8.8 SWO-ATL-ATLANTIC SWORDFISH

The last assessment for Atlantic swordfish was conducted in 2006 (Anon. 2007b). Other information relevant to Atlantic swordfish is presented in the Report of the Sub-Committee on Statistics, included as **Appendix 8** to this SCRS Report, and recommendations pertinent to Atlantic swordfish are presented in Section 14.

SWO-ATL-1. Biology

Swordfish *(Xiphias gladius)* are members of the family *Xiphiidae* and are in the suborder *Scombroidei.* They can reach a maximum size in excess of 500 kg. They are distributed widely in the Atlantic Ocean and Mediterranean Sea. The management units for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups separated at 5°N. This stock separation is supported by recent genetic analyses. However, the precise boundaries between stocks are uncertain, and mixing is expected to be highest at the boundary in the tropical zone. Swordfish feed on a wide variety of prey including groundfish, pelagic fish, deep-water fish, and invertebrates. They are believed to feed throughout the water column, and undertake extensive diel vertical migrations.

Swordfish mostly spawn in the western warm tropical and subtropical waters throughout the year, although seasonality has been reported in some of these areas. They are found in the colder temperate waters during summer and fall months. Young swordfish grow very rapidly, reaching about 140 cm LJFL (lower-jaw fork length) by age three, but grow slowly thereafter. Females grow faster than males and reach a larger maximum size. Tagging studies have shown that some swordfish can live up to 15 years. Swordfish are difficult to age, but about 50% of females were considered to be mature by age five, at a length of about 180cm. However, the most recent information indicates a smaller length and age at maturity.

One scientific document related to the selectivity of the surface longline on swordfish was presented during the 2008 species group meeting. Three types of hooks (2 circle hooks with two different offsets and one J hooks) and two types of bait (squid and mackerel) were tested over a period of 240 days at sea. The data indicated that the overall catch rates in weight of the swordfish target species would be reduced with the two circle hooks and squid bait. These results were similar to related investigations conducted in North and South Atlantic waters.

SWO-ATL-2. Fishery indicators

Due to the broad geographical distribution of the Atlantic swordfish **(SWO ATL-Figure 1)**, in coastal and off-shore areas, mostly ranging from 50°N to 45°S, this species is available to a large number of fishing countries. The ages exploited in the North Atlantic fisheries include primarily ages two and three in recent years **(SWO ATL-Figure 2)**. Directed longline fisheries from Canada, EC-Spain, and the United States have operated since the late 1950s or early 1960s, and harpoon fisheries have existed at least since the late 1800s. Other directed swordfish fisheries include fleets from Brazil, Morocco, Namibia, EC-Portugal, South Africa, Uruguay, and Venezuela. The primary by-catch or opportunistic fisheries that take swordfish are tuna fleets from Chinese Taipei, Japan, Korea and EC-France. The tuna longline fishery started in 1956 and has operated throughout the Atlantic since then, with substantial catches of swordfish that are produced as a by-catch of tuna fisheries. The largest proportion of the Atlantic catches is made using surface drifting longline. However, many additional gears are used, including traditional gillnets off the coast of western Africa.

Total Atlantic

The total Atlantic estimated catch of swordfish (North and South, including discards) reached a historical high of 38,803 t in 1995 **(SWO-ATL-Table 1** and **SWO-ATL-Figure 3)**. The 2007 reported catch was 27,354 t, a 6% increase compared with 2006. A substantial number of countries have not yet reported their 2007 catches and therefore values should be considered provisional and subject to revision.

North Atlantic

For the past decade, the North Atlantic reported catch (landings plus discards) has averaged about 11,400 t **(SWO-ATL-Table 1** and **SWO-ATL-Figure 3)**. Since the 1987 peak in North Atlantic landings (20,236 t), the reported catch has declined to 9,654 t in 2002, in response to ICCAT recommendations. Reduced landings have

also been attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic. In addition, some fleets, including Canada, EC-Portugal, EC-Spain, and the United States, have changed operating procedures to opportunistically target other large pelagic species (tuna and/or sharks), taking advantage of market-price conditions and their high relative catch rates. Since 2002, the reported catches of swordfish have increased moderately. The 2007 reported catch (11,938 t) reflects a slight increase compared with 2006 (11,504 t).

The available age-specific indices of abundance from the various fleets harvesting northern Atlantic swordfish show generally consistent trends over the period of overlap, with a few exceptions especially in the most recent period. A period of relatively strong recruitment occurred in the mid-1990s. This, in combination with lower catches subsequently resulted in an increase in spawning biomass. Unfortunately, there is little information available with which to judge the most recent recruitment levels. The overall indicator of northern Atlantic swordfish biomass from the major fisheries reflected an increase in biomass in the late 1990s **(SWO-ATL-Figure 4)**; the trend has been generally flat since 2000 until 2005. More recent indices were available for the Canadian longline fishery (until 2007), and indicated stability in catch rates from 2000 to 2007. Anecdotal reports from other swordfish longline fisheries (USA and EC-Spain) indicate that catch rates in those fisheries have remained stable in recent years.

South Atlantic

The historical trend of catch (landings plus discards) can be divided in two periods: before and after 1980. The first one is characterized by relatively low catches, generally less than 5,000 t (with an average value of 2,300 t). After 1980, landings increased continuously up to a peak of 21,780 t in 1995, levels that match the peak of North Atlantic harvest (20,236 t). This increase of landings was in part due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Expansion of fishing activities by southern coastal countries, such as Brazil and Uruguay, also contributed to this increase in catches. The reduction in catch following the peak in 1995 resulted from regulations and is due in part to a shift to other oceans and target species. In 2007, the catches (15,416 t) were about 29% lower than the 1995 reported level but 8% higher than the 2006 reported catches (14,277 t). The reported 2007 catch should be considered provisional and is probably an underestimate.

As observed in the 2006 assessment, the CPUE trend from targeted and by-catch fisheries were similar in the early part of the available time-series, but the patterns diverged starting in the mid 1990s **(SWO-ATL-Figure 5)**. It was noted that there was little overlap in fishing area and strategies between the by-catch and targeted fleets used for estimating CPUE pattern, and therefore the by-catch and targeted fisheries CPUE trends could be tracking different components of the population.

Discards

Since 1991, several fleets have reported discards (see **SWO-ATL-Table 1**). The volume of Atlantic-wide reported discards since then has ranged from 215 t to 1,139 t. The most recent (2007) reported level of discards is 363 t, a reduction of 68% from the peak level reported for 2000.

SWO-ATL-3. State of the stocks

North Atlantic

The last assessment conducted in 2006 indicated that North Atlantic swordfish biomass had improved possibly due to strong recruitment in the late 1990s, combined with reductions in reported catch since then, especially compared to the peak catch values of 1987 **(SWO-ATL-Figure 3)**. The estimate of maximum sustainable yield from production model analyses is about 14,100 t. The biomass at the beginning of 2006 was estimated to be about 99% of the biomass needed to produce MSY and the 2005 fishing mortality rate was estimated to be about 14% below the fishing mortality rate at MSY. Although there is some uncertainty in these estimates, the stock trajectory with respect to F_{MSY} and B_{MSY} shows that the status of North Atlantic swordfish is close to the Convention objectives **(SWO-ATL-Figure 6)**. The replacement yield for the year 2006 (14,438 t) was estimated to be slightly more than the MSY level. As the TAC for North Atlantic swordfish for 2005 was 14,000 t (about equal to MSY), it was considered likely that biomass would continue to approach or attain the B_{MSY} level under those catch levels.

South Atlantic

The 2006 assessment indicated that if the available CPUE information is used in a simple production model, two different conclusions are reached about the status of southern Atlantic swordfish. Using by-catch fishery data leads to overly-pessimistic results while using target fishery data leads to optimistic results (**SWO-ATL-Figure 5**). The Committee believes that in the case of the by-catch CPUE data, the estimates of MSY and intrinsic growth rate obtained could not be supported by current knowledge of swordfish population dynamics and historical catch levels. On the other hand, the Committee believed that the recent increase in the target pattern CPUE was more likely due to changes in catchability than it was to an increase in abundance, possibly leading to an overestimation of the intrinsic growth rate. As a result, the Committee based its base case analyses on a composite CPUE pattern that has been constructed from both types of fisheries. Recognizing that further research is required in order to make better use of the available data, the results obtained indicate that the stock is in good condition: The current estimated fishing mortality rate is likely below that which would produce MSY, and the current biomass is likely above that which would result from fishing at F_{MSY} in the long term (**SWO-ATL-Figure 7**). The estimated MSY (about 17,000 t) is 9% higher than current reported landings.

SWO-ATL-4. Outlook

North Atlantic

Results from the 2006 assessment indicated that it is likely that the northern swordfish stock is nearly rebuilt to B_{MSY} (**SWO-ATL-Figure 6**). Although there is some uncertainty associated with this conclusion, almost half of the bootstrap estimates of current biomass were greater than or equal to B_{MSY}. Projections based on the last assessment taking into account the current agreement [Rec. 06-03], if fully realized, indicates that the stock is likely to decline to below the level that would produce MSY.

South Atlantic

The 2006 assessment indicated that while the southern swordfish stock appears to be in a healthy condition at present, it is unclear if substantially higher catches than currently envisioned by the Commission could be sustained in the long-run, due to the divergent views of stock status provided by the targeted and by-catch fisheries indicators.

SWO-ATL-5. Effects of current regulations

In 2006, the Committee provided information on the effectiveness of existing minimum size regulations. New regulations are being implemented on the basis of Rec. 06-03, which entered into effect in 2007. The next assessment will provide the first opportunity to measure the effectiveness of these new regulations.

Catch limits

The total allowable catch in the North Atlantic during the 2003 to 2007 period was 14,000 t per year. The reported catch during that period averaged 11,897 t and did not exceed the TAC in any year. Reports for 2007 are considered provisional and subject to change.

The total allowable catch in the South Atlantic for the years 2007 through 2009 was 17,000 t

Minimum size limits

There are two minimum size options that are applied to the entire Atlantic: 125 cm LJFL with a 15% tolerance, or 119 cm LJFL with zero tolerance and evaluation of the discards. In the absence of size data, these calculations could not be updated or examined for 2005.

For the period 2001-2005, our estimate of the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 22% (in number) overall for all nations fishing in the Atlantic. If this calculation is made using reported landings plus estimated discards, then the percentage less than 125 cm LJFL would be slightly higher, but still about 22%. These estimates are based on the overall catch at age, which have high levels of substitutions for a significant portion of the total catch.

Other implications

The Committee is concerned that in some cases regulations have resulted in the discard of swordfish caught in the North stock and, to a certain extent, could have influenced similar behavior of the fleet that fishes the South Atlantic swordfish stock. The Committee considers that regulations may have had a detrimental effect on the availability and consistency of scientific data on catches, sizes and CPUE indices of the Atlantic fleet. The Committee expressed its serious concern over this limitation on data for future assessments.

SWO-ATL-6. Management recommendations

North Atlantic

In order to maintain the northern Atlantic swordfish stock close to a level that would produce MSY, the Committee continues to recommend continuing the present TAC (14,000 t). Given the estimated stock productivity (r=0.49) and MSY (14,100 t), this TAC should be sustainable into the future, and reflects the maximum yield that could be harvested from the population under existing environmental and fishery conditions.

South Atlantic

Until sufficiently more research has been conducted to reduce the high uncertainty in stock status evaluations for the southern Atlantic swordfish stock, the Committee recommends that annual catch should not exceed the provisionally estimated MSY (about 17,000 t).

ATLANTIC SWORDFISH SUMMARY

	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,133 t (12,800-14,790)[3]	~17,000t[4]
Current (2007) Yield[2]	11,938 t	15,416 t
2006 Replacement Yield	14,438 t	Not estimated
Relative Biomass (B_{2006}/B_{MSY})	0.99 (0.87 - 1.27)[3]	Likely >1
Relative Fishing Mortality		
F_{2005}/F_{MSY}[1]	0.86 (0.65 - 1.04)[3]	Likely <1
F_{2005}/F_{max}	1.2	Not estimated
$F_{2005}/F_{0.1}$	2.4	Not estimated
$F_{2005}/F_{30\%SPR}$	2.4	Not estimated
Management Measures in Effect:	Country-specific TACs [Rec. 06-02]; 125/119 cm LJFL minimum size.	Country-specific TACs [Rec. 06-03]; 125/119 cm LJFL minimum size.

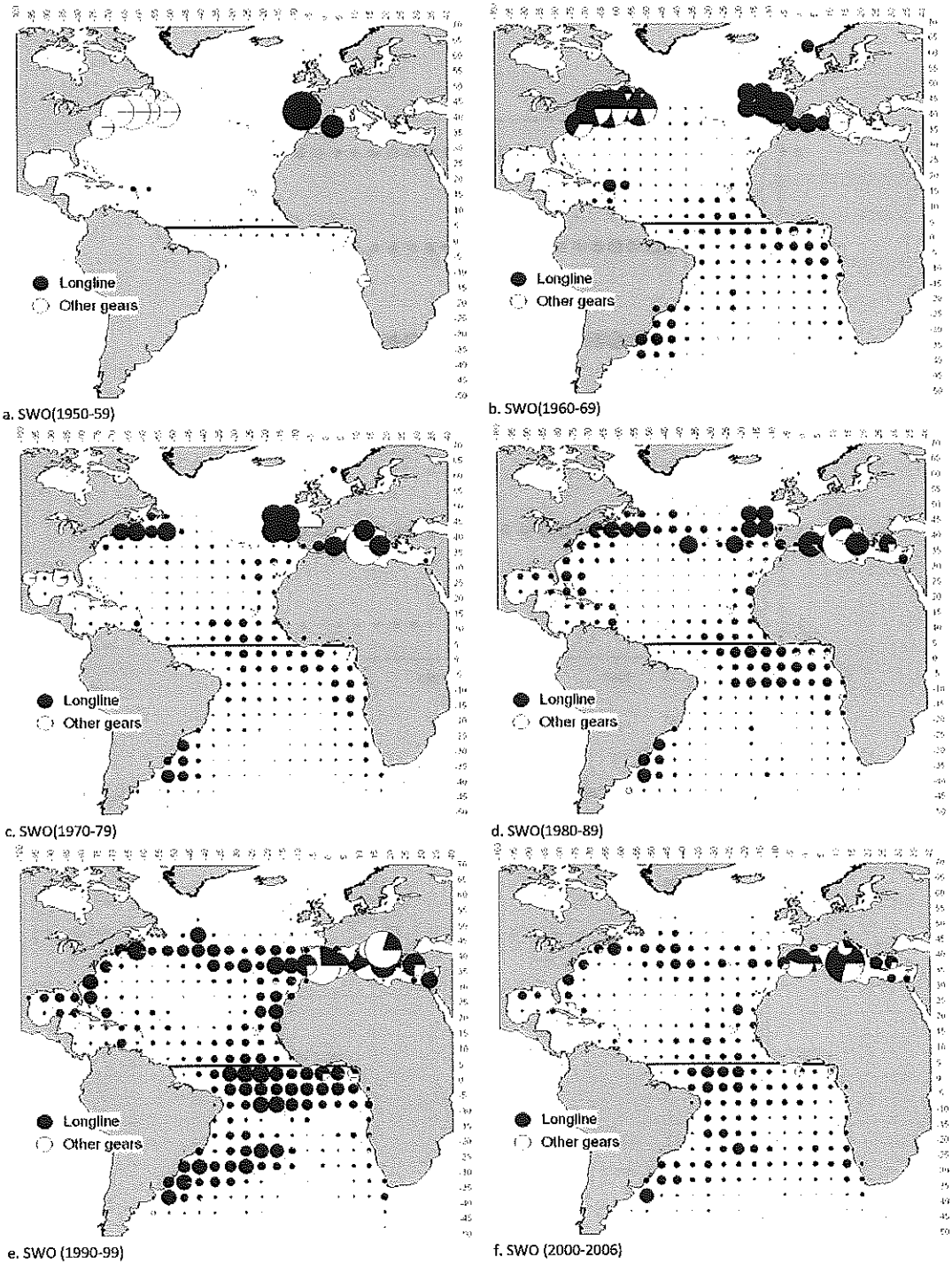
[1] Base Case production model (Logistic) results based on catch data 1950-2005.
[2] Provisional and subject to revision.
[3] 80% confidence intervals are shown.
[4] Provisional and preliminary, based on production model (exponential) results based on catch data 1970-2005.

SWO-ATL-Table 1. Estimated catches (t) of Atlantic swordfish *(Xiphias gladius)* by gear and flag.

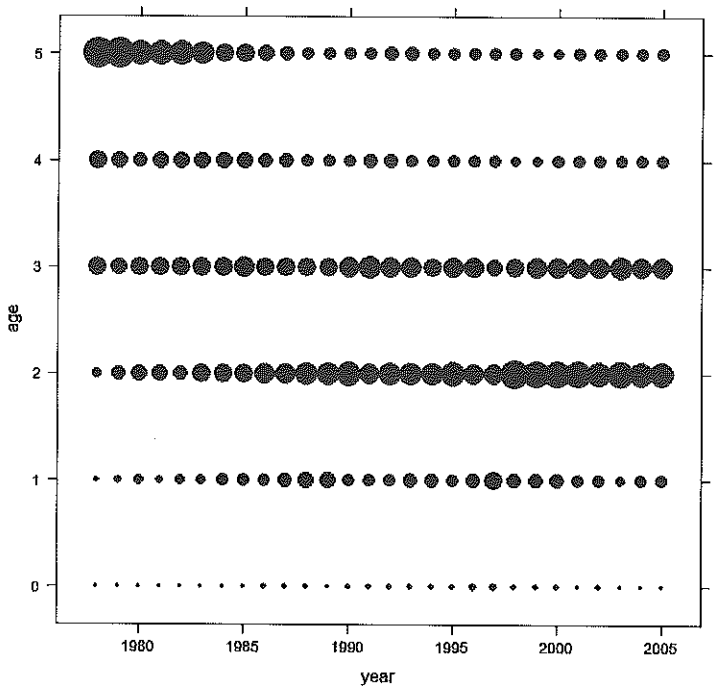
			1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
TOTAL			19929	21930	23969	24380	26266	32685	34305	32976	28826	29204	32861	34437	38803	33489	31567	26222	27115	27166	25139	23758	24064	25228	25603	25782	27354
ATS			5402	9139	9586	5894	6030	13172	17055	17304	13893	13810	16130	18936	21930	18289	18542	13998	15497	15728	15128	14104	12633	13068	13152	14277	15416
ATN			14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16731	15501	16872	15200	13025	12223	11619	11439	10011	9654	11431	12160	12451	11504	11938
Landings	ATN	Longline	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8425	8664	9988	11393	11503	10872	11122
		Other surf.	504	127	143	217	214	586	1902	1646	511	723	683	484	581	825	388	956	640	659	685	374	820	447	615	409	544
	ATS	Longline	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13720	14819	15448	14302	13576	11712	12485	12915	13757	14956
		Other surf.	95	219	723	943	584	768	657	599	606	637	583	1571	1124	489	282	269	672	278	825	527	920	582	238	520	369
Discards	ATN	Longline	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	1137	896	607	618	313	323	215	264
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7	10	8	8
	ATS	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	0	91
Landings	ATN	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10	10	10	10	39	27
		Belize	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
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	0	0	0
		Canada	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203	1558	1404	1348*
		China P.R.	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316	56	108	72	85
		Chinese Taipei	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30	140	172	103
		Cuba	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	3	3	2	2	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		EC.España	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586	5376	5521	5448	5564
		EC.France	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102	178	92	46
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12	1	1	3	2
		EC.Portugal	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320	900	949	778
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0	0	0	0	0	0
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3	36	48	0	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	
		Grenada	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73	56	30	26
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		Japan	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	575	705	688	800
		Korea Rep.	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	0	51	65	
		Liberia	53	0	24	16	30	19	35	3	0	7	14	26	28	28	28	28	28	0	0	0	0	0	0	0	
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
		Maroc	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335	334	341	237
		Mexico	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32	44	41	31	35
		NEI (ETRO)	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	0	0	14	3	131	190	185	43	35	111	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	44	5	5	8	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		Senegal	0	0	0	0	0	0	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0	108	108	0	38
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	22	22	7	7	7	0	51
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3	0	0
		Trinidad and Tobago	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83	91	19	29
		U.S.A.	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2380	2160	1873	2454
		U.S.S.R.	0	16	13	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	5	3	3	2	0	0	1	1	0	3
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	7	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	29	14	
		Venezuela	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45	53	55	22	30
	ATS	Angola	0	26	228	815	84	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
		Argentina	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	38	0	5	10	8	0	0	0	
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120
		Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	0	0	0	
		Benin	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	0	0	0	
		Brasil	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998	3785	4430	4153
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	

			1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	534	344	200	423	353	278	91	300	473
		Chinese Taipei	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745	744	377	671
		Cuba	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29	31	39	17
		EC.España	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483	5402	5300	5283
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345	493	440	428
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	
		Ghana	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343	55	32	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	
		Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	0	0	0	0	
		Japan	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	790	685	833	924	686	480	1124	2461
		Korea Rep.	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	24	70	36	94	
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	
		NEI (ETRO)	0	0	0	0	0	0	856	439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730	469	751	504	191	549	832	1118	1038
		Nigeria	83	69	0	0	0	0	0	0	0	3	0	0	0	9	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	8	1	1	4	
		S. Tomé e Príncipe	0	0	0	0	0	216	207	181	179	177	202	190	178	166	148	135	129	120	120	120	120	126	147	138	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	
		South Africa	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295	199	186	207
		St. Vincent and Grenadines	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
		Togo	0	0	6	32	1	0	2	3	5	5	8	14	14	64	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	171	396	160	179	142	43	200	21	15	0	0	
		U.S.S.R.	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	0	
		Uruguay	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105	843	620	464
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	26	
Discards	ATN	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45	106	38	61
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	598	567	319	263	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	308	263	282	275	227	185	212
	ATS	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	0	

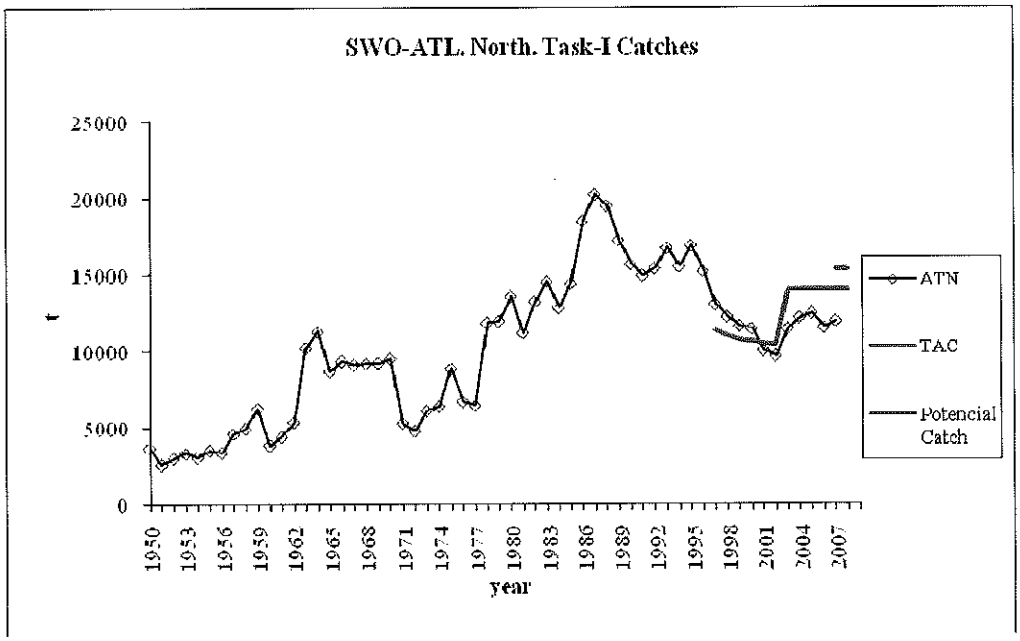
* Canada landings in 2007 include 82 t caught under charter arrangements with FR-St. Pierre and Miquelon.

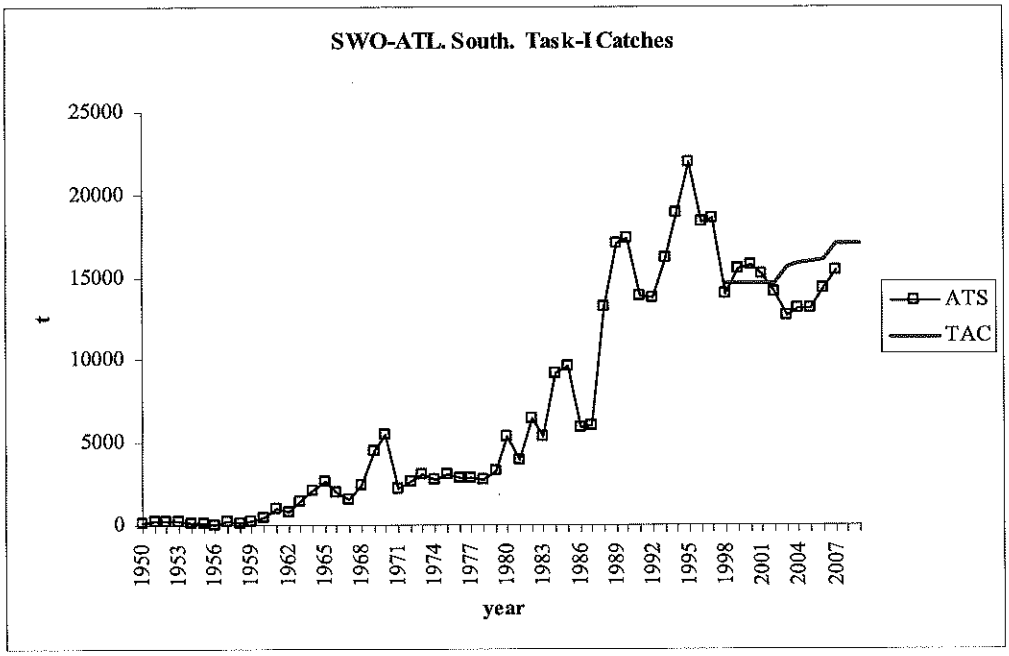


SWO-ATL Figure 1. Geographic distribution of swordfish cumulative catch (t) by gear, in the Convention area, shown on a decadal scale. The more contemporary period (2000 to 2006) is shown on the bottom right.

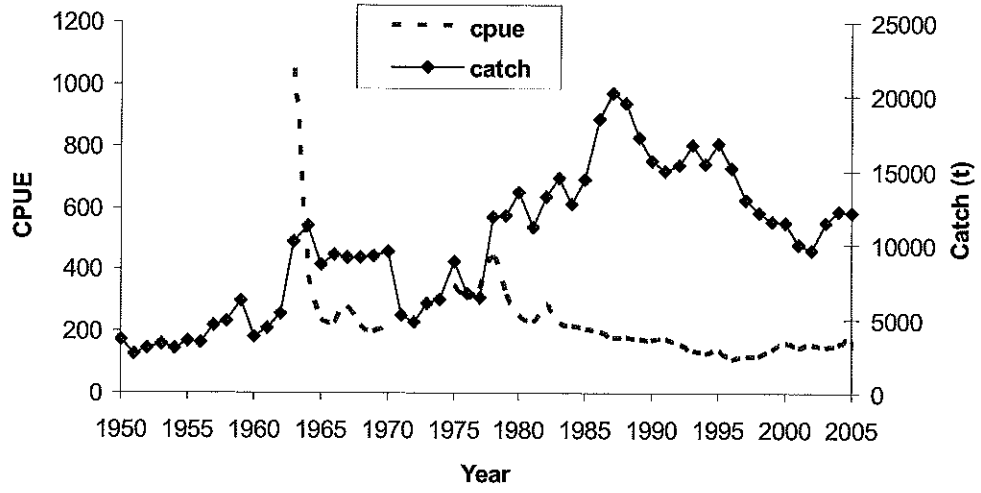


SWO-ATL Figure 2. Catch at age, in numbers, of North Atlantic swordfish, with the area of the filled circle showing proportional catch at age. Note: Age 5 is a plus group.

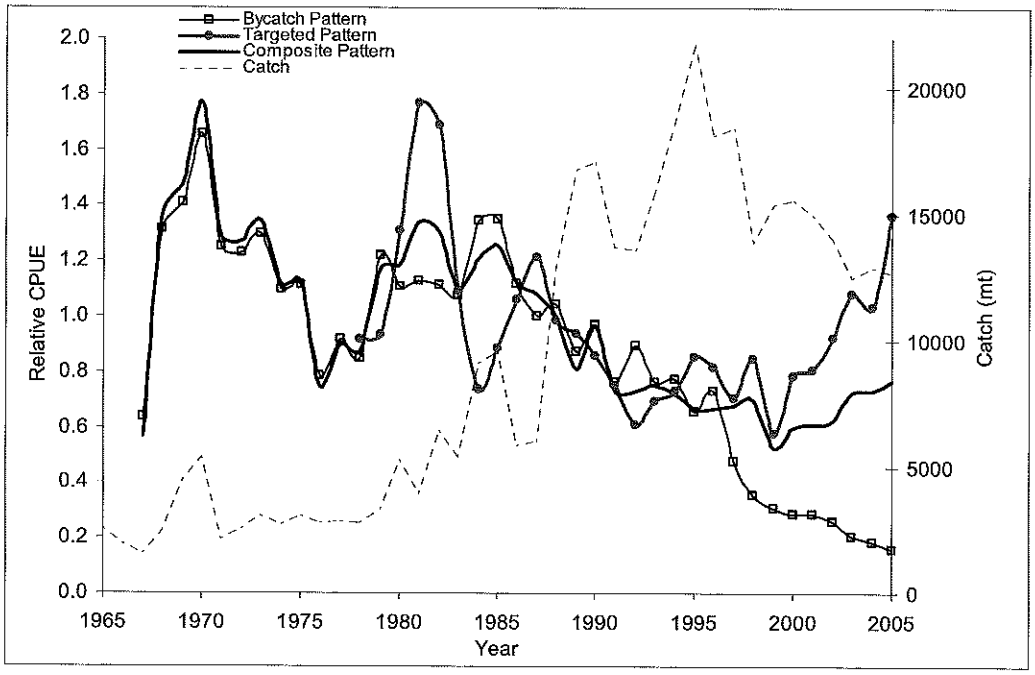




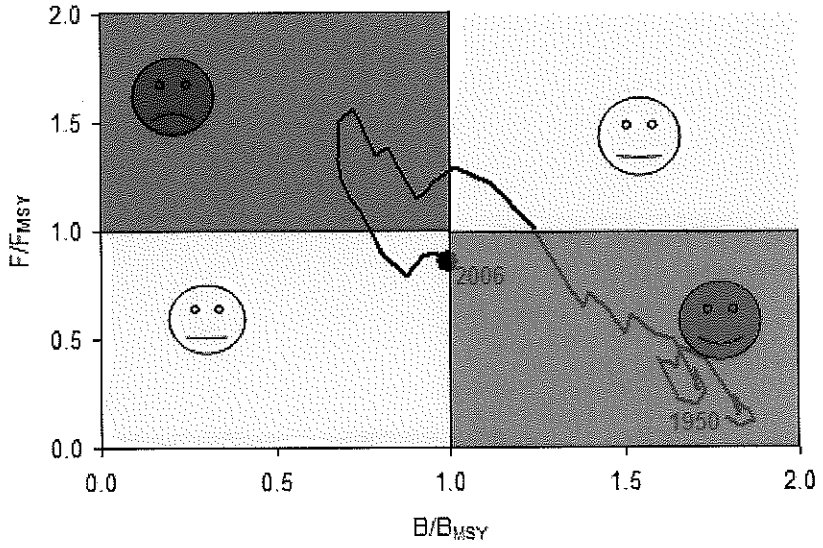
SWO-ATL Figure 3. Swordfish reported catches for North and South Atlantic, in tons, for the period 1950-2007 and the corresponding TACs. For the North Atlantic, "Potential catch" refers to the potential catch from the fishing possibilities identified in [Rec. 06-02].



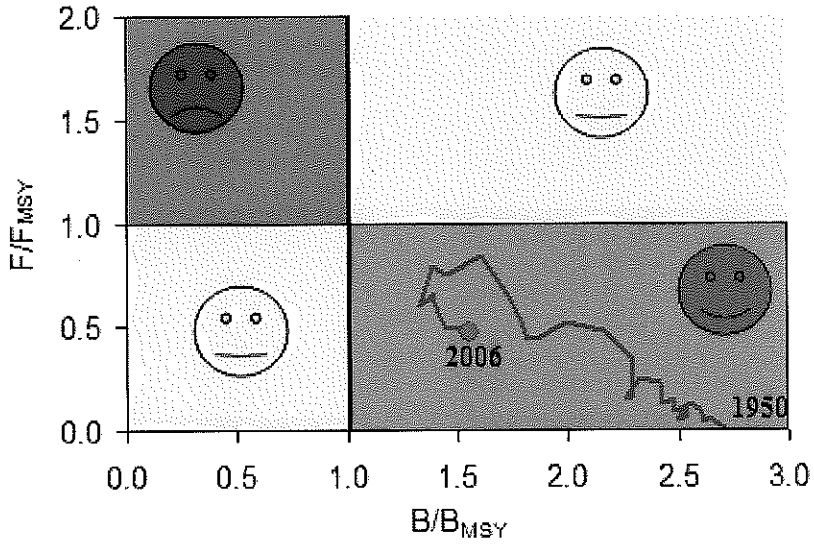
SWO-ATL Figure 4. Estimated catches of North Atlantic swordfish (in t, including discards) for 1950-2005, and the combined CPUE index based on weight.



SWO-ATL Figure 5. Relative CPUE patterns from by-catch (Japan and Chinese Taipei) and targeted (Brazil and EC-Spain) fleets harvesting southern Atlantic stock swordfish compared to the catch of southern Atlantic swordfish.



SWO-ATL Figure 6. Time series of B/B_{MSY} and F/F_{MSY} from 1950 to 2006 showing the progression of stock status as the North Atlantic tuna fisheries evolved. Results are from surplus production analyses.



SWO-ATL Figure 7. Time series of B/B_{MSY} and F/F_{MSY} from 1950 to 2006 showing the progression of stock status as the South Atlantic tuna fisheries evolved. Results are from surplus production analyses.