught by each gear type during 1978 may not be representative for 1970–1975.

(25) Skipjack catch estimates for 1976 and 1977, in Table 5, for gillnet, handline, longline and unclassified were estimated in two steps. First, the proportion caught by the gear type in 1978 was applied to the total catch for 1976 and 1977 respectively. Second, the estimates for all gear types were then adjusted such that the estimate of the total catch remained unchanged. A similar procedure was followed to estimate skipjack catches by longline and seine net in 1983, using the proportions in 1982; the catch by ringnet in 1984, using the proportion in 1985; and catches by gillnet, handline, longline and unclassified in 1991, using the proportions in 1992.

(26) Skipjack catch estimates for 1988–1989, in Table 5, were estimated by apportioning the total catch using the proportions caught by each gear type during 1987. The proportions for 1990 were not used to estimate the catches by gear type for 1989 because the estimates for gillnet, handline and longline for 1990 are not consistent with the rest of the time series.

(27) Skipjack catch estimates for 1996, in Table 5, were estimated by apportioning the total catch using the proportions caught by each gear type during 1995.

Table 6: Yellowfin, revised

(28) Yellowfin catch estimates for 1970–1977, in Table 6, were estimated by applying the weighted average proportion for 1978–1979 to the total catch. This is the same procedure used for Table 4.

(29) The catch estimates for 1978–1986 were taken from Table 4. Bagnet and seine net from Table 2 were included in unclassified.

(30) The catch estimates for 1987 were taken from Table 2.

(31) Yellowfin catch estimates for 1988–1989, in Table 6, were estimated by applying the weighted average proportion for 1990–1991 to the total catch. This is the same procedure used for Table 4.

(32) Yellowfin catch estimates for 1990–1991, in Table 6, were estimated by applying the weighted average proportion for 1992–1993 to the total catch. This was done because of the large unclassified catch estimates, but also because of inconsistent gillnet, handline and longline catch estimates for 1990 and inconsistent gillnet and longline catch estimates for 1991.

(33) The yellowfin catch estimates for 1992–1993 in Tables 2 and 4, and hence Table 6, are identical.

(34) The yellowfin catch estimates for 1994–1995 in Tables 2 and 4 are identical. These estimates were used in Table 6, except that the estimates for purse seine and ringnet were revised by applying the weighted average proportion of each gear type in the total of purse seine and ringnet during 1992–1993 to the total of purse seine and ringnet.

(35) Yellowfin catch estimates by gear type, in Table 6, for 1996 have been estimated by apportioning the total catch using the estimated proportions caught by each gear type during 1995.

REVISED ESTIMATES OF ANNUAL CATCHES OF YELLOWFIN, ADJUSTED FOR BIGEYE

Significant quantities of bigeye (*Thunnus obesus*) are known to be taken in the tuna fisheries of the Philippines. However, bigeye are not routinely separated from small yellowfin in the catch and are not reported separately in the statistics prepared by BFAR and BAS.

Miyabe (1995) confirmed the species identification of bigeye based on external morphological characters and mtDNA analysis, and attempted to estimate catch-at-size of bigeye and yellowfin for 1993.

The Landed Catch and Effort Monitoring Programme (LCEM), which was carried out in 1993–1994 as part of the Philippines Tuna Research Project, has provided data which can be used to estimate the proportion of bigeye in the combined catch of yellowfin and bigeye. Sampling was conducted at 18 landing sites throughout the Philippines, which were chosen to provide the maximum coverage of skipjack, yellowfin and bigeye.

The proportion of bigeye in the combined catch of yellowfin and bigeye, determined from the LCEM data, was estimated to be 8.6 per cent for handline, 10.0 per cent for purse seine, and 9.9 per cent for ringnet. Data were insufficient for reliably estimating the proportion for other gear types; hence, the proportion for purse seine, 10 per cent, was assumed for gillnet; the proportion for handline, 8.6 per cent, was assumed for longline; and the proportion for unclassified gear types was assumed to be 10 per cent.

Tables 7 and 8 present estimates of annual catches of yellowfin and bigeye, respectively, determined by adjusting the estimates in Table 6 using the proportions of bigeye in the combined catch of

yellowfin and bigeye listed above.

DISCUSSION

Although the revised estimates of skipjack catches in Table 5 are more complete and consistent than the estimates in Tables 1 and 3, they still exhibit inconsistencies in the time series. There is large drop in the gillnet catch from 1978 to 1979. There is a large catch by handline in 1991. There is a large drop in the longline catch from 1979 to 1980, and a large increase from 1986 to 1987. The purse-seine catches from 1976 to 1979 are highly variable.

Similarly, the revised estimates of yellowfin catches in Table 6 show a 30 per cent increase from 1989 to 1990, an 18 per cent increase from 1990 to 1991, and then a 53 per cent decrease from 1991 to 1992. The estimated purse-seine catch dropped a further 63 per cent from 1992 to 1993.

If these inconsistencies cannot be corrected or explained, then it might be appropriate to smooth the time series, by applying, for example, a three-year moving average. Smoothing of the time-series may be considered following further discussion with BFAR and BAS.

The differences between the SPC and NMFS statistics for yellowfin catches during 1978 are large, and the differences are not due to a simple redistribution of the catches among gear types (see point 12). The reason for the large downward revision should be investigated.

The LCEM data for 1993–1994 have been used to estimate the proportion of bigeye in the combined catch of yellowfin and bigeye for handline, purse seine and ringnet. It is unclear whether LCEM sampling continued during 1995–1996. Additional sampling data are required to estimate the proportions for gillnet, longline, bagnet and seine net.

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Table 1. Catches (metric tonnes) of skipjack by domestic fisheries of the Philippines compiled by SPC. Key: BAG bagnet; GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; SEN seine net; UNCL unclassified.

YEAR	BAG	GILL	HOOK	LL	PS	RIN	SEN	UNCL	TOTAL
1970	...	...	...	...	...	...	...	20,000	20,000
1971	...	...	...	...	...	...	...	21,400	21,400
1972	...	...	...	...	...	...	...	23,500	23,500
1973	...	...	...	...	...	...	...	26,400	26,400
1974	...	...	...	...	...	...	...	29,456	29,456
1975	...	...	...	...	...	...	...	31,657	31,657
1976	150	10	...	...	4,518	4,972	165	19,359	29,174
1977	54	...	286	...	16,956	5,164	37	32,593	55,090
1978	1,302	14,286	13,178	2,665	6,987	7,585	14	3,701	49,718
1979	298	4,435	12,069	...	27,050	...	130	1,102	45,084
1980	197	4,908	10,633	...	15,004	...	45	391	31,178
1981	243	2,995	14,406	440	14,048	4,683	102	1,522	38,439
1982	364	2,437	7,735	530	26,607	4,081	80	8,961	50,795
1983	192	1,980	9,816	...	39,971	...	80	5,112	57,151
1984	63	1,221	11,481	652	29,976	...	104	1,174	44,671
1985	1,791	2,183	10,309	735	28,477	14,303	211	2,527	60,536
1986	978	2,851	13,683	590	38,982	18,343	72	1,469	76,968
1987	862	2,656	14,627	2,019	39,125	11,873	59	2,528	73,749
1988	...	...	...	...	...	...	...	55,940	55,940
1989	...	...	...	...	...	...	...	64,654	64,654
1990	1,304	174	1,200	114	49,555	17,558	...	29,800	99,705
1991	79	1	192	612	57,838	13,614	...	30,058	102,394
1992	74	6,249	7,264	717	43,607	18,721	1,168	5,379	83,179
1993	28	1,452	8,351	463	34,555	19,231	...	4,001	68,081
1994	16	2,954	8,106	1,102	48,469	17,721	...	6,192	84,560
1995	57	1,202	11,655	756	61,185	31,166	...	4,090	110,111
1996	...	...	...	...	...	...	...	...	110,004

Table 2. Catches (metric tonnes) of yellowfin by domestic fisheries of the Philippines compiled compiled by SPC. Key: BAG bagnet; GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; SEN seine net; UNCL unclassified.

YEAR	BAG	GILL	HOOK	LL	PS	RIN	SEN	UNCL	TOTAL
1970	...	...	...	...	...	...	...	32,000	32,000
1971	...	...	...	...	...	...	...	35,800	35,800
1972	...	...	...	...	...	...	...	37,200	37,200
1973	...	...	...	...	...	...	...	44,500	44,500
1974	...	...	...	...	...	...	...	51,732	51,732
1975	...	...	...	...	...	...	...	52,793	52,793
1976	270	9	161	1,232	5,902	1,854	2,727	32,323	44,478
1977	407	...	1,407	...	7,821	2,552	71	50,801	63,059
1978	831	6,431	32,607	874	4,188	1,019	849	230	47,029
1979	1,081	2,027	32,887	...	12,301	...	647	281	49,224
1980	651	2,301	32,108	...	12,463	...	68	432	48,023
1981	508	2,655	32,800	1,073	14,546	3,636	5	953	56,176
1982	122	1,386	29,738	1,897	16,347	1,329	48	1,055	51,922
1983	323	1,260	35,878	...	20,779	...	135	3,661	62,036
1984	752	2,161	31,005	1,284	22,989	...	84	649	58,924
1985	1,333	2,040	35,505	1,819	16,753	4,838	680	1,325	64,293
1986	350	2,137	36,188	2,411	12,671	4,920	9	824	59,510
1987	423	2,161	26,408	3,774	15,171	2,916	91	866	51,810
1988	...	...	...	...	...	...	...	57,060	57,060
1989	...	...	...	...	...	...	...	62,146	62,146
1990	694	811	2,746	214	21,571	8,192	...	46,874	81,102
1991	13	21	22,872	255	23,981	2,977	...	45,475	95,594
1992	122	1,758	24,181	1,219	12,105	2,716	1,118	1,807	45,026
1993	654	1,140	26,410	1,044	4,445	1,566	...	2,939	38,198
1994	539	4,250	37,767	1,412	9,437	7,731	...	2,944	64,080
1995	47	1,659	35,662	1,328	18,643	101	...	3,517	60,957
1996	...	...	...	...	...	...	...	...	61,280

Table 3. Catches (metric tonnes) of skipjack by domestic fisheries of the Philippines compiled by NMFS. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	-	-	-	-	-	20,000	20,000
1971	-	-	-	-	-	21,400	21,400
1972	-	-	-	-	-	23,500	23,500
1973	-	-	-	-	-	26,400	26,400
1974	-	-	-	-	-	29,456	29,456
1975	-	-	-	-	-	31,657	31,657
1976	10	-	-	4,518	4,972	19,674	29,174
1977	-	286	-	16,956	5,164	32,684	55,090
1978	14,286	13,178	2,665	6,987	7,585	5,017	49,718
1979	4,435	12,069	-	27,050	-	1,530	45,084
1980	4,908	10,633	-	15,004	-	633	31,178
1981	2,995	14,406	440	14,048	4,683	1,867	38,439
1982	2,437	7,735	530	26,607	4,081	9,405	50,795
1983	1,980	9,816	-	39,971	-	5,384	57,151
1984	1,221	11,481	652	29,976	-	1,341	44,671
1985	2,183	10,309	735	28,477	14,303	4,529	60,536
1986	2,851	13,683	590	38,982	18,343	2,519	76,968
1987	2,656	14,627	2,019	39,125	11,873	3,449	73,749
1988	2,015	11,095	1,531	38,033	9,006	2,616	64,296
1989	113	778	74	48,802	11,386	20,169	81,322
1990	174	1,200	114	49,555	17,558	31,104	99,705
1991	1	192	612	57,838	13,614	30,137	102,394
1992	6,249	7,264	717	43,607	18,721	6,621	83,179
1993	1,452	8,351	463	34,555	19,231	4,029	68,081
1994	2,954	8,106	1,102	48,469	17,721	6,208	84,560
1995	1,202	11,655	756	61,185	30,460	4,216	109,474
1996	...	...	...	...	...	...	...

Table 4. Catches (metric tonnes) of yellowfin by domestic fisheries of the Philippines compiled by NMFS. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	2,664	21,835	612	4,920	1,772	197	32,000
1971	2,981	24,429	685	5,504	1,982	219	35,800
1972	3,097	25,384	712	5,719	2,060	228	37,200
1973	3,705	30,365	851	6,842	2,464	273	44,500
1974	4,307	35,300	990	7,954	2,865	316	51,732
1975	4,395	36,024	1,010	8,117	2,923	324	52,793
1976	2,691	22,056	618	4,969	1,790	199	32,323
1977	4,230	34,665	972	7,810	2,813	311	50,801
1978	4,918	24,941	689	4,133	1,010	230	35,921
1979	2,027	31,980	907	8,760	3,541	281	47,496
1980	2,301	29,235	1,177	8,188	4,275	432	45,608
1981	2,655	32,254	1,619	14,343	3,839	953	55,663
1982	1,386	29,826	1,897	16,288	1,388	1,055	51,840
1983	1,260	32,396	2,824	17,418	3,361	3,661	60,920
1984	2,161	31,005	1,284	18,728	4,261	649	58,088
1985	2,040	35,505	1,819	15,381	6,210	1,325	62,280
1986	2,137	36,188	2,411	12,640	4,951	824	59,151
1987	2,160	26,407	3,775	15,171	2,916	866	51,295
1988	2,220	32,339	3,196	14,368	4,064	873	57,060
1989	2,418	35,221	3,481	15,648	4,427	951	62,146
1990	811	2,746	214	21,571	8,192	47,569	81,103
1991	21	22,872	255	23,981	2,977	45,488	95,594
1992	1,758	24,181	1,219	12,105	2,716	3,047	45,026
1993	1,140	26,410	1,044	4,445	1,566	3,593	38,198
1994	4,250	37,767	1,412	9,437	7,731	3,483	64,080
1995	1,659	35,183	1,328	18,643	1,054	2,824	60,691
1996	...	...	...	...	...	...	...

Table 5. Revised estimates of skipjack catches (metric tonnes) for tuna fisheries of the Philippines. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	5,747	5,301	1,072	2,811	3,051	2,018	20,000
1971	6,149	5,672	1,147	3,007	3,265	2,160	21,400
1972	6,753	6,229	1,260	3,303	3,585	2,370	23,500
1973	7,586	6,997	1,415	3,710	4,028	2,664	26,400
1974	8,464	7,807	1,579	4,140	4,494	2,972	29,456
1975	9,096	8,391	1,697	4,449	4,830	3,194	31,657
1976	8,246	7,607	1,539	4,444	4,891	2,447	29,174
1977	14,608	13,475	2,725	15,647	4,765	3,870	55,090
1978	14,286	13,178	2,665	6,987	7,585	5,017	49,718
1979	3,677	10,006	2,004	22,426	5,702	1,269	45,084
1980	4,331	9,383	315	13,240	3,351	558	31,178
1981	2,995	14,406	440	14,048	4,683	1,867	38,439
1982	2,437	7,735	530	26,607	4,081	9,405	50,795
1983	1,815	8,999	546	36,645	4,210	4,936	57,151
1984	988	9,287	527	24,247	8,538	1,084	44,671
1985	2,183	10,309	735	28,477	14,303	4,529	60,536
1986	2,851	13,683	590	38,982	18,343	2,519	76,968
1987	2,656	14,627	2,019	39,125	11,873	3,449	73,749
1988	2,015	11,095	1,531	29,677	9,006	2,616	55,940
1989	2,328	12,823	1,770	34,300	10,409	3,024	64,654
1990	8,125	9,444	932	53,751	19,045	8,408	99,705
1991	8,257	9,598	657	62,078	14,612	7,192	102,394
1992	6,249	7,264	717	43,607	18,721	6,621	83,179
1993	1,452	8,351	463	34,555	19,231	4,029	68,081
1994	2,954	8,106	1,102	48,469	17,721	6,208	84,560
1995	1,202	11,655	756	61,185	31,166	4,147	110,111
1996	1,201	11,644	755	61,126	31,136	4,142	110,004

Table 6. Revised estimates of yellowfin catches (metric tonnes), unadjusted for bigeye, for tuna fisheries of the Philippines. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	2,560	20,979	588	4,752	1,677	1,444	32,000
1971	2,864	23,470	658	5,316	1,876	1,616	35,800
1972	2,976	24,388	684	5,524	1,950	1,679	37,200
1973	3,559	29,173	818	6,608	2,333	2,009	44,500
1974	4,138	33,915	951	7,682	2,712	2,335	51,732
1975	4,223	34,610	970	7,839	2,767	2,383	52,793
1976	3,558	29,159	818	6,605	2,331	2,008	44,478
1977	5,044	41,340	1,159	9,364	3,305	2,846	63,059
1978	4,918	24,941	689	4,133	1,010	1,910	37,601
1979	2,027	31,980	907	8,760	3,541	2,009	49,224
1980	2,301	29,235	1,177	8,188	4,275	1,151	46,327
1981	2,655	32,254	1,619	14,343	3,839	1,466	56,176
1982	1,386	29,826	1,897	16,288	1,388	1,225	52,010
1983	1,260	32,396	2,824	17,418	3,361	4,119	61,378
1984	2,161	31,005	1,284	18,728	4,261	1,485	58,924
1985	2,040	35,505	1,819	15,381	6,210	3,338	64,293
1986	2,137	36,188	2,411	12,640	4,951	1,183	59,510
1987	2,161	26,408	3,774	15,171	2,916	1,380	51,810
1988	2,203	32,085	3,170	14,255	4,032	1,314	57,060
1989	2,399	34,945	3,453	15,526	4,392	1,431	62,146
1990	2,824	49,301	2,205	16,128	4,173	6,471	81,102
1991	3,329	58,111	2,599	19,010	4,918	7,627	95,594
1992	1,758	24,181	1,219	12,105	2,716	3,047	45,026
1993	1,140	26,410	1,044	4,445	1,566	3,593	38,198
1994	4,250	37,767	1,412	13,639	3,529	3,483	64,080
1995	1,659	35,662	1,328	14,891	3,853	3,564	60,957
1996	1,668	35,851	1,335	14,970	3,873	3,583	61,280

Table 7. Revised estimates of yellowfin catches (metric tonnes), adjusted for bigeye, for tuna fisheries of the Philippines. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	2,304	19,175	537	4,277	1,511	1,300	29,104
1971	2,578	21,452	601	4,784	1,690	1,454	32,559
1972	2,678	22,291	625	4,972	1,757	1,511	33,834
1973	3,203	26,664	748	5,947	2,102	1,808	40,472
1974	3,724	30,998	869	6,914	2,444	2,102	47,051
1975	3,801	31,634	887	7,055	2,493	2,145	48,015
1976	3,202	26,651	748	5,945	2,100	1,807	40,453
1977	4,540	37,785	1,059	8,428	2,978	2,561	57,351
1978	4,426	22,796	630	3,720	910	1,719	34,201
1979	1,824	29,230	829	7,884	3,190	1,808	44,765
1980	2,071	26,721	1,076	7,369	3,852	1,036	42,125
1981	2,390	29,480	1,480	12,909	3,459	1,319	51,037
1982	1,247	27,261	1,734	14,659	1,251	1,103	47,255
1983	1,134	29,610	2,581	15,676	3,028	3,707	55,736
1984	1,945	28,339	1,174	16,855	3,839	1,337	53,489
1985	1,836	32,452	1,663	13,843	5,595	3,004	58,393
1986	1,923	33,076	2,204	11,376	4,461	1,065	54,105
1987	1,945	24,137	3,449	13,654	2,627	1,242	47,054
1988	1,983	29,326	2,897	12,830	3,633	1,183	51,852
1989	2,159	31,940	3,156	13,973	3,957	1,288	56,473
1990	2,542	45,061	2,015	14,515	3,760	5,824	73,717
1991	2,996	53,113	2,375	17,109	4,431	6,864	86,888
1992	1,582	22,101	1,114	10,895	2,447	2,742	40,881
1993	1,026	24,139	954	4,001	1,411	3,234	34,765
1994	3,825	34,519	1,291	12,275	3,180	3,135	58,225
1995	1,493	32,595	1,214	13,402	3,472	3,208	55,384
1996	1,501	32,768	1,220	13,473	3,490	3,225	55,677

Table 8. Estimates of bigeye catches (metric tonnes) for tuna fisheries of the Philippines. Key: GILL gillnet; HOOK handline; LL longline; PS purse seine; RIN ring net; UNCL unclassified.

YEAR	GILL	HOOK	LL	PS	RIN	UNCL	TOTAL
1970	256	1,804	51	475	166	144	2,896
1971	286	2,018	57	532	186	162	3,241
1972	298	2,097	59	552	193	168	3,367
1973	356	2,509	70	661	231	201	4,028
1974	414	2,917	82	768	268	234	4,683
1975	422	2,976	83	784	274	238	4,777
1976	356	2,508	70	661	231	201	4,027
1977	504	3,555	100	936	327	285	5,707
1978	492	2,145	59	413	100	191	3,400
1979	203	2,750	78	876	351	201	4,459
1980	230	2,514	101	819	423	115	4,202
1981	266	2,774	139	1,434	380	147	5,140
1982	139	2,565	163	1,629	137	123	4,756
1983	126	2,786	243	1,742	333	412	5,642
1984	216	2,666	110	1,873	422	149	5,436
1985	204	3,053	156	1,538	615	334	5,900
1986	214	3,112	207	1,264	490	118	5,405
1987	216	2,271	325	1,517	289	138	4,756
1988	220	2,759	273	1,426	399	131	5,208
1989	240	3,005	297	1,553	435	143	5,673
1990	282	4,240	190	1,613	413	647	7,385
1991	333	4,998	224	1,901	487	763	8,706
1992	176	2,080	105	1,211	269	305	4,146
1993	114	2,271	90	445	155	359	3,434
1994	425	3,248	121	1,364	349	348	5,855
1995	166	3,067	114	1,489	381	356	5,573
1996	167	3,083	115	1,497	383	358	5,603