STATUS AND IMPROVEMENT OF THE TOTAL CATCH IN WEIGHT STATISTICS FOR THE JAPANESE LONGLINE FISHERY DURING 1952-1969 KEPT IN THE IOTC DATABASE

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ABSTRACT

At the IOTC meeting of the tropical tuna working group held at Shanghai on June 2002, it was pointed out that the average weight calculated using total catch in weight kept in the IOTC data base and total catch in number are nearly the same during 1952-1969 at least for bigeye and yellowfin. In order to clarify the status and reason of these problems, IOTC database and past data were investigated, and improved estimates of the catch in weight statistics were presented in this paper.

The total catch in weight data during 1964-1969 in the current IOTC database for all tunas and billfishes seems to coincide with those of FAO database. Those from 1952 to 1963 appear to be made by multiplying total catch in number (IOTC CE database) by constant average weight at least for ALB (AVW=16.0 kg), BET (AVW=33.8 kg) and YFT (AVW=24.8 kg), as suggested by IOTC secretariat.

Two tentative options for improvement are suggested. 1) Delete total catch in weight data during 1952-1969 from the IOTC database and use the total catch in weight statistics in the FAO Fish. Tech. Rep. No.200 (IPTP Atlas for albacore) for stock assessment. 2) Recalculate total catch in weight in IOTC areas using average weight estimated by total catch in number in new IOTC statistical area and total catch in weight of FAO Fish. Tech. Rep. No.200 (IPTP Atlas for albacore). However, further investigation would be necessary to complete the catch weight statistics especially for billfishes. As some of the basic data (logbook and size data) are now being compiled with additional information of landing statistics, it may be possible to re-estimate catch weight statistics in the future.

INTRODUCTION

At the IOTC meeting of the tropical tuna working group held at Shanghai on June 2002, it was pointed out that the average weight calculated using total catch in weight kept in the IOTC data base and total catch in number (sum of Catch and Effort statistics by 5°x5° square by month) are nearly the same during 1952-1969 at least for bigeye and yellowfin (maybe also for other species). After that, it was also noticed that the average weight thus calculated above was considered too small for yellowfin in this period. In order to clarify the status and reason of these problems, IOTC database and past data were investigated, and improved estimates of the catch in weight statistics were presented in this paper.

Background of total catch in weight data of Japanese longline

Principally, basic unit of Japanese longline catch statistics has been the catch in number (not catch in weight). In 1970, catch in weight statistics began to be compiled using catch in number data and average weight estimated mostly by size data for each tunas (SBF, ALB, BET, YFT and SKJ) and billfishes (SWO, MLS, BLZ, BLM and SFA&BIL), and thereafter the catch in weight data has been submitted to IPTP (IOTC) as well as to other international commissions like the ICCAT. Since the size data were made only for limited species such as yellowfin and albacore before 1970, catch in weight statistics, in general, did not seem to have been submitted to international commissions at least officially. Although FAO database includes total catch statistics in weight by FAO area from

1964, the weight data from 1964 to 1969 were possibly estimated mainly by the number of catch and landing data. FAO stats has been reported by Statistic Division of MAFF (The Ministry of Agriculture, Forestry and Fisheries of Japan) apart from NRIFSF (National Research Institute of Far Seas Fisheries).

Since 1994, catch in weight has been estimated by the weight data recorded in logbooks.

Review of catch in weight statistics in the IOTC database during 1952-1969

The total catch in weight data during 1952-1969 period exists in the IOTC database for all tunas and billfishes (IOTC DB Weight in Table 1). The figures for SBF in this period in this database coincide with those in FAO database (Table 2) although the values are quite different from the estimation adopted by CCSBT (for example, apparently too large at least during 1952-1956 comparing to value of CCSBT). Catch in weight data for other species from 1964 to 1969 seems to coincide with those of FAO database. Those from 1952 to 1963 appear to be made by multiplying total catch in number (IOTC CE database) by constant average weight (IOTC DB AVW in Table 1) at least for ALB (AVW=16.0 kg), BET (AVW=33.8 kg) and YFT (AVW=24.8 kg), as suggested by IOTC secretariat at IOTC meeting of tropical tuna working group in June 2002 at Shanghai. According to the information from the ICCAT secretariat, the average weight of yellowfin was perfectly same (AVW= 24.789) during the period, it was unable to reconstruct the same AVW, probably because of difference in the area definition. According to the data source description in the IOTC database (Table 2), total catch in weight during 1952-1963 for billfishes were fully estimated by IOTC (IOTC database, as of Nov. 20, 2002), while those for tunas in the same period were derived from FAO statistics except 1963 for ALB, BET and YFT (Table 3). However, the weight statistics for ALB, BET and YFT do not exist in the actual FAO database during 1952-1963 (Table 2). Therefore, it is supposed that the weight data for these three tuna species were also estimated by IOTC after 1999 when the IOTC started its works.

Traditional catch in weight statistics

In 1979, a workshop (Workshop on the Assessment of Selected Tunas and Billfish Stocks in the Pacific and Indian Oceans) was held at Shimizu, Japan. For the stock assessment in this workshop, total catch in weight statistics of Japanese longline fishery in the Pacific and Indian Oceans were estimated for major tuna and billfish species. In the FAO Fisheries Technical Report No.200 (1980), those weight statistics from 1952 to 1977 were summarized for each tuna (except albacore) and billfish species (Tech200 Weight in Table 1). The catch in weight table for each species in the Report was derived from respective documents or tables written by Japanese scientists who were engaged on the statistical work for each species. That is, in the case of the Indian Ocean, the catch table made by Ueyanagi in Wetherall et al. (1979) for yellowfin, Kume and Morita (1979) for Bigeye, Shingu and Hisada (1979) for southern bluefin, and Honma and Ueyanagi (1979) for billfishes. These estimations were probably achieved by using available data (the number of catch, available size data and landing data) for each species in those years (Shiohama, pers. comm.) although the resolution for billfish was not high, level of 100MT or 1000MT. The catch in weight tables in the FAO Fish.Tech. Rep. No.200 were referred to as Table 1.3 in the "Atlas of Industrial Tuna Longline and Purse-seine Fisheries in the Indian Ocean" published by IPTP in 1988 with additional albacore catch table taken from Shiohama (1986) (because Japanese albacore catch was not included in the FAO Fish. Tech. Rep. No200). These total catch in weight data had been used for previous stock assessment WG done on these species (for instance in Shimizu 1979 and in Colombo 1991). Although these statistics seems to be most reasonable estimates as the total catch in weight in the

Indian Ocean for those years, the covered area (area map B in Fig. 1) was somewhat different from current IOTC statistical area (area map C in Fig 1). For example, the some data include the catch in the Banda Sea. The catch in number recalculated for the FAO Fish. Tech.Rep.200 area was shown as Number 2 in Table 1.

Proposed Improvement

[Short term]

Two tentative options for improvement would be the followings.

Option1: Delete total catch in weight data during 1952 -1969 from the IOTC database and use the total catch in weight statistics in the FAO Fish. Tech. Rep. No.200 (or IPTP Atlas) for stock assessment.

Option2: Recalculate total catch in weight in IOTC areas (East and West Indian Oceans) using average weight of Tech200 AVW in Table 1 estimated by total catch in number in IOTC statistical area (Number 3 in Table 1) and total catch in weight of FAO Fish. Tech. Rep. No.200 (Tech200 Weight in Table 1). Total weight estimated for whole IOTC area by this method were listed as IOTC new Weight est in Table 1. Partially because of that the resolution of total catch weight statistics for billfishes in FAO Fish. Tech. Rep. No. 200 are not so high, their Tech 200 AVWs don't appear to be reliable while the Tech 200 AVW and newly estimated catch in weight for tunas seems to be reasonable. In anyway, further investigation would be necessary to complete the catch weight statistics especially for billfishes.

[Long term]

Some of the basic data (logbook and size data) are now being compiled with additional information of landing statistics. In mean time, it may be possible to re-estimate catch weight statistics in the future. However, it will take long time and it is too early to anticipate how good the re-estimation can be attained.

REFERENCE

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Table 1. Comparison of total catch in weight (MT), total catch in number of fish and calculated average weight (kg) for each species between three data sources. SBF: southern bluefin, ALB: albacore, BET: bigeye, YFT: yellowfin, SWO: swordfish, MLS: striped marlin, BLZ: blue marlin, BLM: black marlin.

				SBF									
Country	Area	Year	Gear	IOTC_DB Weight	Tech 200 Weight	IOTC_new Weight	Number1	Number2	Number3	IOTC_DB AVW	Tech 200 AVW	IOTC_new AVW	IOTC_new Weight_est
Japan	IO_ALL	1952	LL	14,100	556	-	6171	6173	6078	2,284.9	90.1	-	547
Japan	IO_ALL	1953	LL	12,100	3,809	-	49888	49888	48988	242.5	76.4	-	3,740
Japan	IO_ALL	1954	LL	13,600	2,182	-	30734	30734	29487	442.5	71.0	-	2,093
Japan	IO_ALL	1955	LL	15,900	2,915	-	24381	24381	23687	652.1	119.6	-	2,832
Japan	IO_ALL	1956	LL	15,500	14,880	-	118776	118776	117989	130.5	125.3	-	14,781
Japan	IO_ALL	1957	LL	13,600	14,175	-	193098	193098	191530	70.4	73.4	-	14,060
Japan	IO_ALL	1958	LL	10,000	8,556	-	119609	119611	119513	83.6	71.5	-	8,549
Japan	IO_ALL	1959	LL	25,302	48,469	-	693276	693276	693093	36.5	69.9	-	48,456
Japan	IO_ALL	1960	LL	25,308	70,212	-	1071924	1071924	1071511	23.6	65.5	-	70,185
Japan	IO_ALL	1961	LL	28,400	63,162	-	909615	909615	903516	31.2	69.4	-	62,738
Japan	IO_ALL	1962	LL	22,422	29,620	-	431526	400523	431419	52.0	74.0	-	31,905
Japan	IO_ALL	1963	LL	23,545	44,139	-	648684	599150	648385	36.3	73.7	-	47,766
Japan	IO_ALL	1964	LL	22,122	32,316	-	490307	467276	489983	45.1	69.2	-	33,886
Japan	IO_ALL	1965	LL	21,913	29,768	-	458787	405620	458723	47.8	73.4	-	33,665
Japan	IO_ALL	1966	LL	13,900	28,660	-	428286	366250	427956	32.5	78.3	-	33,489
Japan	IO_ALL	1967	LL	27,900	52,757	-	786882	733580	786800	35.5	71.9	-	56,584
Japan	IO_ALL	1968	LL	26,700	42,916	-	686229	589271	691742	38.9	72.8	-	50,379
Japan	IO_ALL	1969	LL	28,000	40,311	-	673022	598405	673679	41.6	67.4	-	45,382
Japan	IO_ALL	1970	LL	19,500		27,716			453792			61.1	
Japan	IO_ALL	1971	LL	22,600		25,404			421701			60.2	
Japan	IO_ALL	1972	LL	20,100		26,686			469472			56.8	
Japan	IO_ALL	1973	LL	19,500		24,098			443838			54.3	
Japan	IO_ALL	1974	LL	22,637		26,439			478608			55.2	
Japan	IO_ALL	1975	LL	16,019		18,608			322295			57.7	
Japan	IO_ALL	1976	LL	19,179		24,682			453865			54.4	
Japan	IO_ALL	1977	LL	16,734		20,489			366073			56.0	
Japan	IO_ALL	1978	LL	10,059		13,263			259096			51.2	
Japan	IO_ALL	1979	LL	10,293		12,968			253841			51.1	
Japan	IO_ALL	1980	LL	14,488		18,556			357176			52.0	
Japan	IO_ALL	1981	LL	12,861		14,335			294380			48.7	
Japan	IO_ALL	1982	LL	10,788		11,796			237979			49.6	
Japan	IO_ALL	1983	LL	17,297		18,385			366538			50.2	
Japan	IO_ALL	1984	LL	15,551		16,392			296186			55.3	
Japan	IO_ALL	1985	LL	13,794		15,790			250406			63.1	
Japan	IO_ALL	1986	LL	9,153		11,300			181117			62.4	
Japan	IO_ALL	1987	LL	8,397		10,972			151739			72.3	
Japan	IO_ALL	1988	LL	8,256		10,039			140830			71.3	
Japan	IO_ALL	1989	LL	8,915		10,050			143158			70.2	
Japan	IO_ALL	1990	LL	4,338		6,285			86292			72.8	
Japan	IO_ALL	1991	LL	2,475		4,720			97785			48.3	
Japan	IO_ALL	1992	LL	2,949		5,660			102135			55.4	
Japan	IO_ALL	1993	LL	1,822		2,943			79540			37.0	
Japan	IO_ALL	1994	LL	2,520		3,776			90130			41.9	
Japan	IO_ALL	1995	LL	3,145		3,407			69227			49.2	
Japan	IO_ALL	1996	LL	4,336		4,466			79135			56.4	
Japan	IO_ALL	1997	LL	4,558		4,746			96660			49.1	
Japan	IO_ALL	1998	LL	5,737		5,780			135786			42.6	
Japan	IO_ALL	1999	LL	4,956		5,032			118541			42.4	
Japan	IO_ALL	2000	LL	4,026		3,783			67780			55.8	
Japan	IO_ALL	2001	LL			5201			98519			52.8	

IOTC_DB Weight: Total catch in weight kept in the IOTC database.
Tech 200 Weight (IPTP1986 for ALB): Total catch in weight in FAO Fisheries Technical Report No.200 (Shiohama 1986 for ALB).
IOTC_New Weight: Total catch in weight calculated basing on the new IOTC area.
Number 1: Total catch in number in the area which is supposed to be used for estimation of total catch in weight 1952-1963 in the IOTC database.
Number 2: Total catch in number in the area which was used for Japanese longline catch in weight of FAO Fish. Tech. Rep. No.200 (Shiohama 1986 for ALB).
Number 3. Total catch in number calculated basing on the new IOTC area.
IOTC_DB AVW: Average weight estimated using IOTC_DB Weight and Number 1.
Tech 200 AVW (IPTP1986 AVW for ALB): Average weight estimated using Tech 200 Weight (IPTP1986 Weight for ALB) and Number 2.
IOTC_new AVW: Average weight estimated using IOTC_new Weight and Number 3.

IOTC_new Weight_est: Total catch in weight calculated with by Tech 200 AVW and Number 3.

Table 1. Continued.

				ALB									
Country	Area	Year	Gear	IOTC_DB Weight	PTP1986 weight	IOTC_new Weight	Number1	Number2	Number3	IOTC_DB AVW	PTP1986 AVW	IOTC_new AVW	IOTC_new Weight_est
Japan	IO_ALL	1952	LL	54	67	-	3400	3571	3244	15.9	18.8	-	61
Japan	IO_ALL	1953	LL	915	1,099	-	57180	57183	56932	16.0	19.2	-	1,094
Japan	IO_ALL	1954	LL	2,268	2,759	-	141747	141840	140549	16.0	19.5	-	2,734
Japan	IO_ALL	1955	LL	2,514	3,098	-	157109	157231	155275	16.0	19.7	-	3,059
Japan	IO_ALL	1956	LL	4,136	5,118	-	258468	258519	256345	16.0	19.8	-	5,075
Japan	IO_ALL	1957	LL	3,709	4,664	-	231815	231836	231713	16.0	20.1	-	4,662
Japan	IO_ALL	1958	LL	4,824	6,285	-	301491	301497	301486	16.0	20.8	-	6,285
Japan	IO_ALL	1959	LL	8,386	10,412	-	524127	524135	524014	16.0	19.9	-	10,410
Japan	IO_ALL	1960	LL	9,187	11,066	-	574187	574223	573999	16.0	19.3	-	11,062
Japan	IO_ALL	1961	LL	12,425	15,438	-	776538	776538	766646	16.0	19.9	-	15,241
Japan	IO_ALL	1962	LL	16,132	17,668	-	1010038	1008396	1007336	16.0	17.5	-	17,649
Japan	IO_ALL	1963	LL	11,768	12,546	-	721772	717640	718363	16.3	17.5	-	12,559
Japan	IO_ALL	1964	LL	15,300	17,874	-	1009564	1008329	1004935	15.2	17.7	-	17,814
Japan	IO_ALL	1965	LL	14,200	11,375	-	629632	627727	627244	22.6	18.1	-	11,366
Japan	IO_ALL	1966	LL	12,300	13,130	-	751567	749551	745420	16.4	17.5	-	13,058
Japan	IO_ALL	1967	LL	15,200	14,098	-	849582	847219	847471	17.9	16.6	-	14,102
Japan	IO_ALL	1968	LL	10,200	10,034	-	623070	621238	622402	16.4	16.2	-	10,053
Japan	IO_ALL	1969	LL	10,200	8,546	-	588960	587095	588508	17.3	14.6	-	8,567
Japan	IO_ALL	1970	LL	5,900		4,926			302293			16.3	
Japan	IO_ALL	1971	LL	2,900		3,318			227856			14.6	
Japan	IO_ALL	1972	LL	1,100		1,410			99518			14.2	
Japan	IO_ALL	1973	LL	1,800		1,982			144593			13.7	
Japan	IO_ALL	1974	LL	2,596		2,793			181689			15.4	
Japan	IO_ALL	1975	LL	1,188		1,262			79074			16.0	
Japan	IO_ALL	1976	LL	883		1,172			98747			11.9	
Japan	IO_ALL	1977	LL	313		405			33119			12.2	
Japan	IO_ALL	1978	LL	341		419			32215			13.0	
Japan	IO_ALL	1979	LL	266		393			31979			12.3	
Japan	IO_ALL	1980	LL	487		621			46676			13.3	
Japan	IO_ALL	1981	LL	1,381		1,186			86967			13.6	
Japan	IO_ALL	1982	LL	932		1,292			104690			12.3	
Japan	IO_ALL	1983	LL	1,263		1,669			140505			11.9	
Japan	IO_ALL	1984	LL	1,588		1,830			135795			13.5	
Japan	IO_ALL	1985	LL	2,328		2,280			175805			13.0	
Japan	IO_ALL	1986	LL	2,121		2,501			204106			12.3	
Japan	IO_ALL	1987	LL	1,641		2,269			160426			14.1	
Japan	IO_ALL	1988	LL	1,171		1,311			99266			13.2	
Japan	IO_ALL	1989	LL	776		890			67631			13.2	
Japan	IO_ALL	1990	LL	1,066		954			68334			14.0	
Japan	IO_ALL	1991	LL	830		983			60934			16.1	
Japan	IO_ALL	1992	LL	1,040		1,778			126574			14.0	
Japan	IO_ALL	1993	LL	895		1,281			95880			13.4	
Japan	IO_ALL	1994	LL	1,487		1,787			141034			12.7	
Japan	IO_ALL	1995	LL	2,043		2,039			147500			13.8	
Japan	IO_ALL	1996	LL	2,388		2,413			178737			13.5	
Japan	IO_ALL	1997	LL	2,870		3,233			274286			11.8	
Japan	IO_ALL	1998	LL	3,215		3,214			235663			13.6	
Japan	IO_ALL	1999	LL	2,319		2,283			156900			14.6	
Japan	IO_ALL	2000	LL	2,535		2,478			194531			12.7	
Japan	IO_ALL	2001	LL			3,009			223393			13.5	

Table 1. Continued.

				BET									
Country	Area	Year	Gear	IDTC_DB Weight	Tech200 Weight	IDTC_new Weight	Number1	Number2	Number3	IDTC_DB AVW	Tech 200 AVW	IDTC_new AVW	IDTC_new Weight_est
Japan	ID_ALL	1952	LL	702	1,500	-	20,763	28,065	5,236	33.8	53.4	-	280
Japan	ID_ALL	1953	LL	1,778	3,600	-	52,604	65,654	30,146	33.8	54.8	-	1,653
Japan	ID_ALL	1954	LL	4,627	7,900	-	136,526	144,136	123,157	33.9	54.8	-	6,750
Japan	ID_ALL	1955	LL	5,860	10,100	-	173,070	177,841	167,966	33.9	56.8	-	9,539
Japan	ID_ALL	1956	LL	9,482	13,400	-	280,531	293,899	268,568	33.8	45.6	-	12,245
Japan	ID_ALL	1957	LL	7,271	12,412	-	215,108	229,404	204,973	33.8	54.1	-	11,090
Japan	ID_ALL	1958	LL	6,407	11,295	-	190,817	202,076	181,643	33.6	55.9	-	10,153
Japan	ID_ALL	1959	LL	5,706	8,947	-	168,767	173,593	162,321	33.8	51.5	-	8,366
Japan	ID_ALL	1960	LL	9,754	15,652	-	314,449	323,722	306,366	31.0	48.4	-	14,813
Japan	ID_ALL	1961	LL	9,146	13,554	-	270,454	270,832	260,723	33.8	50.0	-	13,048
Japan	ID_ALL	1962	LL	14,169	18,715	-	419,264	431,850	398,711	33.8	43.3	-	17,279
Japan	ID_ALL	1963	LL	9,064	12,385	-	264,324	273,540	256,207	34.3	45.3	-	11,600
Japan	ID_ALL	1964	LL	14,000	16,751	-	334,380	341,675	326,550	41.9	49.0	-	16,009
Japan	ID_ALL	1965	LL	15,500	18,208	-	386,186	394,866	380,970	40.1	46.1	-	17,567
Japan	ID_ALL	1966	LL	17,400	22,629	-	478,793	489,857	462,970	36.3	46.2	-	21,387
Japan	ID_ALL	1967	LL	21,700	22,338	-	516,784	520,438	507,887	42.0	42.9	-	21,799
Japan	ID_ALL	1968	LL	22,400	24,623	-	541,453	552,789	530,126	41.4	44.5	-	23,614
Japan	ID_ALL	1969	LL	15,700	15,009	-	377,522	389,946	372,914	41.6	38.5	-	14,353
Japan	ID_ALL	1970	LL	12,300		12,709			337,718			37.6	
Japan	ID_ALL	1971	LL	10,800		11,186			284,690			39.3	
Japan	ID_ALL	1972	LL	8,900		8,349			209,349			39.9	
Japan	ID_ALL	1973	LL	5,100		5,161			134,231			38.4	
Japan	ID_ALL	1974	LL	6,782		6,886			178,857			38.5	
Japan	ID_ALL	1975	LL	5,622		5,525			142,894			38.7	
Japan	ID_ALL	1976	LL	2,098		2,108			56,396			37.4	
Japan	ID_ALL	1977	LL	2,968		3,138			84,313			37.2	
Japan	ID_ALL	1978	LL	10,349		10,904			262,184			41.6	
Japan	ID_ALL	1979	LL	4,183		4,207			106,146			39.6	
Japan	ID_ALL	1980	LL	5,903		5,899			148,153			39.8	
Japan	ID_ALL	1981	LL	8,395		7,774			191,270			40.6	
Japan	ID_ALL	1982	LL	11,687		11,394			283,475			40.2	
Japan	ID_ALL	1983	LL	18,425		18,332			427,542			42.9	
Japan	ID_ALL	1984	LL	13,516		14,022			345,525			40.6	
Japan	ID_ALL	1985	LL	16,502		17,239			409,626			42.1	
Japan	ID_ALL	1986	LL	16,204		15,757			382,451			41.2	
Japan	ID_ALL	1987	LL	14,744		15,509			381,505			40.7	
Japan	ID_ALL	1988	LL	12,149		12,254			295,152			41.5	
Japan	ID_ALL	1989	LL	6,905		7,701			182,083			42.3	
Japan	ID_ALL	1990	LL	9,309		8,222			198,553			41.4	
Japan	ID_ALL	1991	LL	7,140		7,768			207,922			37.4	
Japan	ID_ALL	1992	LL	4,786		5,628			132,917			42.3	
Japan	ID_ALL	1993	LL	6,911		8,317			214,279			38.8	
Japan	ID_ALL	1994	LL	14,543		17,483			392,597			44.5	
Japan	ID_ALL	1995	LL	15,862		17,210			393,342			43.8	
Japan	ID_ALL	1996	LL	15,340		16,454			382,152			43.1	
Japan	ID_ALL	1997	LL	16,442		18,805			429,611			43.8	
Japan	ID_ALL	1998	LL	17,106		17,125			405,409			42.2	
Japan	ID_ALL	1999	LL	14,004		13,997			347,912			40.2	
Japan	ID_ALL	2000	LL	12,777		12,956			321,322			40.3	
Japan	ID_ALL	2001	LL			12,823			314,880			40.7	

Table 1. Continued.

				YFT									
Country	Area	Year	Gear	IOTC_DB Weight	Tech 200 Weight	IOTC_new Weight	Number1	Number2	Number3	IOTC_DB AVW	Tech 200 AVW	IOTC_new AVW	IOTC_new Weight_est
Japan	IO_ALL	1952	LL	3,240	8,858	-	130,649	170,420	70,853	24.8	52.0	-	3,683
Japan	IO_ALL	1953	LL	5,957	13,258	-	240,205	275,805	140,572	24.8	48.1	-	6,757
Japan	IO_ALL	1954	LL	11,693	24,883	-	471,522	511,512	445,388	24.8	48.6	-	21,666
Japan	IO_ALL	1955	LL	24,103	46,459	-	971,906	993,035	943,951	24.8	46.8	-	44,163
Japan	IO_ALL	1956	LL	30,869	64,402	-	1,244,706	1,293,022	1,194,292	24.8	49.8	-	59,485
Japan	IO_ALL	1957	LL	18,059	36,036	-	728,192	769,914	680,780	24.8	46.8	-	31,864
Japan	IO_ALL	1958	LL	13,777	25,727	-	556,035	588,718	518,161	24.8	43.7	-	22,644
Japan	IO_ALL	1959	LL	14,836	24,428	-	598,232	621,096	563,988	24.8	39.3	-	22,182
Japan	IO_ALL	1960	LL	23,796	40,292	-	961,522	1,009,697	903,508	24.7	39.9	-	36,055
Japan	IO_ALL	1961	LL	21,562	34,551	-	869,438	870,858	824,965	24.8	39.7	-	32,730
Japan	IO_ALL	1962	LL	33,006	51,665	-	1,330,891	1,412,779	1,208,414	24.8	36.6	-	44,191
Japan	IO_ALL	1963	LL	15,911	25,888	-	656,216	694,793	589,927	24.2	37.3	-	21,981
Japan	IO_ALL	1964	LL	17,300	24,752	-	594,229	620,271	555,404	29.1	39.9	-	22,163
Japan	IO_ALL	1965	LL	20,900	27,579	-	766,722	812,954	734,742	27.3	33.9	-	24,926
Japan	IO_ALL	1966	LL	27,200	44,106	-	1,156,899	1,194,788	1,104,201	23.5	36.9	-	40,762
Japan	IO_ALL	1967	LL	27,800	31,597	-	903,699	912,822	871,408	30.8	34.6	-	30,163
Japan	IO_ALL	1968	LL	38,100	50,475	-	1,715,645	1,755,641	1,680,882	22.2	28.8	-	48,326
Japan	IO_ALL	1969	LL	22,700	25,228	-	770,680	818,575	749,968	29.5	30.8	-	23,114
Japan	IO_ALL	1970	LL	10,800		10,340			358,596			28.8	
Japan	IO_ALL	1971	LL	12,900		13,370			462,884			28.9	
Japan	IO_ALL	1972	LL	7,800		7,884			286,849			27.5	
Japan	IO_ALL	1973	LL	3,400		3,934			135,233			29.1	
Japan	IO_ALL	1974	LL	4,415		4,949			170,491			29.0	
Japan	IO_ALL	1975	LL	4,719		6,420			223,050			28.8	
Japan	IO_ALL	1976	LL	2,744		2,778			93,004			29.9	
Japan	IO_ALL	1977	LL	2,061		2,100			76,374			27.5	
Japan	IO_ALL	1978	LL	4,024		4,621			147,879			31.2	
Japan	IO_ALL	1979	LL	2,023		3,294			119,016			27.7	
Japan	IO_ALL	1980	LL	3,304		3,236			99,513			32.5	
Japan	IO_ALL	1981	LL	4,699		4,915			158,848			30.9	
Japan	IO_ALL	1982	LL	6,355		7,280			227,548			32.0	
Japan	IO_ALL	1983	LL	7,039		7,792			239,434			32.5	
Japan	IO_ALL	1984	LL	7,467		7,903			245,275			32.2	
Japan	IO_ALL	1985	LL	9,263		9,464			280,621			33.7	
Japan	IO_ALL	1986	LL	10,955		10,704			311,337			34.4	
Japan	IO_ALL	1987	LL	7,552		8,308			237,875			34.9	
Japan	IO_ALL	1988	LL	8,554		9,255			265,810			34.8	
Japan	IO_ALL	1989	LL	3,568		4,592			129,461			35.5	
Japan	IO_ALL	1990	LL	6,192		6,336			175,226			36.2	
Japan	IO_ALL	1991	LL	3,847		4,388			122,309			35.9	
Japan	IO_ALL	1992	LL	3,843		5,740			141,772			40.5	
Japan	IO_ALL	1993	LL	3,377		5,713			171,744			33.3	
Japan	IO_ALL	1994	LL	6,965		9,717			252,585			38.5	
Japan	IO_ALL	1995	LL	7,954		8,026			220,754			36.4	
Japan	IO_ALL	1996	LL	12,012		12,807			325,062			39.4	
Japan	IO_ALL	1997	LL	13,466		15,600			381,139			40.9	
Japan	IO_ALL	1998	LL	16,534		16,803			440,680			38.1	
Japan	IO_ALL	1999	LL	14,926		14,662			408,702			35.9	
Japan	IO_ALL	2000	LL	14,285		14,563			407,326			35.8	
Japan	IO_ALL	2001	LL			13,594			391,965			34.7	

Table 1. Continued.

				SWO									
Country	Area	Year	Gear	IDTC_DB Weight	Tech 200 Weight	IDTC_new Weight	Number1	Number2	Number3	IDTC_DB AVW	Tech 200 AVW	IDTC_new AVW	IDTC_new Weight_est
Japan	ID_ALL	1952	LL	24	100	-	447	909	89	53.7	110.0	-	10
Japan	ID_ALL	1953	LL	93	100	-	1699	2359	728	54.7	42.4	-	31
Japan	ID_ALL	1954	LL	200	200	-	3618	4047	3286	55.3	49.4	-	162
Japan	ID_ALL	1955	LL	263	200	-	4608	4875	4351	57.1	41.0	-	179
Japan	ID_ALL	1956	LL	599	500	-	10441	10964	10083	57.4	45.6	-	460
Japan	ID_ALL	1957	LL	449	300	-	7924	8232	7631	56.7	36.4	-	278
Japan	ID_ALL	1958	LL	700	500	-	12422	12591	12149	56.4	39.7	-	482
Japan	ID_ALL	1959	LL	653	500	-	11527	11704	11324	56.6	42.7	-	484
Japan	ID_ALL	1960	LL	870	600	-	15295	15599	14990	56.9	38.5	-	577
Japan	ID_ALL	1961	LL	960	700	-	16863	16884	16482	56.9	41.5	-	683
Japan	ID_ALL	1962	LL	1,286	900	-	22441	23212	21627	57.3	38.8	-	839
Japan	ID_ALL	1963	LL	970	700	-	17282	17975	16356	56.1	38.9	-	637
Japan	ID_ALL	1964	LL	1,300	900	-	21206	21871	20493	61.3	41.2	-	843
Japan	ID_ALL	1965	LL	1,600	1,100	-	25126	25889	24594	63.7	42.5	-	1,045
Japan	ID_ALL	1966	LL	1,300	1,200	-	28588	29437	27415	45.5	40.8	-	1,118
Japan	ID_ALL	1967	LL	2,100	1,600	-	39644	39827	38950	53.0	40.2	-	1,565
Japan	ID_ALL	1968	LL	1,900	1,200	-	30274	31443	28091	62.8	38.2	-	1,072
Japan	ID_ALL	1969	LL	1,900	1,200	-	30955	31748	30334	61.4	37.8	-	1,147
Japan	ID_ALL	1970	LL	1600		1,192			26762			44.5	
Japan	ID_ALL	1971	LL	1000		1,058			23072			45.9	
Japan	ID_ALL	1972	LL	700		939			21163			44.4	
Japan	ID_ALL	1973	LL	700		817			16560			49.3	
Japan	ID_ALL	1974	LL	632		774			16905			45.8	
Japan	ID_ALL	1975	LL	653		786			17079			46.0	
Japan	ID_ALL	1976	LL	316		428			8993			47.6	
Japan	ID_ALL	1977	LL	189		287			5915			48.5	
Japan	ID_ALL	1978	LL	776		915			20265			45.2	
Japan	ID_ALL	1979	LL	435		554			11895			46.6	
Japan	ID_ALL	1980	LL	446		602			12761			47.2	
Japan	ID_ALL	1981	LL	642		753			16220			46.4	
Japan	ID_ALL	1982	LL	790		980			21552			45.5	
Japan	ID_ALL	1983	LL	992		1,176			25663			45.8	
Japan	ID_ALL	1984	LL	998		1,320			28302			46.6	
Japan	ID_ALL	1985	LL	1665		2,164			46618			46.4	
Japan	ID_ALL	1986	LL	1150		1,343			30261			44.4	
Japan	ID_ALL	1987	LL	1117		1,367			30358			45.0	
Japan	ID_ALL	1988	LL	1095		1,452			33369			43.5	
Japan	ID_ALL	1989	LL	667		954			20911			45.6	
Japan	ID_ALL	1990	LL	853		1,022			22743			44.9	
Japan	ID_ALL	1991	LL	410		895			19683			45.5	
Japan	ID_ALL	1992	LL	1151		1,728			24569			70.3	
Japan	ID_ALL	1993	LL	882		1,420			24273			58.5	
Japan	ID_ALL	1994	LL	1359		2,588			39078			66.2	
Japan	ID_ALL	1995	LL	1675		1,687			26605			63.4	
Japan	ID_ALL	1996	LL	2069		2,107			32981			63.9	
Japan	ID_ALL	1997	LL	2375		2,772			46209			60.0	
Japan	ID_ALL	1998	LL	2246		2,241			38936			57.6	
Japan	ID_ALL	1999	LL	1561		1,538			25878			59.4	
Japan	ID_ALL	2000	LL	1555		1,519			24991			60.8	
Japan	ID_ALL	2001	LL			1,237			21147			58.5	

Table 1. Continued.

				MLS									
Country	Area	Year	Gear	IDTC_DB Weight	Tech 200 Weight	IDTC_new Weight	Number1	Number2	Number3	IDTC_DB AVW	Tech 200 AVW	IDTC_new AVW	IDTC_new Weight_est
Japan	ID_ALL	1952	LL	145	100	-	2852	3053	2367	50.8	32.8	-	78
Japan	ID_ALL	1953	LL	362	300	-	7129	7415	6591	50.8	40.5	-	267
Japan	ID_ALL	1954	LL	1,037	800	-	20997	21212	20844	49.4	37.7	-	786
Japan	ID_ALL	1955	LL	887	800	-	19152	19267	18913	46.3	41.5	-	785
Japan	ID_ALL	1956	LL	2,144	1,800	-	45227	45424	44780	47.4	39.6	-	1,774
Japan	ID_ALL	1957	LL	2,438	1,800	-	49565	49844	49251	49.2	36.1	-	1,779
Japan	ID_ALL	1958	LL	2,266	1,700	-	46291	46545	45944	49.0	36.5	-	1,678
Japan	ID_ALL	1959	LL	2,666	2,100	-	56186	56631	55869	47.4	37.1	-	2,072
Japan	ID_ALL	1960	LL	2,476	2,000	-	52074	52608	51786	47.5	38.0	-	1,969
Japan	ID_ALL	1961	LL	3,130	2,400	-	64990	65063	64045	48.2	36.9	-	2,362
Japan	ID_ALL	1962	LL	2,240	1,800	-	47803	48022	47374	46.9	37.5	-	1,776
Japan	ID_ALL	1963	LL	1,594	1,300	-	33597	33787	33360	47.4	38.5	-	1,284
Japan	ID_ALL	1964	LL	1,900	1,400	-	38033	38092	37780	50.0	36.8	-	1,389
Japan	ID_ALL	1965	LL	3,400	3,000	-	81350	81430	81129	41.8	36.8	-	2,989
Japan	ID_ALL	1966	LL	3,800	3,900	-	105479	105526	105182	36.0	37.0	-	3,887
Japan	ID_ALL	1967	LL	5,600	4,200	-	114485	114491	114395	48.9	36.7	-	4,196
Japan	ID_ALL	1968	LL	3,000	2,300	-	63359	63450	63160	47.3	36.2	-	2,289
Japan	ID_ALL	1969	LL	2,900	2,200	-	59229	59244	59176	49.0	37.1	-	2,197
Japan	ID_ALL	1970	LL	2,000		1,620			45108			35.9	
Japan	ID_ALL	1971	LL	1,000		1,045			28453			36.7	
Japan	ID_ALL	1972	LL	900		760			21197			35.9	
Japan	ID_ALL	1973	LL	500		540			14493			37.3	
Japan	ID_ALL	1974	LL	1,303		1,358			37462			36.3	
Japan	ID_ALL	1975	LL	913		908			24907			36.5	
Japan	ID_ALL	1976	LL	573		494			14279			34.6	
Japan	ID_ALL	1977	LL	520		539			12752			42.3	
Japan	ID_ALL	1978	LL	1,784		1,795			43781			41.0	
Japan	ID_ALL	1979	LL	1,197		1,110			24977			44.4	
Japan	ID_ALL	1980	LL	1,213		1,106			24181			45.7	
Japan	ID_ALL	1981	LL	1,240		913			21261			42.9	
Japan	ID_ALL	1982	LL	719		618			15372			40.2	
Japan	ID_ALL	1983	LL	756		621			15617			39.8	
Japan	ID_ALL	1984	LL	1,157		990			25150			39.4	
Japan	ID_ALL	1985	LL	1,046		966			24955			38.7	
Japan	ID_ALL	1986	LL	1,104		977			24301			40.2	
Japan	ID_ALL	1987	LL	661		673			15822			42.5	
Japan	ID_ALL	1988	LL	309		285			6478			44.0	
Japan	ID_ALL	1989	LL	157		134			3080			43.5	
Japan	ID_ALL	1990	LL	149		112			2479			45.2	
Japan	ID_ALL	1991	LL	152		159			3690			43.1	
Japan	ID_ALL	1992	LL	180		190			3431			55.4	
Japan	ID_ALL	1993	LL	93		113			2409			46.9	
Japan	ID_ALL	1994	LL	194		199			4685			42.5	
Japan	ID_ALL	1995	LL	222		216			4792			45.1	
Japan	ID_ALL	1996	LL	281		270			5971			45.2	
Japan	ID_ALL	1997	LL	348		350			7427			47.1	
Japan	ID_ALL	1998	LL	272		273			6014			45.4	
Japan	ID_ALL	1999	LL	288		282			6221			45.3	
Japan	ID_ALL	2000	LL	311		321			6756			47.5	
Japan	ID_ALL	2001	LL			136			2931			46.4	

Table 1. Continued.

				BLZ									
Country	Area	Year	Gear	IOTC_DB Weight	Tech 200 Weight	IOTC_new Weight	Number1	Number2	Number3	IOTC_DB AVW	Tech 200 AVW	IOTC_new AVW	IOTC_new Weight_est
Japan	IO_ALL	1952	LL	1,473	800	-	9199	11801	5757	160.1	67.8	-	390
Japan	IO_ALL	1953	LL	4,400	2,000	-	27478	31351	19790	160.1	63.8	-	1,262
Japan	IO_ALL	1954	LL	7,232	3,300	-	47119	50526	45487	153.5	65.3	-	2,971
Japan	IO_ALL	1955	LL	6,271	3,600	-	50611	52415	49505	123.9	68.7	-	3,400
Japan	IO_ALL	1956	LL	9,198	5,000	-	73568	76007	71940	125.0	65.8	-	4,732
Japan	IO_ALL	1957	LL	7,434	3,800	-	57147	58285	56267	130.1	65.2	-	3,668
Japan	IO_ALL	1958	LL	7,187	4,100	-	62353	63510	61385	115.3	64.6	-	3,963
Japan	IO_ALL	1959	LL	7,323	4,300	-	64386	65219	63427	113.7	65.9	-	4,182
Japan	IO_ALL	1960	LL	6,674	3,700	-	55808	57245	55196	119.6	64.6	-	3,568
Japan	IO_ALL	1961	LL	5,372	3,200	-	48648	49217	48034	110.4	65.0	-	3,123
Japan	IO_ALL	1962	LL	5,433	3,100	-	45861	47897	44492	118.5	64.7	-	2,880
Japan	IO_ALL	1963	LL	3,249	1,800	-	26513	28050	26025	122.5	64.2	-	1,670
Japan	IO_ALL	1964	LL	4,700	2,900	-	43067	43868	42217	109.1	66.1	-	2,791
Japan	IO_ALL	1965	LL	4,800	3,300	-	49801	50623	49349	96.4	65.2	-	3,217
Japan	IO_ALL	1966	LL	5,200	3,300	-	49918	50531	48923	104.2	65.3	-	3,195
Japan	IO_ALL	1967	LL	6,100	3,400	-	51458	51732	50882	118.5	65.7	-	3,344
Japan	IO_ALL	1968	LL	4,600	2,300	-	33509	34826	32226	137.3	66.0	-	2,128
Japan	IO_ALL	1969	LL	3,700	1,800	-	26199	26949	25775	141.2	66.8	-	1,722
Japan	IO_ALL	1970	LL	2,500		1,249			17028			73.3	
Japan	IO_ALL	1971	LL	1,600		952			13720			69.4	
Japan	IO_ALL	1972	LL	1,500		914			13835			66.1	
Japan	IO_ALL	1973	LL	800		566			7929			71.4	
Japan	IO_ALL	1974	LL	1,256		904			12194			74.1	
Japan	IO_ALL	1975	LL	1,084		659			8964			73.5	
Japan	IO_ALL	1976	LL	623		304			4375			69.5	
Japan	IO_ALL	1977	LL	342		252			3298			76.4	
Japan	IO_ALL	1978	LL	1,021		949			12061			78.7	
Japan	IO_ALL	1979	LL	542		410			5303			77.3	
Japan	IO_ALL	1980	LL	789		643			7714			83.4	
Japan	IO_ALL	1981	LL	960		805			10040			80.2	
Japan	IO_ALL	1982	LL	1,185		1,098			14870			73.8	
Japan	IO_ALL	1983	LL	1,695		1,617			22300			72.5	
Japan	IO_ALL	1984	LL	1,616		1,478			18574			79.6	
Japan	IO_ALL	1985	LL	1,585		1,487			20249			73.4	
Japan	IO_ALL	1986	LL	1,328		1,237			16561			74.7	
Japan	IO_ALL	1987	LL	931		933			12927			72.2	
Japan	IO_ALL	1988	LL	807		771			9739			79.2	
Japan	IO_ALL	1989	LL	372		355			4513			78.7	
Japan	IO_ALL	1990	LL	506		315			4097			76.9	
Japan	IO_ALL	1991	LL	227		228			2968			76.8	
Japan	IO_ALL	1992	LL	292		298			3101			96.1	
Japan	IO_ALL	1993	LL	244		297			3729			79.6	
Japan	IO_ALL	1994	LL	597		594			7712			77.0	
Japan	IO_ALL	1995	LL	425		416			5164			80.6	
Japan	IO_ALL	1996	LL	582		574			7092			80.9	
Japan	IO_ALL	1997	LL	1,162		1,169			14989			78.0	
Japan	IO_ALL	1998	LL	1,164		1,173			15603			75.2	
Japan	IO_ALL	1999	LL	806		794			10714			74.1	
Japan	IO_ALL	2000	LL	840		886			11535			76.8	
Japan	IO_ALL	2001	LL			451			5913			76.3	

Table 1. Continued.

				BLM									
Country	Area	Year	Gear	IOTC_DB Weight	Tech 200 Weight	IOTC_new Weight	Number1	Number2	Number3	IOTC_DB AVW	Tech 200 AVW	IOTC_new AVW	IOTC_new Weight_est
Japan	IO_ALL	1952	LL	568	300	-	5916	8237	3608	96.0	36.4	-	131
Japan	IO_ALL	1953	LL	1,669	800	-	17395	21146	12846	95.9	37.8	-	486
Japan	IO_ALL	1954	LL	2,395	1,100	-	25233	30316	22344	94.9	36.3	-	811
Japan	IO_ALL	1955	LL	2,232	1,100	-	24389	29758	22389	91.5	37.0	-	828
Japan	IO_ALL	1956	LL	3,745	1,500	-	40819	46484	38013	91.7	32.3	-	1,227
Japan	IO_ALL	1957	LL	3,303	1,400	-	35550	38942	34078	92.9	36.0	-	1,225
Japan	IO_ALL	1958	LL	2,753	1,200	-	29953	31905	26927	91.9	37.6	-	1,013
Japan	IO_ALL	1959	LL	2,608	1,200	-	28335	32222	26604	92.0	37.2	-	991
Japan	IO_ALL	1960	LL	3,779	1,700	-	40930	47866	38808	92.3	35.5	-	1,378
Japan	IO_ALL	1961	LL	3,199	1,400	-	35470	39402	34072	90.2	35.5	-	1,211
Japan	IO_ALL	1962	LL	4,089	1,800	-	44824	48685	41653	91.2	37.0	-	1,540
Japan	IO_ALL	1963	LL	2,368	1,100	-	25677	30046	23246	92.2	36.6	-	851
Japan	IO_ALL	1964	LL	3,077	1,300	-	33710	35591	31140	91.3	36.5	-	1,137
Japan	IO_ALL	1965	LL	2,691	1,100	-	29627	30902	28486	90.8	35.6	-	1,014
Japan	IO_ALL	1966	LL	2,782	1,200	-	30855	33101	28530	90.2	36.3	-	1,034
Japan	IO_ALL	1967	LL	3,133	1,300	-	35443	35868	34132	88.4	36.2	-	1,237
Japan	IO_ALL	1968	LL	4,117	1,700	-	44490	47418	40762	92.5	35.9	-	1,461
Japan	IO_ALL	1969	LL	3,191	1,300	-	34720	36209	33779	91.9	35.9	-	1,213
Japan	IO_ALL	1970	LL	2,284		1,087			23876			45.5	
Japan	IO_ALL	1971	LL	1,508		747			14997			49.8	
Japan	IO_ALL	1972	LL	467		341			5388			63.3	
Japan	IO_ALL	1973	LL	422		210			3959			53.0	
Japan	IO_ALL	1974	LL	927		414			8416			49.2	
Japan	IO_ALL	1975	LL	1,020		415			9605			43.2	
Japan	IO_ALL	1976	LL	405		195			4299			45.4	
Japan	IO_ALL	1977	LL	184		103			1673			61.6	
Japan	IO_ALL	1978	LL	377		360			5571			64.6	
Japan	IO_ALL	1979	LL	248		172			2673			64.3	
Japan	IO_ALL	1980	LL	382		239			4013			59.6	
Japan	IO_ALL	1981	LL	399		275			4272			64.4	
Japan	IO_ALL	1982	LL	345		280			4123			67.9	
Japan	IO_ALL	1983	LL	459		408			6250			65.3	
Japan	IO_ALL	1984	LL	693		620			10746			57.7	
Japan	IO_ALL	1985	LL	574		466			7578			61.5	
Japan	IO_ALL	1986	LL	437		328			5008			65.5	
Japan	IO_ALL	1987	LL	270		278			4140			67.1	
Japan	IO_ALL	1988	LL	223		197			2809			70.1	
Japan	IO_ALL	1989	LL	116		109			1552			70.2	
Japan	IO_ALL	1990	LL	116		88			1252			70.3	
Japan	IO_ALL	1991	LL	54		61			830			73.5	
Japan	IO_ALL	1992	LL	69		80			856			93.5	
Japan	IO_ALL	1993	LL	50		68			705			96.5	
Japan	IO_ALL	1994	LL	67		71			766			92.7	
Japan	IO_ALL	1995	LL	101		95			974			97.5	
Japan	IO_ALL	1996	LL	69		63			676			93.2	
Japan	IO_ALL	1997	LL	111		117			1300			90.0	
Japan	IO_ALL	1998	LL	171		170			2164			78.6	
Japan	IO_ALL	1999	LL	199		187			2107			88.8	
Japan	IO_ALL	2000	LL	132		135			1395			96.8	
Japan	IO_ALL	2001	LL			70			725			96.6	

Table 2. Total catch in weight statistics of Japanese longline fishery in the FAO database.

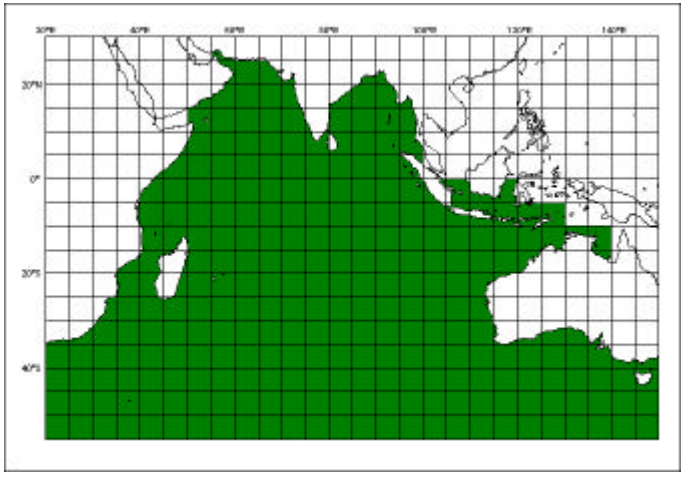
	Species								
Year	SBF	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SFA
1952	14,100	-	-	-	-	-	-	-	-
1953	12,100	-	-	-	-	-	-	-	-
1954	13,600	-	-	-	-	-	-	-	-
1955	15,900	-	-	-	-	-	-	-	-
1956	15,500	-	-	-	-	-	-	-	-
1957	13,600	-	-	-	-	-	-	-	-
1958	10,000	-	-	-	-	-	-	-	-
1959	25,300	-	-	-	-	-	-	-	-
1960	25,300	-	-	-	-	-	-	-	-
1961	28,400	-	-	-	-	-	-	-	-
1962	22,400	-	-	-	-	-	-	-	-
1963	23,500	-	-	-	-	-	-	-	-
1964	22,100	15,300	14,000	17,300	1300	1,900	4,700	-	600
1965	21,900	14,200	15,400	20,900	1600	3,400	4,800	-	1100
1966	13,900	12,300	17,400	27,200	1300	3,800	5,200	-	800
1967	27,900	15,200	21,700	27,800	2,100	5,600	6,100	-	2,100
1968	26,700	10,200	22,400	38,100	1,900	3,000	4,600	-	1500
1969	28,000	10,200	15,700	22,700	1,900	2,900	3,700	-	1100
1970	19,500	5,900	12,300	10,800	1,600	2,000	2,500	-	800

Table 3. Data source of total catch in weight in the IOTC database.

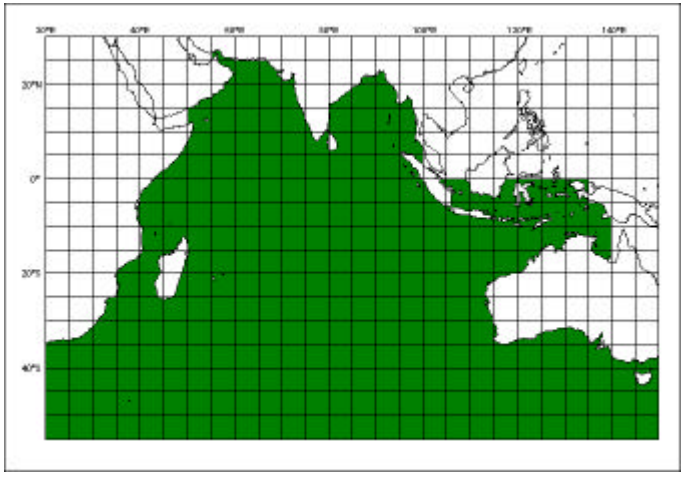
Year	SBF	ALB	BET	YFT	SWO	MLS	BLZ	BLM	SFA
1952	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1953	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1954	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1955	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1956	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1957	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1958	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1959	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1960	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1961	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1962	FAO	FAO	FAO	FAO	IOTC	IOTC	IOTC	IOTC	IOTC
1963	FAO	IOTC	IOTC	IOTC	IOTC	IOTC	IOTC	IOTC	IOTC
1964	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1965	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1966	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1967	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1968	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1969	FAO	FAO	FAO	FAO	FAO	FAO	FAO	IOTC	FAO
1970	LO	LO	LO	LO	LO	LO	LO	IOTC	LO

FAO: Data from FAO databases
IOTC: Estimated by IOTC
LO: Reported by Liaison Officer

A.



B.



C.

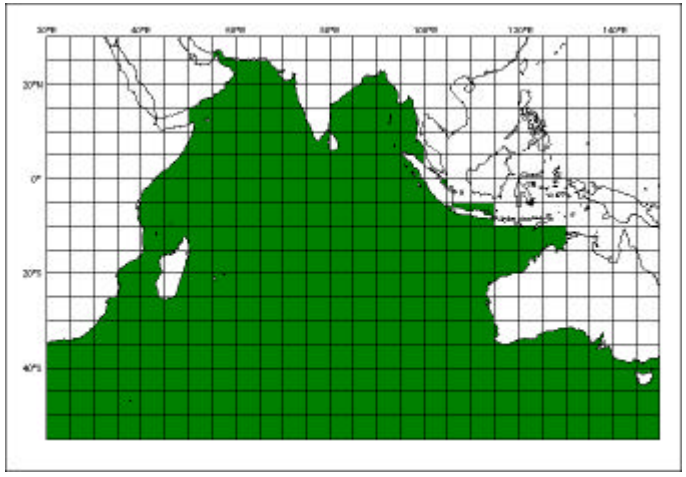


Fig. 1. Area definitions used in catch calculation in this study.

A: Area which is supposed to be used for estimatation of total weight 1952-1963 of current IOTC database. This area was used for calculation Number 1 in Table 1.

B: Area used to culculate total weight of FAO Fish. Tech. Rep. No. 200. This area was used for calculation Number 2 in Table 1.

C: Area used to culculate total catch in weight and number (Number 3 in Table 1) in the new IOTC area.