



ISC/09/BILLWG-2/07

Input Data of Japanese Catch Amount of a North Pacific Swordfish Stock Assessment

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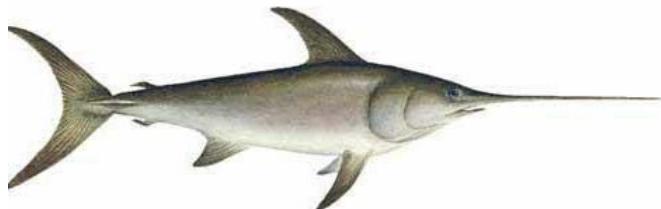
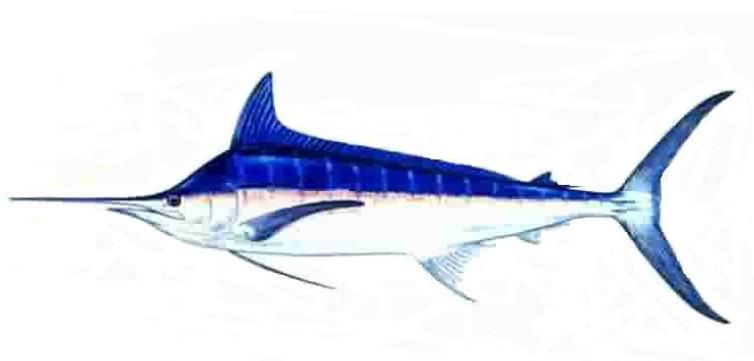
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Abstract

This report provides input data of Japanese catch amount between 1951 and 2007 for the stock assessment of the North Pacific swordfish. The input data was obtained by Japanese year books and log books, and was estimated separately by stock scenario (Ichinokawa and Brodziak, 2008), sub-area, quarter, and gear designated by the WG (Kimoto and Yokawa, 2009). There were several gear types: Japanese offshore and distant-water longline, coastal longline, other longline, squid drift net, drift net, bait fishing, net fishing, trap net, and others-primarily harpoon. The area stratification for sub-area in each stock scenario was followed by Sun *et al.* (2008).

Introduction

This report provides input data of Japanese catch amount for the stock assessment of the North Pacific swordfish. Because the ISC Billfish Working Group decided to conduct the stock assessment of the North Pacific swordfish with the two stock structure scenarios, the input data was estimated separately by stock scenario, sub-area, quarter, and gear designated by the WG (Kimoto and Yokawa, 2009).

Methods

Japanese catch amount (mt) of the North Pacific swordfish between 1951 and 2007 was compiled for each stock scenario using swordfish catch data obtained by Japanese year books and log books. Catch amount was provided separately by stock scenario, sub-area, quarter, and gear. There were several gear types: Japanese offshore and distant-water longline, coastal longline, other longline, squid drift net, drift net, bait fishing, net fishing, trap net, and others-primarily harpoon. The area stratification for sub-area in each stock scenario was followed by Sun *et al.* (2008).

Offshore and distant-water longline

Catch number information on the operations of Japanese offshore and distant-water longliners was available since 1952, when the collection of log book is initiated by Japan Fishery Agency. This study used aggregated catch data by month and 5x5 degree grids. Detailed catch weight information (by 5x5 degree and by month) was estimated from size sampling data, but it is available only since 1971. Due to the lack of the detailed data of the catch weight in between 1952 and 1970, they were obtained by multiplying the detailed catch number data by the average weight which was estimated by area and by quarter using data in the period between 1971 and 1990. For the calculation of the average weight, the area stratification for each stock scenario was used. Since 1994, Japanese log-book system for the offshore and distant-water longliner started to collect average weight of major species by each operation, and this information was used for the calculation of areal and seasonal catch weight of swordfish.

Catch amount between 1952 and 2007 by Japanese offshore and distant-water longline was estimated separately by stock scenario, sub-area, and quarter. The catch amount in 1951 was obtained by apportioning the year book data in the same ratio as 1952.

Coastal and other longline, bait fishing, net fishing, and trap net

Japan Fishery Agency also started to collect the log book of Japanese coastal longliners (defined as the longline boat of 10 – 19.99 tons) in 1994, and catch weight data was collected since 1998. Fishing grounds of the coastal longliners are in sub-areas 1 and 4. Same as the case of offshore and distant-water longline, the aggregated catch data by month and 5x5 degree grids was used. The catch number data was used for the estimation of areal and seasonal catch of swordfish by coastal longliners, because they showed a quite similar trend to the catch weight data, and they have longer period compared to the catch weight data. Because the exact coverage of log-book was not available for the coastal longliners, the ratio of catch number by area and quarter was used to apportion the total annual catch by coastal longliners appeared in the year book.

Catch amount between 1994 and 2007 by Japanese coastal longline was estimated separately by stock scenario, sub-area, and quarter by apportioning the year book data in the ratio of catch number. For the catch before 1993, the average ratio of catch number by area and quarter in between 1994 and 1998 was used to apportion the total annual catch from year book.

For other longline, bait fishing, net fishing, and trap net, the ratio of catch number, estimated for the coastal longline between 1951 and 2007, was used to apportion the total annual catch from year book to each area and quarter in each stock scenario.

Drift net, Squid drift net, and others-primarily harpoon

Japan Fishery Agency also collected the log book of Japanese driftnet in between 1977 and 1993. Because the catch weight information is not available, this study used aggregated catch number data by month and 5x5 degree grids. The ratio of catch umber by stock scenario, sub-area, and quarter was calculated to apportion the year book data. The ratio of catch number before 1976 was assumed to be same as 1977. Due to the moratorium, which prohibited the operation of drift nets in the high seas area, the ratio of catch number in sub-area 1 and 4 after 1994 was set to be same as the average ratio between 1991 and 1993.

For the catch amount by drift net, squid drift net, and others (primarily harpoon), the estimated ratio of catch number in the drift net was used to apportion the catch data from year book to each area and quarter in each stock scenario.

Results and Discussions

North Pacific swordfish catch data (mt) between 1951 and 2007 were compiled annually by gear type separately for each stock scenario (Tables 1 – 3).

For offshore and distant-water longline data, due to the lack of the detailed data of catch weight before 1970, the average weight in the period between 1971 and 1990 was used to obtain the estimation of the catch weight. It is thought to be suitable to use the average weight, because the average weight was quite similar in all quarters through the period between 1971 and 1990, and it is considered that the drastic change after 1970 in biomass was not observed compared to before 1970 from the result of the standardized CPUE (Kimoto and Yokawa, 2009).

Large mesh drift net and others-primarily harpoon caught relatively large amount of catch, but the detailed data, such as the size data or fishing season, is still not available. Though the detailed data such as log books and size sampling has started to be collected in a recent year, it is necessary to continue to accumulate the detailed data.

Bait fishing, net fishing, or trap net caught a small amount of swordfish as an accidental catch, and they are operating in the coastal area. Therefore, it was considered that the ratio of catch by these fisheries could be assumed same as those of the coastal longline.

References

- Ichinokawa, M., J. Brodziak. 2008. Stock boundary between possible swordfish stocks in the northwest and southeast Pacific judged from fisheries data of Japanese longliners. ISC/08/BILLWG-SS/04.
- Kimoto, A., and K. Yokawa. 2009. Update of the Catch per Unit Effort (CPUE) trend of Swordfish (*Xiphias gladius*) by the Japanese offshore and distant-water longline fishery in the Pacific. ISC/09/ BILLWG-1/15.
- Sun, C.-L., S.-Z. Yeh, and N.-J. Su. 2009. Standardization of Taiwanese distant water tuna

longline catch rates for swordfish in the North Pacific, 1995-2007, based on two stock structure scenarios. ISC/09/ BILLWG-1/17.

Table 1. Stock Scenario-1 Japanese swordfish catches (mt) by fisheries, 1951-2007; “-“ indicates no effort or data not available, “0” indicates less than 1 metric ton, and catch of 2006 and 2007 are preliminary (*).

area	Offshore and Distant-water longline																Coastal longline								Other longline								Squid drift net													
	1				2				3				4				5				6				1				4				1				2				4					
	quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4									
1951	3409	808	648	1852	235	5	28	184	0	0	0	0	21	5	1	7	7	16	5	16	0	0	0	0	-	-	-	-	-	33	13	9	36	7	7	7	4	-	-	-	-					
1952	4183	991	795	2272	288	6	34	225	0	0	0	0	25	6	1	9	8	19	6	20	0	0	0	0	-	-	-	-	-	43	18	12	47	9	10	9	5	-	-	-	-					
1953	3955	1822	264	3650	305	6	294	412	0	0	0	0	5	3	2	17	24	13	13	0	0	0	0	-	-	-	-	-	22	9	6	24	4	5	4	3	-	-	-	-						
1954	5452	3234	657	1049	386	3	138	1589	0	0	0	0	7	5	3	9	4	10	3	1	0	0	0	13	-	-	-	-	28	11	7	30	5	6	5	3	-	-	-	-						
1955	2496	2328	69	789	2786	1046	82	3382	0	0	0	0	13	8	3	12	9	14	7	8	1	0	0	0	8	-	-	-	-	8	3	2	9	2	2	1	-	-	-	-						
1956	3037	2196	21	932	4265	693	50	3312	4	0	0	0	1	14	14	3	10	25	5	6	4	0	0	1	3	-	-	-	-	3	1	1	3	1	1	1	0	-	-	-	-					
1957	5235	2297	72	2411	2057	391	15	1609	0	0	0	1	25	11	4	14	20	17	27	26	0	7	24	5	-	-	-	-	-	11	4	3	11	2	2	2	1	-	-	-	-					
1958	7163	2093	153	2884	1820	1098	298	2816	0	0	1	6	12	21	3	17	45	46	30	10	1	0	6	3	-	-	-	-	-	12	5	3	13	2	3	2	1	-	-	-	-					
1959	4663	1701	1473	2342	2132	791	1166	2754	0	0	1	1	45	19	1	20	44	35	15	4	2	3	9	14	-	-	-	-	-	19	8	5	20	4	4	4	2	-	-	-	-					
1960	6320	1366	947	2383	3013	1335	572	3936	3	7	3	5	30	13	3	17	18	11	13	9	0	11	30	15	-	-	-	-	-	15	6	4	16	3	3	2	-	-	-	-						
1961	3737	1576	1339	1060	4230	1120	532	5483	1	8	11	2	45	12	8	95	31	56	107	14	9	72	124	44	-	-	-	-	-	14	6	4	16	3	3	2	-	-	-	-						
1962	1113	351	123	461	2927	1059	339	3509	1	8	3	6	58	16	14	31	26	25	26	21	25	275	126	63	-	-	-	-	-	22	9	6	24	4	5	4	3	-	-	-	-					
1963	577	373	160	1195	2685	237	360	3697	74	7	10	139	25	7	10	96	33	101	27	21	69	156	168	95	-	-	-	-	-	28	11	8	31	6	6	3	-	-	-	-						
1964	1601	668	395	933	677	41	116	1115	23	63	48	1152	27	8	5	28	53	67	24	18	131	196	192	87	-	-	-	-	-	26	11	7	28	5	6	5	3	0	0	0	0					
1965	2014	590	503	1049	486	179	356	2150	19	8	73	598	33	25	38	68	52	59	35	18	111	105	98	76	-	-	-	-	-	34	14	9	37	7	7	7	4	0	0	0	0					
1966	1925	826	1060	2136	1223	78	80	1339	147	51	70	351	25	28	20	68	41	52	18	32	52	126	55	63	-	-	-	-	-	32	13	9	35	6	7	6	4	0	0	0	0					
1967	2785	799	507	1575	1840	139	145	1928	26	30	32	294	31	49	15	17	52	66	35	13	59	108	171	168	-	-	-	-	-	53	21	14	57	10	12	10	6	0	0	0	0					
1968	1847	558	879	1619	1372	41	358	1360	60	67	158	510	62	40	36	22	31	54	19	16	121	149	249	182	-	-	-	-	-	67	27	18	73	13	15	13	8	0	0	0	0					
1969	2111	411	821	1487	1587	62	122	903	139	140	189	172	32	46	13	25	50	51	22	15	85	344	296	292	82	33	22	89	16	18	16	10	3	1	1	1	0	0	0	0	0	0				
1970	1471	391	632	1224	764	64	98	479	285	183	130	154	24	28	9	20	132	104	53	17	162	316	393	193	112	45	30	122	22	25	22	13	10	4	3	11	2	2	2	1	0	0	0	0	0	
1971	1023	325	507	1066	1163	29	44	789	278	219	95	248	22	23	10	24	110	100	57	16	101	223	346	219	95	39	25	103	19	21	19	11	5	2	1	6	1	1	1	0	0	0	0	0		
1972	1255	325	200	579	929	40	91	815	580	210	65	299	32	37	8	26	132	167	83	23	175	364	168	194	149	60	40	162	30	33	29	17	3	1	3	1	1	0	0	0	0	0	0			
1973	911	306	144	792	1107	145	104	525	474	186	76	167	30	41	10	20	162	87	53	23	359	537	525	334	116	47	31	126	23	25	13	14	3	1	1	3	1	0	0	0	0	0	0			
1974	678	311	224	1638	540	87	293	320	58	98	70	188	59	52	27	39	113	152	63	33	218	201	316	145	59	39	158	29	32	29	17	42	17	11	45	8	9	8	5	0	0	0	0	0	0	
1975	1114	705	474	1965	609	78	126	276	15	176	106	121	51	54	52	38	68	85	40	13	88	151	267	359	172	70	46	187	34	38	34	20	5	2	1	6	1	1	1	0	0	0	0			
1976	1273	520	447	1431	1030	343	176	551	421	144	69	186	53	48	52	46	48	176	74	23	149	230	368	199	80	53	215	39	43	39	23	17	7	5	18	3	4	3	2	0	0	0	0	0	0	
1977	1748	752	510	1870	1225	571	48	236	55	73	2	21	60	72	33	32	57	82	41	19	124	394	228	130	239	97	64	260	47	28	13	5	4	14	3	3	3	2	0	0	0	0	0	0		
1978	1405	554	423	1552	1596	869	132	454	71	0	4	14	38	58	39	35	48	104	39	42	107	216	143	57	281	114	75	306	56	62	56	33	13	5	4	15	3	3	3	2	0	0	0	0	0	0
1979	1373	801	883	1643	1785	558	45	300	207	5	12	12	37	94	46	97	57	90	59	36	42	171	200	51	278	113	74	303	55	61	55	33	19	8	5	20	4	4	4	2	0	0	0	0	0	0
1980	1129	633	339	748	1998	326	42	611	70	9	8	122	48	66	42	56	125	117	39	68	40	174	73	24	236	96	63	257	47	52	47	28	7	3	2	8	1	2	1	1	0	0	0	0	0	0
1981	1284	962	317	827	1786	361	54	299	160	31	14	182	43	88	103	16	43	147	50	14	15	96	126	20	193	78	52	210	38	42	38	23	15	6	4	16	3	3	2	0	0	0	0	0	0	0
1982	1010</																																													

Table 1. Continued.

Table 1. Continued.

area	Netfishing								Trap net								Others																							
	1				4				1				4				1				2				3				4											
quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4								
1951	3	1	1	3	1	1	1	0	22	9	6	24	4	5	4	3	0	10	2790	840	0	0	339	151	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1952	2	1	0	2	0	0	0	0	19	8	5	21	4	4	4	2	0	6	1735	523	0	0	211	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1953	25	10	7	27	5	5	5	3	6	2	2	7	1	1	1	1	0	3	950	286	0	0	116	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1954	5	2	1	5	1	1	1	1	5	2	1	6	1	1	1	1	0	2	549	165	0	0	67	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1955	12	5	3	13	2	3	2	1	10	4	3	11	2	2	2	1	0	2	554	167	0	0	67	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1956	2	1	1	2	0	0	0	0	9	4	2	10	2	2	2	1	0	2	524	158	0	0	64	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1957	3	1	1	3	1	1	1	0	5	2	1	6	1	1	1	1	0	2	580	175	0	0	70	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1958	6	2	2	7	1	1	1	1	9	4	2	10	2	2	2	1	0	3	722	218	0	0	88	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1959	3	1	1	3	1	1	1	0	9	4	2	10	2	2	2	1	0	2	602	181	0	0	73	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1960	2	1	1	2	0	0	0	0	19	8	5	21	4	4	4	2	0	3	805	242	0	0	98	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1961	3	1	1	3	1	1	1	0	4	2	1	5	1	1	1	1	0	3	902	272	0	0	110	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1962	5	2	1	6	1	1	1	1	4	2	1	5	1	1	1	1	0	3	926	279	0	0	113	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1963	5	2	1	5	1	1	1	1	5	2	1	5	1	1	1	1	0	2	504	152	0	0	61	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1964	7	3	2	8	1	2	1	1	5	2	1	5	1	1	1	1	0	2	679	205	0	0	83	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1965	52	21	14	57	10	11	10	6	4	2	1	4	1	1	1	0	0	4	1289	388	0	0	157	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1966	1	0	0	1	0	0	0	0	3	1	1	3	1	1	1	0	0	4	1167	352	0	0	142	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1967	1	1	0	2	0	0	0	0	3	1	1	4	1	1	1	0	0	2	602	181	0	0	73	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1968	3	1	1	3	1	1	1	0	4	2	1	4	1	1	1	0	0	4	1039	313	0	0	126	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1969	4	2	1	4	1	1	1	0	3	1	1	3	1	1	1	0	0	4	1052	317	0	0	128	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1970	1	0	0	1	0	0	0	0	3	1	1	3	1	1	1	0	0	4	1181	356	0	0	144	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1971	9	4	2	10	2	2	2	1	11	4	3	12	2	2	2	1	0	1	319	96	0	0	39	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1972	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	190	57	0	0	23	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1973	1	0	0	1	0	0	0	0	7	3	2	7	1	1	1	1	0	82	25	0	0	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	1	0	0	1	0	0	0	0	5	2	1	5	1	1	1	1	0	128	39	0	0	16	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	1	0	0	1	0	0	0	0	5	2	1	6	1	1	1	1	0	138	42	0	0	17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1976	3	1	1	4	1	1	1	0	4	2	1	4	1	1	1	0	0	1	211	64	0	0	26	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1977	1	0	0	1	0	0	0	0	2	1	1	2	0	0	0	0	0	1	36	41	0	0	17	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	6	3	2	7	1	1	1	1	1	3	90	3	0	0	1	28	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	1	0	0	1	0	0	0	0	4	2	1	5	1	1	1	1	0	5	73	21	0	0	11	43	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	4	2	1	5	1	1	1	1	2	6	215	131	0	0	7	25	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1981	1	0	0	1	0	0	0	0	3	1	1	3	1	1	1	1	0	6	1	48	15	5	9	34	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	2	1	1	2	0	0	0	0	0	4	5	31	56	21	20	36	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1983	1	0	0	1	0	0	0	0	3	1	1	3	1	1	1	1	0	2	3	30	27	16	28	28	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1984	0	0	0	0	0	0	0	0	4	2	1	4	1	1	1	1	0	6	5	12	12	43	17	15	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1985	0	0	0	0	0	0	0	0	3	1	1	3	1	1	1	1	0	19	14	26	23	70	20	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	3	1	1	3	1	1	1	1	0	18	8	8	17	48	18	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	3	1	1	3	1	1	1	1	0	6	1	3	3	34	15	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	2	1	1	2	0	0	1	0	0	11	0	18	5	80	25	22	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1989	0	0	0	0	0	0	0	0	3	1	1	3	1	1	1	1	0	2	5	37	101	104	74	19	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	12	1	9	14	65	24	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	66	25	12	14	28	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1992	0	0	0	0	0	0	0	0	2	1	0	2	0	0	0	0	0	39	21	33	71	169	46	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1993	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	64	12	109	111	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1994	0	0	0</td																																					

Table 2. Stock Scenario-2 (Sub Area-1) Japanese swordfish catches (mt) by fisheries, 1951-2007; “-“ indicates no effort or data not available, “0” indicates less than 1 metric ton, and catch of 2006 and 2007 are preliminary (*).

area	Offshore and distant-water long line												Coastal long line				Other long line				Squid driftnet															
	1				2				3				4				5				1				4				1							
quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
1951	3410	808	648	1852	235	5	28	184	0	0	0	0	21	5	1	7	7	15	5	16	-	-	-	-	33	13	9	36	7	7	7	4				
1952	4183	991	795	2272	288	6	34	225	0	0	0	0	25	6	1	9	8	19	6	19	-	-	-	-	43	18	12	47	9	10	9	5				
1953	3955	1822	264	3650	305	6	294	412	0	0	0	0	5	3	2	17	24	12	13	12	-	-	-	-	22	9	6	24	4	5	4	3				
1954	5452	3233	657	1049	386	3	138	1589	0	0	0	0	7	5	3	9	4	9	2	1	-	-	-	-	28	11	7	30	5	6	5	3				
1955	2496	2327	69	789	2786	1046	82	3382	0	0	0	0	13	8	3	12	9	14	6	9	-	-	-	-	8	3	2	9	2	2	1	-				
1956	3036	2196	21	932	4264	693	50	3311	4	0	0	0	1	14	14	3	10	25	5	4	5	-	-	-	-	3	1	1	3	1	1	1	0			
1957	5214	2287	72	2401	2049	389	15	1602	0	0	0	0	25	10	4	14	20	17	20	22	-	-	-	-	11	4	3	11	2	2	2	1				
1958	7140	2086	152	2875	1814	1094	297	2807	0	0	1	6	11	21	3	17	44	45	29	10	-	-	-	-	12	5	3	13	2	3	2	1				
1959	4656	1698	1471	2339	2128	790	1165	2750	0	0	1	1	45	19	1	20	43	25	12	3	-	-	-	-	19	8	5	20	4	4	4	2				
1960	6307	1363	945	2378	3007	1332	571	3928	3	7	3	5	30	13	3	17	18	8	13	11	-	-	-	-	15	6	4	16	3	3	3	2				
1961	3699	1560	1325	1049	4187	1109	527	5427	1	8	10	2	44	12	7	94	30	41	120	18	-	-	-	-	14	6	4	16	3	3	3	2				
1962	1082	341	120	448	2844	1029	329	3411	1	7	3	6	56	16	14	30	24	31	26	19	-	-	-	-	22	9	6	24	4	5	4	3				
1963	530	343	147	1099	2470	218	331	3400	68	7	9	128	23	6	9	89	27	70	22	18	-	-	-	-	28	11	8	31	6	6	3	-				
1964	1417	591	350	826	600	37	103	987	20	55	42	1020	24	7	4	25	49	65	33	16	-	-	-	-	26	11	7	28	5	6	5	3				
1965	1909	560	476	995	461	170	338	2039	18	7	69	567	31	24	36	64	66	48	38	18	-	-	-	-	34	14	9	37	7	7	4	0				
1966	1759	754	968	1952	1118	71	73	1224	134	47	64	321	22	26	18	62	49	44	15	30	-	-	-	-	32	13	9	35	6	7	6	4				
1967	2667	766	485	1508	1762	133	138	1847	25	29	30	282	30	47	15	17	57	64	27	12	-	-	-	-	53	21	14	57	10	12	10	6				
1968	1737	525	827	1523	1291	38	337	1279	56	63	149	480	58	38	34	21	35	42	17	15	-	-	-	-	67	27	18	73	13	15	13	8				
1969	1489	290	579	1050	1120	44	98	637	98	99	133	121	23	32	9	18	43	29	16	11	82	33	22	89	16	18	16	10	3	1	1	0				
1970	1161	308	499	966	603	51	78	378	225	145	103	122	19	22	7	16	113	91	37	14	112	45	30	122	22	25	22	13	10	4	3	11	2	2	1	0
1971	952	303	472	993	1083	27	41	735	259	204	88	231	20	21	9	22	133	72	93	22	95	39	25	103	19	21	19	11	5	2	1	6	1	1	1	0
1972	1141	295	182	527	845	36	83	741	527	191	59	272	29	34	7	23	137	129	46	20	149	60	40	162	30	33	29	17	3	1	1	0	0	0	0	0
1973	782	262	124	680	950	125	93	450	406	159	65	144	26	35	9	17	150	82	104	40	116	47	31	126	23	25	23	14	3	1	1	0	0	0	0	0
1974	611	281	202	1477	487	78	264	289	53	89	63	169	53	47	24	35	150	138	89	31	145	59	39	158	29	32	29	17	42	17	11	45	8	9	8	5
1975	997	632	425	1759	546	70	113	247	13	157	95	109	46	48	46	34	69	81	42	11	172	70	46	187	34	38	34	20	5	2	1	6	1	1	1	0
1976	1101	450	387	1238	891	297	152	477	364	124	60	161	46	42	45	40	44	151	67	17	198	80	53	215	39	43	39	23	17	7	5	18	3	4	3	2
1977	1467	631	428	1570	1028	479	40	198	47	62	1	18	50	60	28	27	50	77	37	17	239	97	64	260	47	52	47	28	13	5	4	14	3	3	2	0
1978	1166	459	350	1287	1324	721	110	376	59	0	3	12	32	48	32	29	42	102	33	33	281	114	75	306	56	62	56	33	13	5	4	15	3	3	2	0
1979	1206	703	776	1443	1569	490	39	264	182	5	11	11	32	83	40	85	51	79	48	27	278	113	74	303	55	61	55	33	19	8	5	20	4	4	2	0
1980	875	491	263	580	851	252	32	473	54	7	7	95	37	51	32	43	88	98	33	50	236	96	63	257	47	52	47	28	7	3	2	8	1	2	1	0
1981	1065	797	262	686	1480	299	45	248	133	26	12	151	36	73	85	14	36	126	42	13	193	78	52	210	38	42	38	23	15	6	4	16	3	3	3	2
1982	868	572	213	918	814	281	42	407	227	66	56	217	12	42	28	14	62	63	28	36	240	98	64	261	48	53	48	28	10	4	3	11	2	2	1	0
1983	1903	838	346	859	775	449	48	409	377	2	17	144	14	20	11	25	58	60	31	13	273	111	73	297	54	60	54	32	13	5	3	14	3	3	2	1
1984	949	417	685	1225	1258	525	31	273	495	20	8	115	30	64	23	21	52	73	52	33	326	133	87	355	65	72	65	38	10	4	3	11	2	2	1	5
1985	1620	1574	994	1476	1131	386	36	462	275	0	0	20	40	63	31	25	91	84	49	19	280	114	75	305	56	62	56	33	5	2	1	6	1	1	1	11
1986	1924	953	668	1054	776	509	49	570	176	53	31	132	12	30	14	13	74	85	58	30	275	112	73	299	55	60	54	32	22	9	6	24	4	5	4	3
1987	1432	546	444	768	1459	749	147	881	550	41	13	246	7	32	22	19	98	92	61	32	234	95	63	255	47	52	46	27	12	5	3	13	2	3	2	1
1988	1111	397	429	364	1753	867	118	621	282	4	46	392	14	39	41	17	98	78	34	14	190	77	51	207	38	42	38	22	4	2	1	4	1	1	0	12
1989	514	174	254	323	1463	863	102	538	379	20</																										

Table 2. Continued.

area	Squid driftnet								Driftnet								Bait fishing								Net fishing																				
	3				4				5				1				2				3				4				5				1												
quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4									
1951	-	-	-	-	-	-	-	-	-	0	0	7	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	25	10	7	27	5	6	5	3	3	1	1	3						
1952	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	2	2	1	0	2										
1953	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	1	6	1	1	1	1	25	10	7	27							
1954	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	12	8	32	6	7	6	3	5	2	1	5							
1955	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	14	9	37	7	7	7	4	12	5	3	13							
1956	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	8	5	21	4	4	4	2	2	1	1	2							
1957	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	7	5	18	3	4	3	2	3	1	1	3							
1958	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	5	4	14	3	3	3	2	6	2	2	7							
1959	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	3	11	2	2	2	1	3	1	1	3							
1960	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3	2	7	1	1	1	1	2	1	1	2							
1961	-	-	-	-	-	-	-	-	-	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	1	6	1	1	1	1	3	1	1	3							
1962	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3	2	8	1	2	1	1	5	2	1	6							
1963	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	5	3	13	2	3	2	1	5	2	1	5							
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	11	5	3	12	2	3	2	1	7	3	2	8								
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3	2	8	1	2	1	1	52	21	14	57								
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	5	3	13	2	3	2	1	1	0	0	1								
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	3	10	2	2	2	1	1	0	0	2								
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	5	3	13	2	3	2	1	3	1	1	3								
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	5	3	13	2	3	2	1	4	2	1	4								
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	3	11	2	2	2	1	1	0	0	1								
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	2	1	5	1	1	1	1	9	4	2	10								
1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	11	0	0	5	2	0	0	0	0	0	0	6	2	2	6	1	1	1	1	0	0	0	1						
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	486	146	0	0	59	26	0	0	0	0	0	0	0	8	3	2	8	2	2	2	1	1	0	0	1				
1974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	881	265	0	0	107	48	0	0	0	0	0	0	0	8	3	2	8	2	2	2	1	1	0	0	0				
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1805	544	0	0	219	98	0	0	0	0	0	0	0	17	7	4	18	3	4	3	2	1	0	0	0				
1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	2356	710	0	0	286	128	0	0	0	0	0	0	0	49	20	13	53	10	11	10	6	3	1	1	4				
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1583	477	0	0	193	86	0	0	0	0	0	0	0	20	8	5	22	4	4	4	2	1	0	0	1				
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	59	1718	65	0	14	540	57	0	0	0	0	0	0	0	31	13	8	34	6	7	6	4	0	0	0	0			
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	31	448	126	0	69	261	46	0	0	0	0	0	0	0	13	5	3	14	3	3	3	2	1	0	0	1			
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	24	941	576	0	30	110	52	0	0	0	0	0	0	0	8	3	2	9	2	2	2	1	0	0	0	0			
1981	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	20	684	219	68	124	487	149	0	0	5	0	0	0	0	0	0	0	17	7	4	18	3	4	3	2	1	0	0	1
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	32	198	363	135	131	233	137	0	0	0	0	0	0	0	0	17	7	4	18	3	4	3	2	0	0	0	0		
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	15	175	158	92	162	164	184	0	0	0	0	0	0	0	0	9	3	2	9	2	2	2	1	0	0	1			
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	39	99	99	360	143	124	53	0	0	0	0	0	0	0	28	11	7	31	6	6	6	3	0	0	0	0			
1985	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	75	139	122	374	106	56	52	0	0	0	0	0	0	0	0	20	8	5	21	4	4	4	2	0	0	0	0		
1986	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174	73	75	157	452	168	59	11	0	0	0	0	0	0	0	0	13	5	4	15	3	3	3	2	0	0	0	0		
1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	13	32	35	358	161	242	9	0	0	0	0	0	0	0	0	13	5	3	14	3	3	3	2	0	0	0	0		
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	2	109	28	486	153	135	65	0	0	2	0	0	0	0	0	5	2												

Table 2. Continued.

Table 3. Stock Scenario-2 (Sub Area-2) Japanese swordfish catches (mt) by fisheries, 1951-2007; Blank indicates no effort, “-“ indicates data not available, “0” indicates less than 1 metric ton, and catch of 2006 and 2007 are preliminary (*).

area	0ffshore and D istant-water			
	I			
quarter	1	2	3	4
1951	0	0	0	1
1952	0	0	0	1
1953	0	0	1	1
1954	0	1	1	14
1955	1	0	1	8
1956	1	0	3	4
1957	6	17	37	46
1958	17	11	17	27
1959	18	15	17	17
1960	7	23	34	33
1961	93	119	120	111
1962	164	301	155	148
1963	272	256	390	388
1964	674	273	227	224
1965	268	168	149	223
1966	380	220	145	370
1967	174	185	256	328
1968	201	248	290	507
1969	256	870	1193	1169
1970	1065	542	420	340
1971	329	326	331	271
1972	283	492	286	410
1973	646	752	553	468
1974	321	261	319	452
1975	232	247	389	623
1976	374	369	565	593
1977	464	494	498	612
1978	560	384	327	509
1979	336	308	323	493
1980	343	272	312	665
1981	404	310	277	419
1982	222	200	227	449
1983	407	189	238	459
1984	341	97	132	257
1985	212	175	272	299
1986	268	355	436	449
1987	374	399	503	582
1988	505	258	440	654
1989	483	252	456	496
1990	472	378	506	576
1991	433	354	594	486
1992	626	449	671	784
1993	747	386	351	625
1994	486	329	599	525
1995	470	279	428	493
1996	452	507	302	475
1997	438	298	486	920
1998	719	458	365	611
1999	407	206	302	345
2000	376	290	479	525
2001	855	622	723	700
2002	581	445	526	641
2003	485	388	472	553
2004	570	244	245	387
2005	391	311	192	274
2006*	309	225	250	354
2007*	354	243	234	316