REPORT OF THE DATA-PREPARATORY MEETING FOR THE 2009 SAILFISH ASSESSMENT

(Madrid, Spain, may 19-24, 2008)

1. Opening, adoption of Agenda and meeting arrangements

Mr. Papa Kebe, on behalf of the ICCAT Executive Secretary, opened the meeting and welcomed participants.

The meeting was chaired by Dr. David Die (USA). Dr. Die welcomed Working Group participants and reviewed the objectives of the meeting in the context of the work-plan for the billfish species group (**Appendix 4**).

The Agenda (**Appendix 1**) was adopted without changes. The List of Participants is attached as **Appendix 2**. The List of Documents presented at the meeting is attached as **Appendix 3**.

The following participants served as rapporteurs for various sections of the report:

Section	Rapporteurs
1, 9	P. Pallarés
2	E. Prince and P. Bannerman
3	F. Arocha and F. Hazin
4	B. García, C. Palma and P. Goodyear
5	M. Fitchett
6	C.A. Arfelli and D. Die
7, 8	D. Die

2. Description of fisheries

The West and East Atlantic fisheries reporting sailfish/spearfish catches have participants from multiple countries. For example, recent major sailfish catches in the West and East Atlantic are reported by the artisanal fleets. In the West Atlantic, the primary artisanal fishing activities include numerous countries in the Caribbean Sea region, whereas for the East Atlantic the major artisanal fisheries occur off a few West African countries, primarily Ghana, Senegal, Côte d'Ivoire, and others (**Figure 1**). Directed recreational fisheries for sailfish occur in the West Atlantic from the United States, Venezuela, Bahamas, Brazil, Dominican Republic, Mexico, and other countries in the Caribbean Sea; and, in the East Atlantic off Senegal and Cote d'Ivoire. The tropical Atlantic tuna purse seine fleet operates off the West African coast and often have a bycatch of istiophorid billfish, particularly sailfish. Prior to the 1970's, the major sailfish/spearfish landings were a result of bycatch from offshore longline fisheries. The primary longline participants in the Atlantic reporting sailfish landings include Brazil, Japan, Korea, Cuba, Spain, United States, and Chinese Taipei.

Reported sailfish landings for the total Atlantic (developed in the early 1960`s) reached nearly 3,000 MT in 1965, declined to about 1,600 MT by 1973, reached an historical peak of 6,100 MT in 1976, then fluctuated between 2,000 to 4,000 MT through 1996 (**Figure 2**). Most uncertainties in the total sailfish landings in the last ten years (around 3,000 MT) through 2006 have been resolved. Landings for the East Atlantic generally paralleled the total Atlantic trajectory, whereas the landings in the West were steady over the last decade (**Figure 3**). The Committee continues to recognize that some uncertainties of the landing data, particularly in the East Atlantic, still persist. However, new landing data are becoming available for historically traditional fisheries, as well as some artisanal fisheries. The overall trend in Atlantic landings is very much governed by the large landings from artisanal fisheries off of West Africa (**Figures 1** and **2**). It's come to the Committees attention that some of the Caribbean sailfish catches maybe coming from FAD associated fisheries but this needs to be confirmed. It also has come to the Committees attention that Uruguay sometimes fishes off the Gulf of Guinea and report catches of sailfish.

The geographical distribution of landings has changed dramatically between decades mainly as a result of the changes in the vertical distribution of Japanese longline operations after 1970 and the rise of artisanal catches from the Caribbean in the 1990s (**Figure 3**).

3. Biological data

The current sections expand the biological information available in the ICCAT Manual and generally include only new information presented at the meeting in the form of SCRS papers or other published work.

3.1 Habitat preferences

Temperature preferences for sailfish appear to be in the range of 25-28°C (Hoolihan and Luo, 2007). Off the coast of Brazil, sailfish seem to migrate southward, following the seasonal displacement of the 28oC isotherm. From the northeast coast (0-10oS), where they have their highest CPUE during the third quarter of the year, they move towards the south (20-35o S), where their CPUE peaks during the first quarter. Although they are present year round off the northeast, where the SST never drops below 25oC, off southeast Brazil they are virtually absent during the second and third quarter, since the sea water temperature falls below 25oC (SCRS/2008/049). Biological information has shown that the higher sailfish CPUE during the first quarter of the year is associated with a spawning aggregation (SCRS/2008/080).

Depth distribution, from a study undertaken in the southern Gulf of Mexico, in which 17 sailfish were captured on a commercial pelagic longline vessel, tagged with pop-up satellite tags and released, indicated that habitat preferences of the tagged sailfish were primarily within the upper 20 m of the water column (Graves and Kerstetter, 2007). The tag data also indicated common short-term movements to depths in excess of 100 m by all surviving fish. More information on PSAT movement can be obtained in Richardson' (2007) work.

3.2 Growth

Sailfish age determination and growth for the Atlantic was recently reviewed in the ICCAT manual, since then a recent study (Ehrhardt and Deleveaux, 2006) using the Atlantic billfish database developed an algorithm that permitted robust estimation for growth parameters for Atlantic sailfish. Results demonstrated that length at age for females: $L\infty = 221.0$ cm; $K = 0.617$; and for males: $L\infty = 160.8$ cm; $K = 0.583$; and t0 was fixed at 0 for both sexes. Currently, only Brazil is collecting spines for the study of age and growth of sailfish. Cote d'Ivoire will probably start collecting them as well. Other countries, such as Venezuela, could collect them but are now focusing their sampling on other billfish species (spearfish), and it may not be the best time to expand the collection to sailfish. The group agreed, however, that it would be better if collection of spines could expand to other areas so that samples are more representative of the overall sailfish distribution in the Atlantic. ICCAT has not yet adopted a growth model for Atlantic sailfish.

3.3 Length-Weight relationship

The available sex specific length-weight relationships for sailfish adopted by ICCAT are those presented in the newly updated ICCAT Manual. No new relationships were presented at the meeting.

3.4 Maturity

Information on sailfish maturity from the western North Atlantic remains the same as it appears in the ICCAT Manual. New information on maturity of females based on ovarian macroscopic examination became available from a study conducted in the western south Atlantic, off Brazil (SCRS/2008/080), which estimated that sailfish mature (L50) at 154.98 cm LJFL, and full maturity (L90) is attained at about 180 cm LJFL.

3.5 Sex ratio

Available information on sex ratio-at-size was presented in the updated ICCAT manual. New information on the seasonality of sex ratio in the western south Atlantic (SCRS/2008/080), indicated the predominance of females in almost all months in the western equatorial Atlantic and in the southeast Atlantic (20-27 o S; 39-48 o W), particularly in the western equatorial Atlantic during September when the proportion of females was the highest. Overall sex ratio-at-size for the same area indicated that fish >180 cm LJFL were mostly females.

3.6 Reproduction

Spawning

Available information on spawning grounds and spawning time in the Atlantic were detailed in the recently updated ICCAT Manual. Document SCRS/2008/080, provided new information on spawning in the western South Atlantic. Results indicate that the western equatorial Atlantic Ocean, off the Brazilian coast, was not considered a spawning ground for sailfish, since most of the specimens were either maturing or resting, and was also supported by low gonad index values. In contrast, the southeast Brazilian coast appears to be an important spawning area for the species, in which spawning occur mainly from December to February, where the vast majority of females caught were either ripe or spent and with high gonad index values.

In the western North Atlantic, a study on the physical and biological characteristics of billfish spawning habitat in the Straits of Florida (Richardson, 2007), estimated that the percentage of spawning in the Straits of Florida was ≈2% of spawning of the sailfish stock, and that movement data indicated that sailfish move over large areas during the spawning season. Accompanying these results is the indication that a much larger percentage (≈10%) of the sailfish stock likely moves through the Straits of Florida during the spawning season.

Preliminary information for East Atlantic spawning sailfish was presented to the working group by Cote d'Ivoire. The preliminary information of the study on reproductive biology of sailfish caught by the artisanal fishery of Cote d'Ivoire, revealed that sailfish spawn from October to December in the area of study. Based on samples collected from October 2007 and March 2008, which resulted in the collection of 101 females (158-213 cm LJFL); 25 gonads with hydrated oocytes appeared in October-December, and 1 between January and March, while 31 post-spawning females were collected during January-March. This preliminary information suggests peak spawning of sailfish in the area of the Gulf of Guinea from October to December, with some spawning activity towards the following months. The expansion of biological collections of reproductive and ageing samples to other West African countries will require coordination with researchers elsewhere to ensure sampling protocols allow for comparisons across sampling sites.

Recruitment

A recent investigation on the physical and biological characteristics of billfish spawning habitat in the Straits of Florida pointed strongly to the importance of small-scale processes in sailfish spawning site selection (Richardson, 2007). Spawning was determined to be highly targeted at a frontal zone associated with the formation of a sub-mesoscale eddy. This spawning strategy resulted in the first feeding sailfish larvae occupying a favorable feeding habitat. At the same time, large numbers of eggs of the prey items of adult sailfish were found in these samples were found to occur predominantly at the front. The implications are that the small-scale active targeting of a front by sailfish for spawning is likely driven by the availability of prey for their larval stages. This structuring of spawning site selection at fine spatial scales is believed to have important implications for recruitment and migration in sailfish. The indicated that sailfish larvae are not experiencing the average prey concentrations of the area, but rather occur in those narrow areas where convergence has served to concentrate organisms.

3.7 Migrations

In recent years there has been an increase in tag and release of Atlantic sailfish throughout the Atlantic, but the number of fish tagged in the southwest Atlantic (Brazil) is still too low to allow any sound inference on their movements. Based on CPUE data and information on reproductive biology, however, recent information presented to SCRS (SCRS/2008/080) indicate that sailfish migrate southward, from the third to the first quarter of the year, following the seasonal displacement of the 28oC isotherm, to spawn off southern Brazil (20-35o S). After spawning they move away from the spawning ground, probably assuming a distribution more distant from the coast, since there seems to be size segregation along Brazilian Coast, with the larger specimens being distributed farther away from the coastline (SCRS/2008/049). Movement off Senegal have been confirmed.

3.8 Diet

Adult sailfish are apex predators that opportunistically prey on halfbeaks, jacks, small tunas, and cephalopods. A recent study in the western south Atlantic, off Cabo Frio in Brazil (SCRS/2008/047), revealed that the most important prey fish for adult sailfish is *Sardinella brasiliensis*, due to its high occurrence in the area, which is also used as live bait to catch sailfish. According to the analyses the second important prey items were *Argonauta nodosa* and *Auxis thazard thazard*. Other prey species show a lot of biodiversity but low occurrence. Another study investigating the temporal, spatial and ontogenetic variability in the feeding of sailfish larvae across the Straits of Florida showed that consumed prey throughout early larval ontogeny were numerically dominated (90%) by 2 crustaceans: a copepod (Farranula; mainly *F. gracilis*) and a cladoceran (Evadne; mainly *E. tergestina*), with relative proportions displaying marked spatial variability (Llopiz and Cowen, 2008).

3.9 Behaviour

Sailfish caught by the EU purse seine fleets in the Gulf of Guinea indicated that sailfish were associated more with school sets than with FAD sets (Gaertner et al., 2002). One of the more general implications of the findings concerns the impact of the ban of FADs by the purse-seine fishery on the bycatch of Istiophoridae. The analysis suggests that the moratorium in the Gulf of Guinea led to doubling of the incidental catch of sailfish. Another study identifying sailfish catch associated to tuna free schools and to FADs in the eastern Atlantic (SCRS/2000/76), showed that mean size of sailfish caught in free schools was 176.9 cm LJFL (120-250 cm LJFL), while those caught near FADs were 220.5 cm LJFL (130-277 cm LJFL).

3.10 Mortality

In a recent study on post-release survival of sailfish in the southern Gulf of Mexico using satellite tags, revealed that 15 of 17 tagged fish survived for the full duration of the 10-day deployment period (Graves and Kerstetter, 2007). The study suggested that a large percentage of sailfish can survive the trauma resulting from the interaction with pelagic longline gear, with a post-release mortality of 11.8%.

3.11 Conversion factors

Most of the conversion factors available to date come from the western Atlantic, in a recent study; Hoolihan (2006) developed conversion factors for sailfish from the Arabian Gulf.

3.12 Stock structure

In the Atlantic Ocean, sailfish has historically been managed as a separate eastern and western stock, with an arbitrary boundary (**Figure 1**). The stock boundary was based on the distribution of catch, tag release and recapture information and morphological data (ANON. 2002), mainly from the north Atlantic.

There has been substantial effort in tagging Atlantic sailfish (over 100.000 tagged fish by 2001), but most of the effort was executed in the western North Atlantic. Still no trans-Atlantic movements have been recorded. In addition, morphological data suggest that East Atlantic sailfish are different from those in the West, by reaching larger sizes and presenting a different colour pattern in the dorsal fin. However, these differences may not represent different genetic stocks.

McDowell and Graves (2002) examined the possibility of genetic stock structuring in the Atlantic using mitochondrial and nuclear markers. Results revealed no evidence of stock structuring of sailfish within the Atlantic.

Recent information showed that in the western South Atlantic there is a very well defined spawning ground (south of 20oS), and season (December-February), with no spawning activity happening from that latitude up to 5oN (close to 3,000 km distance). In addition, preliminary information presented to the working group during the meeting, indicated the existence of another potentially well defined spawning ground and season for sailfish in the East Atlantic, off the coast of Cote d'Ivoire from October-December. The present information suggests that there are three distinct spawning grounds and seasons: in the western North Atlantic, in the western South Atlantic, and in the eastern Atlantic. It is not clear; however, whether the apparent separation of spawning grounds in the Atlantic is an indication of three independent stocks.

Based on the available information, ICCAT should consider two possible alternative stock structures: the present hypothesis of east and west stock (ANON. 2002), and an alternative one, with three stocks: northwest, southwest and East.

4. Review of catch estimates (historical and current)

4.1 Updated estimates of sailfish catch

New bycatch estimates for the Spanish longline surface longline fishery from 1997-2006 were presented (SCRS/2008/045). Sailfish were the most commonly encountered species of the billfish bycatch. New estimates of total catch and average length of sailfish were provided for the artisanal fishery in Côte d'Ivoire (SCRS/2008/041) have not shown a trend during the period 1988-2006. Annual landings ranged from 20 to 80 tons. Annual average total length ranged from 170 to 185 cm, also without a trend. All other estimates of sailfish catch were obtained from data held at the ICCAT secretariat including Task I, Task II (**Table 1**) and CATDIS. Details of how these various sources of data were used to obtain sailfish catch estimates at the stock level are explained below.

4.2 Separation of sailfish and spearfish catches

Summary of analyses conducted during the 2001 Sailfish assessment

In the previous sailfish assessment (Anon 2002), the working group noted that some longline fleets traditionally included their spearfish catches in their reported sailfish landings. The group also agreed that there was enough evidence to conclude that:

i. The ratio of sailfish to spearfish in Japanese longline catches differs spatially and seasonally (Saito et al 2001; Kikawa and Honma 1982); and,

ii. The spatial distribution of fishing effort from the Japanese and Chinese Taipei longline fleets has changed

through the years (Chang et al 1996, Hsu 2001, Yokawa and Uozumi 2001).

The group therefore agreed that it was imperative to develop a procedure to estimate catches and abundance estimates for sailfish-only from the offshore longline fleets so that this data could be incorporated into assessments. The Working Group decided to estimate and apply the average ratios of sailfish vs. spearfish calculated by 5x5 area and by quarter, using all the data available since 1995, when the Japanese fleet began keeping separate statistics for the two species. The Group further decided to use this matrix of ratios to estimate sailfish and spearfish caches from catches reported for both species combined by the pelagic longline fishery. However because of temporal changes in Japanese longline fishing patterns, the sailfish/spearfish ratios for many previously fished 5x5 areas could not be estimated. A previous study of species compositions of catches based on research survey data (Kikawa and Honma 1982) was used as a source of data on the proportions of sailfish for areas for which there was no recent data. The catches then were divided into sailfish and spearfish for Japan and Chinese Taipei in number of fish. These numbers were then converted into weight and applied to estimate the landings of these two countries and summed to the east-west areas by year for each fishery and scaled to the reported Task I landing on an annual basis. This was necessary because the coverage rates for Task II data for by-catch species were not 100%.

However, work carried out during the previous ICCAT species group session lacked advanced preparations, and the time available for the group during the meeting was very limited. Consequently the group had no time to evaluate the assumptions used in the separation procedure. The Working Group felt it was premature to adopt these separated catch values as official ICCAT estimates (i.e. Task I data).

Analyses conducted in the current workshop

The procedures adopted in 2001 to partition the sailfish catch from the reported sailfish-spearfish combined landings could not be verified because the method and data used to estimate the quarterly species ratios in each 5X5 grid were not available. However, the Group now has better Task II data and more extended period of Japanese longline data separated for two species than during 2001. Also, the group had available other species-specific catch estimates from longline observations from other fleets. The spatial distributions of the sailfish and spearfish were re-examined by the working group using the 1995-2006 Japanese longline catch data and observer data from the Brazilian, US, and Venezuelan longline fleets. Because of the sparseness of data in many 5x5 cells, the group decided to pool each data set over years and months. The US longline observer data were partitioned into statistical areas rather than by latitude and longitude and the sailfish/spearfish proportions of the totals were estimated accordingly (**Figure 4**). The Japanese, Brazilian and Venezuelan data were summarized by 5X5 and the results further pooled across all 3 data sources (SAI_SPF_ratios.xls). The distribution of the sailfish and spearfish fractions in the 5X5 degree cells for the combined dataset effort is depicted in **Figure 5**. The spatial coverage of the current data is more limited than the data matrix used in 2001 to reclassify longline catches into sailfish and spearfish. Further, it is also more limited than the spatial coverage of the long-term average longline landings for several fleets (**Figures 6-8**), presumably because of temporal changes in fishing grounds between earlier periods and the post-1995 Japanese data, which provides the bulk of the data for most areas.

Separation of the sailfish/spearfish mix is essential for estimating the sailfish landings required for the next assessment. As a consequence, the group requests each party to provide data required to estimate the ratio of sailfish and spearfish in the combined sailfish/spearfish catch of each of their fisheries catching these species by the next working group meeting. The data should at a minimum allow aggregation by quarter and 5X5 degree grid.

4.3 Separating sailfish catch from Task I data reported as unclassified billfish

The group reviewed the most recent Task I data (**Table 2**) containing unclassified billfish with the purpose of separating any sailfish that may have been reported in such category. The group only attempted to separate recent catches (post 1995) that were either substantial (in the order of 100s of tons) or for which information was available from the countries participating at the meeting. The unclassified billfish associated to EC-Spain longliners for 2001 and 2005 should be deleted because this country has now reported longline billfish bycatch by species for the period 1997-2006 (SCRS/08/045). The reported catch of unclassified billfish from Liberia (1995-2003), were disaggregated into species by assuming that the annual species ratios reported by the Côte D'Ivoire gillnet would be similar to those of the neighboring Liberia. Similarly unclassified billfish reported by Togo and Gabon (1993-2003), were disaggregated into species based on the annual species composition from the Ghanean gillnet fleet. Unclassified billfish reports from Uruguay were assumed to contain negligible amounts of sailfish following recent observer data from that country (SCRS/08/ 046). Unclassified billfish reports from Dominica (2001-2002), were separated into species based on the species ratios calculated from billfish reported by Dominica in 2006. The group was unable to separate other unclassified billfish catches because of lack of information. The resulting catches of sailfish for Liberia, Gabon, Togo and Dominica were added to the catch estimates developed by the group. Overall, these calculations have reduced substantially the reports of unclassified billfish (**Figure 9**).

4.4 Estimations of missing catches in the ICCAT Task I data.

The estimation of sailfishes by-catch of the European and associated PS fleet was based on the estimation made by Gaertner et al. (2002, 2003) from observer data. Gaertner conducted estimates of by-catch through Monte Carlo simulation methods considering time-area and fishing mode (FAD vs free school) strata. Our estimation have been carried out applying the average ratio sailfish catch to overall tuna catch obtained by Gaertner to the more recent series of catches. We have considered two average ratios: 1998-2000 and 1991-2000. Estimates have been made over the total catch, FADs and free school together, because Gaertner results did not allow a more detailed approach (**Table 3**).

The NEI-ETRO longline catch series obtained from the historical Japanese trade estimates made for tropical tuna was largely incomplete for sailfish. The 1993 ratios of billfish (SAI, 1%; BUM and WHM, 2%) against total tropical species (BET+YFT+ALB) from the Chinese Taipei fleet were used to estimate sailfish catches for subsequent years for the NEI-ETRO longline.

Finally, the Group identified the ten most important SAI fisheries of each the western and eastern stock-area, ranking them in descending order of the average catch by Flag (all gears combined). The group then inspected the data for these fisheries to identify gaps in the annual data. The group agreed to follow (ICCAT 2007) to fill in missing data by either using a 3 year moving average of prior years reported values or by using the average of the two closest years to the gap year. Gaps in series for Senegal, Dominican Republic, Liberia, Togo, NEI-ETRO and Benin were filled with 3 year moving averages. Gaps in series for Cuba, Chinese Taipei, Gabon, St. Vincent, Barbados, Benin, EC.Portugal, EC.España, Togo and Trinidad and Tobago were filled with the average of the two closest years to the gap years. Many more minor changes were made to the task I data including reclassifying catches that had been classified as unknown gear or unknown area. All these changes have been recorded in the Task I database (**Table 4**). Landings of sailfish for the whole Atlantic Ocean peaked at around 6,000 tons in the mid 1970s. During the next decade (1976-1985) they declined to about 4,000 tons and in the following decade (1986-1995) to about 3,000 tons. Since then they haave not declined further, ranging between 2,600 and 3,500 tons (**Figure 10**). Note that some longline fleets included spearfish in their sailfish reports, especially prior to 1995.

For the eastern stock the trend in sailfish catches is similar to total Atlantic trend because this stock represents 60% of total Atlantic catches. Landings since 1995 have averaged 1,600 tons and ranged between 1,400 and 2,200 tons (**Figure 11**). For the western stock sailfish catches peaked in the late 1960s reaching about 1,500 tons but declining quickly thereafter so that by 1973 they were about 800 tons. Over the next three decades catches steadily increased to again reach 1,500 tons by the end of the twentieth century. They have stayed around this level, with the exception of a peak of 2,000 tons in 2002 (**Figure 12**).

4.5 Classification of revised Task I into three Stocks

Catches were allocated, if possible to either the northwest or southwest sub-stocks according to a split along Latitude 5° N. Catches reported in Task I areas NW, NWC, WTRO and GOFM were associated to the northwest stock. Catches reported in Task I area SW were associated to the southwest Stock. In the specific cases of the longline fisheries of Japan, Chinese Taipei and Korea, the spatial distribution (5x5 squares) of CATDIS dataset (as of 2008/02/28), was used to break the Task I catches reported as West, on a yearly basis between the two western stocks. Catches from all other fleets were allocated to the northwestern stock except those from Brazil that were allocated to the SW stock. During the 1960s catches grew in both the SW and NW reaching an average of about 800 tons for each area. After that, since the early 1970, catch trends for these two areas of the western stock have differed markedly. In the northern part of the western stock catches steadily grew reaching 1,100 tons in 1983. Since then they have declined and are averaging again about 800 tons. In the southern part of the western stock catches quickly declined in the mid 1970s and stayed at around 200 t until the early 1980s. They then increase slowly to reach 300 tons by the end of the twentieth century. During the first few years of the current century catches increased very rapidly to 1,000 tons in 2002, but declined after and were only 600 tons in 2005 (**Figure 13** and **Table 5**).

4.6 Catch at size data

There is no plan to use the catch at size data in the assessment, however, the group was provided a summary of the available catch at size data (**Table 6**) which includes updates provided at the meeting by Senegal (Anon. 2008) and Cote d'Ivoire (SCRS/2008/041).

5. Review of catch rate information

5.1 Summary of relative abundance indices available at the 2001 assessment:

In 2001Japanese scientists attempted to obtain indices of abundance for sailfish by selecting areas where sailfish were much more abundant than spearfish, thus allowing the scientists to use the reported sailfish (which could otherwise be contaminated with spearfish) in the standardization process. Three areas were selected in the East and two in the west

providing indices for each stock. Additionally Japanese scientists used both GLM and habitat models in the estimation process. For the Western stock estimates were provided for 18 different years within the period (1967-99) because the number of observations in the selected areas was too small for the estimation in the remaining 19 years. For the Eastern stock estimates were provided for all years except two for the period (1967-99). At the meeting data on sailfish cpue from the pelagic longline of Chinese Taipei was standardized with a GLM for the years 1977 to 1989. Unfortunately these data contain substantial catches of spearfish and thus the group agreed the resulting index probably did not reflect only sailfish abundance and it was recommended that the Chinese Taipei scientists should attempt to restrict the data geographically as it was done by their Japanese counterparts.

In the Western Atlantic Ocean, GLM estimates of relative abundance were provided for the Venezuelan longline (1991-2000), Venezuelan recreational (1961-1989), US longline (1986-2000) and US recreational (1973-2000).

In the Eastern Atlantic two indices were developed during the meeting, one based on nominal cpue from Cote d'Ivoire (1988-2000) and one from a GLM conducted on the monthly aggregated nominal CPUE for Ghana (1988-2000).

5.2 Relative abundance indices provided at the meeting

At the meeting the following indices were updated, those for the Venezuelan longline (1991-2006), the US longline (1987-2007) and the US recreational (1973-2007). Additionally the nominal cpue index from Cote d'Ivoire (1988-2006) was also updated. Four new indices were presented, Venezuelan gillnet (1991- 2007), Brazilian longline (1986-2006), Brazilian recreational (1996-2007) and Senegalese artisanal (1989-2006). There were five indices presented for the northwestern stock, two for the southwestern stock and one for the eastern stock (**Table 7**). More detail on each of these indices is provided below.

Observer data are available for the Venezuelan longline fleet from 1991 to 2006. Using 1° x 1° CPUE data a delta lognormal GLM was used to estimate relative abundance indices (SCRS/08/039). Most of the observations of catch were closer to coastal areas within Venezuela. Variables used in standardization include components of year, area, seasons, bait, and selected interactions for modeling proportion of positive catch while the components for positive catch rates were used using variables year, area, season, bait, depth, and selected interactions. Indices show a slight declining trend, but with a peak in 1999. A possible caveat or bias may exist for this analysis because lately observers have been increasingly deployed onto large vessels to maximize the number of observations obtained.

With the help of the SCRS and the ERPB Venezuela has been monitoring a localized small-scaled drift gillnet fishery near Playa Verde since 1991. This fleet operates gillnets up to 1,500 m in length. Data for 1991-2007 were analyzed using GLM procedures assuming a lognormal error structure with variables being Year and Season with a Year*Season interaction (SCRS/08/040). Winter season includes November, December, and January while the rest of the monthly data records are included in a "summer" season. The resulting relative abundance index displays high variability throughout the time series.

An update of the relative abundance indices for sailfish derived from the United States pelagic longline (PLL) logbook data and Pelagic Observer Program (POP) was conducted, resulting in indices for the period 1986-2007 (SCRS/08/043). This fleet operates across a wide area of the western North Atlantic Ocean, Caribbean Sea, and Gulf of Mexico, targeting swordfish and tunas. Relative indices of abundance were estimated using Generalized Linear Mixed Models under a delta-lognormal model approach. The comparison of the model results from the PLL and POP sailfish data indicate that the proportion of positive sets is best explained by the main factors: area, season and target. Standardized CPUE estimates for number of fish per thousand hooks and weight (kg) per thousand hooks were similar. A decrease in the relative index around year 2000 may be associated with permanent PLL closures for the DeSoto Canyon area in the Gulf of Mexico (2000), Florida East Coast (2001), and time closure (for Jan thru April) for the Charleston Bump area in the northeast.

An update of standardized sailfish catch rates from the US recreational fleet was also presented (SCRS/08/044). Data used came from the RBS (Recreational Billfish Survey) along the southeast Florida coast for live baits tournaments only and the MRFSS (Marine Recreational Fisheries Statistical Survey) for the non-tournament component of the US Atlantic fishery. Standardized indexes of abundance were estimated using Generalized Linear Mixed Model under the Delta lognormal approach. For standardized indices the factors included were year, season, and selected interactions. The RBS standardized index shows a "dip" in the index in 1982, with a subsequent gradual increase through the end of the times series. The MRFSS standardized index has greater variability, with a gradual increase throughout the entire time series. From about the early to mid-1980's to end of each time series, the two indices have similar increasing trajectories.

The five indices available for the northwestern stock showed diverse trends (**Figure 14**). The Venezuelan and US longline indices show similar trends declining since the early 1990s. The two US recreational indices show opposite trends increasing steadily since the 1980s. The Venezuelan Gillnet index increased until the late 1990s and then has

fluctuated widely ever since.

Recreational fishing radio logbooks from 1996 to 2007, including boat name, effort (by tournament day/hooks), and size/weight of boated fish, from tournaments off Rio de Janeiro and Sao Paulo states were analyzed to obtain relative abundance index for sailfish off southern Brazil (SCRS/08/081). A GLM model that included as factors year, month, target, state, interaction terms, and assumed a Poisson error distribution was used in the estimation. Months included from October to February and two types of targets were separated, sailfish and blue marlin. The Rio de Janeiro state comprises the greatest effort and catch rates. Throughout time, nominal CPUE increases concomitant with a drop in fishing effort, with CPUE being greatest in 2004 and 2007. Sailfish comprise the majority of catch, with the exception of 1998 when blue marlin dominated the total catch. Trips were sailfish was the target species elicit the greatest overall catch rates. The standardized CPUE trend shows a smooth, stable trend.

Brazilian pelagic longline CPUE (number of fish per 1,000 hooks) data were analyzed to estimate relative abundance indices (SCRS/08/079). Data corresponded to "national" and chartered vessel set by set logbooks with catch recorded with a resolution of 1 degree of latitude and longitude. Sailfish comprised 1.4% of total catch and 78% of sets contained no sailfish. Although there were 40,000 longline sets in the database, not enough observations existed to provide estimates for the years 1990, 1993, and 2003; thus, those years were excluded from the standardization process. The GLM model used assumed three different error distributions: Negative Binomial, Poisson and Delta-lognormal. Factors incorporated included year, month, area, distance from coast, and selected interactions. The resulting standardized CPUE series exhibits an increase trend since 2002. However, it is possible that this increase is the result of white marlin being reported as sailfish during later years because of the recent ban of landing white marlin.

The two indices for the southwestern stock exhibit patterns that are difficult to interpret because they don't show a clear trend and because the Brazilian longline index has very large inter-annual variability (**Figure 15**).

Catch per unit of effort data (numbers and landing weight per trip) from the artisanal fishery that operates along the Senegalese coast were used to estimate a relative abundance index for sailfish for the period 1989-2006 (SCRS/08/082). Although the fleet operates year around, and monthly sampled effort is relatively constant, 99% of sampled trips that landed sailfish occurred between June and November with the highest catch rates occurring from July through September. Therefore, trip analyses were partitioned into high season (July-September) or low season (June, October, November). Only trips corresponding to gears that landed most of the sailfish (gillnets, troll, and handline) were considered. A delta lognormal GLM with factors of year, season, and gear was used in the estimation of the index which exhibited large inter-annual variability and no clear trend (**Figure 16**).

A GRASP (Generalized Regression Analysis and Spatial Prediction) model was used to develop spatially explicit estimates of sailfish abundance linked to environmental parameters (SCRS/08/049). GRASP uses generalized additive models (GAM) to model relationships between response variables and environmental variables/indices, then incorporates a spatial pattern of predictors to estimate abundance maps. This approach may be less cumbersome, because it is less data intensive and restrictive than other approaches and is ideally applicable to sparsely distributed data such as those analyzed. Chlorophyll-a (CLR) and sea surface temperature (SST) data was extracted from satellite imagery and implemented as numerical data while fishery data came from the Brazilian pelagic observer program (size, catch, effort). Using the apparent influences of SST, CLR, distance from land, year and month spatial patterns of abundance were estimated. The analysis shows that SST and year are the factors that provide the greatest contribution to explain the distribution of sailfish.

5.3 Other indices required for assessment

Given that the only relative abundance index presented at the meeting for the eastern stock was the one for Senegal, the group agreed of the need to review the other indices already considered during the 2001 assessment, namely the indices from Ghana and Cote d'Ivoire. The nominal CPUE from Cote d'Ivoire, presented in SCRS/08/041 extends from 1988-2006 and appears stable. Cote d'Ivoire reports that daily CPUE data does exist, so the group requested such data is analyzed with methods similar to those used for the Senegalese and Venezuelan artisanal fleets with the purposes of obtaining an additional index for the east. In the case of Ghana, data available is only aggregate catch and effort per month. Although this data is not ideal for the standardization of CPUE it appears from the experience of analyzing the data from the Venezuelan and Senegalese artisanal fleets that nominal and standardized annual CPUE do not differ much, and that once the seasonal effects are removed from the data, nominal cpue can be a valid index of abundance for artisanal fleets. The group therefore requests that a GLM model is implemented for the Ghanean data in the same way that it was done during the 2001 assessment, but including observations for years 2001 and onwards.

The lack of updated indices for fleets that have historically fished both the eastern and western stocks, namely the Chinese Taipei and Japanese longline fleets, was of concern to the group. In spite of the difficulties of selecting the appropriate model and data for this standardization, as identified during the 2001 assessment, the group hoped to have

received an update of the analyses conducted in 2001. Without these indices the assessments will have to proceed with the added uncertainty of not knowing the trends in abundance that such important fleets could reveal. It is hoped that such indices can be presented to the group before the assessment, ideally at the SCRS meeting of September 2008.

6. Intersessional workplan leading to the 2009 Assessment

The group reviewed the progress achieved in the main tasks identified in the inter-sessional work plan for 2008 (**Table 8**). Considerable progress has been made in the biological studies for marlins, spearfish, and sailfish. Details for the latter one can be found in section 3 above.

There was significant progress on biological research of white marlin (habitat and migration), blue marlin (feeding and larval ecology) and reproduction (sailfish). The review of catches has shown a new report completed for Senegal and the initiation of a pilot project to monitor catches from FAD caught billfish in the Dominican Republic. There is still a lot of work to be done on other countries.

Not much progress has been achieved regarding increasing conventional tagging activities in the South Atlantic or West Africa. The main impediment for this expansion is the fact that the current conventional tagging carried out in the northwest Atlantic is sustained thanks to the voluntary collaboration of a large constituent group of recreational fishermen, which has no parallel elsewhere. The number of recreational fishermen engaged in billfish fishing in West Africa and South America is much smaller than in the US and the Caribbean, thus the much smaller number of tags deployed by these two groups. Thus, the majority of conventional tag releases and recaptures are associated with the western North Atlantic (**Table 9**).

Tagging with PSATs continues and Brazilian scientists are planning to deploy two tags on spearfish and three on sailfish in 2009. US scientists will focus their tagging off the coast of Venezuela with the intention of recording long range migrations (150 day deployments) of white marlin after they leave their feeding grounds off North Venezuela. This work will complement the recent work done on white marlin, where tagged fish were released off Maryland with PSATs programmed for pop-up after 150 days. As reported elsewhere (ICCAT 2008), some work has been recently done on release mortality of billfish. Although the work conducted onboard longliners has been useful in providing an estimate of the range of mortalities to be expected after the release of live billfish from longliners, the estimation of similar rates for recreational releases is a lot more difficult because of the great variety of gear configurations and fishing strategies used by this sector (Goodyear reference here).

In regards to the tasks planned for the preparation of the 2009 sailfish assessment there has been considerable progress but not all planned task have been completed (**Table 10**). The review of catches was completed during this meeting and is described in detail in section 4 of this report. However a major task remains to be completed, the separation of spearfish and sailfish for longline catches were the sailfish reported are known to be contaminated by spearfish landings. The group hopes to obtain additional observations of scientific reports of sailfish and spearfish counts associated with geographical information that will allow the group to associate the counts with 5 by 5 degree grids. This new information should be incorporated with the information collated during this meeting to develop a matrix of sailfish/spearfish ratios that can be used to separate the longline catches. It is the intention of the group to conduct the separation during the species group meeting in September, unless scientists from the countries for which catch separation must be done provide these estimates before. Additionally estimates of the bycatch of sailfish obtained during purse seine operations in the Gulf of Guinea needs to be updated. The group made preliminary calculations during the meeting but EC scientists will hopefully redo them prior to the species group meeting in September.

Given the intention of pursuing assessment for the three possible sailfish stocks that may occupy the Atlantic (see section 3.12 of this document) there is a need to obtain several indices for each of these stocks. The consensus from the group is that it is essential that scientists from Japan and Chinese Taipei provide the group with relative abundance indices from their fleets and for each of the three possible stock areas. Additionally it is imperative that more indices are developed for the West African stock area. The group recommended that data available from Cote d'Ivoire (trip by trip) and from Ghana (monthly aggregated cpue data) should be processed with a GLM to obtain relative abundance indices. Although the Ghanean data appears not to be at the ideal resolution for a cpue standardization it appears from the analysis made of the Senegalese (SCRS/08/82) and Venezuelan (SCRS/08/ 040) artisanal fleets that standardized indices are not much different to the nominal indices suggesting that if the seasonal factors are taken into account other sources of variation are not as important.

The biological information on sailfish made available to the group and reviewed in section 3 of this report seems sufficient to proceed with the assessment. Additionally by the time the assessment is done there will be stronger confirmation of reproductive activities of sailfish in Cote 'Ivoire, thus strengthening the argument for an alternative hypotheses on stock structure that will consider three, rather than two, Atlantic stocks.

7. Other matters

The status of the ERPB was reviewed in accordance to the allocation of funds provided by the ICCAT commission to the program. Special attention was put on the expenditures or lack of from countries that had been allocated funds according to the ERPB work plan for 2007/08. As a result of this review Venezuela, Ghana and Cote d'Ivoire transmitted to ICCAT during the meeting their respective fund request with the support of the general and regional coordinator of the ERPB.

8. Recommendations

A number of recommendations were identified from the work conducted at the meeting in regards to the preparation of data for the planned 2009 sailfish assessment. Additionally the review of work conducted according to the billfish work plan produced additional recommendations relating to other billfish. Both are listed below:

Sailfish stock assessment

- Proceed with the plan to conduct a 2009 sailfish stock assessment meeting.
- Request count data on longline caught sailfish and spearfish sampled or reported at the 5 degree level from fleets that did not provide it during the meeting (Chinese Taipei, Japan, US).
- Request countries that have reported significant landings of combined billfish to disaggregate such landings to separate the sailfish catch.
- Request that relative abundance indices are provided to the group for longline fleets for which indices were not provided at the meeting. Indices for the fleets from Japan and Chinese Taipei are especially important because of the level of historical landings reported for sailfish.
- Develop relative abundance indices for Cote d'Ivoire and Ghana by standardizing the data at the smallest level of aggregation possible.
- Provide an update of the study on reproduction of sailfish off Cote d'Ivoire presented during the SCRS meeting of 2008.

Other matters

- Seek the support of ICCAT in the continued collection of biological data and monitoring of catches of billfish by allocating funds from the appropriate ICCAT projects to sustain sampling activities in Venezuela, Uruguay, Brazil, Ghana, Senegal and Cote d'Ivoire.
- Support the initiatives of the Japanese data project to provide training on data collection for West Africa and the Caribbean

9. Report adoption and closure

The report was adopted by correspondence.

The Chairman thanked participants for their hard work.

The meeting was adjourned.

References cited

ANON. 2002. Report of the 2001 billfish species group session. ICCAT, Coll. Vol. Sci. Pap., 54:649-754.

ANON. 2008. Rapport du projet JDIP 2007 for Senegal. Republique du Senegal, Direction des peches maritimes.9 p.

Ehrhardt, N., and V. Deleveaux, 2006. Interpretaion of tagging data to study growth of the Atlantic sailfish (*Istiophorus platypterus*). Bull. Mar. Sci., 79:719-726.

Gaertner , D., F. Menard, C. Develter, J. Ariz, A. Delgado de Molina, 2002. Bycatch of billfishes by the European tuna purse-seine fishery in the Atlantic Ocean. Fish. Bull., 100:683-689.

Graves, J., and D. Kerstetter, 2007. Atlantic Billfish Research Program: Use of Pop-up Satellite Archival Tags to Estimate Post-release Survival and Habitat Preferences of Sailfish (*Istiophorus platypterus*) from Commercial Pelagic Longline Gear in the Southern Gulf of Mexico. Gulf States Marine Fisheries Commission Project Final Report: Billfish-2005-009.

Hoolihan, J.P. 2006. Age and growth of Indo-Pacific sailfish, *Istiophorus platypterus*, from the Arabian Gulf. Fish. Res., 78:218-226.

Hoolihan, J.P., and J. Luo, 2007. Determining summer residence status and vertical habitat use of sailfish (*Istiophorus platypterus*) in the Arabian Gulf. ICES J. Mar. Science, 64:1791-1799.

ICCAT 2007. Report of the 2007 meeting of the working group on stock assessment methods. Madrid, Spain - March 19 to 23, 2007. 52p.

ICCAT 2008. Report of the standing committee on research and statistics (SCRS). Madrid, Spain, October 1 to 5, 2007. 213 p.

Llopiz, J., and R. Cowen, 2008. Precocious, selective and successful feeding of larval billfishes in the oceanic Strait of Florida. Mar. Ecol. Prog. Ser., 358:231-244.

McDowell, J., and J. Graves 2002. A genetic perspective on Atlantic sailfish stock structure. ICCAT, Col. Vol. Sci. Pap., 54:805-810.

Richardson, D., 2007. Physical and biological characteristics of billfish spawning habitat in the Straits of Florida. Ph.D. Dissertation, Univ. of Miami, pp 198.

Table 1 Catalogue of Task-2 catch and effort with SAI (*Istiophorus albicans*) catches (W: in weight; N: in number), by Flag, Gear group and Year.

Flag	Gear	Values
Belize	LL	W
Brasil	LL	W
		N
Cape Verde	LL	W
China P.R.	LL	W
		N
Chinese Taipei	LL	W
		N
Côte D'Ivoire	GN	N
Dominica	HL	W
	TR	W
EC.Portugal	LL	W
	SU	W
	UN	W
EC.United Kingdom	TW	W
Ghana	BB	W
	GN	W
Grenada	LL	W
Japan	LL	N
Korea Rep.	LL	W
		N
Mexico	LL	W
		N
Russian Federation	LL	W
Senegal	HL	W
	SP	W
		N
	SU	W
		N
	TR	W
St. Vincent and Grenadines	LL	W
Trinidad and Tobago	LL	W
	RR	W
U.S.A.	GN	N
	LL	N
	RR	N
U.S.S.R.	LL	W
Venezuela	GN	W
	LL	W

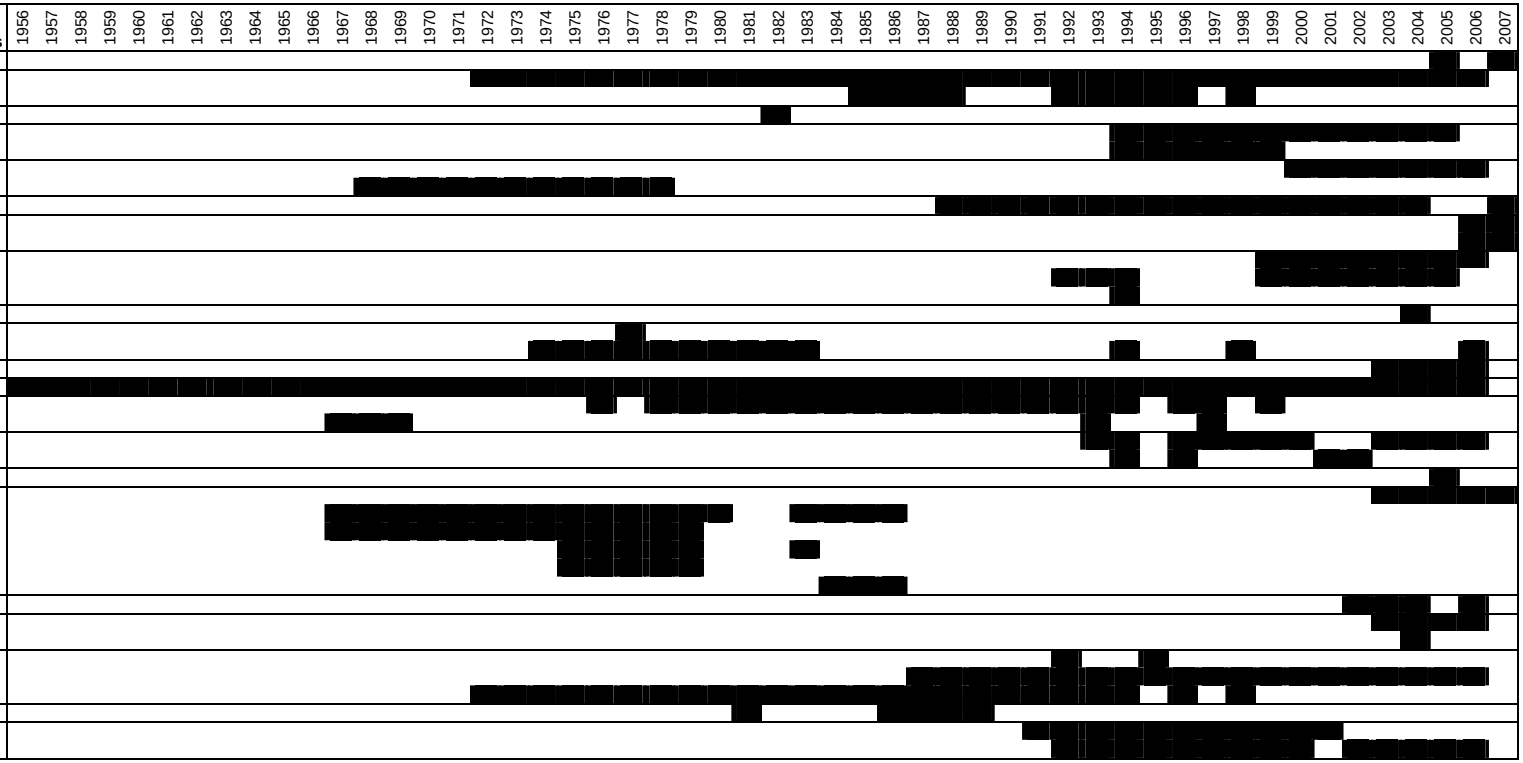


Table 2 Catches reported as billfish unclassified at the beginning of the meeting. Shaded cells contain those that were changed during the meeting. For details of changes refer to **Table 4.4**.

Stock	Flag	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ATN	Barbados												85	53	53			116	
	Brasil											0							
	Chinese Taipei												31						
	Cuba									28									
	Dominica												67	144					
	EC.España												1	1	1		5		
	EC.Malta						1	1	1										
	EC.Portugal	1								15	13	70	438	688	348	113	97	34	
	Korea Rep.																22	7	
	Liberia	18	20	38	27	112	120	120	71	781	513	683	163	165	135				
	Mexico				2	8						3	6						
	Seychelles											16							
	St. Vincent and Grenadines							1		2	1	0	1						
	Sta. Lucia											4		9					
	Trinidad and Tobago	16	7												14	3	9		
	Togo								32		110	77	205	158	872				
	U.S.A.																		
	UK.Bermuda								3	1									
	UK.Turks and Caicos																		1
	Venezuela												8						
ATS	Brasil											17	2	1	4	28		19	
	EC.Portugal											5	31	2	24	23	10	6	
	Gabon				3	5									9				
	Korea Rep.															145	15	11	
	Mixed flags (FR+ES)											56							
	Namibia													3		5	9	57	
	Seychelles													0					
	South Africa													11					
	Uruguay		1			6	1	2	50					2	19	4	11	19	
UNK	Chinese Taipei												8						
	EC.Portugal														3				
	Korea Rep.														28				
	St. Vincent and Grenadines											343	306						
	UK.British Virgin Islands																	1	
	UK.Sta Helena						2	2	1	2	4	4	3	4	1				
	Ukraine			5															

Table 3 Estimates of sailfish by catch (tons) from the European and associated purse seine vessels. Estimates were calculated by applying the method of Gaertner et al. (2002, 2003) to the total tuna catch from these vessels and by using two types of ratios calculated for data from 1998-2000 and 1991-2000.

Année	Total tunas	Sailfish	
		1998-2000	1991-2000
2001	154,475	44	43
2002	137,270	39	38
2003	155,639	44	43
2004	142,858	41	39
2005	121,110	35	33
2006	110,533	32	31

Table 4 Changes to catch values, gear code and area for sailfish records accepted by the working group and included in Task-1 database.

Flag	YearC	Fleet	Stock	Area	GearCode	DataType	Catch(t)	Remarks
Barbados	1995	BRB	ATW	WTRO	LL	C	74	Reclassified gear (UNCL->LL)
	1996	BRB	ATW	WTRO	LL	C	25	Reclassified gear (UNCL->LL)
	1997	BRB	ATW	WTRO	LL	C	70.8	Reclassified gear (UNCL->LL)
	2001	BRB	ATW	WTRO	LL	C	42.400	BIL unclassified breakdown (new)
	2002	BRB	ATW	WTRO	LL	C	26.350	BIL unclassified breakdown (new)
	2003	BRB	ATW	WTRO	LL	C	26.500	BIL unclassified breakdown (new)
	2004	BRB	ATW	WTRO	LL	C	26	Carried over (average of 2 closest years)
	2005	BRB	ATW	WTRO	LL	C	42	Carried over (average of 2 closest years)
	2006	BRB	ATW	WTRO	LL	C	57.950	BIL unclassified breakdown (new)
Benin	1983	BEN	ATE	ETRO	GILL	C	51	Carried over (average of 2 closest years)
	2001	BEN	ATE	ETRO	GILL	C	12	Reclassified gear (UNCL -> GILL)
	2002	BEN	ATE	ETRO	GILL	C	2	Reclassified gear (UNCL -> GILL)
	2003	BEN	ATE	ETRO	GILL	C	2	Reclassified gear (UNCL -> GILL)
	2004	BEN	ATE	ETRO	GILL	C	5	Carried over (3 yr moving average)
	2005	BEN	ATE	ETRO	GILL	C	3	Carried over (3 yr moving average)
	2006	BEN	ATE	ETRO	GILL	C	3	Carried over (3 yr moving average)
Chinese Taipei	1987	TAI	ATE	EAST	LLFB	C	5	Carried over (average of 2 closest years)
	1988	TAI	ATE	EAST	LLFB	C	6	Carried over (average of 2 closest years)
	1991	TAI	ATE	EAST	LLFB	C	10	Carried over (average of 2 closest years)
	1992	TAI	ATE	EAST	LLFB	C	215	Carried over (average of 2 closest years)
	2001	TAI	ATE	EAST	LLFB	C	101.329	catches obtained from CEF dataset
	2001	TAI	ATW	WEST	LLFB	C	57.008	catches obtained from CEF dataset
Cuba	1967	CUB	ATW	WTRO	UNCL	C	151	Carried over (average of 2 closest years)
	1976	CUB	ATW	WTRO	UNCL	C	122	Carried over (average of 2 closest years)
Dominica	2001	DMA	ATW	NW	HAND	C	2.684	BIL unclassified breakdown (BUM/SAI) using 2006 HL
	2001	DMA	ATW	NW	TROL	C	2	Reclassified gear (UNCL -> TROL)
	2002	DMA	ATW	NW	HAND	C	2.887	BIL unclassified breakdown (BUM/SAI) using 2006 HL
Dominican Republic	2001	DOM	ATW	WTRO	SURF	C	81	Reclassified gear (UNCL->SURF)
	2002	DOM	ATW	WTRO	SURF	C	260	Reclassified gear (UNCL->SURF)
	2003	DOM	ATW	WTRO	SURF	C	91	Reclassified gear (UNCL->SURF)
	2004	DOM	ATW	WTRO	SURF	C	144	Carried over (3 yr moving average)
	2005	DOM	ATW	WTRO	SURF	C	165	Carried over (3 yr moving average)
	2006	DOM	ATW	WTRO	SURF	C	133	Carried over (3 yr moving average)
EC.España	1983	EC.ESP	ATE	NE	LLHB	C	7	Carried over (average of 2 closest years)
	1987	EC.ESP	ATE	NE	LLHB	C	19	Carried over (average of 2 closest years)
	1997	EC.ESP	ATW	NW	LLHB	C	3.576	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	1997	EC.ESP	ATW	NWC	LLHB	C	9.897	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2001	EC.ESP	ATE	NE	LLHB	C	73.166	Spain revision (preliminary)
	2001	EC.ESP	ATE	SE	LLHB	C	77.237	Spain revision (preliminary)
	2001	EC.ESP	ATW	NW	LLHB	C	25.215	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2001	EC.ESP	ATW	NWC	LLHB	C	44.224	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2001	EC.ESP	ATW	SW	LLHB	C	284.242	Spain revision (preliminary)
	2002	EC.ESP	ATE	MEDI	LLHB	C	0.153	Spain revision (preliminary)
	2002	EC.ESP	ATE	NE	LLHB	C	96.371	Spain revision (preliminary)
	2002	EC.ESP	ATW	NW	LLHB	C	39.847	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2002	EC.ESP	ATW	NWC	LLHB	C	35.184	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2003	EC.ESP	ATW	NW	LLHB	C	15.941	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2003	EC.ESP	ATW	NWC	LLHB	C	13.579	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2004	EC.ESP-ES-SWO	ATE	MEDI	LLHB	C	0.054	Spain revision (preliminary)
	2004	EC.ESP-ES-SWO	ATW	NW	LLHB	C	35.738	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2004	EC.ESP-ES-SWO	ATW	NWC	LLHB	C	20.828	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2005	EC.ESP-ES-SWO	ATW	NW	LLHB	C	44.092	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2005	EC.ESP-ES-SWO	ATW	NWC	LLHB	C	24.425	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2006	EC.ESP-ES-SWO	ATW	NW	LLHB	C	26.266	Area split (BIL94A->NW/NWC) using CEF ratios SWO
	2006	EC.ESP-ES-SWO	ATW	NWC	LLHB	C	13.972	Area split (BIL94A->NW/NWC) using CEF ratios SWO
EC.Portugal	1995	EC.PRT	ATE	NE	SURF	C	2	Carried over (average of 2 closest years)
	1996	EC.PRT	ATE	NE	SURF	C	1	Carried over (average of 2 closest years)
	1997	EC.PRT	ATE	NE	SURF	C	2	Carried over (average of 2 closest years)
	1998	EC.PRT-PT-MAINLND	ATE	NE	LLHB	C	27	Carried over (average of 2 closest years)
Gabon	1993	GAB	ATE	ETRO	GILL	C	2.913	Breakdown with GHA ratios by YY (new)
	1994	GAB	ATE	ETRO	GILL	C	2.523	Breakdown with GHA ratios by YY (new)
	1995	GAB	ATE	ETRO	GILL	C	110.462	Carried over (average of 2 closest years)
	1996	GAB	ATE	ETRO	GILL	C	218.400	Breakdown with GHA ratios by YY (new)
	1997	GAB	ATE	ETRO	GILL	C	1.985	Breakdown with GHA ratios by YY (new)
	2001	GAB	ATE	ETRO	GILL	C	0.301	Breakdown with GHA ratios by YY (new)
	2003	GAB	ATE	ETRO	GILL	C	3.949	Breakdown with GHA ratios by YY (new)
Japan	1956	JPN	ATW	WEST	LLFB	C	1	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1957	JPN	ATE	EAST	LLFB	C	90	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1957	JPN	ATW	WEST	LLFB	C	28	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1958	JPN	ATE	EAST	LLFB	C	39	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1958	JPN	ATW	WEST	LLFB	C	80	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1959	JPN	ATE	EAST	LLFB	C	12	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1959	JPN	ATW	WEST	LLFB	C	16	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1960	JPN	ATE	EAST	LLFB	C	90	Area split (ATL->EAST/WEST) using CEF ratios SAI
	1960	JPN	ATW	WEST	LLFB	C	125	Area split (ATL->EAST/WEST) using CEF ratios SAI
Korea Rep.	1988	KOR	ATW	WEST	LLFB	C	2.800	catches obtained from CEF dataset
	1991	KOR	ATW	WEST	LLFB	C	0.900	catches obtained from CEF dataset
Liberia	1995	LBR	ATE	ETRO	GILL	C	32.74	Breakdown with CIV ratios by YY (new)
	1996	LBR	ATE	ETRO	GILL	C	85.24	Breakdown with CIV ratios by YY (new)
	1997	LBR	ATE	ETRO	GILL	C	43.48	Breakdown with CIV ratios by YY (new)
	1998	LBR	ATE	ETRO	GILL	C	135.65	Breakdown with CIV ratios by YY (new)
	1999	LBR	ATE	ETRO	GILL	C	122.04	Breakdown with CIV ratios by YY (new)

	2000	LBR	ATE	ETRO	GILL	C	153.88	Breakdown with CIV ratios by YY (new)
	2001	LBR	ATE	ETRO	GILL	C	56.31	Breakdown with CIV ratios by YY (new)
	2002	LBR	ATE	ETRO	GILL	C	132.96	Breakdown with CIV ratios by YY (new)
	2003	LBR	ATE	ETRO	GILL	C	127.23	Breakdown with CIV ratios by YY (new)
	2004	LBR	ATE	ETRO	GILL	C	106	Carried over (3 yr moving average)
	2005	LBR	ATE	ETRO	GILL	C	122	Carried over (3 yr moving average)
	2006	LBR	ATE	ETRO	GILL	C	118	Carried over (3 yr moving average)
Mexico	1996	MEX	ATW	GOFM	LL	C	10	Reclassified area (ATL->WTRO) & gear (UNCL->LL)
	1998	MEX	ATW	GOFM	LL	C	64.6	Reduced to 65 t (error in units)
Mixed flags (FR+ES)	2001	MIX.FR+ES	ATE	ETRO	PS	C	44.097	Revised series (new)
	2002	MIX.FR+ES	ATE	ETRO	PS	C	39.186	Revised series (new)
	2003	MIX.FR+ES	ATE	ETRO	PS	C	44.429	Revised series (new)
	2004	MIX.FR+ES	ATE	ETRO	PS	C	40.781	Revised series (new)
	2005	MIX.FR+ES	ATE	ETRO	PS	C	34.572	Revised series (new)
	2006	MIX.FR+ES	ATE	ETRO	PS	C	31.553	Revised series (new)
NEI (ETRO)	1993	NEI.001	ATE	EAST	LL	C	27.43390358	Rebuilt catch series (updated)
	1993	NEI.001	ATW	WEST	LL	C	14.56609642	Rebuilt catch series (updated)
	1994	NEI.001	ATE	EAST	LL	C	51.38523149	Rebuilt catch series (updated)
	1994	NEI.001	ATW	WEST	LL	C	27.283111	Rebuilt catch series (updated)
	1995	NEI.001	ATE	EAST	LL	C	57.124738	Rebuilt catch series (updated)
	1995	NEI.001	ATW	WEST	LL	C	30.33051565	Rebuilt catch series (updated)
	1996	NEI.001	ATE	EAST	LL	C	68.52375587	Rebuilt catch series (updated)
	1996	NEI.001	ATW	WEST	LL	C	36.38285133	Rebuilt catch series (updated)
	1997	NEI.001	ATE	EAST	LL	C	86.46915888	Rebuilt catch series (updated)
	1997	NEI.001	ATW	WEST	LL	C	45.91100579	Rebuilt catch series (updated)
	1998	NEI.001	ATE	EAST	LL	C	126.6836925	Rebuilt catch series (new)
	1998	NEI.001	ATW	WEST	LL	C	67.26300816	Rebuilt catch series (new)
	1999	NEI.001	ATE	EAST	LL	C	119.9622604	Rebuilt catch series (new)
	1999	NEI.001	ATW	WEST	LL	C	63.69424777	Rebuilt catch series (new)
	2000	NEI.001	ATE	EAST	LL	C	77.49460194	Rebuilt catch series (new)
	2000	NEI.001	ATW	WEST	LL	C	41.14594341	Rebuilt catch series (new)
	2001	NEI.001	ATE	EAST	LL	C	43.20987259	Rebuilt catch series (new)
	2001	NEI.001	ATW	WEST	LL	C	22.94238473	Rebuilt catch series (new)
	2002	NEI.001	ATE	EAST	LL	C	2.687058051	Rebuilt catch series (new)
	2002	NEI.001	ATW	WEST	LL	C	1.42669987	Rebuilt catch series (new)
	2003	NEI.001	ATE	EAST	LL	C	2.199886053	Rebuilt catch series (new)
	2003	NEI.001	ATW	WEST	LL	C	1.168034738	Rebuilt catch series (new)
	2004	NEI.001	ATE	EAST	LL	C	16	Carried over (3 yr moving average)
	2004	NEI.001	ATW	NW	LL	C	9	Carried over (3 yr moving average)
	2005	NEI.001	ATE	EAST	LL	C	7	Carried over (3 yr moving average)
	2005	NEI.001	ATW	NW	LL	C	4	Carried over (3 yr moving average)
	2006	NEI.001	ATE	EAST	LL	C	8	Carried over (3 yr moving average)
	2006	NEI.001	ATW	NW	LL	C	4	Carried over (3 yr moving average)
S. Tomé e Príncipe	1995	STP	ATE	SE	TROL	C	91.8	Reclassified gear (UNCL->TROL)
	1996	STP	ATE	SE	TROL	C	96.4	Reclassified gear (UNCL->TROL)
	1997	STP	ATE	SE	TROL	C	139	Reclassified gear (UNCL->TROL)
	1998	STP	ATE	SE	TROL	C	141.4	Reclassified gear (UNCL->TROL)
	1999	STP	ATE	SE	TROL	C	140.7	Reclassified gear (UNCL->TROL)
	2000	STP	ATE	SE	TROL	C	136.4	Reclassified gear (UNCL->TROL)
	2001	STP	ATE	SE	TROL	C	136.4	Reclassified gear (UNCL->TROL)
	2002	STP	ATE	SE	TROL	C	136.4	Reclassified gear (UNCL->TROL)
	2003	STP	ATE	SE	TROL	C	136.4	Reclassified gear (UNCL->TROL)
	2004	STP	ATE	SE	TROL	C	515.2	Reclassified gear (UNCL->TROL)
Senegal	2001	SEN	ATE	ETRO	HAND	C	266	Reclassified gear (UNCL->HAND)
	2002	SEN	ATE	ETRO	HAND	C	138	Reclassified gear (UNCL->HAND)
	2003	SEN	ATE	ETRO	HAND	C	361	Reclassified gear (UNCL->HAND)
	2004	SEN	ATE	ETRO	HAND	C	262.535	Reclassified gear (UNCL->HAND)
	2005	SEN	ATE	ETRO	HAND	C	254	Carried over (3 yr moving average)
	2006	SEN	ATE	ETRO	HAND	C	292	Carried over (3 yr moving average)
St. Vincent and Grenadines	2005	VCT	ATW	NW	LLFB	C	73	Carried over (average of 2 closest years)
Togo	1997	TGO	ATE	ETRO	GILL	C	9.075	Breakdown with GHA ratios by YY (new)
	1998	TGO	ATE	ETRO	GILL	C	22	Carried over (average of 2 closest years)
	1999	TGO	ATE	ETRO	GILL	C	35.910	Breakdown with GHA ratios by YY (new)
	2000	TGO	ATE	ETRO	GILL	C	22.978	Breakdown with GHA ratios by YY (new)
	2001	TGO	ATE	ETRO	GILL	C	61.805	Breakdown with GHA ratios by YY (new)
	2002	TGO	ATE	ETRO	GILL	C	54.629	Breakdown with GHA ratios by YY (new)
	2003	TGO	ATE	ETRO	GILL	C	95.229	Breakdown with GHA ratios by YY (new)
	2004	TGO	ATE	ETRO	GILL	C	71	Carried over (3 yr moving average)
	2005	TGO	ATE	ETRO	GILL	C	73	Carried over (3 yr moving average)
	2006	TGO	ATE	ETRO	GILL	C	80	Carried over (3 yr moving average)
Trinidad and Tobago	1998	TTO	ATW	NW	LL	C	6.85	Carried over (average of 2 closest years)
U.S.A.	1987	USA	ATW	ATW	LL	D	0.1	Reclassified area (ATL->ATW)
	1988	USA	ATW	ATW	LL	D	0.1	Reclassified area (ATL->ATW)
	1989	USA	ATW	ATW	LL	D	0.3	Reclassified area (ATL->ATW)
	1990	USA	ATW	ATW	LL	D	0.2	Reclassified area (ATL->ATW)
	2001	USA	ATW	ATW	LL	D	0.34	Reclassified area (ATL->ATW)
Venezuela	1991	VEN	ATW	NW	GILL	C	41	Reclassified gear (SURF->GILL)
	1992	VEN	ATW	NW	GILL	C	25	Reclassified gear (SURF->GILL)
	1993	VEN	ATW	NW	GILL	C	60	Reclassified gear (SURF->GILL)
	1994	VEN	ATW	NW	GILL	C	65	Reclassified gear (SURF->GILL)
	1995	VEN	ATW	NW	GILL	C	41	Reclassified gear (SURF->GILL)
	1996	VEN	ATW	NW	GILL	C	88	Reclassified gear (SURF->GILL)
	1997	VEN	ATW	NW	GILL	C	113.965	Reclassified gear (SURF->GILL)
	1998	VEN	ATW	NW	GILL	C	182	Reclassified gear (SURF->GILL)
	1999	VEN	ATW	NW	GILL	C	140	Reclassified gear (SURF->GILL)
	2000	VEN	ATW	NW	GILL	C	71	Reclassified gear (SURF->GILL)

Table 5 Estimated Catches (t) of Atlantic sailfish (*Istiophorus albicans*) by Stock and Flag

			1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
TOTAL			1	118	119	28	326	690	903	1000	1487	2923	2432	2186	2615	2335	2754	2815	2563	1786	4545	6129	6644	2476	3342	4159	3006	3187
ATE total				90	39	12	90	304	459	511	542	1387	1361	1185	1335	1241	924	1212	1518	1007	3672	5337	5646	1544	2547	3256	2099	2131
ATW	NW			6	55	3	133	177	240	255	419	924	553	547	697	450	973	962	509	500	633	642	690	585	526	677	621	901
	SW		1	23	25	12	102	209	204	234	526	612	518	455	583	644	857	641	536	279	240	150	309	347	269	226	286	155
ATW total			1	28	80	16	236	386	444	489	945	1536	1071	1001	1280	1094	1830	1603	1045	779	873	792	998	932	795	903	907	1056
ATE	ATE	Benin	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	36
		Cape Verde	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	0
		China P.R.	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	0
		Chinese Taipei	0	0	0	0	0	0	2	4	2	1	15	71	557	423	296	526	785	491	99	25	217	59	7	19	5	12
		Côte D'Ivoire	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	0
		Cuba	0	0	0	0	0	0	0	10	20	43	31	371	56	52	42	21	13	42	96	110	185	65	69	40	79	79
		EC.España	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	0
		EC.Portugal	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	0
		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	0	0	0
		Gabon	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	0
		Ghana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3040	4726	4517	764	1885	2691	1191	891
		Japan	0	90	39	12	90	304	457	495	515	1331	1237	404	548	230	95	125	89	66	19	38	4	24	11	19	33	50
		Korea Rep.	0	0	0	0	0	0	0	0	1	5	62	231	49	395	326	321	312	69	58	46	165	46	18	5	34	24
		Liberia	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	0
		Maroc	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	0
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	2	4	4	11	18	36	46	67	93	143	148	235	256	327	400	405	375	432	504
		NEI (ETRO)	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	0
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	31	9	7	41	13	4	0	0	0
		Russian Federation	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	0
		S. Tomé e Príncipe	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	0
		Senegal	0	0	0	0	0	0	0	0	0	0	0	76	76	81	87	112	122	144	107	122	189	160	143	107	325	498
		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	0	0
		Togo	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	0
		U.S.A.	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	0
		U.S.S.R.	0	0	0	0	0	0	0	0	0	3	5	14	13	14	11	14	39	14	9	7	1	13	5	0	0	37
ATW	ANW	Aruba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	20	20	30	30	30	30
		Barbados	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	0
		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	0	0
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	4	20	16	8	12	44	3	7	12	0	39	0	1	1	2	4
		Cuba	0	0	0	0	0	0	0	13	29	59	44	151	258	19	58	30	17	58	133	152	122	91	51	151	119	134
		Dominica	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	0
		Dominican Republic	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	0
		EC.España	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	0
		EC.Portugal	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	0
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	37	40	31	36
		Japan	0	6	55	3	22	7	30	52	177	580	239	52	126	98	215	294	127	76	118	110	133	23	7	20	21	44
		Korea Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28	28	6	13	31	27
		Mexico	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	0
		NEI (ETRO)	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	0
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	28	28	28	28	28	28	28	21	21	21	21
		Seychelles	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	0
		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	0	0
		Sta. Lucia	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	0
		Trinidad and Tobago	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	0
		U.S.A.	0	0	0	0	111	126	142	157	173	188	194	201	207	214	220	227	233	240	248	254	261	308	308	308	308	533
		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	0	0	0	0	0
		Venezuela	0	0	0	0	0	44	68	33	40	96	72	123	90	111	440	338	101	91	84	60	59	56	66	93	58	72
	ASW	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	0	0
		Brasil	0	0	0	0	0	159	91	46	46	46	46	23	57	27	21	43	64	37	78	76	186	287	246	201	231	64
		China P.R.	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	0
		Chinese Taipei	0	0	0	0	0	0	0	0	0	1	16	86	70	171	99	126	14	100	68	28	87	5	9	17	34	77
		EC.España	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	0
		EC.Portugal	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	0
		Japan	1	23	25	12	102	50	113	188	478	560	369	222	296	130	284	27	5	2	0	2	0	0	2	0	1	0
		Korea Rep.	0	0	0	0	0	0	0	0	2	6	87	124	160	316	453	446	433	96	81	35	36	37	8	6	20	14
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	44	13	9	0	18	3	2	0	0
		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	0	0
		U.S.A.	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	0

Table 5 (cont.)

			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL			3995	4976	3713	3421	3386	3761	3446	2815	3637	2779	3344	4032	2613	3089	3465	2597	2839	2993	2929	2975	3496	3069	3271	3242	2714
ATE total			2876	3745	2492	2328	2105	2590	2148	1750	2411	1580	1999	2585	1334	1843	2295	1429	1446	1627	1395	1501	1477	1740	1864	1787	1669
ATW	NW		931	1115	1029	817	904	962	848	730	811	967	947	975	892	916	792	959	1037	958	897	720	1035	539	734	902	740
	SW		188	116	192	275	377	209	449	335	415	233	398	473	387	330	378	209	356	407	637	755	984	789	673	553	305
ATW total			1119	1231	1221	1093	1281	1171	1297	1065	1226	1200	1345	1447	1278	1246	1170	1168	1393	1366	1534	1475	2019	1328	1407	1455	1045
ATE	ATE	Benin	48	51	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	12	2	2	5	3	3
		Cape Verde	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	5	9	4	5	11	4	4	8	
		Chinese Taipei	67	20	8	9	1	5	6	7	13	10	215	420	101	155	65	150	117	178	120	101	124	74	30	50	73
		Côte D'Ivoire	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73	93	78
		Cuba	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533	0	0	0	0	0	0	0	0	0	
		EC.España	10	7	4	7	9	19	28	14	0	13	3	42	8	13	42	38	15	20	8	150	210	183	148	177	200
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	1	2	1	2	1	2	27	53	11	3	8	13	19	11	136
		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	1	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	3	3	110	218	2	0	0	0	0	0	4	0	0	
		Ghana	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529	551	503	542	282
		Japan	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	20	21	70	51	71
		Korea Rep.	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	33	85	43	136	122	154	56	133	127	106	122	118
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	
		Mixed flags (FR+ES)	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98	44	39	44	41	35	32
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	27	51	57	69	86	127	120	77	43	3	2	16	7	8
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		S. Tomé e Príncipe	0	0	0	0	0	0	78	86	97	84	78	81	88	92	96	139	141	141	136	136	136	136	515	346	292
		Senegal	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	266	138	361	263	254	292
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1
		Togo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	22	36	23	62	55	95	71	73	80
		U.S.A.	0	0	0	0	0	0	0	0	0	2	4	1	1	3	1	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	0	0	0	0	2	5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ATW	ANW	Aruba	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10	0	0	0	0	0	
		Barbados	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44	42	26	27	26	42	58
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	
		Chinese Taipei	1	2	2	2	3	2	16	9	4	4	2	12	13	2	2	0	7	2	1	3	9	1	9	2	1
		Cuba	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18	50	72	47
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3	0	1	0	3
		Dominican Republic	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	81	260	91	144	165	133
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	69	75	30	57	69	40
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	2	0	8	63	1
		Grenada	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112	147	159
		Japan	133	20	28	20	10	1	12	10	7	8	0	0	0	0	1	9	1	6	10	1	2	7	5	21	4
		Korea Rep.	6	12	29	38	8	0	0	3	9	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	2	19	19	10	9	65	40	118	36	34	45	51	55	42
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	15	27	30	36	46	67	64	41	23	1	1	9	4	4
		Netherlands Antilles	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	0	2	164	3	86	73	42
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	7	4	3	7	6	8	10	9	17
		U.S.A.	452	734	495	282	462	496	508	381	304	407	330	265	207	374	300	374	291	234	121	69	110	5	7	4	5
		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	0	0	0	0
		Venezuela	57	119	81	81	77	80	22	24	24	65	71	206	162	93	155	175	248	169	83	126	159	133	158	178	184
	ASW	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
		Brasil	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	592	412	547	585	534	416	140
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	9	4	3	1	0	1	0	
		Chinese Taipei	21	29	43	37	61	29	284	162	79	69	31	211	220	36	35	4	122	31	21	54	61	24	10	39	21
		EC.España	0	0	0	0	0	0	0	0	0	8	13	13	19	36	5	17	42	7	14	284	374	167	125	45	108
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	12	4	48	18
		Japan	2	2	6	18	18	5	10	12	18	65	1	2	8	2	3	8	2	4	2	2	1	1	0	1	0
		Korea Rep.	13	24	23	34	6	1	3	14	16	1	2	4	8	8	22	8	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	0	0	0	0	0	0	0	0	
		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	18
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	3	0	0	0	0	0	0	0	

Table 6 Catalogue of Task-2 size samples of SAI (*Istiophorus albicans*) available, by Flag, Gear group and Year

Flag	Gear	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	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
Brasil	LL																																						
China (ICCAT program)	LL																																						
Chinese Taipei	LL																																						
Côte D'Ivoire	GN																																						
Cuba	LL																																						
EC.España	LL																																						
Ghana	GN																																						
Japan	LL																																						
Japan (foreign obs.)	LL																																						
Korea Rep.	LL																																						
Mexico	LL																																						
Mixed flags (KR+PA)	LL																																						
Senegal	HL																																						
Senegal	SP																																						
U.S.A.	LL																																						
U.S.A.	RR																																						
U.S.A.	SP																																						
Venezuela	GN																																						
Venezuela	LL																																						

Table 7 Relative indices of abundance obtained by standardizing CPUE data from different fleets (RBS= Recreational tournaments US, MRFSS = Recreational non-tournament US, USLL= Longline US, VELL = Longline Venezuela, VEGN = Gillnet Venezuela, BRREC = Recreational Brazil, BRLL = Longline Brazil, SEGN = Artisanal Senegal). All indices have been scaled to their mean.

	RBS	MRFSS	USLL	VELL	VEGN	BR REC	BR LL	SEGN
1973	1.07							
1974	0.80							
1975	1.07							
1976	0.82							
1977	1.25							
1978	1.15							
1979	1.09							
1980	1.26							
1981	1.22	0.50						
1982	0.27	0.26						
1983	0.26	0.92						
1984	0.58	0.60						
1985	0.44	0.51						
1986	0.64	0.71	1.09				0.51	
1987	0.55	0.42	0.64				0.55	
1988	0.82	0.68	1.23				0.41	
1989	0.57	0.59	1.30				1.67	1.82
1990	0.90	0.67	1.45				0.00	2.33
1991	1.07	1.07	1.80	1.56	0.40		0.39	0.51
1992	1.41	1.41	2.44	1.64	0.51		0.60	0.71
1993	0.93	1.08	1.95	1.34	0.86		0.00	0.51
1994	1.48	1.01	1.41	1.81	0.97		0.32	0.51
1995	1.31	1.29	0.89	1.16	1.07		0.27	0.40
1996	1.41	1.00	0.89	0.55	0.98	1.23	0.64	0.61
1997	1.54	0.73	1.40	0.99	1.17	0.83	0.76	1.52
1998	1.80	1.40	0.97	0.55	1.28	1.06	0.83	1.92
1999	1.03	1.69	1.32	2.09	1.51	0.49	0.39	0.81
2000	0.78	1.27	0.92	0.61	0.97	1.35	0.51	1.72
2001	0.86	0.77	0.28	0.32	0.79	1.03	0.62	1.52
2002	1.12	1.41	0.34	0.69	0.63	1.09	2.53	0.61
2003	1.32	1.43	0.35	0.67	0.97	0.94	0.00	0.61
2004	0.96	1.17	0.50	0.57	1.38	1.18	2.83	0.71
2005	1.04	2.08	0.21	0.61	1.30	0.91	2.10	0.71
2006	1.16	1.13	0.23	0.85	0.95	0.55		0.51
2007		1.21	0.39		1.27	1.34		

Table 8 List of general billfish tasks to be completed by the Working group in 2007/08 (from ICCAT 2008)

Planned activity	Progress to date
Estimation of age and growth for blue and white marlin	White marlin study will be completed by end of 2008. Blue marlin will be completed by end of 2009.
Reproduction, age and growth studies towards sailfish and spearfish	Study on age and growth and reproduction of spearfish was initiated in early 2008. For information on sailfish see section 3 of this report. Cote d'Ivoire initiated in late 2007 a study of reproduction of sailfish and blue marlin.
Analysis of tissue samples of white marlin and spearfish to evaluate the presence of roundscale spearfish	Study is in progress and collections are been made by Venezuela, Uruguay, Brazil and USA
Describe vertical distribution and habitat of billfish	New work has been done on white marlin with PSATs deployed for 150 days after the fall migration to the northern US
Help design a monitoring program in the eastern Caribbean with the FAO-WECAFC ad hoc group on moored FADs	A new study has started in early 2008 in the Dominican Republic to monitor FAD caught billfish
Collaboration of the Tropical Tuna Working Group in an activity directed to estimate the historical catches of billfish from purse seine fisheries in the Gulf of Guinea	Yet to be started
Review of sampling programs for artisanal fisheries	Senegal has just completed a report reviewing their sampling program (Anon 2008)
Increase conventional tagging activities in the south Atlantic and eastern Atlantic	No progress
Restart conventional tagging in the Côte d'Ivoire recreational fishery	No progress

Table 9 Summary of SAI (*Istiophorus albicans*) tagging (releases and recoveries), by year.

Releases			Recoveries																																																			
Year	Total	No recovery	1951	1952	1953	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
?	44	4																													1																				3	3	3	9	19	2	40
1940	60	27					1																		2	4	3		1							3			2	3	10	4															33
1950	2	1		1																																																					1
1951	2	1	1																																																						1
1952	4	2		1	1																																																				2
1953	2	1				1																																																			1
1954	3	3																																																							0
1955	12	10				1	1																																																		2
1956	4	3							1																																																1
1957	62	60					1	1																																																	2
1958	32	30							2																																																2
1959	255	254									1																																														1
1960	927	922								1	4																																														5
1961	1311	1304									3	2	2																																												7
1962	1503	1493										4	6																																												10
1963	1438	1430											7	1																																											8
1964	1313	1307												5	1																																										6
1965	1319	1310													2	6	1																																								9
1966	1292	1275														8	6	2		1																																					17
1967	896	883															10	3																																							13
1968	859	849																6	3	1																																					10
1969	828	821																	4	1	1	1																																			7
1970	636	634																		1		1																																			2
1971	1079	1075																			1	2		1																																	4
1972	926	920																				2	3	1																																	6
1973	920	903																					3	10	2	1								1																							17
1974	888	878																						2	2	5	1																														10
1975	1035	1018																							7	8	2																														17
1976	1511	1488																								11	8	4																													23
1977	1466	1434																									15	10	3	2	1		1																								32
1978	1625	1590																										12	12	9	1								1																		35
1979	1895	1858																											11	13	5	4	2												1		1										37
1980	2201	2150																												19	14	3	2	1	1						3	1	2	4	1												51
1981	1903	1860																													20	15	5	2	1																						43
1982	1683	1651																														12	11	5	3	1																					32
1983	1865	1852																															6	4	2	1																					13
1984	2259	2227																																11	9	5	3	2			1		1														32
1985	1949	1908																																	17	14	3	3	1	1	2																41
1986	2289	2245																																		24	12	5	3																		44
1987	2038	1992																																			17	10	9	5	2		2			1											46
1988	2537	2487																																				23	9	7	4	3	1	1			2										50
1989	2247	2197																																					12	21	12	4		1													50
1990	3584	3492																																						22	40	15	9	5				1									92
1991	5376	5225																																							46	60	32	5	5	3											151
1992	6339	6188																																								42	70	33	3	1					2						151
1993	6166	6031																																									46	53	26	7		1	2								135
1994	5989	5896																																										36	33	11	8	2	2	1							93
1995	6647	6552																																											30	40	18	4	2		1						95
1996	5084	4974																																												36	42	25	4	1	1	1					110
1997	5555	5452																																													26	47	16	9	3		2				103
1998	5097	5007																																														26	36	21	4	2		1			90
1999	7083	6988																																															37	33	14	5	3	1	2		95
2000	4139	4116																																																9	5	9					23
2001	654	628																																																	4	14	3		5		26
2002	810	787																																																		12	4	4	2	1	23
2003	2107	2090																																																			8	5	4		17
2004	465	448																																																			1	3	10	3	17
2005	337	315																																																					6	16	22
2006	38	30																																																						8	8
Total	110590	108576	1	2	1	2	3	1	3	1	8	6	15	6	3	14	17	11	7	4	2	6	6	14	13	29	29	26	27	43	42	34	27	24	33	48	35	43	37	59	#	#	#	#	99	99	97	#	99	74	37	46	24	23	48	30	2014

Table 10 List of tasks to be completed during 2007/08 in preparation for the 2009 sailfish assessment (from ICCAT 2008)

Planned activity	Progress to date
Update estimates of catch for all components of the directed and by-catch fisheries specially for: − By-catch from industrial longline fleets − By-catch from tropical purse seine − Artisanal gillnet − Artisanal FAD fleets − Recreational, including estimates of live releases	A review of catches was conducted during the meeting and most catches are complete until 2006, few are yet available for 2007. See section 4 of this report for more details
Update relative abundance estimates for the following fleets: − United States longline − United States rod and reel − Japanese longline − Chinese Taipei longline − Venezuelan longline	The following indices have been updated: − US longline (-2007) SCRS/08/043 − US rod and reel (-2007) SCRS/08/044 − Venezuela longline (-2006) SCRS/08/039
Obtain new relative abundance indices for other fleets: − Côte d'Ivoire − Ghana − Senegal − Venezuela gillnet − Sao Tomé − Brazilian longline	The following new indices have been estimated: − Brazil longline (-2006) SCRS/08/079 − Brazil recreational (-2007) SCRS/08/081 − Senegal artisanal (-2006) SCRS/08/082 − Venezuela gillnet (-2007) SCRS/08/040
Review biological information on sailfish	See section 3 of this report

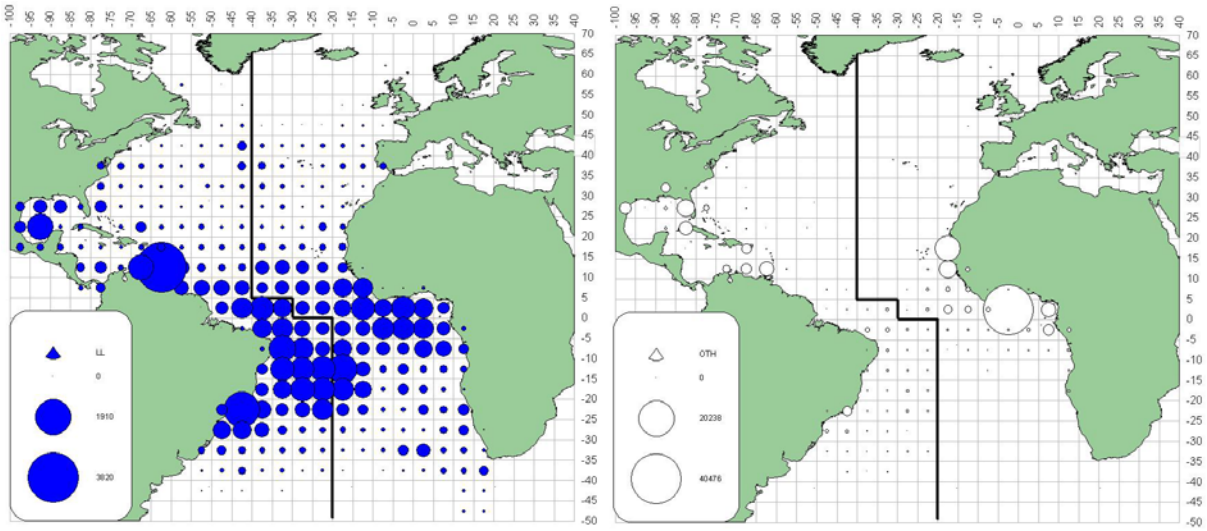


Figure 1. Geographical distribution of sailfish catches by major gears, from the entire period 1950-2006.

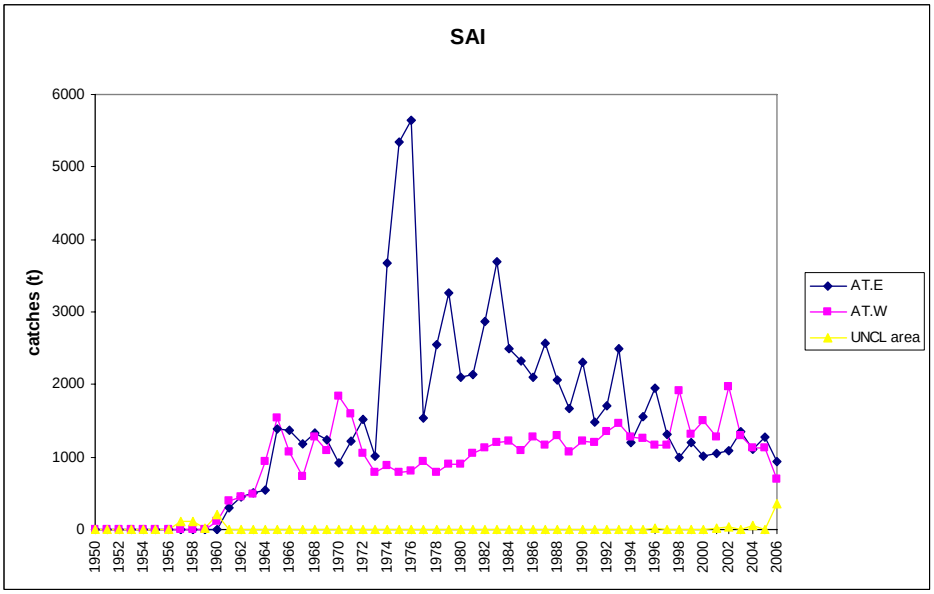
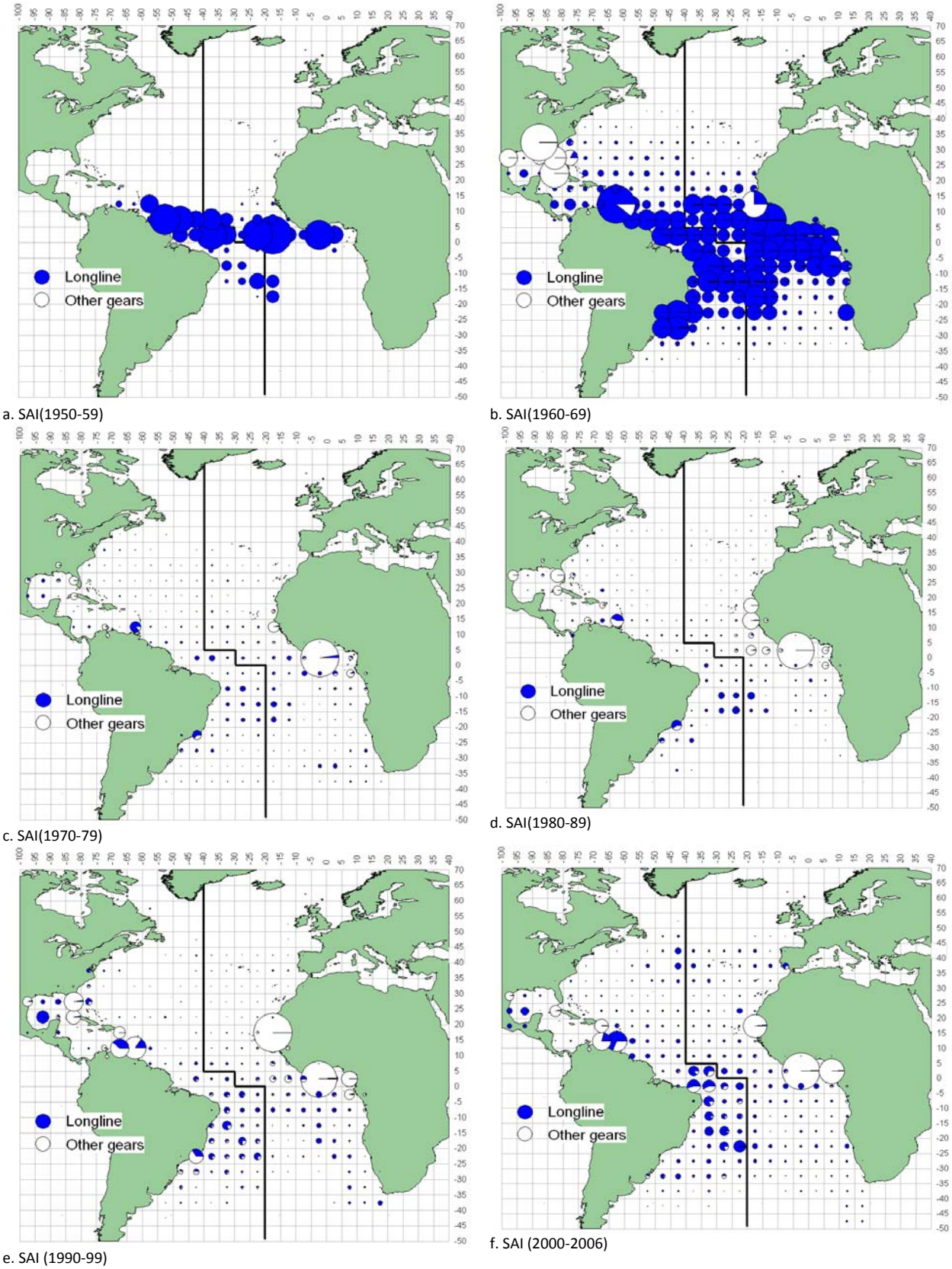


Figure 2 Reported catches of sailfish and spearfish combined in the Atlantic from 1956 – 2006 for East and West stocks.



a. SAI(1950-59)

b. SAI(1960-69)

c. SAI(1970-79)

d. SAI(1980-89)

e. SAI (1990-99)

f. SAI (2000-2006)

Figure 3 Distribution of Sailfish catches by major gear and by decades

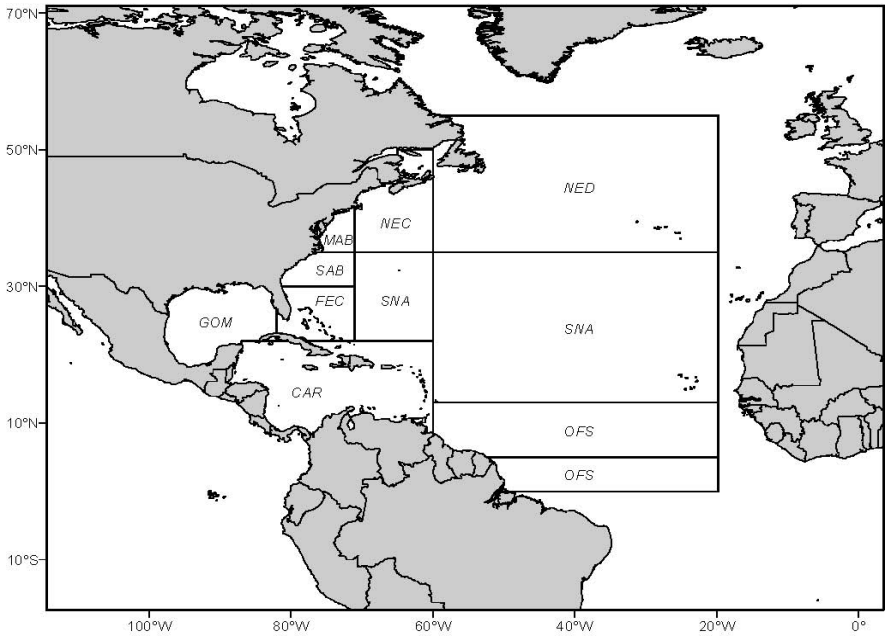


Figure 4. Statistical areas for the US longline summary data used to estimate the sailfish-spearfish proportions of the combined catch.

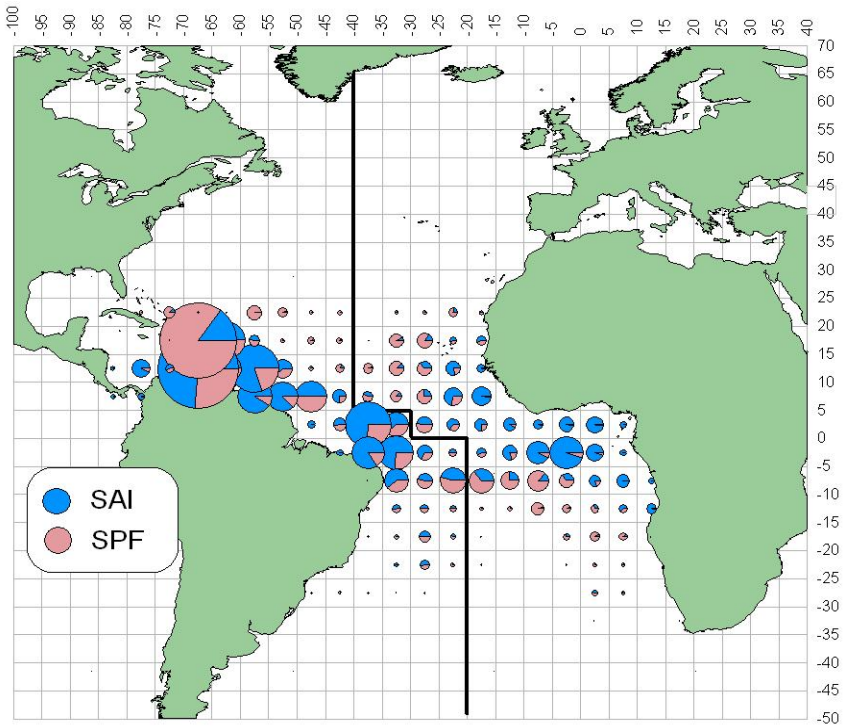


Figure 5. Distribution of SAI and SPF according to ratio calculated from the Japanese longline CE, and Brazilian and Venezuelan longline observer data. The radii of the circles is proportional to the number of observations used to estimate the ratios.

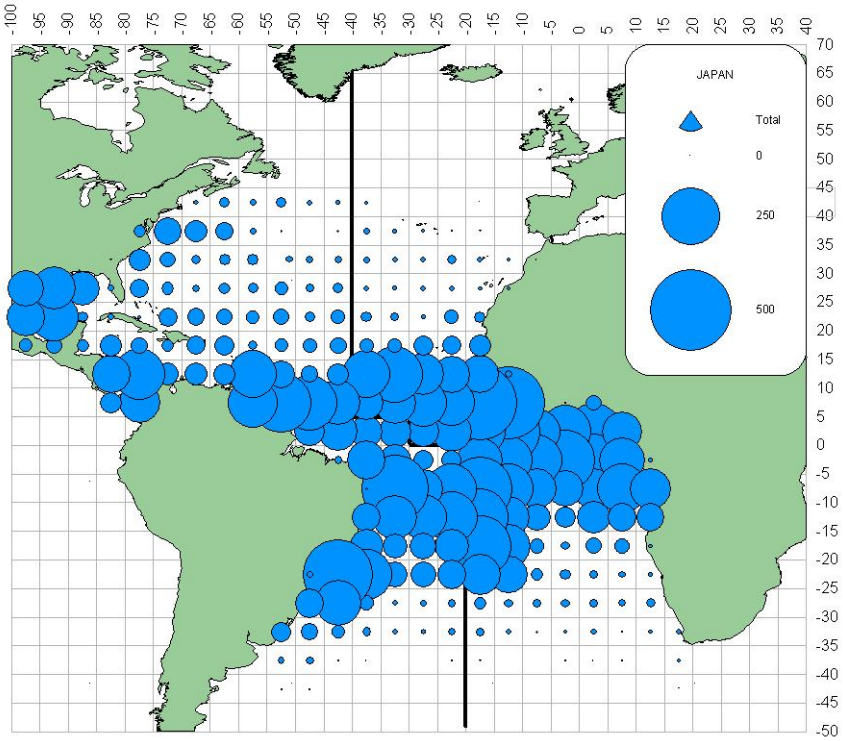


Figure 6. Distribution of SAI for Japan (all gears 1950-2006)

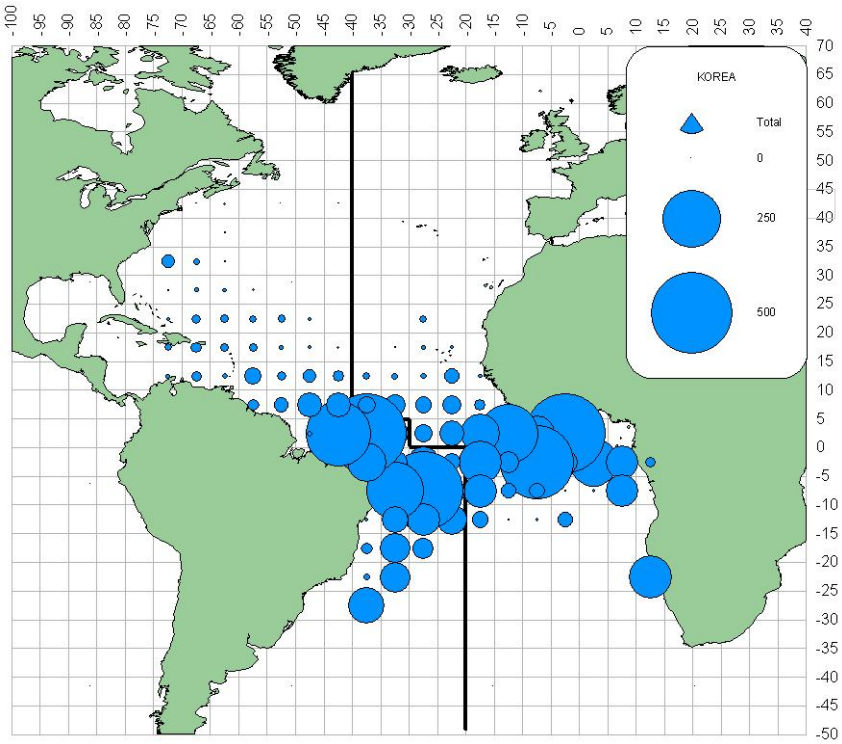


Figure 7. Distribution of SAI for Korea (all gears 1950-2006)

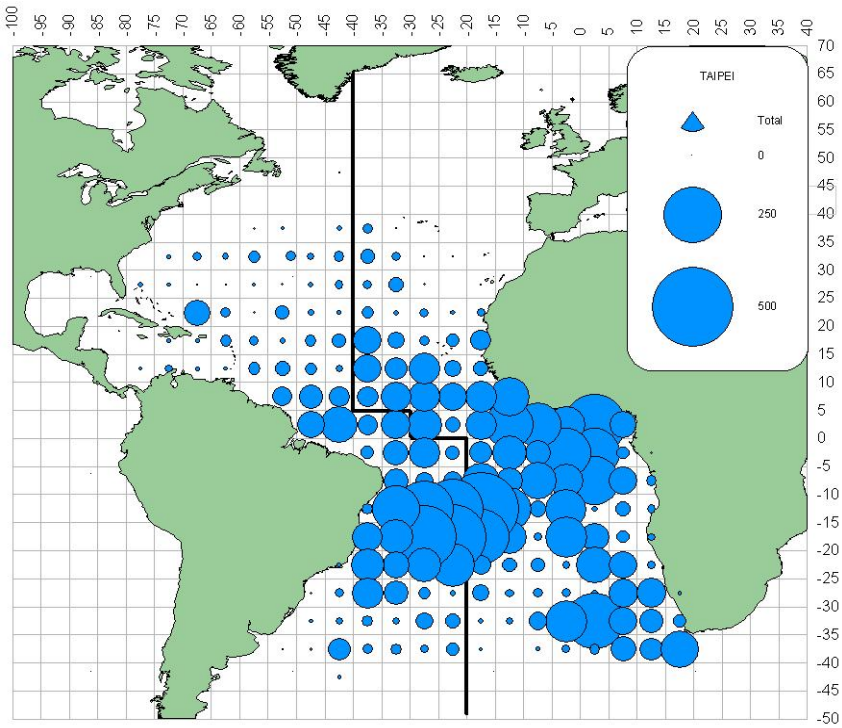


Figure 8. Distribution of SAI for Chinese-Taipei (all gears 1950-2006)

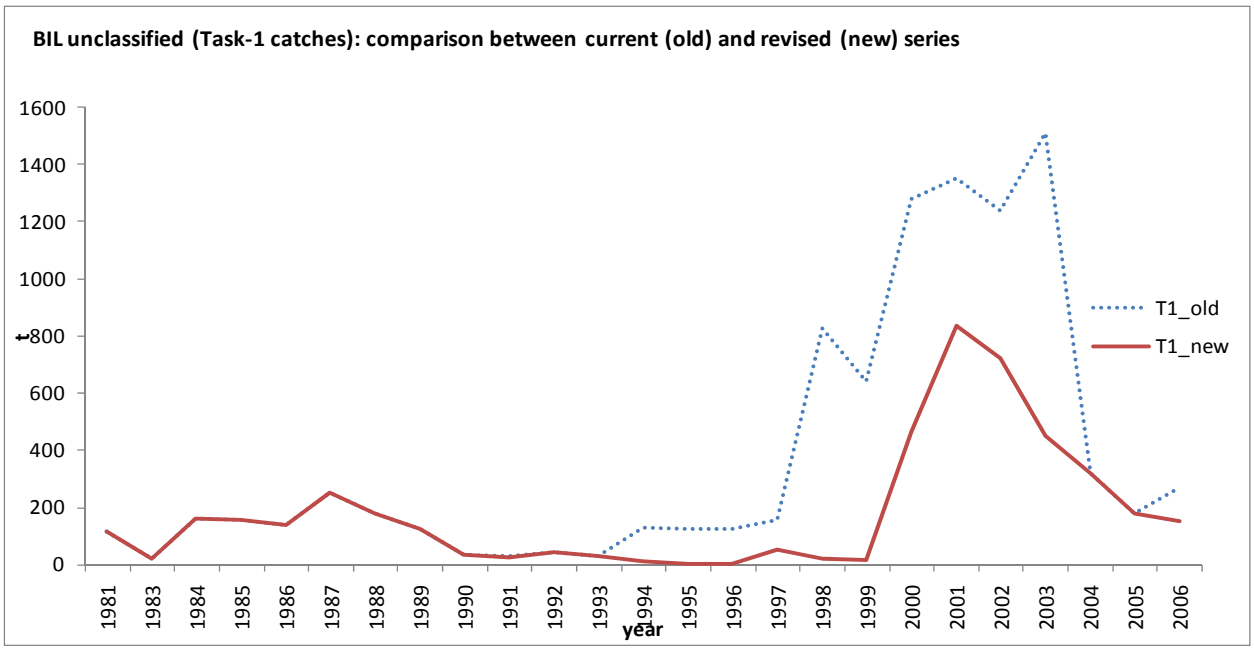


Figure 9 Landings of unclassified billfish prior (broken line) and after (solid line) the group made some calculations to disaggregate these catches by species.

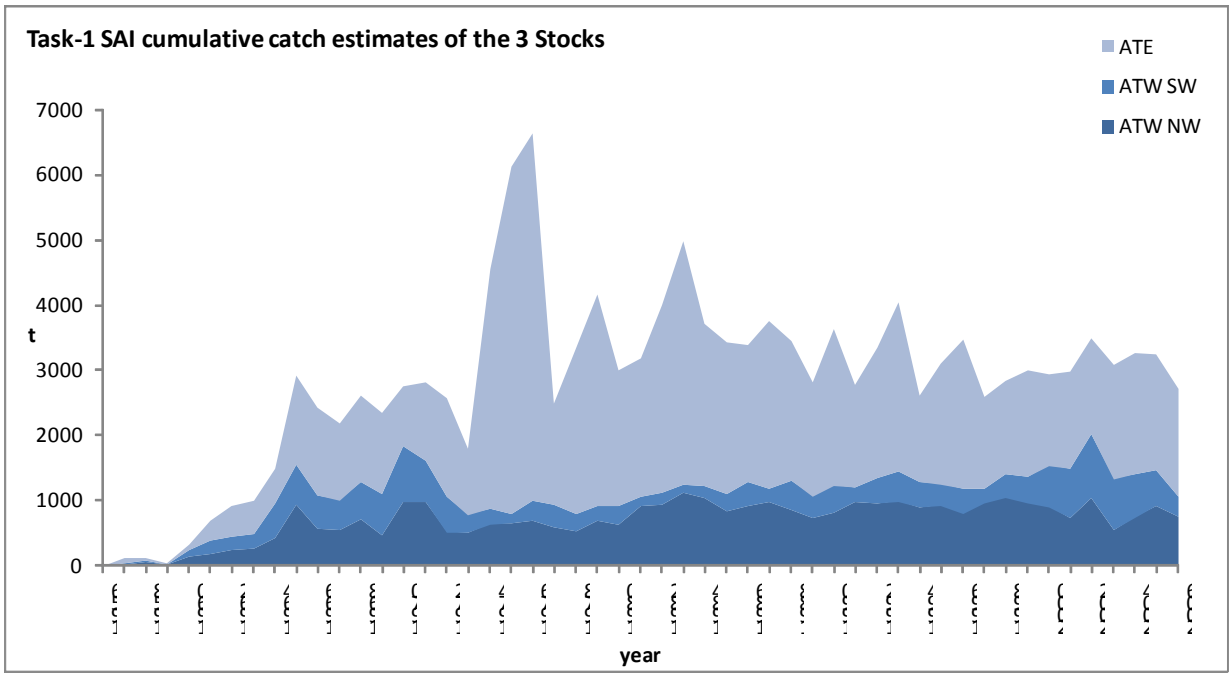


Figure 10. Estimated task I catches for sailfish separated by area. Note that some longline fleets included spearfish in their sailfish reports, specially prior to 1995.

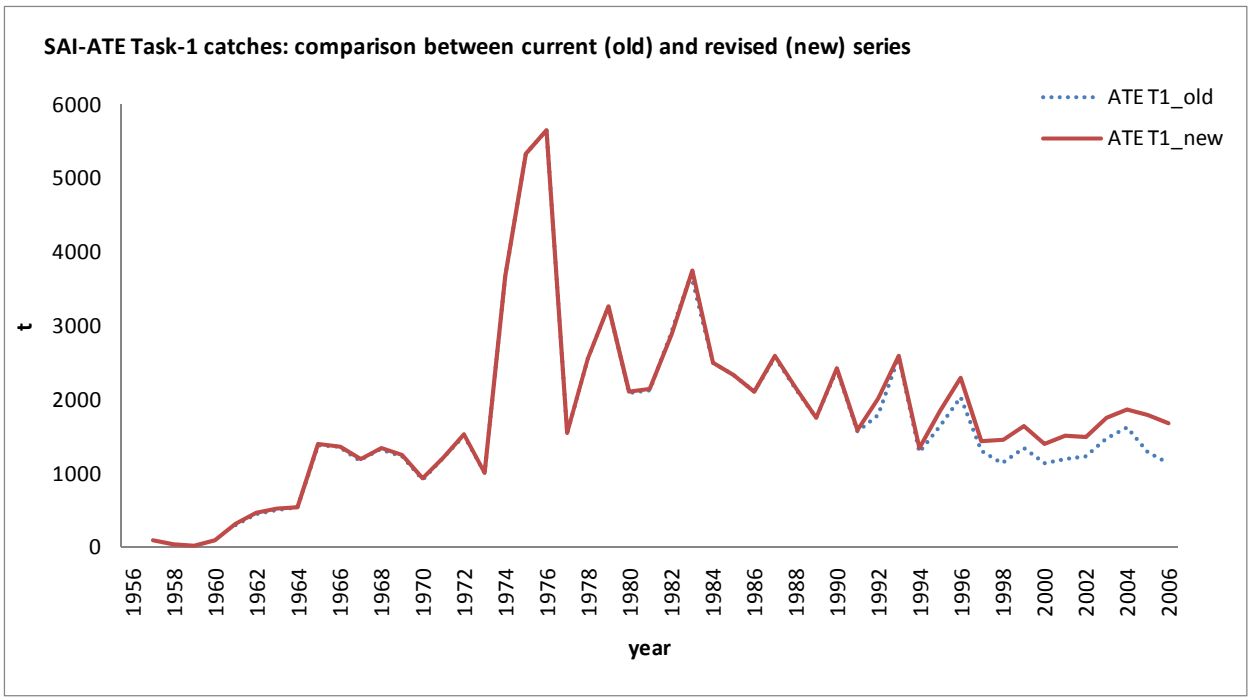


Figure 11 Estimated task I catches for sailfish for the eastern stock. Note that some longline fleets included spearfish in their sailfish reports, specially prior to 1995. Broken line represents task I estimates prior to changes made during the meeting.

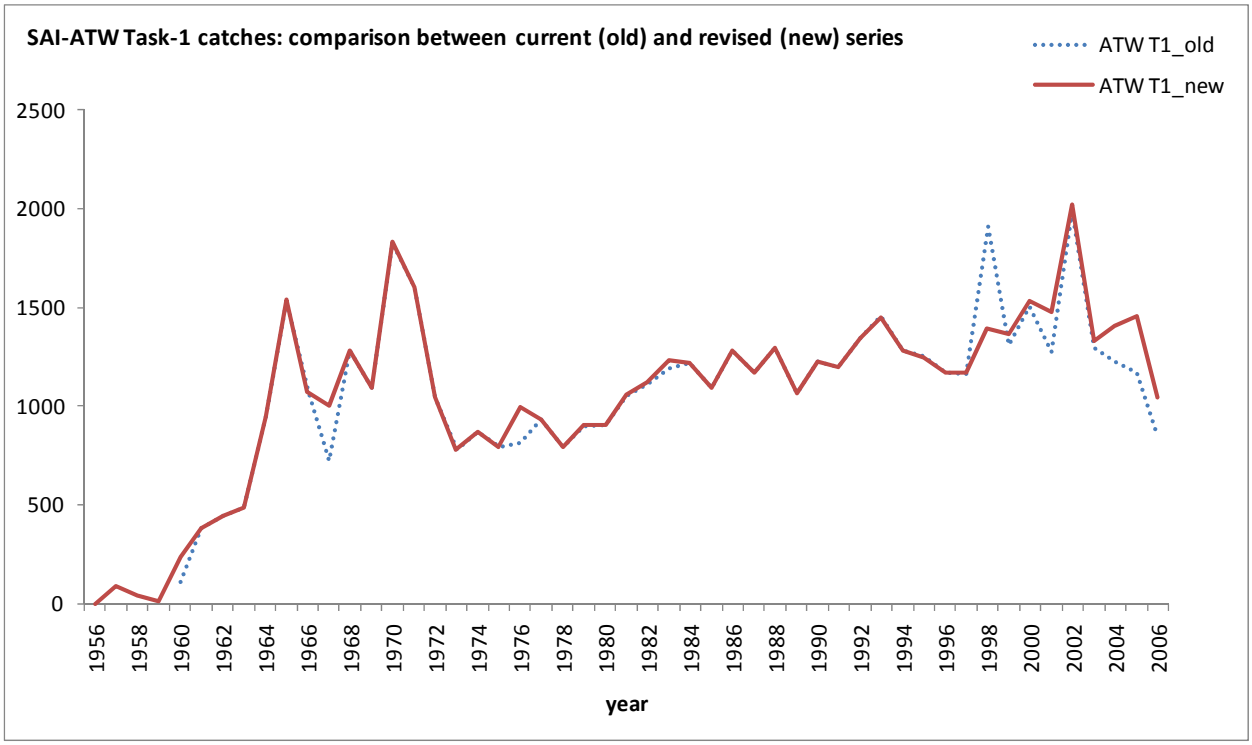


Figure 12 Estimated task I catches for sailfish for the western stock. Note that some longline fleets included spearfish in their sailfish reports, specially prior to 1995. Broken line represents task I estimates prior to changes made during the meeting.

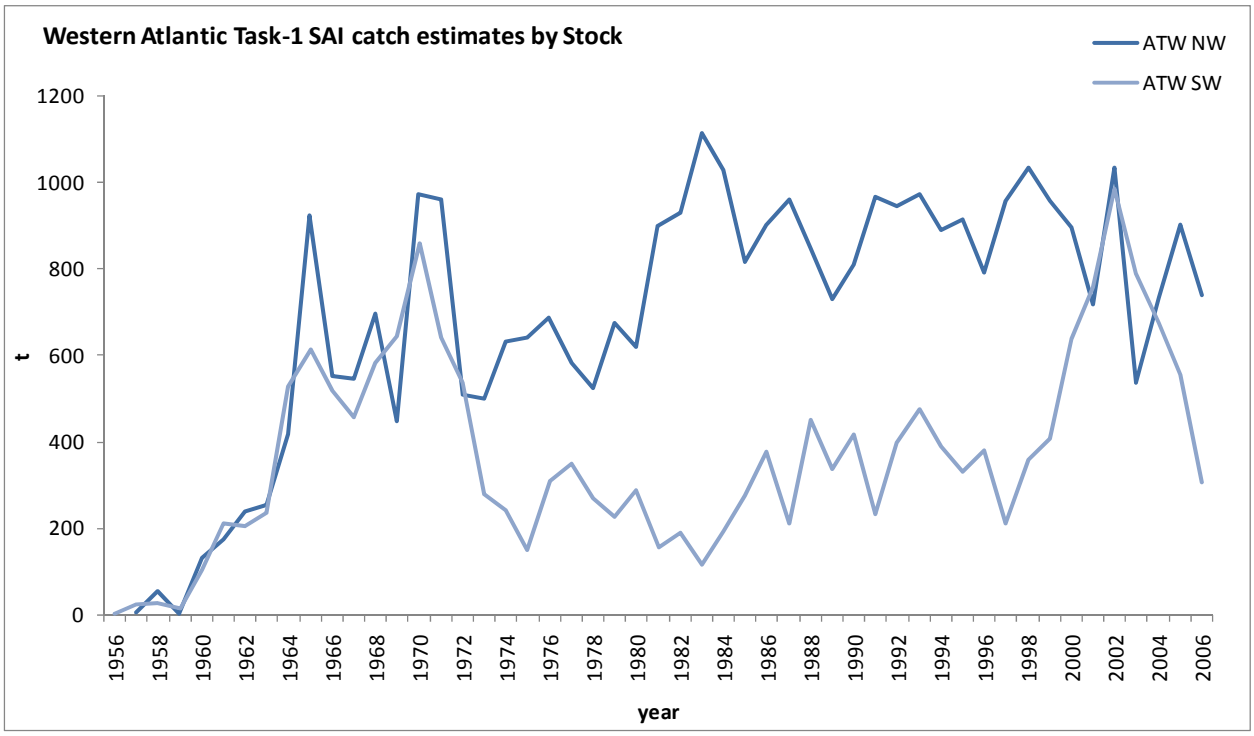


Figure 13 Estimated task I catches for sailfish for the two portions of the western stock, north and south . Note that some longline fleets included spearfish in their sailfish reports, specially prior to 1995.

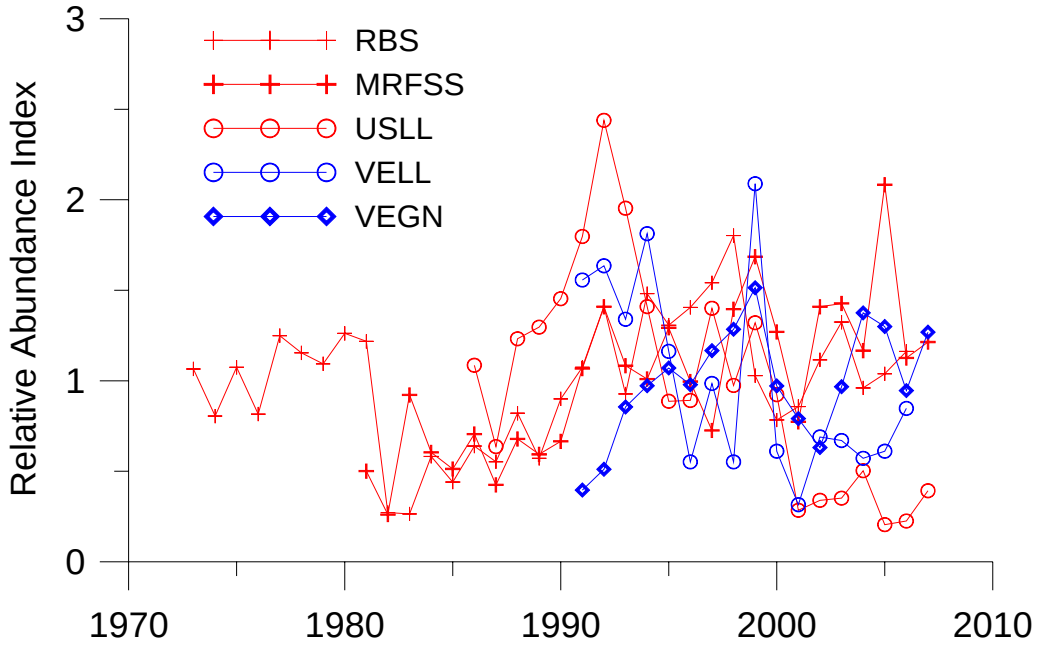


Figure 14 Relative abundance indices estimated for the North Western stock area. In red are US indices and in blue those for Venezuela. The symbol determines the gear type, plus for Recreational, circle for longline and diamond for gillnet. RBS – recreational tournament US, MRFSS – recreational non tournament US, USLL Longline US, VELL Longline Venezuela, VEGN Gillnet Venezuela. All indices were scaled to their mean prior to plotting.

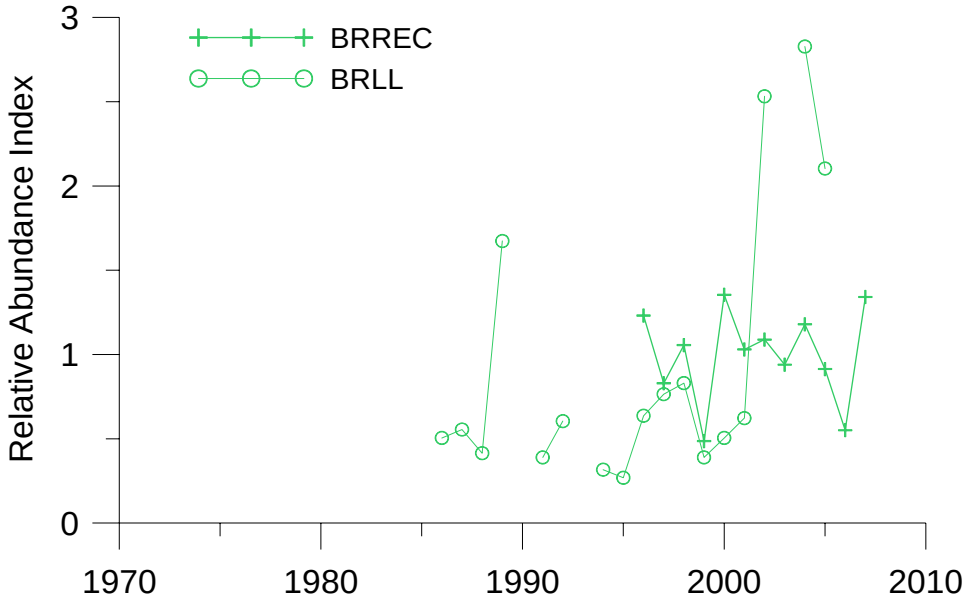


Figure 15 Relative abundance indices estimated for the South Western stock area. The symbol determines the gear type, plus for Recreational, circle for longline. BRREC Recreational Brazil, BRLL Longline Brazil. Both indices were scaled to their mean prior to plotting.

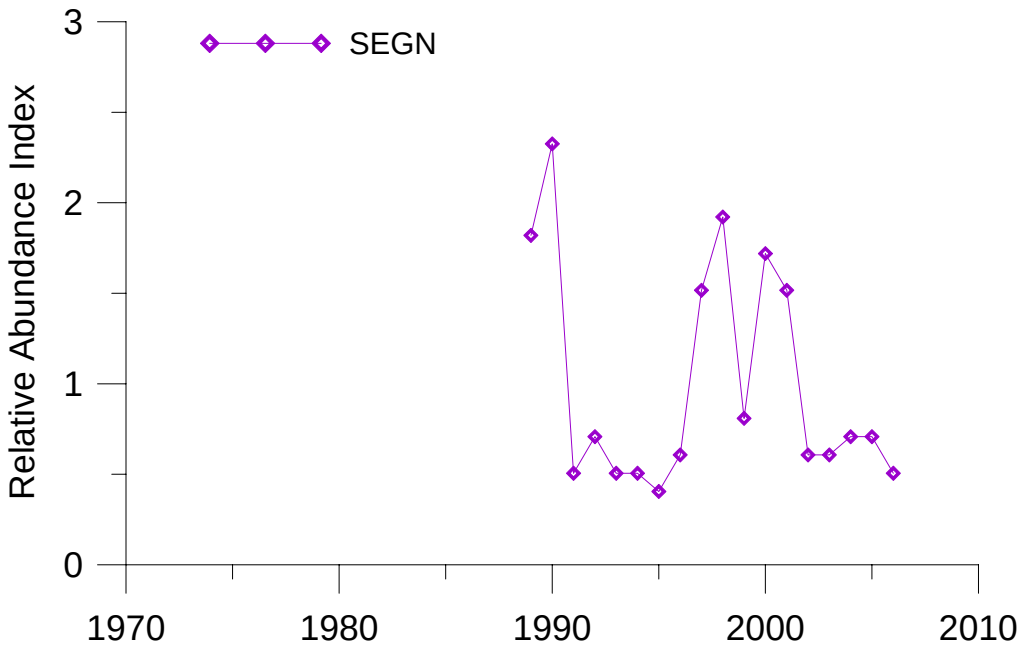


Figure 16 Relative abundance index estimated for the Eastern stock area from the artisanal fleet of Senegal.

Appendix 1

AGENDA

1. Opening, adoption of the Agenda and meeting arrangements.
2. Description of fisheries
3. Biological data
4. Review of catch estimates (historical and current)
5. Review of catch rate information
6. Intersessional workplan leading to the 2009 Assessment
7. Other matters
8. Recommendations
9. Report adoption and closure

Appendix 2

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Appendix 3

LIST OF DOCUMENTS

SCRS/2008/039 Update of standardized catch rates for sailfish (Istiophorus albicans) from the Venezuelan pelagic longline fishery off the Caribbean sea and ajacent areas: period 1991-2006. Arocha, F. and M. Ortiz

SCRS/2008/040 Standardized catch rates for sailfish (Istiophorus albicans) from the small scale fishery off La Guaira, Venezuela: Period 1991-2007 Arocha, F., A. Barrios, D. Debrot and L. Marcano

SCRS/2008/041 Exploitation du voilier Istiophorus albicans (Istiophoridae, Latreille,1804) par la pêcherie artisanale maritime en Côte d'Ivoire. N'Da, K. and G.R. Dedo

SCRS/2008/043 Updated sailfish (Istiophorus platypterus) catch rates from the U.S. pelagic longline fishery in the Northwest Atlantic and Gulf of Mexico 1986-2007. Ortiz, M., G. Diaz and J. P. Hoolihan

SCRS/2008/044 Estimated sailfish catch-per-unit-effort for the U.S. Recreational Billfish Tournaments and U.S. recreational fishery (1973-2007). Hoolihan, J.P., M. Ortiz, G. A. Diaz, and E. D. Prince

SCRS/2008/045 Scientific estimations of bycatch landed by the Spanish surface longline fleet targeting swordfish (Xiphias gladius) in the Atlantic ocean with special reference to the years 2005 and 2006 . Mejuto, J., B. García-Cortés, A. Ramos-Cartelle and J. M. de la Serna

SCRS/2008/046 Analisis de la captura, distribucion y composicion de tallas de istioforidos en el Atlantico sur

observada en la flota de palangre uruguaya (1998-2007). Domingo, A., M. Pons and M. Rios

SCRS/2008/047 Stomachal content of sailfish, Istiophorus platypterus caught off northern Rio de Janeiro State, Brazil. Pimenta, E. G.; M. F. Rezende and A. F. de Amorim

SCRS/2008/048 Sailfish sports fishing off Rio de Janeiro State, Brazil (2002/08). Amorim, A.F.; C. A. Arfelli; E. Pimenta; N. D. Fina; N. P. Silva and B. P. Silva

SCRS/2008/049 Catch probabilities of sailfish (Istiophorus platypterus) based on environmental factors in southwestern Atlantic ocean. Hazin, H.G.; C. Wor; B. Mourato; F. H. V. Hazin; P. Travassos; C. A. Arfelli and A. F. Amorim

SCRS/2008/079 Standardized catch rate of sailfish (Istiophorus platypterus) caught by Brazilian longliners in the Atlantic ocean (1986-2006). Wor, C.; B. L. Mourato; H. G. Hazin; F. H. V. Hazin and P. Travassos

SCRS/2008/080 Preliminary analysis of gonad development, spawning period, sex ratio and length at first sexual maturity of sailfish, Istiophorus platypterus in Brazilian coast. Mourato, B.L.; P. Pinheiro; F. H. V. Hazin; V. Basante; A. F. Amorim; E. Pimenta and C. Guimarães

SCRS/2008/081 Standardized cpue of Atlantic sailfish (Istiophorus platypterus) caught by recreational fishery in southern Brazil (1996-2007). Mourato, B.L.; A. F. Amorim; C. A. Arfelli; H. G. Hazin; F. H. V. Hazin and C. Wor

SCRS/2008/82 Relative abundance indices for sailfish from the artisanal fleet from Senegal. Diatta , Y., Die D.J. and Fitchett M.

Appendix 4

Billfish Work Plan

Summary

The Billfish Species Group proposes to conduct the next assessment of sailfish through a two stage process:

- Hold a data preparatory meeting in the first half of 2008 to produce estimates of sailfish catches, and relative abundance indices. Catch estimates need to be done so as to split away any spearfish reported as sailfish and any sailfish reported as billfish unclassified.

- Have a full assessment of eastern and western stocks of sailfish in 2009.

The Working Group should continue to work on the development of methods to better interpret the historical changes in CPUE from longline data. This work should be supported by further research on the vertical distribution of billfish. The work on age and growth and spawning should be completed as soon as possible to provide a comprehensive view of spawning and growth patterns for all billfish stocks.

Background

The last assessment for sailfish was conducted in 2001 (Anon. 2002). The last assessment conducted for marlin was 2006 (Anon. 2007a). No assessments have ever been conducted on spearfish. The last assessment for sailfish was unable to estimate management benchmarks such as maximum sustainable yield or whether the stock was over-fished, especially because of the uncertainty in the basic data required in the assessment. ICCAT has also recommended substantial investment in billfish research aimed at improving the data required for stock assessments. Improvements are required on the biology (especially on the definition of billfish habitat, survival and growth), catch statistics (more reliable and timely reporting for all fisheries, particularly for those where sailfish are a by-catch and for artisanal fisheries for which catch statistics are often inadequate or out of date and for which few indices of abundance are available.

Work completed in 2007

Proposed work for 2008

- Complete estimation of age and growth for blue and white marlin and refocus reproduction, age and growth studies towards sailfish and spearfish. Continue and expand the analysis of tissue samples of white marlin and spearfish to evaluate the presence of roundscale spearfish in the western Atlantic.

- Continue the program that aims to describe vertical distribution and habitat of billfish.

- Continue to try to coordinate a review of billfish catches and the design of a monitoring program in the eastern Caribbean with the FAO-WECAFC *ad hoc* group on moored FADs. Initial coordination has not yet produced estimates of this catch for most Caribbean countries with the exception of estimates from France for 2005, from St. Lucia for 2003-2005 and Dominica for 2004-2006.

- Request the collaboration of the Tropical Tuna Working Group in an activity directed to estimate the historical catches of billfish from purse seine fisheries in the Gulf of Guinea as several West African countries have noted that significant numbers of billfish are landed by these vessels and sold in local markets.

- Continue conventional tagging activities focusing more in the south Atlantic and eastern Atlantic. Attempt to restart conventional tagging in the Côte d'Ivoire recreational fishery.

- To continue the review of sampling programs for artisanal fisheries. This review has taken place for West Africa (SCRS/2007/145), and is available for Venezuela (SCRS/2007/121).

In preparation for the Sailfish Data Preparatory Meeting:

- Update estimates of catch for all components of the directed and by-catch fisheries with an emphasis of the main sources of historic harvest:
  - By-catch from industrial longline fleets
  - By-catch from tropical purse seine
  - Artisanal gillnet
  - Artisanal FAD fleets
  - Recreational, including estimates of live releases
- Update relative abundance estimates for fleets for which previous estimates were obtained:
    - United States longline
    - United States rod and reel
    - Japanese longline
    - Chinese Taipei longline
    - Venezuelan longline
- Obtain relative abundance indices for other important fleets:
    - Artisanal gillnet
      - Côte d'Ivoire
      - Ghana
      - Senegal
      - Venezuela
      - Sao Tomé
    - Brazilian longline
- Review biological information available with emphasis on:
    - Habitat utilization
    - Growth and ageing
    - Reproduction and fecundity
    - Migration
    - Survival