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COMMISSION INTERNATIONALE POUR LA CONSERVATION DES THONIDES DE L'ATLANTIQUE

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COMISIÓN INTERNACIONAL PARA LA CONSERVACIÓN DEL ATÚN ATLÁNTICO

REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

(Madrid, Spain, October 1 to 5, 2007)

October 2007

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REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

(Madrid, Spain – October 1 to 5, 2007)

1. Opening of the meeting

The 2007 Meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, October 1, at the Hotel Velázquez in Madrid, by Dr. Gerald Scott, Chairman of the Committee. Dr. Scott welcomed all the participants to the annual meeting.

Dr. Scott introduced the Executive Secretary, Mr. Driss Meski, who welcomed the participants and pointed out the importance of the work of the SCRS, which is the basis for the Commission's conservation and management measures. The Executive Secretary guaranteed his support and that of the entire Secretariat staff to the Committee and wished the scientists a fruitful meeting. The Executive Secretary's opening address is attached as **Appendix 4**.

2. Adoption of Agenda and arrangements for the meeting

The Tentative Agenda was adopted, without changes and is attached as **Appendix 1**.

The following scientists served as rapporteurs of the various species sections (Agenda Item 8) of the 2006 SCRS Report.

Tropical tunas- general	R. Pianet
YFT - Yellowfin tuna	C. Brown
BET - Bigeye tuna	N. Miyabe
SKJ - Skipjack tuna	D. Gaertner
ALB - Albacore	V. Ortiz de Zarate
BFT - Bluefin tuna	C. Porch (W), J.M. Fromentin (E)
BIL - Billfishes	D. Die
SWO- Swordfish	J. Neilson, P. Travassos (Atl.), G. Tserpes (Med.)
SBF - Southern bluefin tuna	
SMT - Small tunas	J. Ortiz de Urbina
SHK - Sharks	F. Hazin

The Secretariat served as rapporteur for all other Agenda items.

3. Introduction of Contracting Party delegations

There were 23 Contracting Parties present at the 2007 meeting: Brazil, Canada, Cape Verde, China (People´s Republic), Côte d'Ivoire, Croatia, Equatorial Guinea, European Community, Ghana, Japan, Korea (Rep.), Libya, Mexico, Morocco, Norway, Russian Federation, St. Tome & Principe, Senegal, Turkey, United Kingdom (Overseas Territories), United States of America, Uruguay, and Venezuela. The List of Participants at the Species Groups Meetings and the Plenary Sessions is attached as **Appendix 2**.

4. Introduction and admission of observers

Representatives from the GFCM, CARICOM, and WWF and scientists from Chinese Taipei were admitted as observers (see **Appendix 2)**.

5. Admission of scientific documents

The Secretariat informed the Committee that 143 documents had been submitted during the year, many of them prepared for the inter-sessional meetings.

Besides the scientific documents, there are nine reports of inter-sessional meetings and Species Groups, Annual Reports from 26 Contracting Parties, two Cooperating Parties/Entities/Fishing Entities and one Inter-governmental organization, as well as various Secretariat documents. The List of SCRS Documents is attached as **Appendix 3**.

6. Report of Secretariat activities in research and statistics

The Secretariat briefly summarized its activities concerning the collection, processing and publication of statistical data, which are described in its annual report (Secretariat Report on Statistics and Coordination of Research in 2007). This document was discussed in depth at the meeting of the Sub-Committee on Statistics.

The Secretariat again urged respecting the deadline dates for the submission of information aimed at improving the work of the scientists during their meetings and for the submission of information on fleet characteristics (FORM-1).

The Committee was informed of the publication of the *Statistical Bulletin, No. 36* and the publication on DVD of all the scientific documents presented to the SCRS since its creation. The SCRS Chairman, on behalf of the Committee, wholeheartedly congratulated the Secretariat for the work done in compiling and preparing this DVD.

The Secretariat informed the Committee of its new policy which consists of using a server, accessible on a wireless network, for sharing information and documents electronically. As this policy substantially reduces distribution of paper copies, the Secretariat requested the scientists' collaboration.

The new Coordinator of the Japan Data Improvement Project (JDIP), Mr. Takaaki Suzuki, gave a general overview of the JDIP activities, for which details are provided in the Coordinator's Report on Activities of the Japan Data Improvement Project (JDIP). This Project, aimed mainly at reinforcing the capacity of developing countries in the collection of tuna fishing statistics, has contributed, in large part, to the participation of scientists at ICCAT meetings. The JDIP has also organized and/or contributed to training courses in South America, Madrid and Senegal.

Almost all the Parties that have benefited from the assistance of funds available from ICCAT thanked the Japanese and American donators and confirmed that this assistance has resulted in improvements in the data collection schemes in their countries and to strengthening their capacity in data analysis.

The Executive Secretary availed himself of this occasion to thank the Governments of Japan and the United States and he reiterated the importance of these funds for improvements in the collection of reliable data.

For a more illustrative presentation of the status of the stocks, the Chairman of the SCRS developed a new approach consisting of a table with four panels and a track that traces the state of the stocks over the years. This approach, summarized in A Common Format, Among Tuna RFMOs, for the Presentation of the State of the Stocks, was first presented at the meeting of tuna RFMOs in Kobe, Japan (January 2007). The SCRS Chairman noted there were various ways of representing the state of the stocks, but he informed the Committee of the decision of the other FRMOs to adopt the *Kobe Approach* and requested its use in future SCRS Executive Summaries.

The Executive Secretary, on behalf of the Commission, congratulated the SCRS and its Chairman for this initiative, which has been well received by participants at the Commission meeting and at Kobe.

7. Review of national fisheries and research programs

In accordance with the format established in 2005, information relative to new research programs was presented to the Committee. The Committee considered the need to include information of interest for its work, separating

it from the Annual Report which, with its current structure, is more geared to providing information to the Commission on compliance. The Committee reiterated the need to follow the guidelines established for the preparation of the Annual Reports and to clearly define the contents under the various sessions (scientific or regarding compliance). The Committee referred to the summary table format for providing basic information on sampling coverage, which should be attached to the Annual Reports.

Brazil

In 2006, the Brazilian tuna longline fleet consisted of 91 boats (61 national and 30 chartered), registered in seven different ports. There was a decrease of about 8% in the total number of vessels from 2005, when 99 vessels were operating. The number of baitboats remained the same as in 2005 (41, all national), and were based in the same ports (Rio de Janeiro, Itajaí, and Rio Grande). An experimental purse seine fishery began in 1997, being done mainly by sardine fishing boats that sporadically target tunas. In 2006, the number of these boats was 14.

The Brazilian catch of tunas and tuna-like fishes was 41,490.6 t (live weight), in 2006, representing a decrease of 15.2% from 2005. The majority of the catch again was taken by baitboats (24,771.5 t), with skipjack tuna being the most abundant species (23,012.2 t). Total catch of the tuna longline fishery (11,147.4 t) was about 34.7% smaller than 2005, with swordfish being the most abundant species (4,119,7t), accounting for 36.9% of the catches. Blue shark (2,532.5 t) and bigeye tuna (1,422.9 t) ranked second and third. The total catches of white and blue marlin were, respectively, 89,7 t (of which, 14,8 t were discarded alive and 1,6 t dead) and 297,6 t (live discards: 46,9 t; dead discards: 2,2 t), representing a decrease of about 63.2% and 51.2%, respectively, from 2005. A similar trend was observed in sailfish catches, which decreased by 66.5%. These strong decreases in the catches of marlin species were mainly associated to the end of fishing operations of one of the foreign chartered fleet (11 vessels), flagged to Panama and based in Recife. A total of 245,5 t of tunas were caught by purse seine, with skipjack tuna accounting for 97.3% of that figure. Part of the Brazilian catches were also taken by small scale (~15 m) fishing vessels based mainly in Itaipava-ES (southeast coast), operating throughout most of the Brazilian coast and targeting a variety of species with different gears, including longline, handline, troll and others surface gears. In 2006, this fleet caught 1,888.4 t.

The monitoring of sea turtles and seabirds by-catch in longline fisheries is being developed since 1998 for both groups. However, due to difficulties related to data collection and analysis of incidental catches, this work has been focused in obtaining reliable catch rates instead of estimating total catch, which might be very unreliable. The catch rates are very high and consequently worrisome in some areas for some species. During 2006, incidental catches of turtles and seabirds by Brazilian tuna fishing vessels continued to be recorded. In June 2006, Brazilian NPOA-Seabirds was launched by IBAMA and it is now being implemented. The Brazilian NPOA, which aims to assure the viability of Procellariiform breeding colonies within Brazilian territorial boundaries and to reduce seabird by-catch, includes several actions such as research on new technologies to reduce incidental seabird by-catch, educational efforts to promote the awareness in the fishing sector on the importance of the conservation of albatross and petrel species and dissemination of the methods already available to reduce their by-catch. Research efforts, including the use of circle hooks, are also being conducted, aiming to reduce turtle by-catch.

Several institutions directly assisted the Special Secretariat of Fisheries and Aquaculture (SEAP) in processing and analyzing data from 2006. Besides the catch and effort data regularly collected from Brazilian tuna fisheries, in 2006, a total of 32,408 fishes were measured at landing, and 49,370 at sea, by observers on board, resulting in a total of 81,778 fish measured, as follows: yellowfin: 15,952; bigeye: 13,775; albacore: 4,502; swordfish: 40,377; blue marlin: 2,961; white marlin: 2,911; and sailfish: 1,300. Data have also been collected from several recreational fisheries based off southeast and northeast Brazil.

In 2006, an important billfish research effort in cooperation with U.S. scientists continued to be developed, including collection of spines and gonads, for age and growth and reproduction studies, as well as habitat utilization, through PSAT tags, and gear selectivity, by the use of circle hooks, hook timers, and TDRs. From 2006 on, a new cooperation on shark research has began and is being presently developed by scientists from both countries.

In order to adequately comply with ICCAT recommendations, the Brazilian government has implemented the following new rules: (a) Interministerial Rule No. 02, of September 4, 2006, the National Fishing Vessel Monitoring System (*Programa Nacional de Rastreamento de Embarcações Pesqueiras*-PREPS); and (b) Rule No. 01, of September 29, 2006, establishing the National Onboard Fishing Fleet Observer Program (*Programa Nacional de Observadores de Bordo da Frota Pesqureira*- PRO-BORDO).

Canada

The Canadian nominal landings of Atlantic bluefin tuna in 2006 were 733 t, taken by tended line, rod and reel, trap, electric harpoon and longline from July through December. The TAC for 2006 was 755 t. All traditional bluefin tuna fishing areas produced catches of tuna in 2006, although catches on the Tail of the Grand Banks of Newfoundland were low. Bluefin tuna fleets operate independently of each other, adopting their own strategies to address when and how to harvest the resource.

Nominal landings of swordfish in 2006 were 1,404 t, taken by longline and harpoon from April to December. In recent years, effort has been reduced as a result of a combination of factors including the reduced quota, increased opportunities for fishing other species, relatively low market value, and the introduction of the ITQ system for this fishery.

In Canada, the other tunas (albacore, bigeye and yellowfin) are at the northern edge of their range, and have traditionally been a minor portion of the overall Canadian catch of large pelagic species. In 2006, however, the other tunas accounted for slightly greater than 18% of commercial large pelagic species landed. Among the other tunas, yellowfin tuna is the most significant by landed weight.

Porbeagle is the only shark species for which there is a directed longline fishery. Historically, blue shark and shortfin mako have been a by-catch of the Canadian swordfish and groundfish longline fisheries although small amounts are also landed from other fisheries. It is believed that the by-catch for these two shark species is larger than reported because of discarding and live releases. Total reported landings in 2006 were 192 t of porbeagle, 4 t of blue shark and 71 t of shortfin mako.

Canada conducts research on bluefin tuna, swordfish and shark species. Among a number of scientific studies, biological sampling, stock origin and age determination studies for bluefin tuna are underway, as well as archival satellite tagging initiatives for bluefin tuna, swordfish, porbeagle and blue shark.

Cape Verde

Tuna fishing is one of the most ancient practices carried out in Cape Verde. The fishing gears are hand line in the artisanal fishery and pole and line in the industrial or semi-industrial fishery. This is an important activity for Cape Verde, in terms of its socio-economic importance, by supplying the canneries and in reducing the trade balance deficit through exports, as well as the significant direct and indirect employment that this activity generates.

Catches by the Cape Verde fleet for tuna and tuna-like species in its EEZ is estimated at 3,665 t for the artisanal fishery and the industrial or semi-industrial fishery.

Besides the national market, the tuna fishing products are also exported fresh, frozen and canned.

Billfishes and swordfish are caught mainly in Cape Verdian waters by European Union vessels and by sport fishing vessels.

Sport fishing was practiced very little, but with the development of tourism, it is becoming a preferential activity that is increasing more and more. The countries have a need for clear and complete regulatory measures for better control of this activity.

In Cape Verde there is no fishery directed at sharks but these are frequently taken as by-catches of other fisheries or as supplemental information in the research trips for other species.

In the 1990s the semi-industrial fleet underwent important changes, with the introduction of 20 new vessels measuring 11 m. From 2001 to 2003, the industrial fleet also underwent new changes with the incorporation of 10 new vessels measuring 26 m.

The last census was carried out in 2005. The Cape Verde fishing fleet is comprised of 766 boats with outboard motors, 270 boats without motors, with an average of three fishers per boat, and about 80 larger vessels, with in-board motors and an average of 11 fishers per vessel.

The registered and authorized foreign fleet that fishes in the Cape Verde EEZ, is based on fishing agreements or contracts. The majority of the vessels pertain to European Union countries and Asian countries. Generally, the species that are most caught by the foreign fleet are sharks, bigeye tuna, swordfish and yellowfin tuna. The Asian longliners mainly fish yellowfin and bigeye tunas.

Monitoring of the fisheries is one of the priorities of Cape Verde research to improve knowledge on the state of the tunas and to identify alternatives for their fishing. Due to numerous problems, the Statistical Bulletin on Fisheries (*Bulletin Statistique des Pêches*), which should be published annually, has had a delay of some years. Hence it is currently available, but only up to 2003. This situation should be normalized by the end of 2008, with the publication of all the delayed Statistical Bulletins, improvement in the capacity to assess the stocks and conduct periodic assessments of the stocks in the Cape Verde EEZ, with the support from ICCAT, to improve monitoring of the data from the foreign fleet, and to carry out periodic socio-economic studies on the fishery.

China

Longline is the only fishing gear for tunas by Chinese tuna fishing fleet in the Atlantic Ocean. There were 33 tuna longliners operating in 2006, and a total of 9,906.6 t of fish were caught, including tuna and tuna-like species, sharks (in round weight), which was more than caught in 2005 (8,969 t). Bigeye tuna and bluefin tuna are the targeted species, and their catches amounted to 7,200 t and 42 t, respectively, in 2006. Bigeye tuna accounted for 72.7% of the total, about 1,000 t (16.1%) higher than that of 2005. Yellowfin tuna, swordfish and albacore are taken as by-catch. Yellowfin catches decreased from 1,185.5 t in 2005 to 1,085 t in 2006. Catches of swordfish and albacore amounted to 372 t and 302 t, which represent an 87.7% and 46.2% increase from the previous year, respectively.

The data compiled, including Task I and Task II as well as the number of fishing vessels, have been routinely reported to the ICCAT Secretariat by Shanghai Fisheries University (SFU). China has carried out a national scientific observer program for the tuna fishery in ICCAT waters since 2001. In 2006, one observer was dispatched on board a Chinese Atlantic tuna longline fishing vessel from January to April. The area covered was 04°48′N -11°53′N, 27°00′W-37°43′W and the average nominal CPUE of bigeye (yellowfin) tuna was 12.10 (2.80) inds./1000 hooks based on the observer data.

In terms of implementation of the relevant ICCAT conservation and management measures, the fishery administration authority of China requires all fishing companies operating in the Atlantic Ocean to report their fisheries data on a monthly basis to the Branch of Distant Water Fisheries of China Fisheries Association and the Tuna Technical Working Group in SFU in order to comply with the catch limits. The Chinese Fishery Authority has established a fishing vessel management system, including the issuance of licenses to all the approved Chinese fishing vessels operating on the high seas of world oceans. The Chinese high seas tuna fishing fleet has been required to be equipped with a VMS system since October 1, 2006. The Chinese Fishery Authority has strictly abided by the National Observer Program and the ICCAT Regional Observer Program for transshipment at sea.

Côte d'Ivoire

While Côte d'Ivoire has not had an industrial tuna fleet since 1985, it is in charge of monitoring the fleets that land at the fishing port of Abidjan. Thus, in 2006, 23 tuna vessels (17 Spanish or similar vessels, 6 French, 7 Ghanaian, 2 Guinean and 2 cargo vessels); 123,404 t of tuna processed (landings, transshipments, canneries); 19,082 t of « faux thons » or « faux poissons » (tunas rejected by the canneries because they are damaged or small sized, small tunas (Atlantic black skipjack, frigate tuna) and all other species landed by the purse seiners). The high seas artisanal driftnet fishery is carried out by Ivorian and Ghanaian vessels. Overall, they made more than 19,396 trips in which 18,698 fish were landed, comprised of large tuna (yellowfin, skipjack), small tunas (Atlantic black skipjack and frigate tuna), billfishes (marlins, sailfish and swordfish) and sharks. The catches are broken down as follows: 2,047.69 t of large pelagics: 482,44 t of yellowfin tuna *(Thunnus albacares),* 1,565.25 t of skipjack *(Katsuwonus pelamis)*, 468,93 t of small tunas. The small tunas catches were comprised of 298,29 t of Atlantic black skipjack *(Euthynnus alletteratus),* 170,48 t of frigate tuna *(Auxis thazard),* 296,11 t of billfishes. The billfish catches were comprised of 177,64 t of blue marlin *(Makaira nigricans)*, 0,78 t of white marlin *(Tetrapturus albidus)*, 78,21 t of sailfish *(Istiophorus albicans)*, 39,48 t of swordfish *(Xiphias gladius),* 81,83 t of sharks. The shark catches were comprised of 22,02 t of shortfin mako *(Isurus oxyrynchus)*, 57,30 t of smooth hammerhead and scalloped hammerhead (*Sphyrna zygaena* and *S. lewini*), 2,51t of silky shark *(Carcharhinus falciformis).*

Croatia

The total Croatian catch of tuna and tuna-like fishes in 2006 was 1,022.6 metric tons (t). Bluefin tuna comprised 100% of the catch. The total catch has been caught by purse seine and transferred into floating cages for growing purposes. Additionally, 1,642 t of bluefin tuna have been imported in Croatia in 2006 from France, Italy and Libya for growing purposes. The number of licensed vessels actively fishing for tuna and tuna-like species in 2006 was 30.

During 2006, within the framework of the Bluefin Year Program (BYP) on bluefin tuna farming based on the tagging of live specimens in captivity, all tagged specimens that remained in the cages were harvested at beginning of the year. The results of all these research activities have been summarized, analyzed and prepared for publishing. At the end of this year, logistical efforts supported by the BYP were made in order to increase the probability to spot and to collect conventional and electronic tags from bluefin tuna taken to the bluefin farms in the Adriatic Sea.

In addition, a review of different tagging activities carried out on bluefin tuna in the eastern Atlantic and Mediterranean Sea during 2005 has been carried out, as reported in document SCRS/2006/171.

A national sampling program targeting bluefin tuna harvested from aquaculture facilities has been carried out in accordance with Rec. 05-04. Within the framework of this sampling program, collection of Task II data has been done.

Equatorial Guinea

There are three types of fisheries in Equatorial Guinea: Industrial, maritime artisanal and continental artisanal.

Industrial or tuna fishing continues to be carried out by the foreign fleets, since Equatorial Guinea does not have its own tuna fleet. To rectify this situation, the Government of Equatorial Guinea has recently constituted a National Society on Fishing (*Sociedad Nacional de PescaI*-SONAPESCA), which will be in charge of exploiting the abundant fishing resources, particularly the tuna resources, in a orderly and rational manner.

Maritime artisanal fishery, the second type of fishing, continues to be hampered by various negative factors, which affect and considerably limit its development. Notwithstanding, the available and reported statistics are those from the catches by the artisanal fishery.

As regards research and statistics, the fishing sector lacks a reliable data collection scheme which hinders knowledge on the functioning and development of the trends in the various fisheries.

The Improvement of Data for Equatorial Guinea, financed by the Government of Japan, through the International Commission for the Conservation of Atlantic Tunas (ICCAT), will surely assist Equatorial Guinea to establish a scheme to manage the fisheries, in particular, the tuna fisheries.

The Government of Equatorial Guinea is satisfactorily complying with inspection scheme activities, with the implementation of on-board observers and with port inspection.

As regards other activities, the Government policy regarding the fishing sector is noteworthy, whereby among other measures, such policy concentrates fundamentally on the rational management of the existing abundance resources in its jurisdictional waters, aimed at supplying seafood for the population and achieving food security.

European Community

The tuna fisheries and research of the EU member countries has been generally stable in recent years. Ten EU countries carry out tuna fisheries to the some degree in the Atlantic and these countries can be classified in two groups: the major countries, such as Spain, France, Italy and Portugal, and a second group of countries whose tuna activities are of lesser importance, such as Cyprus, Greece, Ireland, Malta, Netherlands and United Kingdom. All the species managed by ICCAT are targeted by these countries in various degrees and in all the ICCAT areas, in the Atlantic and the Mediterranean. Multiple gears are used by the EU tuna fleets, with the very important total annual catches of about 200,000 t in recent years, thus being about half of the catches reported by ICCAT. A decrease has been noted in the EU catches in recent years, and this is due to the decline in fishing effort and in the catches of tropical tunas. The EU report provides a summary of the statistics on the various

fleets and the research developed by the EU, which is generally carried out on all the species in recent decades. The results of this research is regularly transmitted to the SCRS and to the specialized working groups. A major part of this research is regularly financed by the European Union, within the framework of its program for the collection of biological and statistical data (implementation of observer programs) as well as extensive research projects on Atlantic tunas that are financed on a case-by-case basis. EU scientists have participated in all the SCRS working groups. Some fisheries continue to be poorly monitored statistically and the research is insufficient, but the EU carries out continual actions to remedy these deficiencies. Of note is the EU's increased interest in conserving the pelagic ecosystems and the by-catch species of the tuna fisheries. Various recent European regulations are aimed at improved statistical and scientific monitoring of these matters, for example, to reduce the accidental mortality of sea birds and sharks.

Ghana

Baitboats and purse seiners exploited tuna resources off the EEZ of Ghana. The total number of vessels currently in operation is 37, comprised of 23 baitboats, 10 purse seiners, and 4 longliners. The pole and line operators are the main exploiters of tunas in Ghanaian waters, using bait in their fishing operations. In addition, numerous bamboo rafts (fitted with radio buoys) are used as Fish Aggregating Devices (FADs) to enhance the capture of tuna species. Baitboats work in collaboration with purse seiners often sharing their catch.

The new AVDTH programme adopted from the French purse seine fleet for processing catch effort and logbook data was used to analyze data for 2006. Catches of the three principal tuna species for 2006 dropped to 52,000 t from 76,000 t in 2005. Skipjack landings contributed over 59% of the overall catches whilst bigeye species and yellowfin catches contributed approximately 18% and 23%, respectively.

In conformity with the objectives of the Data Fund aimed at improving Data Collection, Ghana's statistics (1997-2005) for the principal tunas were revised during the recent Bigeye Stock Assessment Session based on improved sampling and size composition.

As part of the ICCAT Data Improvement Programme an observer programme was conducted during the year under review (SCRS/2006/024). Results from the programme indicate higher catch rates from purse seiners fishing off FADs. However, the majority of fish caught were relatively small (40-65cm) as compared to catches from free swimming schools.

Beach sampling of billfishes for catch, effort and size composition continued off the western coast of Ghana from small artisanal drift-gillnet operators. Very few white marlin were observed in the year under review.

Japan

Longline is the only tuna fishing gear deployed by Japan at present in the Atlantic Ocean. The number of the Japanese longliners which operated in the Atlantic in 2005 was estimated at 214. In 2005, the number of fishing days was 30,300, which was 92% compared to an average value in recent years, suggesting the fleet has exerted a lesser amount of time in the Atlantic in recent years. The 2005 catch of tunas and tuna-like fishes (excluding sharks) is estimated to be 23,696 t. Although the total amount of fishing effort in 2005 was 92% of the average effort in the last 10 years, the total catch in 2005, excluding discards and sharks, was only 75% of the average catch for the same years. The most important species was still bigeye representing 62% of the total tuna and tuna-like fish caught in 2005. The next dominant species was yellowfin, which comprised 19% in weight, and the third species was bluefin tuna (10%). The remaining species were mainly composed of albacore, blue marlin and swordfish. The decline in catch in recent years was almost due to a decrease of bigeye catch. In 2005, the bigeye catch was 74% of the average catch amount. Swordfish catches decreased slightly (87%) and southern bluefin also showed a decline, down to 41%. On the other hand, yellowfin and albacore catches increased markedly, 114% and 140%, respectively.

Korea (Rep.)

Korean tuna fisheries for Atlantic tunas and tuna-like species have shown a gradual decline year after year since the mid-1980s. During the 1990s, the average annual number of Korean tuna longliners that operated in the Atlantic Ocean was less than 10, with 1,700 t of annual catch. In 2002 and 2003, Korean tuna longliners did not operate in the Atlantic Ocean, but tuna purse seiners which were charted from Turkey operated in the Mediterranean Sea and targeted bluefin tuna in 2004 and 2005. Some longliners that targeted bigeye tuna and yellowfin tuna have also operated in the Atlantic Ocean since 2004.

Korean longliners have mainly operated in the tropical area of the Atlantic Ocean and Mediterranean Sea targeting bigeye, yellowfin and bluefin tunas. However, the fishing grounds have fluctuated annually depending on the fishing conditions for the target species and oceanographic conditions.

In 2006, eight Korean longliners operated in the ICCAT area, with total catches amounting to 2,770 t, which was a slight decrease from previous years. Almost 85% of the total catches in 2006 were comprised of two species, bigeye tuna (2,067 t) and yellowfin tuna (283 t). Bigeye tuna catches, in particular, increased sharply, from 770 t in 2005 to 2,067 t in 2006.

Korea began to develop its observer program for distant-water fisheries, including tuna fisheries, in 2002. In 2006, one observer was deployed on Korean tuna longline vessels that operated in EEZ of Algeria to catch bluefin tuna in the Mediterranean Sea. All Korean longliners have aVMS system.

Libya

In 2006, Fishing for bluefin tuna was carried out by trap nets, of which only one (Zreg tuna trap) was in operation. The total catch was 10 bluefin tuna of medium size (100-150 kg) taken by longline. Four Libyan longline vessels caught 167 t of bluefin tuna, 13,5 t of swordfish, 1,4 t of dogfish and 788 kg of other fish species. Purse seine bluefin tuna catches amounted to 1,085.4 t. Taking advantage of placing an observer on board fishing vessels, scientific observers were allowed to carry out biological research studies, in which a total of 312 bluefin tuna were analyzed for length, weight, sex, GSI and female percentage of frequency distribution.

Mexico

The Mexican tuna fishery in the Gulf of Mexico in 2006 has been carried out by a high seas longline fleet comprised of 30 vessels. Fishing effort was directed at yellowfin tuna (*Thunnus albacares*). However, there was a reported incidental catch of other tuna species, billfishes, and sharks, among others. In 2006 there was a reported catch of 938 t yellowfin tuna, which represented 76% of the total reported catch for that year. In the last three years, there has been a decrease in catches, with 1,362 t, 1,207 t and 1,050 t in 2003, 2004 and 2005, respectively.

Mexico has adhered to the rules and regulations implemented by the International Commission for the Conservation of Atlantic Tunas (ICCAT). With regard to statistical information, Mexico has continued work on improving the Tuna Statistical Data System (*Sistema de Información de Atún*-SIA) in the Gulf of Mexico, in order to provide the best statistical information available annually. Scientific research has focused on increasing the catches of yellowfin tuna and on reducing by-catch. In particular, projects have been initiated for the spatial analysis of fishing effort, analysis of the size structure of yellowfin tuna, time-area analysis of by-catches, analysis of the bait used to catch tuna, together with the best database on longline tuna fishing in the Gulf of Mexico.

As concerns the on-board observer program, a 100% coverage rate has been maintained for longline fishing trips in the Gulf of Mexico, and the updating of the on-board observers manual has been implemented and instruction has been given on the National Observer Program. With regard to the quotas assigned to Mexico for bluefin tuna (*Thunnus thynnus*) and swordfish (*Xiphias gladius*) in the Gulf of Mexico for 2007 and 2008, work has started with the regulatory institutions and the industrial sector to design a program on the exploitation and management of these resources.

Morocco

Tuna fishing for tunas and tuna-like species has considerable socio-economic importance. As these fisheries require important investments, they continue to assure an average annual production on the order of 10,000 t.

The major species caught along the Moroccan coasts are bluefin tuna, yellowfin tuna, albacore, small tunas and sharks. The fishing zones differ from one species or group of species to another. Multiple fishing gears are used, mainly traps, hand line, purse seine (sporadically), driftnet (which is being discontinued and substituted by other gears, particularly longline). A farming operation is currently in place off the coast of Morocco.

With regard to catches, the quantities landed in 2006 have increased as compared to 2005 for some species (bigeye tuna, skipjack tuna and sharks), have decreased for others (yellowfin tuna, albacore and swordfish) and up to now the amounts of bluefin tuna, small tunas and sharks landed are maintained at almost the same levels.

For the major species (bluefin, swordfish, tropical tunas and small tunas) catches are broken down by area and by gear for the period 1996 to 2006.

The conservation and management measures on these resources and their fisheries, which have been adopted by ICCAT, are based essentially on the following aspects: minimum size limits, limit on fishing effort, monitoring of fishing activities at sea and on land at landing. These measures are reinforced by the implementation of a satellite monitoring system on the fishing vessels (DRS/GPS).

The collection of statistical data on catch and effort is carried out exhaustively through the fishing administration structures (Department of Fisheries and the National Office on Fishing), found all along the Atlantic and Mediterranean coasts of Morocco. Monitoring is also carried out by the Foreign Exchange Office, as concerns the export of fishing products.

For the scientific aspect, the National Institute of Fishing Research (*Institut National de Recherche Halieutique*-INRH), through its five Regional Centers, covers the entire Moroccan coast, reinforces the collection of biological data on the major species (bluefin tuna and swordfish). The Regional Center of the INRH in Tangiers coordinates the collection of all the data. In recent years, monitoring of other species has started, in particular, tropical tunas (especially bigeye tuna), with an extension of research work towards the areas located in southern Morocco. Considerable progress has also been reported in the collection of biological data, as reported in a series of scientific documents submitted by Moroccan scientists to the SCRS (for the swordfish, bluefin tuna and bigeye tuna stock assessments).

Norway

The fishery

Norway did not catch any bluefin tuna in 2006 and 2007. The Norwegian government banned fishing for bluefin tuna in 2007 and put aside the allocated quota for conservation purposes, due to serious overexploitation of bluefin tuna and thereby unsustainable management of the stock.

Research and statistics

Norway continuously works on historical data for bluefin tuna, and aims to put the data into an ecosystem perspective. A scientific report SCRS/2006/131 entitled "Fisheries of bluefin tuna (*Thunnus thynnus*) spawners in the Northeast Atlantic" has been written, trying to explain the dynamics of bluefin tuna and the drastic decline of bluefin tuna in northern waters in recent decades.

Russian Federation

The fishery

Specialized purse seine fishing for tunas was carried out periodically in 2006 and in the first half of 2007 by two purse seiners. In 2006 the catch amounted to 436 t (42 t of yellowfin tuna, 393 t of skipjack and 1 t of bigeye tuna) and, according to preliminary data, 788 t of tunas were caught in 2007.

The trawl fishing vessels caught 28 t of tunas and 316 t of bonito as by-catch in 2006 in the central East Atlantic (CEA). The catches taken by trawling fishing vessels in 2007 were represented by 42 t of bullet tuna and bonito.

Research and statistics

In 2006 and in the first half of 2007, observers collected materials on board tuna seiners in the open part of the Atlantic Ocean. Besides, work on the occurrence of tunas and tuna-like species in the catches of the trawlers engaged in the fishing in the Exclusive Economic Zones (EEZ) of Mauritania and Morocco was carried out. The species and length composition of tunas, their biological condition and proportion in total catches of all fish species were determined. The material obtained included mass measurements of 1,859 specimens and biological analysis of 1000 specimens.

Based on the retrospective data for 1965-1998, the length structure, the reproduction periods and seasonal feeding intensity of bullet tuna in the eastern part of the Atlantic Ocean were analyzed. Primary data numbering 11,273 mass measurements and 4,245 biological analyses of fish were processed. Differences between biological parameters of tunas inhabiting the central east and southeast parts of the Atlantic Ocean were revealed.

The extent of pelagization and oceanization of nektonic sharks belonging to the families *Lamnidae*, *Pseudocarchariidae*, *Alopiidae*, *Carcharhinidae*, and *Sphyrnidae* was investigated within the framework of studies on shark life cycles and the development of approaches for simulation of life processes taking place in the ocean. The investigation was focused both on commercial mass shark species and by-catch species. In the course of evolutionary process euoceanic sharks have developed a number of adaptations for the most efficient use of the oceanic currents while performing long-range migrations, such as larger fin sizes, lower mineralization of skeleton, and larger relative sizes of liver. Similarities and distinctions between the energy strategies and adaptations in neritic, far-oceanic and euoceanic shark species were revealed.

Implementation of ICCAT conservation and management measures. To improve the quality of statistics, the observers aboard tuna-fishing seiners and trawlers operating in the Convention area collect the data on commercial fishery and biological materials, as well as data on the by-catch of tunas and tuna-like species, on an annual basis. The 2006-2007 ICCAT Resolutions and Recommendations have been forwarded to fishing companies.

St. Tome & Principe

The fisheries

St. Tome and Principe's major fisheries are those for bigeye tuna (BET), yellowfin tuna (YFT), skipjack tuna (SKJ), small tunas (FRI, LTA, etc.) as well as those for sailfish (SAI), billfishes (BUM, WHM), swordfish (SWO) and their respective assessory fish.

Research

- Recovery and detailed statistical data on ICCAT species and their respective publication.
- Reinforcement and preparation of observers for the collection of catch and fishing effort data on the target species at the various landing points (collected previously).
- Re-initiation of biological studies on SAI, SKJ, BET, BUM, WHM.
- Updating of the size/weight relationships of some species, including SWO.
- Improvement of knowledge on CPUE by fishery and by fishing gear.

Senegal

Senegal has three major fisheries for tunas, as follows:

- The industrial fishery with the following three target species: yellowfin tuna (YFT), skipjack tuna (SKJ) and bigeye tuna (BET). These species are caught by a fleet of purse seiners that land all their catches at the port of Dakar. A total of seven purse seiners caught 6,063 t in 2006, broken down as follows: 1,262 t YFT; 3,534 t SKJ; and 1,267 t BET. The most important catches were obtained between May and December, which corresponds to the period of activity of the tuna vessels.
- The artisanal fishery that uses mainly hand line, purse seine, circle driftnets, beach seine and fixed nets to fish small tunas: Atlantic black skipjack-LTA *(Euthynus alleteratus)*, West African Spanish mackerel-MAW *(Scomberomorus tritor)*, spotted Spanish mackerel-SSM *(Scomber japonicus (maculatus))*, plain bonito-BOP *(Orcinopsis unicolor)* and Atlantic bonito-BON *(Sarda sarda)*, wahoo-WAH *(Acanthocybium solandri)*. This fishery sued hand line and purse seine to catch frigate tuna-FRI *(Auxis thazard)* as well as the following billfishes: swordfish-SWO *(Xiphias gladius)*, blue marlin-BUM *(Makaira nigricans)* and sailfish-SAI *(Istiophorus platypterus*) and also catches the following major tunas as by-catch: yellowfin-YFT *(Thunnus albacares*), skipjack tuna-SKJ *(Katsuwonus pelamis*) and bigeye tuna-BET *(Thunnus obesus*). Total catches in 2005 amounted to 9,811 t. Shark catches (5,861 t) are also caught by this fishery by fixed nets and by hand line.
- The sport fishery which targets billfishes, sailfish and other species during the fishing season that lasts from May to December. In 2006, a provisional total, in number, of 437 sailfish were caught, equivalent to an average of 10 t and 23 ports of call.

The statistical data collection system is based on daily surveys which is carried out at the various landing sites or on sampling which is also carried out. Besides these fisheries, in 2006 only one tuna cannery was in operation (SE-SNCDS), which reported 5,199 t.

Conservation and management measures have also been monitored and an inspection scheme has been implemented at the port of Dakar.

Turkey

The total bluefin tuna catch in 2006 was 806 t, a decrease as compared to the previous year. Bad weather conditions had negative effects on fishery efforts. Almost all of the catch was caught by purse seiners. The Ministry of Agriculture and Rural Affairs (MARA) issued bluefin tuna fishing licenses to 76 fishing vessels in 2007 in accordance with the legal regulations summarized above and the ICCAT regulations. All of these fishing boats were equipped and monitored with a VMS system. In addition to the fishing vessels, 97 vessels were licensed as auxiliary vessels.

Bonito play a major role in the Turkish fishery. Bonito fishing is intensively carried out in the Black Sea and Marmara Sea using purse seines, gillnets, encircling nets and hand lines. There have been decreases in catch quantities since 2002. However, in 2005, there was a considerable increase (70,000 t). It has been reported that this abundance was also seen in the other Black Sea coastal countries. The total catch in 2006 was 29,690 t, a decrease as compared to the previous year.

The tagging of bluefin tuna in Turkish Seas continued in 2006 in cooperation between Istanbul and Bari University (Italy). Fifteen (15) bluefin tuna donated by the Association of Bluefin Tuna Farmers and Exporters (OYID) were tagged in the eastern Mediterranean Sea.

A tuna larval survey (TUNALEV II) was carried out July 19-22, 2007 in the Cilician Basin whereby bluefin tuna, albacore, Atlantic black skipjack and bullet tuna larvae were caught. Research on tuna larvae production in this area will continue in the coming years.

United Kingdom (Overseas Territory)

The total catch of tuna and tuna-like species in Bermuda for 2006 was 134 metric tonnes (t). This represents a decrease in landings of 28 t over the previous year. A decrease in yellowfin tuna landings, from 61 t in 2005 to 31 t in 2006, accounted for the majority of this decline.

Bermuda remained active in the ICCAT Enhanced Programme for Billfish Research. Contributions to a study of post-release survival and movement patterns of blue marlin caught on recreational fishing vessels in the western Atlantic, utilizing pop-up satellite tags, are continuing. However, there were no deployments of satellite tags in Bermuda waters in 2006. Data collected during tournament sampling of blue marlin over the past five years has been analyzed and published. The data on reproductive seasonality indicate a significant amount of spawning activity in July.

United States of America

Annual fisheries information

Total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2006 was 18,081 t, a decrease of about 6% from 19,261 t in 2005. Estimated swordfish catch (including estimated dead discards) decreased 339 t to 2,048 t, and provisional landings from the U.S. fishery for yellowfin increased in 2006 to 7,075 t from 5,568 t in 2005. U.S. vessels fishing in the northwest Atlantic landed in 2006 an estimated 468 t of bluefin, a decrease of 245 t compared to 2005. Provisional skipjack landings increased by 30.1 t to 60.8 t from 2005 to 2006, estimated bigeye landings increased by 503 t compared to 2005 to an estimated 987 t in 2006, and estimated albacore landings decreased from 2005 to 2006 by 91 t to 397 t.

Research and statistics

The landings and size of swordfish, bluefin tuna, yellowfin tuna, billfish and other large pelagic species continue to be monitored through port and tournament sampling, logbook and dealer reporting procedures, and scientific observer sampling of the U.S. fleet. Major research activities in 2005 and 2006 focused on several items. Research on development of methodologies to determine the genetic discreteness of large pelagic fishes in the Atlantic was continued, as were otolith microconstituent analyses and larval surveys for bluefin tuna and other large pelagic species in the Gulf of Mexico. Research on development of robust estimation techniques for population assessment and robust management approaches was also conducted. Participants in the Southeast

Fisheries Science Center's Cooperative Tagging Center (CTC) and the Billfish Foundation Tagging Program (TBF) tagged and released 5,887 billfishes (including swordfish) and 238 tunas in 2006. This represents a decrease of 43.4% for billfish and a decrease of 27.7% for tunas from 2004 levels. There continues to be several electronic tagging studies involving bluefin tuna and billfish in the Atlantic Ocean and adjacent waters during 2006. The ICCAT Enhanced Research Program for Billfish (IERPBF) in the western Atlantic Ocean has continued to assist in reporting tag recaptures to improve the quantity and quality of tag recapture reports, particularly from Venezuela, Barbados, and Grenada. Cooperative research was conducted with scientists from other nations on development of assessment methodologies, on biological investigations and on development of indices of abundance for species of concern to ICCAT.

Uruguay

Information on the fishery

In 2006 the Uruguayan tuna fleet continued to fish with surface longline and maintained the same number of vessels as in 2005 (12 boats). The major part of the fleet is comprised of vessels that are less than 24 m in length and less than 200 GRT. They direct their effort mainly in Uruguayan territorial waters and adjacent international waters. The total catch (provisional) landed and reported in 2006 by this fleet was 1,500t, which represents a decrease of 938 t as compared to the previous year. Of this total, 620 t were swordfish (20% less than in 2005), corresponding to 41% of the total catch. Blue shark landings were on the order of 234 t and yellowfin tuna landings amounted to 218 t. These three species (SWO, BSH and YFT) represented 71% of the catches of the fleet. The other 29% was comprised of albacore-ALB 6%, bigeye tuna-BET 5%, shortfin mako-SMA 5%, ground sharks-CVX 3%, porbeagle-POR 2%, hammerheads-SPN 2%, billfishes-BIL 1% and other fish of lesser commercial value (oilfish, wahoo, gilthead seabream, thresher shark, etc.) 5%.

Research and Statistics

In 2006 various activities were carried out concerning statistics, research and management. Some of these activities were conducted jointly with other governmental institutions. The National Observer Program (*Programa Nacional de Observadores*-PNOFA), which covered approximately 20% of the fleet in 2006, which is similar the coverage the previous year. Within this program, work was initiated to educate and inform the workers and boat owners.

- *Swordfish*

A project was carried out on the "Correction of the historical data series on effort and catches (1981-2004) (ICCAT/JDIP/DINARA)", through which all the data on swordfish catch and effort was corrected, as well as the data from the landing sheets and from the PNOFA. It is hoped that standardized CPUE series on this species will be presented at forthcominig meetings of the SCRS. In 2007, the "Tagging Program" was initiated, using tags provided by ICCAT. This first stage of the program was dedicated to establishing the operative technical aspects.

- *Tropical tunas*

As for other species, the monitoring of catch and effort statistics was continued. The bigeye (BET) historical series was updated in accordance with the terms of reference of the ICCAT/JDIP/DINARA project. Yellowfin studies were carried out with information from fishing logbooks, from the longline fleet and data from the Observer Program (SCRS/2007/122 and SCRS/2007/123).

- *Sharks*

Uruguay hosted the Data Preparatory Meeting of the Shark Species Group in Punta del Este from June 25 to 29, 2007. Three documents were submitted to this meeting (SCRS/2007/080, SCRS/2007/081, SCRS/2007/082), two of which presented standardized CPUE series on *Prionace glauca* and *Isurus oxyrhinchus*. Blue sharks were tagged and work was initiated on stock identification by means of genetic techniques. The development of Uruguay's National Plan for the Conservation of Sharks was finalized, and publication is expected prior to the end of 2007. Various biological studies are being carried on pelagic shark species as recommended at the last inter-sessional meeting of the Shark Species Group.

- *Sea birds*

The "National Plan of Action to Reduce the Incidental Catch of Sea Birds" was finalized and published (June

2007). Currently, work is being done on the development of the Plan to implement the measures proposed therein. Relative to this objective and with the proposal of the Sub-Committee on Ecosystems, a document was presented SCRS/2007/126) on the albatrosss of the genus *Diomedea*.

- *Sea turtles*

In recent years studies with a regional focus have been carried out jointly with Brazilian scientists. Molecular analyses have been carried out for the haplotype identification of some *Caretta caretta* turtles in order to contribute to the knowledge on the stocks that occur in the southwestern Atlantic (SCRS/2007/124).

Collaboration has been carried out with organizations of other countries to develop an initiative to establish a platform, by means of the placement of satellite transmitters, to gather information on the migratory routes and transoceanic movements of leatherback turtles. Experiments are being done with circle hooks for which the first phase should be completed in early 2008. This project is being carried out in collaboration with the National Marine Fisheries Service (NMFS), Pacific Island Fisheries Science Center, Honolulu, USA.

Implementation of the ICCAT conservation and management measures

Implementation of the "National Plan of Action to Reduce the Incidental Catch of Sea Birds in the Uruguyan Fisheries" has begun. "Scarecrow" lines are now starting to be used and these will be effective for the entire fleet by mid-2008 at the latest.

The "National Plan for the Conservation of Sharks" is now finalized and it should be published before early 2008. This will have an effect on the implementation of the conservation measures.

The minimum size measures for swordfish catches (25 kg, 15% tolerance), bigeye and yellowfin tunas (3.2 kg) are among the national management measures that continue to remain in effect. On-board size sampling this year continues to indicate that the swordfish, bigeye tuna and yellowfin tunas caught are mainly large-sized adults, as can be expected from a longline fishery in this area.

Activities have been initiated and as well meetings with other national bodies, such as the National Navel Prefecture (*Prefectura Nacional Naval*), the National Port Administration (*Administración Nacional de Puertos*) and the National Customs Administration (*Administración Nacional de Aduanas*), etc., to generate more control at the ports of Uruguay.

Venezuela

The fisheries for tunas and tuna-like tunas in Venezuela are carried out by industrial and artisanal boats. In 2006, the industrial fleet was comprised of eight purse seine vessels, eight baitboats and 34 pelagic longliners. While the artisanal fleet is comprised of about 100 vessels of which 30 use driftnets and the remainder surface longline, these vessels diversify the fishery during difference times of the year. Monitoring and control of the catch and effort of the various fisheries are carried out, by means of the submission, as are the collection and review of the fishing logbooks, monitoring of the movements of the fleet, inspections of the unloadings at the various ports, monitoring of the destination of the catch and biological sampling, and the establishment of consultory mechanims of the fishery administration in charge of the review, attention, and recommendation of administrative measures, management and research of the tuna resources in Venezuela.

In 2006, the industrial fleet made 388 trips, with an average coverage rate of 88.1% (88.1% purse seine, 86.3% baitboat, and 88.9% longline). The landings by the industrial fleet amounted to 9,627 t, of which 72% was from purse seiners, 19% from baitboats, and 9% from the pelagic longline fleet. The landings of the artisanal driftnet fleet were 358 t.

Among the measures for sustainable management of the fishing activity adopted by Venezuela are the monitoring of the landings of the industrial fleet by implementation of Article 55 of the Fishing Law which mandates the presence of an inspector from the Fishing Administration Institute at the landings of catches, the establishment of Local Committees for the monitoring of the tuna and tuna-like fisheries, the setting up of a Group of Tuna Experts and Consultative Councils, with participation of representative from all the segments involved in the production circuit, to assure participation, understanding and compliance of the administrative measures of control, monitoring and compliance in effect for the fishing activity.

Research continued on the large pelagic fishery, which includes tunas, billfishes and sharks. Besides, the Enhanced Research Program on Billfish in Venezuela (PIIM-VZLA) also continued, under the auspices of ICCAT.

Observers from Cooperating non-Contracting Parties, Entities or Fishing Entities

Chinese Taipei

The number of longline vessels from Chinese Taipei declined to 142 in 2005. As a special measure made in compliance with Recommendation 05-02, longliners authorized to target bigeye tuna were limited to 15 vessels and those targeting albacore were limited to 60 vessels in 2006. As a result of this derogation on vessel limits, the total annual catches of all tunas have further declined from 32,923 t in 2005 to 23,686 t in 2006.

In 2006, three major tunas (albacore, bigeye and yellowfin) constituted more than four-fifths of the total annual catch of tunas. The catches of South Atlantic albacore and North Atlantic albacore were 12,293 t and 2,357 t, respectively, in 2006. The catches of bigeye tuna and yellowfin tuna were estimated to be 2,965 t and 1,260 t, respectively, in 2006. This drastic decrease in catches of bigeye tuna and yellowfin tuna in 2006 is due to the aforementioned vessel limitations.

Chinese Taipei has taken several new measures in 2006 to further improve its statistical data collection system. Some of those improvements worth mentioning were: the establishment of a port sampling inspection system, a daily e-logbook reporting system, and the continuation of the project of dispatching on-board observers. As more data from various sources became available, the coverage of Task II catch/effort data and size data will subsequently be more complete. The port sampling program was carried out in Port of Spain, Trinidad and Tobago in 2006. Further, 15 compliance observers (100% coverage rate) were placed onboard the 15 LSTLVs targeting bigeye tuna. Four scientific observers were deployed onboard vessels targeting albacore. All observers were required to collect fishery data and size measurements on target species and by-catch species, and the observer program will also help in the collection of biological samples. In 2006, scientists from Chinese Taipei provided a total of nine scientific papers at the various inter-sessional scientific meetings of SCRS.

Observers from Inter-governmental Organizations

CARICOM

In 2006, there were no significant changes in the nature of fishing operations in the Eastern Caribbean islands of Grenada, the Commonwealth of Dominica, and St. Kitts and Nevis. These fisheries continue to be multi-species, multi-gear fisheries, with yellowfin tuna, blackfin tuna, skipjack tuna, wahoo, sailfish, swordfish and blue marlin being the main species caught. Mostly small, open vessels are still used, which restrict the time spent at sea. For the three islands noted, the most common gear type for targeting tuna and tuna-like species continues to be the troll line, but hand lines are also used and a form of longlining is conducted. The increasing use of anchored FADs in Dominica has helped to improve the efficiency of fishing operations in that island, mainly through reduced fuel costs associated with reductions in search time.

Generally, there were no dramatic fluctuations in reported landings for 2006, compared to those reported for 2005. For the three islands, in 2006, the preliminary estimate of the overall total landings of all tuna and tuna-like species combined is 1,387t.

In 2007, the CRFM Secretariat held its Third Scientific Meeting during which data were examined and analyzed from wahoo and king mackerel fisheries operating in the southeast Caribbean. These analyses were limited by the quantity and quality of the available data. As a result, recommendations were made for data improvements, and for closer collaboration between CRFM and neighbouring non-CRFM States with which these fisheries are shared.

8. Executive Summaries on species

Until 2004, the main purpose of the Species Executive Summaries was to provide a succinct overview of each species to the Commission. These were summaries of the biology and fisheries affecting stocks of concern, the status and outlooks for these stocks, evaluations of effectiveness of management measures agreed by the

Commission, and recommendations for additional management measures that the Committee felt would improve the odds of meeting the Commission's objective of attaining Maximum Sustainable Yield levels from the stocks.

At the 2004 Commission Meeting, the structure of the SCRS Report was discussed and it was suggested that too much time was being spent on stocks which were not scheduled for assessment. The SCRS Chairman explained to the Commission that the format of the Report could be changed if the Commission so wished, but stressed that it was important to review stocks even if no assessment was conducted in order to keep statistical information up-to-date and in order to monitor the status of fisheries and stocks. During the inter-sessional period, the SCRS Chairman developed a proposal for a revised, shorter, format which was distributed to Species Group Rapporteurs for comment.

The structure of the Executive Summaries that follow reflects a diversity of ways in which the different Species Groups have implemented changes intended to streamline the SCRS Report. For example, some members of the SCRS felt that the tradition of providing an overview of the biology of the stock should be retained, whereas others favored the approach of providing a brief overview of new knowledge only. The Committee considers that it would be useful to seek more consistent formats in the future, after the Commission provides further guidance on the contents and structure of the Report.

The Committee reiterates that, in order to obtain a more rigorous scientific understanding of these Executive Summaries, readers consult previous Executive Summaries as well as the corresponding Detailed Reports, which are published in the Collective Volume series.

The Committee also notes that the texts and tables in these summaries generally reflect the information that was available to ICCAT immediately before the plenary sessions of the SCRS, as they were drafted by the Species Group meetings. Therefore, catches reported to ICCAT during or after the SCRS meeting may not be included in the Summaries. Drawing conclusions on the basis of these provisional estimates maybe misleading.

8.1 YFT – YELLOWFIN TUNA

The last assessment for yellowfin tuna was conducted in 2003, at which time catch and effort data through 2001 were available. This report includes the latest data available on catches and the fisheries and focuses on changes that may have taken place since the last assessment. Readers interested in a more complete summary of the state of knowledge on yellowfin tuna should consult the detailed report of the 2003 ICCAT Atlantic Yellowfin Tuna Stock Assessment Session (Anon. 2004).

Other information relevant to yellowfin tuna is presented elsewhere in this SCRS Report:

- The Tropical Tunas Work Plan **(Appendix 5)** includes plans to address research and assessment needs for yellowfin tuna.
- Report of the *2007 Inter-sessional Meeting of the Tropical Species Working Group* (SCRS/2007/012).

The Report of the Meeting of the Tropical Species Group (Madrid, September 27-28, 2007) is found in SCRS/2007/019.

YFT-1. Biology

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans. The sizes exploited range from 30 cm to 170 cm FL; maturity occurs at about 100 cm FL. Smaller fish (juveniles) form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish form schools in surface and sub-surface waters. Reproductive output among females has been shown to be highly variable. The main spawning ground is the equatorial zone of the Gulf of Guinea, with spawning primarily occurring from January to April. Juveniles are generally found in coastal waters off Africa. In addition, spawning occurs in the Gulf of Mexico, in the southeastern Caribbean Sea, and off Cape Verde, although the relative importance of these spawning grounds is unknown. Although such separate spawning areas might imply separate stocks or substantial heterogeneity in the distribution of yellowfin tuna, a single stock for the entire Atlantic is assumed as a working hypothesis, taking into account the transatlantic migration (from west to east) indicated by tagging, a 40-year time series of longline catch data that indicates yellowfin are distributed continuously throughout the entire tropical Atlantic Ocean, and other information (e.g., time-area size frequency distributions and locations of fishing grounds). Growth rates have been described as relatively slow initially, increasing at the time the fish leave the nursery grounds. Males are predominant in the catches of larger sized fish. Natural mortality is assumed to be higher for juveniles than for adults; this is supported by tagging studies for Pacific yellowfin.

Questions remain concerning the most appropriate growth model for Atlantic yellowfin tuna. A recent study developed a new growth curve using daily growth increment counts from otoliths. The results of this study, along with other recent hard part analyses, do not support the concept of the two-stanza growth model (initial slow growth) which is currently used for ICCAT (as well as other management bodies) yellowfin tuna stock assessments and was developed from length frequency and tagging data. This discrepancy in growth models should be resolved prior to, or accounted for during, future stock assessments.

New information on sizes, sex ratio, and catch rates of yellowfin tuna was presented for the western south Atlantic from the Observer Program of Uruguay. The results indicated that higher catch rates of larger (adult) fish occurred further offshore, are associated with warmer temperature waters, and show seasonal patterns.

YFT-2. Fishery indicators

In contrast to the increasing catches of yellowfin tuna in other oceans worldwide, there has been a steady decline in overall Atlantic catches, declining 36% since 2001 with an overall decline of 46% since the peak catches of 1990. Atlantic surface fishery catches have shown a declining trend from 2001 to 2006, whereas longline catches increased within that period until 2004, then began to decline as well In the eastern Atlantic, purse seine catches declined from 94,221 t in 2001 to 55,570 t in 2006, a 41% reduction **(YFT-Table 1; YFT-Figure 1)**. Baitboat catches declined by 45%, from 19,071 t to 10,434 t. This decrease is largely due to reduced catches by Ghana baitboats, which resulted from a combination of reduced days fishing, a lower number of operational vessels, and the observance of the moratorium on fishing using floating objects. In the western Atlantic, purse seine catches have declined by 66%, from 13,072 t to 4,442 t. Baitboat catches declined by 49%, from 5,315 t to 2,695 t. In the eastern Atlantic, longline catches increased from 5,479 t to 11,428 t in 2004, before declining again to 5,808, a

6% increase from 2001. Similarly, in the western Atlantic, longline catches increased from 12,740 t to 15,953 t in 2004, before declining again to 12,984 t, a 5% increase from 2001. The increase in South African catches in the eastern Atlantic during 2005 and 2006 may be the result of a spillover of Indian Ocean fish caught just inside the Atlantic boundary. The most recent available catch distribution is given in **YFT-Figure 2**.

At the same time, the nominal effort in the purse seine fishery was declining. As an indicator, the number of purse seiners from the European and associated fleet operating in the Atlantic declined from 44 vessels in 2001 to 24 vessels in 2006, with an average age of about 25 years. On the other hand, the European and associated baitboat fleet increased from 15 to 17 vessels during the same period.

Several relevant scientific documents were presented to the 2006 and 2007 SCRS which were descriptive of the catches by country fleets. Examination of nominal catch rate trends from purse seine data suggest that catch-per-unit effort was stable or increasing in the East Atlantic **(YFT-Figure 3a)**, and was clearly declining in the West Atlantic **(YFT-Figure 3b)**. If effort efficiency is estimated to have continued to increase as has been assumed in the past, adjustments for such efficiency change would be expected to result in a steeper declining trend. However, the decrease in western Atlantic purse seine catch rates could be linked to specific environmental conditions (e.g. high surface temperatures, reduced availability of prey, etc.), especially considering that decreases are also seen in skipjack catch rates, and it is therefore difficult to conclude that these rates reflect abundance trends. New information on fisheries targeting yellowfin tuna of the southwestern Atlantic was presented for Uruguayan fleets, including catch, effort, and CPUE from 1981 through 2006. Standardized catch rates were provided in 2006 for the Japanese and Chinese Taipei longline fishery, but data for 2006 are not yet available. New standardized indices were made available for the Brazilian (through 2005) and United States (through 2006) longline fleets. These indices are compared in **YFT-Figure 4**. The Chinese Taipei index is not shown prior to 1992 in order to avoid a period of shifting targets (from albacore) which is not adequately accounted for in the standardization. The overall trend of the major index shown, Japanese longline, is clearly one of decline, but there is not clear trend in the four years since 2001, the latest data included in the last assessment.

The average weight trends by fleet (1970-2005) are shown in **YFT-Figure 5.** The recent average weight in European purse seine catches, which represent the majority of the landings, has declined to less than half of the average weight of the early 1990s. This decline is at least in part due to changes in selectivity associated with fishing on floating objects. This trend is also reflected in eastern tropical baitboat catches. Longline mean weights have also followed a generally declining trend, although estimates have been highly variable in recent years.

YFT-3. State of the stock

A full assessment was conducted for yellowfin tuna in 2003 applying various age-structured and production models to the available catch data through 2001. The estimate of MSY based upon the equilibrium models ranged from 151,300 to 161,300 t; the estimates of F_{2001}/F_{MSY} ranged from 0.87 to 1.29. The point estimates of MSY based upon the non-equilibrium models ranged from 147,200-148,300 t. The point estimates for F_{2001}/F_{MSY} ranged from 1.02 to 1.46; the main differences in the results were related to the assumptions of each model. The estimate of MSY derived from age-structured virtual population analysis (VPA) was 148,200 t. In summary, these analyses implied that although the 2001 catches of 159,000 t (since revised to 163,000 t) were slightly higher than MSY levels, effective effort may have been either slightly below or above (up to 46%) the MSY level, depending on the assumptions. Yield-per-recruit analyses provided similar estimates of fishing mortality rates and further indicated that an increase in effort was likely to decrease the yield-per-recruit, while reductions in fishing mortality on fish less than 3.2 kg could result in substantial gains in yield-per-recruit and modest gains in spawning biomass-per-recruit.

Since the relatively high catch levels of 2001 (163,000 t), catches have declined each year to a level of 99,500 t, a reduction of 39% and the lowest level of catch since 1973. A potential explanation for this decline is the reduction in eastern Atlantic purse seine effort, but that alone does not explain the reduction of baitboat and purse seine catches in the western Atlantic, nor the more recent declines of longline catches in both the western and eastern Atlantic. Until a full assessment is conducted, it may not be possible to confirm whether catch declines are due to stock level declines or to reduction in effort or other factors. Declines in catch rates could suggest decreases in abundance or availability, and a clear picture does not emerge from the available fishery indicators.

Yearly catches of small (less than 3.2 kg) yellowfin tuna in number have ranged around 60-75% of purse seine catches and about 40-80% of baitboat catches since 2000, occurring primarily in the equatorial fisheries. The generally declining trends in average weight may also be a cause for concern. Minimum size limits for yellowfin tuna have been shown to be ineffective by themselves, due to difficulties related to the multi-species nature of the fishery. The protection of juvenile tunas may be important and alternative approaches to minimum size regulations to accomplish this should be studied.

YFT-4. Effects of current regulations

Recommendation 04-01 implemented a new, smaller closure for the surface fishing in the area 0º -5º N, 10º W-20º W during November in the Gulf of Guinea. Although this regulation is intended to reduce small bigeye catches, the Committee recognizes that its implementation and the change from the previous moratorium to the current regulation will potentially impact yellowfin catches. There are as yet insufficient data to effect an evaluation of the impact of the new regulation.

In 1993, the Commission recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." As measured by fishing mortality estimates from the 2003 assessment, effective effort in 2001 appeared to be approaching or exceeding the 1992 levels. Catches have been declining since 2001, as has the nominal effort of the purse seiners, but the trend in effective effort is not clear. Additional advice can be offered following the next stock assessment (2008).

ATLANTIC YELLOWFIN TUNA SUMMARY

Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2006)	103,908 t
Replacement Yield (2001)	May be somewhat below 159,000 t
Relative Biomass B_{2001}/ B_{MSY}[3]	0.73 - 1.10
Relative Fishing Mortality: F_{2001}/F_{MSY}[3]	0.87-1.46
F_{99-01}/F_{MSY}[4]	1.13 (80% confidence limits 0.94 to 1.38)
$F_{0.1}$[4]	0.55
F_{MSY}[4]	0.72

Management measures in effect:
- Effective fishing effort not to exceed 1992 level [Rec. 93-04].
- Rec. 04-01, effective 2005. Season/area closure. Although this measure was intended to reduce the catches of juvenile bigeye tuna, as this is a complete closure, impacts are expected on all tropical tunas.

[1] MSY estimates based upon results of age-structured and non-equilibrium production models, and VPA. The complete range of results from all models is 147,200-161,300 t.
[2] The assessment was conducted using the available catch data through 2001. Reports for 2006 should be considered provisional and in this case includes carryovers from previous years.
[3] These are ranges of point estimates; no estimates of uncertainty were calculated around these point estimates during the assessment.
[4] Result exclusively from VPA and yield-per-recruit analyses.

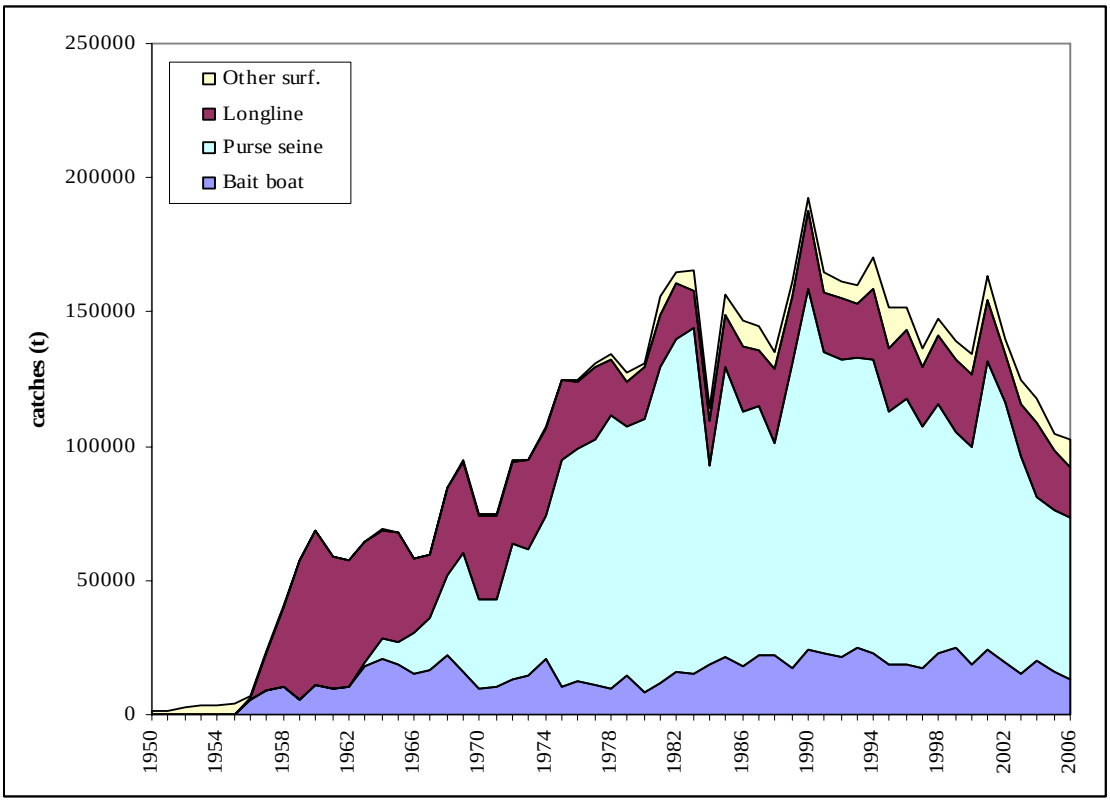
YFT-Table 1. Estimated catches (t) of yellowfin tuna (*Thunnus albacares*) by major area, gear and flag.

			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			165001	165373	113940	156547	146535	144428	135219	161322	192456	164716	161364	159963	170527	151939	151754	136125	147320	138886	134224	163100	139558	124401	117409	104437	102216
	AT.E		138711	124953	76053	113656	106606	110304	99180	123239	157112	124239	121039	116788	116211	110902	113032	99260	110579	102112	96642	120722	109609	98943	86194	77981	75367
	AT.W		26290	39666	37481	42365	31751	27680	30284	32807	27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30357	38154	29343	24807	31143	26365	26622
	UNCL area		0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4224	607	651	73	91	226
Landings	AT.E	Bait boat	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18471	15652	13496	13804	12907	17330	19256	13267	19071	13432	11513	15354	12012	10434
		Longline	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8047	7497	8292	5479	5580	8536	11428	7192	5697
		Other surf.	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	2305	1951	1624	2417	1577	1167	3666
		Purse seine	111820	103502	50860	86576	85325	86141	73117	102200	127673	97182	99532	92130	90151	87597	88715	78358	83647	73891	72777	94221	88973	76476	57835	57610	55570
	AT.W	Bait boat	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315	6009	3764	4868	3867	2695
		Longline	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11638	12740	11604	10024	15953	14795	12984
		Other surf.	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4581	5345	5200	7027	3763	6413	7104	5069	6496
		Purse seine	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13072	7966	4607	3217	2634	4442
	UNCL area	Longline	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4224	528	651	73	91	226
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	0	0	0
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	0	5
Landings	AT.E	Angola	1467	788	237	350	59	51	246	67	292	510	441	211	137	216	78	70	115	170	35	34	34	34	34	111	
		Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1	0	0	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1802	1855	1896	0	2179
		Cayman Islands	100	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	84	71	1535	1652	586	262	1033	1030	1112	1017
		Chinese Taipei	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4946	4145	1988	638
		Congo	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	0	0	0	0	0	0	0	0	0	
		Cuba	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	673	213	99	302	565	175	482
		EC.España	54164	51946	40049	66874	7	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	31105	31469	24884	21414	11777	11381
		EC.Estonia	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949	22672	18940
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	
		EC.Latvia	0	0	0	0	0	0	0	0	0	255	54	16	0	55	151	223	97	25	36	72	334	334	334	334	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	20	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	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	177	194	3	6	4	5	16	274
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	12	88	218	225	225	295	225	162	270	245	44	44	44	
		Gambia	0	0	0	0	0	0	0	0	2	16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Georgia	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	15437	17657	25268	17662	33546	23674	18457	15054	17493	11931
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2906	5207
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
		Japan	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1534	1999	5066	3265	3265
		Korea, Republic of	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	209	984	95	4
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	0	0	0	
		Maroc	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	95	183	95
		NEI (ETRO)	3121	5388	1104	0	0	2077	3140	5436	12513	4856	10921	9875	8544	8970	9567	6706	7225	5418	5448	10205	8209	5396	4294	6808	6151
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165	89	139	85	135	59
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3183	6082	6110	3962	5441	4793	4035	6185	4161	0	1939
		Norway	0	0	0	0	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7839	8644	10854	5759	3137	1753	930	1103	574	1022	0	1887	6170	8557
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9	68	69	30
		Russian Federation	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	737	0	0	0	0	4	42
		S. Tomé e Príncipe	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0	0	0	0	145	137
		Senegal	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279	681	1301	1262
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	

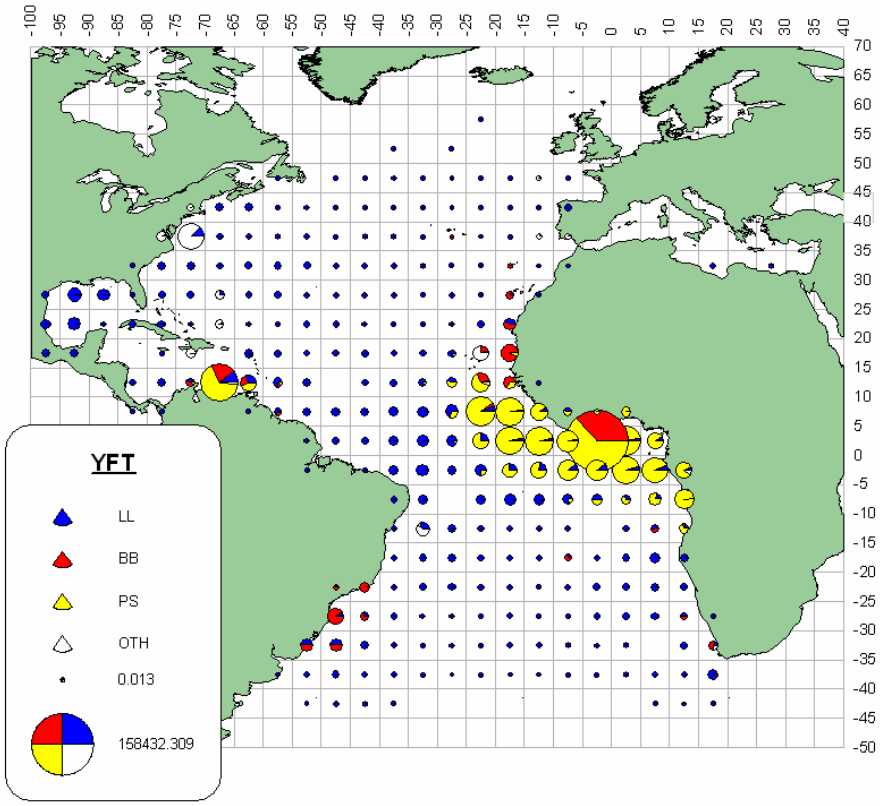
YFT-Table 1 (continued).

			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
		Seychelles (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	
		South Africa	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	240	320	191	342	152	298	402	1156	1187
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	101
		U.S.A.	636	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.	1004	1282	2168	3768	1851	1275	3207	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	0	0	0	344
		Ukraine	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	145
		Venezuela	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	7	0	0	44	23	18	66	33	23	34	1	0	0	0	0	0	0	0	0	0	0	0	327	327	
		Barbados	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142	115	116	116	116	197
		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	143
		Brasil	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985	7223	3790
		Canada	0	0	0	0	2	40	30	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304	240	293
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275	74	68
		Chinese Taipei	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	1679	1608	622
		Colombia	3	29	0	180	211	258	206	136	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46	46	46	
		Cuba	1503	793	2538	1906	2081	1062	98	91	53	18	11	1	14	54	40	40	15	15	0	0	65	65	65	65	
		Dominica	0	0	0	0	0	0	0	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81	119	65
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	220	226	226	226	226	226	226	
		EC.España	0	1957	3976	1000	0	0	1	3	2	1462	1314	989	7	4	36	34	46	30	171	0	0	0	0	0	
		EC.France	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	1	0	0	0	151	60
		Grenada	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460	492	502
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	
		Japan	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	571	755	1194	1223	1223
		Korea, Republic of	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	0	0	580	279
		Mexico	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208	1050	938
		Netherlands Antilles	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0	0	0	0	0	
		Panama	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	1024
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145	299	299	234
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	1	40	48	22	65	16	43	37	35	48	38	33	24	884	568	4251	0	2680
		Sta. Lucia	26	23	56	79	125	76	97	70	58	49	58	92	130	144	110	110	276	123	134	145	94	139	147	172	
		Trinidad and Tobago	0	232	31	0	0	0	1	11	304	543	4	4	120	79	183	223	213	163	112	122	125	186	224	295	
		U.S.A.	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6516	5568	7075
		UK.Bermuda	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47	82	61	31
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204	644	218
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	681	689	661
		Venezuela	14426	26576	21879	20535	11755	11137	10949	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	18651	11421	7411	5774	5097	6514
	UNCL area	China P.R.	0	0	0	0	0	0	0	0	0	0	0	139	156	200	124	0	0	0	0	0	0	0	0	0	
		Chinese Taipei	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	18	226
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73	73	73	
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	0	0	
		NEI (Flag related)	0	754	406	526	956	1297	2324	2780	4100	4318	3836	2671	4404	4202	5962	6100	8339	7409	5269	2883	175	578	0	0	
		Panama	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	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	1956	1341	280	0	0	0	
		UK.Turks and Caicos	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
Discards	AT.W	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	5
	AT.W	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	0	

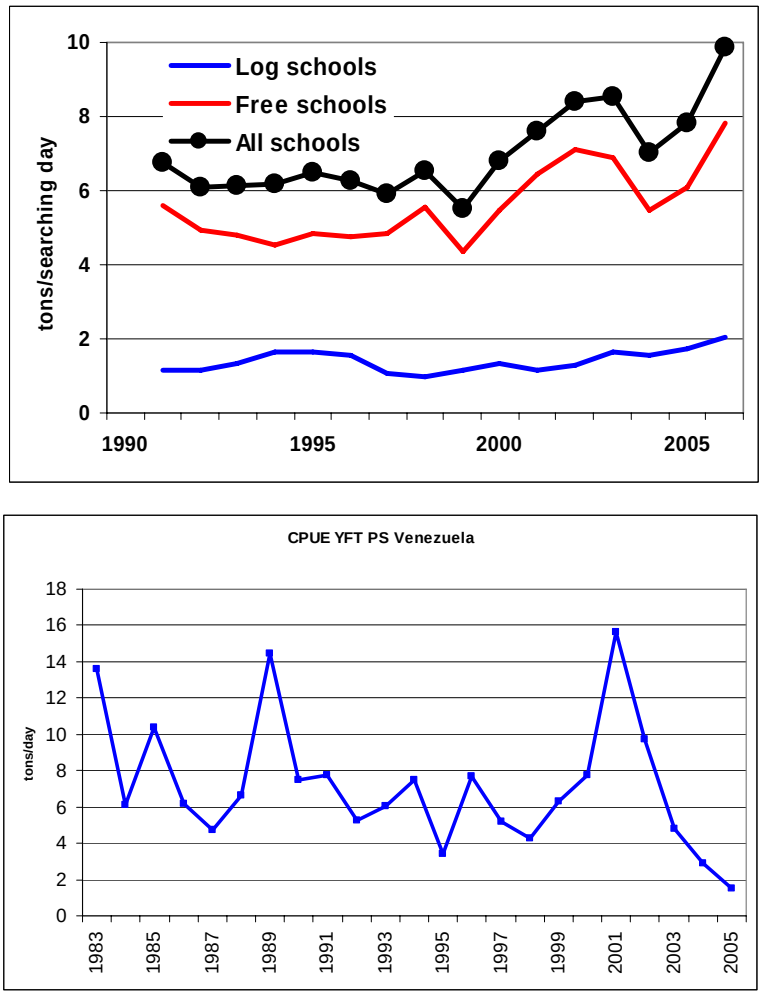
*An estimated Total Yield of 103908 t is obtained (1.66% larger), if 2005 figures of non-reporting Flags in 2006 (shaded cells) are carried over to 2006.



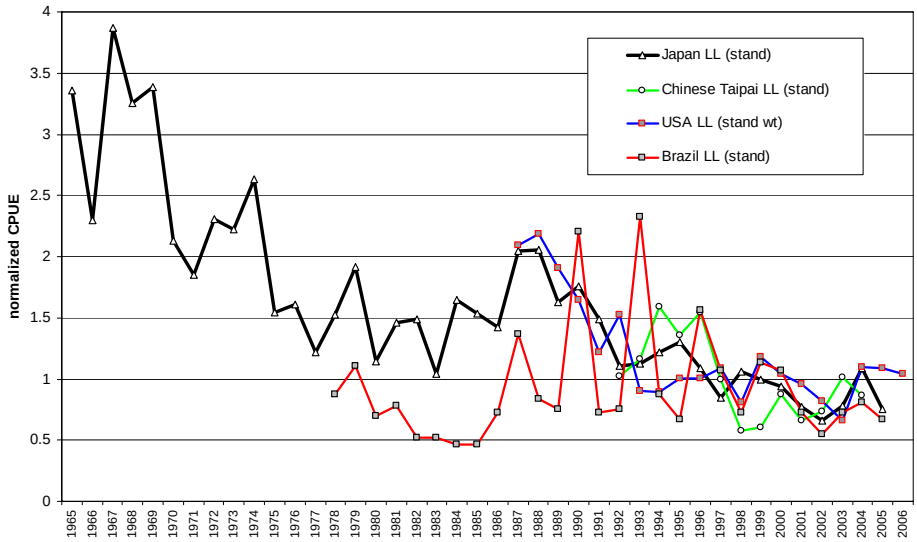
YFT-Figure 1. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2006.



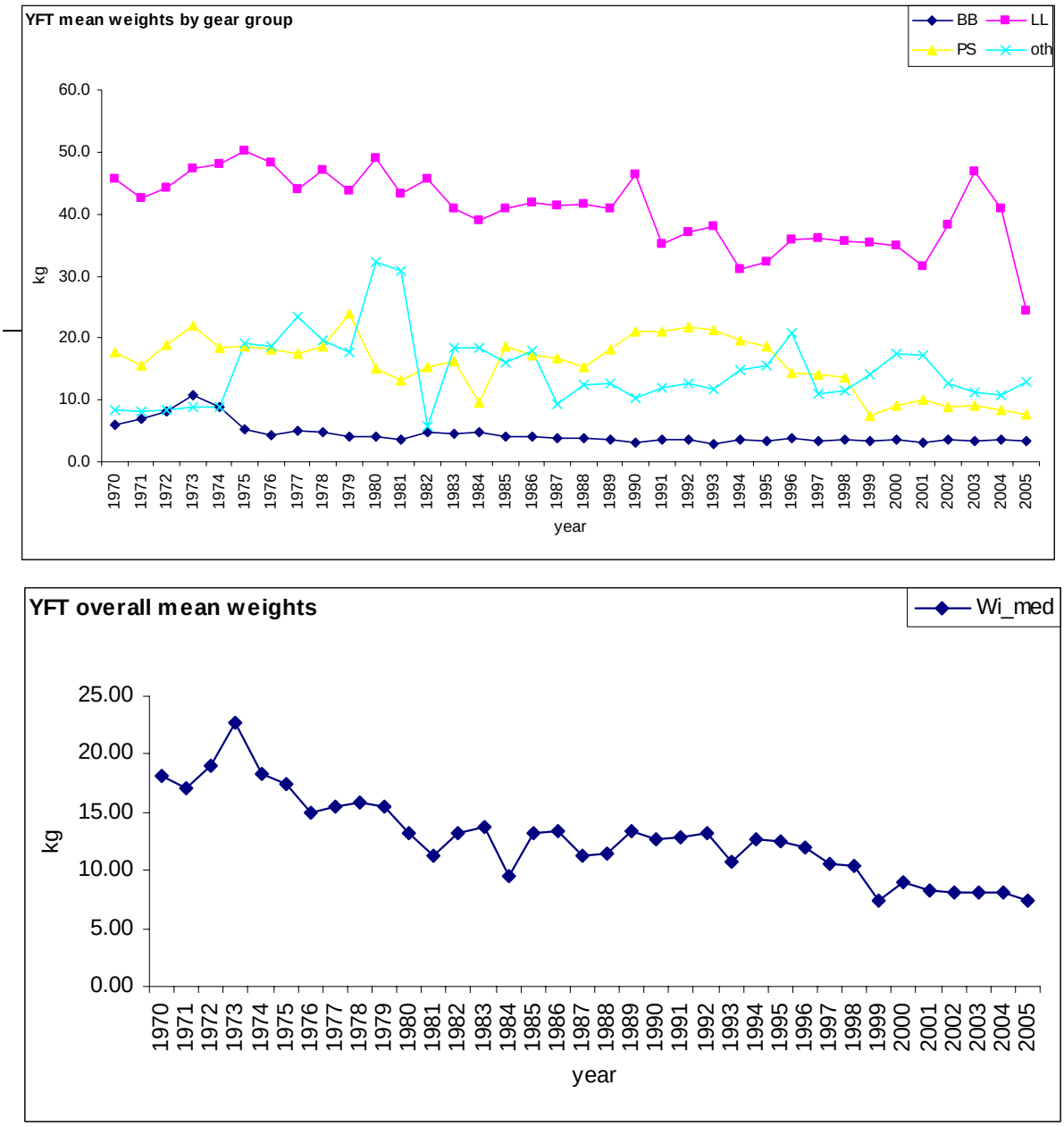
YFT-Figure 2. Geographic distribution of yellowfin tuna catches for most recent years (2000-2004) by major tuna fishery. Ghana's catches have been included in the same 5x5º square, as no detailed information on the spatial distribution of these catches is available.



YFT-Figure 3. Nominal yellowfin tuna catch per unit effort trends for purse seine fleets from the eastern (top) and western (bottom) Atlantic in tons/searching days. No adjustment has been made for estimated increases in fishing power.



YFT-Figure 4. Standardized Atlantic yellowfin tuna catch per unit effort trends (in numbers) for longline fleets. The Chinese Taipei (numbers) index, although partially standardized, has been truncated to begin in 1992 in order to avoid a period of shifting targets which is not adequately accounted for in the standardization.



YFT-Figure 5. Trend in yellowfin tuna average weight by gear group (top panel) and total (bottom panel) calculated from available catch-at-size data. Purse seine averages are calculated across all set types (floating object and free school).

8.2 BET - BIGEYE TUNA

A new stock assessment was conducted for bigeye tuna this year. Due to the early date of the assessment meeting, the last year in catch data was 2005 (71,000 t at the time of the assessment). New biological information provided since the last assessment was considered in the present assessment. Summaries of that and other information including fisheries, tagging, genetic studies and stock modeling can be found in the ICCAT special editions of the *Bigeye Tuna Year Program* (ICCAT CVSP, Vol. 57, No.1), the *Second World Meeting on Bigeye Tuna* (ICCAT CVSP, Vol. 57, No.2) and Chapter 2 of the *ICCAT Field Manual*.

BET-1. Biology

Bigeye tuna are distributed throughout the Atlantic Ocean between 50ºN and 45ºS, but not in the Mediterranean Sea. This species swims at deeper depths than other tropical tuna species and exhibits extensive vertical movements. Similar to the results obtained in other oceans, pop-up tagging and sonic tracking studies conducted on adult fish in the Atlantic has revealed that they exhibit clear diurnal patterns: they are found much deeper during daytime than at night. Spawning takes place in tropical waters when the environment is favorable. From nursery areas in tropical waters, juvenile fish tend to diffuse into temperate waters as they grow larger. Catch information from surface gears indicate that the Gulf of Guinea is a major nursery ground for this species. Dietary habits of bigeye are varied and prey organisms like fish, mollusks, and crustaceans are found in stomach contents. Bigeye exhibit relatively fast growth: about 105 cm fork length at age 3,140 cm at age of 5 and 163 cm at age 7. Bigeye over 200 cm are relatively rare, but do occur with some frequency. Bigeye tuna become mature at about 3 and a half years old. Young fish form schools mostly mixed with other tunas such as yellowfin and skipjack. These schools are often associated with drifting objects, whale sharks and sea mounts. This association appears to weaken as bigeye grow larger. Estimated natural mortality rates (M) for juvenile fish, that were obtained from tagging data, were of a similar range as those applied in other oceans. Various pieces of evidence, such as a lack of identified genetic heterogeneity, the time-area distribution of fish and movements of tagged fish, suggest an Atlantic-wide single stock for this species, which is currently accepted by the Committee. However, the possibility of other scenarios, such as north and south stocks, should not be disregarded.

A paper was presented that investigated the maturity of bigeye tuna in the tropical West Atlantic. According to the histological examination, six oocytes developmental stages were distinguished and oocyte development was compared with the past results. A document in publication provided the results of ageing of this species using the annuli of the first dorsal spine. Samples were collected from the tropical West Atlantic and the results were generally consistent with the recent studies that utilize other materials for ageing in estimating age and growth.

Another document analyzed longline CPUE in the central Atlantic and developed habitat indices that integrated various environmental factors. The indices were mapped with contour lines for different depth intervals as well as the integrated one. The feasibility trials were reported for developing a new fishing method that utilizes FADs and fishing boats in order to attract bigeye tuna. This method appears to be effective in catching bigeye tuna and catches other than bigeye appears to be small.

BET-2. Fisheries indicators

The stock has been exploited by three major gears (longline, baitboat and purse seine fisheries) and by many countries throughout its range of distribution **(BET-Figure 1)**. The size of fish caught varies among fisheries: medium to large for the longline fishery, small to large for the directed baitboat fishery, and small for other baitboat and for purse seine fisheries. Average weights are 45-50 kg, 20-30 kg and 3-4 kg for these three types of fisheries, respectively.

The total annual catch **(BET-Figure 2)** increased up to the mid 1970s reaching 60,000 t and fluctuated over the next 15 years. In 1991, catch surpassed 95,000 t and continued to increase, reaching an historic high of about 132,000 t in 1994. Reported and estimated catch has been declining since then and fell below 100,000 t in 2001, and it was 76,000 t in 2006, the lowest recorded level since 1988.

After the historic high catch in 1994, all major fisheries exhibited a decline of catch while the relative share by each fishery in total catch remained relatively constant. These reductions in catch are related to declines in fishing fleet size (purse seine and longline) as well as decline in CPUE (longline and baitboat).

The major baitboat fisheries are located in Ghana, Senegal, the Canary Islands, Madeira and the Azores. The tropical purse seine fleets operate in the Gulf of Guinea and off Senegal in the East Atlantic and off Venezuela in the West Atlantic. In the eastern Atlantic, these fleets are comprised of vessels flying flags of EC-France EC-Spain, Ghana and others and which are mostly managed by EC companies. In the western Atlantic the Venezuelan fleet dominates the purse-seine catch of bigeye. While bigeye tuna is now a primary target species for most of the longline and some baitboat fisheries, this species has always been of secondary importance for the other surface fisheries. Unlike yellowfin, bigeye tuna are mostly caught while fishing on floating objects such as logs or man-made fish aggregating devices (FADs). There are two major longline fisheries, operated by Japan and Chinese Taipei, whose combined catch accounted for 35% of the total catch in weight in 2005. While Chinese Taipei's catch remained relatively stable since the mid-1990s (averaging about 18,000 t per year), Japan's catch declined after 1994 from about 38,000 t and in 2005 was about one third (13,000 t) of the 1994 catch. China and the Philippines joined this fishery in 1993 and 1998, respectively, and currently account for about 8,000 t per year in combination.

The activities of illegal, unreported and unregulated (IUU) longliners that fly flags of convenience appear to have started in the early 1980s, and became significant thereafter. IUU longline catches were estimated from Japanese import statistics but the estimates are considered uncertain. These estimates indicate a peak in unreported catches of 25,000 t in 1998 and a quick reduction thereafter **(BET-Figure 3)**. This quick reduction reflects increased reporting by the countries/entities who engaged in this activity as well as the efforts made by the longline countries that have cooperated in reducing the number of IUU boats. Nevertheless, the Committee expressed concern that unreported catches from the Atlantic might have been poorly estimated and maybe continuing, but available statistical data collection mechanisms are insufficient to fully investigate this possibility.

BET-3. State of the stock

The 2007 stock assessment was conducted using various types of models. In general, data availability has improved but there is still some lack of information regarding detailed fishing and size data from certain fleets, in addition to the past catch and fishing activities of IUU fleets (e.g., size, location and total catch), leading to the need to assume catch-at-size for an important part of the overall catch. Species composition of Ghanaian fisheries catch was reconstructed for 1997 based on improved sampling and catch-at-size estimated in recent years as part of the data improvement projects of ICCAT (SCRS/2004/015).

This year, two new indices of relative abundance and updated indices of those previously used were made available to the Committee for use in the assessment. In total, six indices **(BET-Figure 4)** were provided, of which four were from longline fisheries from Japan, Chinese Taipei, U.S., and Brazil. The other two were from a purse seine fishery operated by EC and another from baitboat fishery located in Azores. While the Japanese indices have the longest duration and represent roughly 20-40% of the total catch, the other indices are shorter and generally account for smaller fractions of the catch than the Japanese fishery, except for Chinese Taipei's longline index which is based on catch now as large as the Japanese catch. These longline indices primarily relate to medium and large-size fish. The purse seine index was developed from FAD fishing operations, and this index represents the stock trend in recruitment. The Azorean baitboat index represents various size components.

Several types of assessment models, including production models, VPA, and a statistical integrated model (MULTIFAN-CL) were applied to the available data. There was a range of stock status evaluations from the various model formulations applied, not all of which were judged to be equally likely.

Consistent with previous assessments of Atlantic bigeye, the results from non-equilibrium production models are used to provide our best characterization of the status of the resource. The current MSY estimated using two types of production models was about 90,000 t and 93,000 t, although uncertainty in the estimates broaden the range. In addition, these estimates reflect the current relative mixture of fisheries that capture small or large bigeye; MSY can change considerably with changes in the relative fishing effort exerted by surface and longline fisheries.

The estimated stock trajectory is shown in **BET-Figure 5**. The biomass at the beginning of 2006 was estimated to be nearly 92% of the biomass at MSY and the 2005 fishing mortality rate was estimated to be about 13% below the fishing mortality rate at MSY. The replacement yield for the year 2006 was estimated to be slightly below MSY. The uncertainty in our estimates of current stock status is characterized by the range in **BET-Figure 6**.

While the Committee feels this characterization best represents the current status of bigeye in the Atlantic, there are other model formulations which would admit both more optimistic and more pessimistic stock status evaluations.

BET-4. Outlook

Stock projections were conducted, assuming a catch of 71,000 t in 2006 (this was the best preliminary estimate at the time of the assessment but the reported amount was lower at 65,000 in the 2007 SCRS) and varying levels of the constant catch thereafter. It should be noted that [Rec. 04-01] potentially allows for substantially more catch than either the assumed 2006 catch level or the estimated MSY. The projection results suggest that the biomass of the stock would likely decline further with constant catches of 90,000 t or more. Some increase in biomass, leading to rebuilding to B_{MSY} is expected with catches of less than 85,000 t **(BET-Figure 7)**.

BET-5. Effects of current regulations

The *Recommendation by ICCAT on a Multi-year Conservation and Management Program for Bigeye Tuna* [Rec. 04-01] sets a number of regulations for 2005-2008 including an overall TAC for major countries set at 90,000 t as well as a specific limit for the number of vessels for several countries. Overall estimated catch in 2005 was nearly 20,000 t below TAC.

Recommendation 04-01 also implemented a new, smaller closure for the surface fishing in the area 0º-5ºN, 10ºW-20ºW during November in the Gulf of Guinea. The Committee examined the percentages of the small bigeye based on the catch-at-size information created at the time of 2007 assessment. Based on that information, the percentage of small bigeye is at about 70% in number of fish and there is a general increasing trend (**BET Figure 8**). Considering that the new closed area is much smaller in time and area than the previous moratorium time/area, and is located in an area which historically has lower effort anyway, this regulation is likely to be less effective in reducing the overall catches of small bigeye by the surface fishery. The Committee stresses that, if time/area closures are to be effective in reducing small fish harvests and growth overfishing, such a closure should be expanded in time and space and focused in locations with optimal potential benefit.

BET-6. Management recommendations

This assessment indicated that the stock declined rapidly during the 1990s due to the large catches made then, and that in recent years it has stabilized at around or below the level that produces MSY in response to a large reduction in reported catches. Estimated fishing mortality exceeded FMSY for several years since the mid-1990s and has rapidly reduced since 1999 (**BET-Figures 5 and 6**). Projections indicate that catches of 85,000 t or less will permit the stock to rebuild in the future. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendation 04-01 and other countries were to maintain recent catch levels, then the total catch could well exceed 100,000 t. The Committee recommends that the total catch not exceed 85,000 t.

The assessment and subsequent management recommendations are conditional on the reported and estimated history of catch for bigeye in the Atlantic. The Committee reiterates its concern that unreported catches from the Atlantic might have been poorly estimated and maybe continuing, but available statistical data collection mechanisms are insufficient to fully investigate this possibility. Coordination amongst the tuna RFMOs should be encouraged with an eye to, among other objectives, examining the possibility of 'fish laundering' for bigeye and other species.

ATLANTIC BIGEYE TUNA SUMMARY	
Maximum Sustainable Yield	90,000 t-93,000 t [1] (68,000- 99,000) [2]
Current (2006) Yield[1]	64,700 t
Replacement Yield (2006)	Slightly below MSY[2]
Relative Biomass (B2006/BMSY)	0.92[1] (0.85-1.07)[3]
Relative Fishing Mortality	
FMSY	0.20[1] (0.07-0.33) [2]
F2005/FMSY	0.87[1] (0.70-1.24) [3]
Conservation & management measures in effect:	[Rec. 04-01] replaced [Rec. 79-01 and Rec. 99-01] after June, 2005. − Total allowable catch for 2005 is set at 81,400 t for major country and entity. − Limits on numbers of fishing vessels less than the average of 1991 and 1992. − Specific limits of number of longline boats; China (45), Chinese Taipei (98), Philippines (8). − Specific limits of number of purse seine boats for Panama (3). − No purse seine and baitboat fishing during November in the area encompassed by 0º-5ºN and10º W-20º W.

[1] Reports for 2006 should be considered provisional and in this case includes carryovers from previous years.
[2] Base Case production model (Logistic) results based on catch data 1950-2005.
[3] 80% confidence limits.

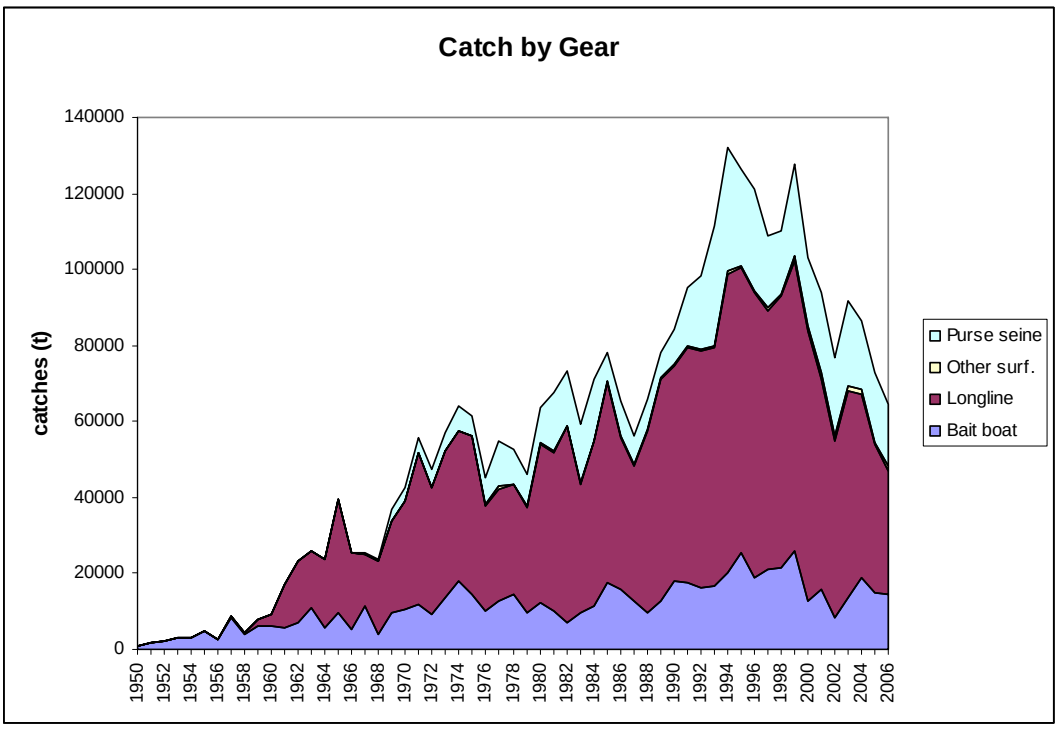
BET-Table 1. Estimated catches (t) of bigeye tuna (*Thunnus obesus*) by major area, gear and flag.

		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		73493	59370	71052	78215	65396	55976	65796	78068	84337	95264	98434	111568	132225	126284	121131	108873	110008	127802	102959	93767	76955	91585	86527	72738	64577
Landings	Bait boat	6922	9796	11439	17651	15618	12631	9710	12672	18106	17750	16248	16467	20290	25552	18959	21037	21381	25868	12634	15842	8367	13437	18879	15092	14671
	Longline	51805	33757	43303	52595	39942	35570	47758	58389	56537	61556	62359	62871	78296	74816	74900	68251	71836	76527	71194	55265	46438	54464	48379	38872	32312
	Other surf.	290	163	247	415	550	626	469	636	287	434	604	648	974	561	353	536	428	1373	1221	1623	1475	1313	1234	534	1447
	Purse seine	14476	15654	16063	7554	9286	7148	7859	6371	9407	15524	19223	31582	32665	25355	26919	19049	16362	24035	17911	21037	20676	22370	18035	18240	16146
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	Angola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	476	75	
	Argentina	0	0	0	100	41	72	50	17	78	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	17	18	18	6	11	11	0	0	18
	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	4
	Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Benin	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	0	0	0	0	
	Brasil	776	521	656	419	873	756	946	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455	1496	1081	1479
	Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	
	Canada	0	0	0	0	11	144	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143	187	196
	Cape Verde	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	1	1	1	1	1
	China P.R.	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555	6200	7200
	Chinese Taipei	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	21563	17717	11984	2965
	Congo	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	0	0	0	0	0	0	0	0	0	
	Cuba	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16	0	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
	Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
	EC.España	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524	10969	8251	7618	7464
	EC.France	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926	2816	2984
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	33	
	EC.Poland	4	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	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3314	1498	1605	2590	1655	3204	4053	5068
	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	3
	FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	28	6	
	Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	0	0	0	0	
	Gabon	0	0	0	0	0	0	0	0	0	0	0	1	87	10	0	0	0	184	150	121	0	0	0	0	
	Ghana	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	9829	13370	17764	5910	12042	7106	13557	14901	13917	9141
	Grenada	0	0	0	0	0	0	0	0	0	65	25	20	10	10	0	1	0	0	0	0	0	0	0	0	
	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1003	999
	Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	
	Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	Japan	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15306	19572	18509	14772	14772
	Korea, Republic of	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629	770	2067
	Liberia	0	0	0	0	0	0	0	206	16	13	42	65	53	57	57	57	57	57	57	57	57	57	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	508	1085	500	400	400	400	400	400	400	31	593	593	0	0	
	Maroc	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889	929	519	888
	Mexico	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7	4	5	4	3
	NEI (ETRO)	338	1141	157	0	0	85	20	93	785	1221	2138	4594	5034	5137	5839	2746	1685	4011	2285	3027	2248	2504	1387	1370	1516
	NEI (Flag related)	0	46	369	354	758	1406	2155	4650	5856	8982	6151	4378	8964	10697	11862	16569	24896	24060	15092	8470	531	0	0	0	
	NEI (UK.OT)	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274	215	177	307	283
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879	2758	3343	0	416
	Norway	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	2844	2732	3165	4461	5173	5616	3847	3157	5258	7446	9991	10138	13234	9927	4777	2098	1252	580	952	89	63	0	1521	2310	2415
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854	1855	1816
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	38	4	8	91	0	0	0	0	1	1
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	6	4
	Senegal	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	474	561	721	1267
	Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162	0	0	0	
	Seychelles (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	0	
	South Africa	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	53	55	249	239	341	113	270	221	84

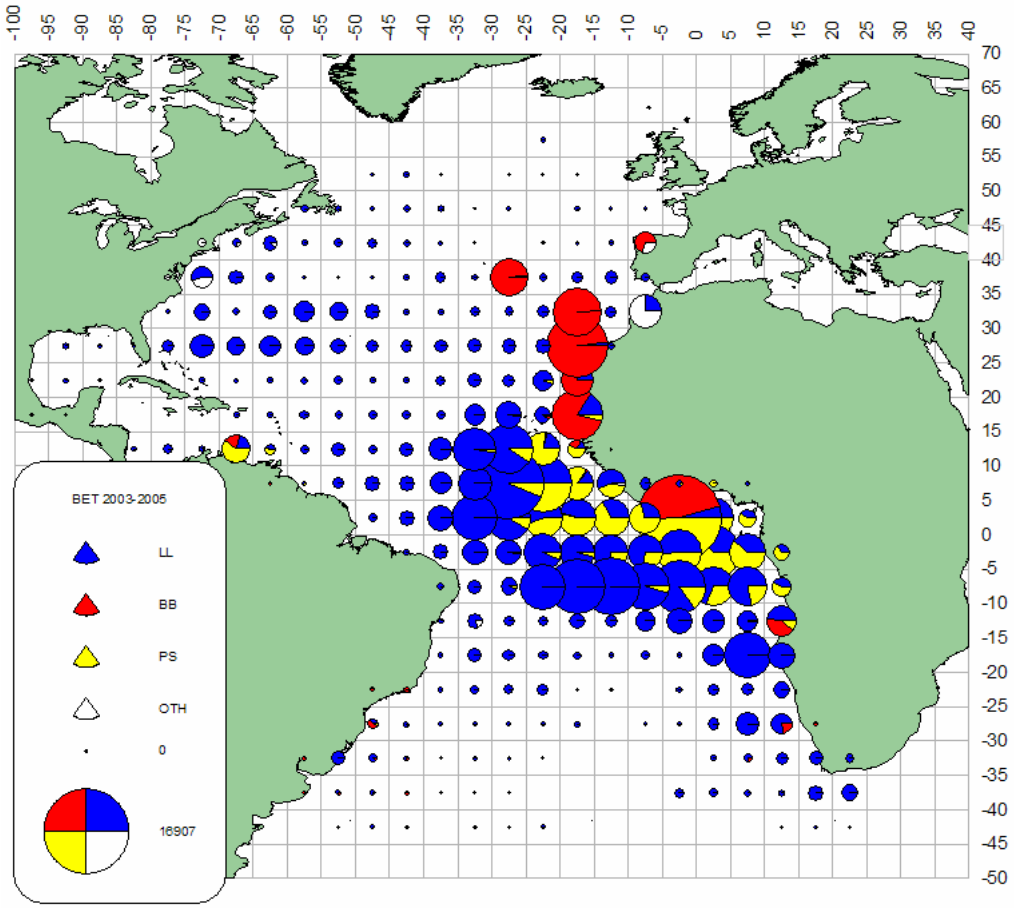
BET. Table 1 (continued).

		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*
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103	18	0	114
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2	0	2	
	Togo	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	0	0	0	0	
	Trinidad and Tobago	0	191	41	22	0	0	1	19	57	263	0	3	29	27	37	36	24	19	5	11	30	6	5	9	
	U.S.A.	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	482	416	484	987
	U.S.S.R.	635	352	1233	870	1071	1887	1077	424	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	
	UK.Sta Helena	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5	0	0	0	25
	Uruguay	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40	62	83
	Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	109	52
	Venezuela	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457	189	274	222	140	226	708	629	516	1060	243	261
Discards	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

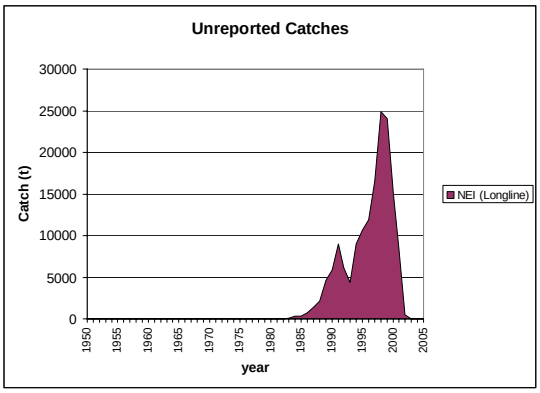
*An estimated Total Yield of 64701 t is obtained (0.2% greater) if 2005 figures of non-reporting flags in 2006 (shaded cells) are carried over to 2006.



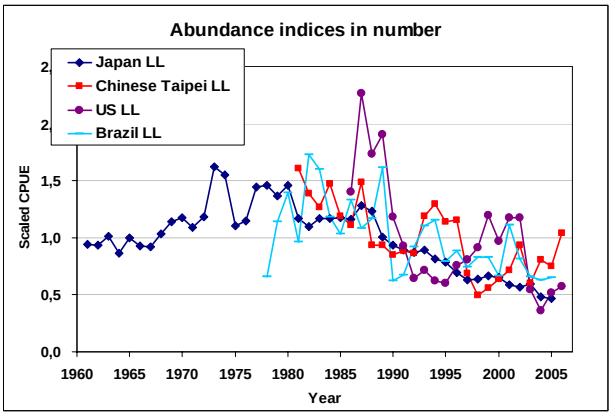
BET-Figure 1. Trend of bigeye catches (1950-2006) by major tuna fisheries.

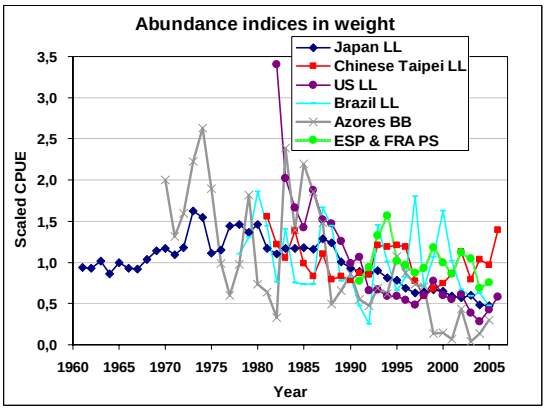


BET-Figure 2. Geographic distribution of bigeye catches for most recent years (2003-2005) by major tuna fisheries. Ghana's catches have been included in the same 5x5º square, as no detailed information on the spatial distribution of these catches is available.

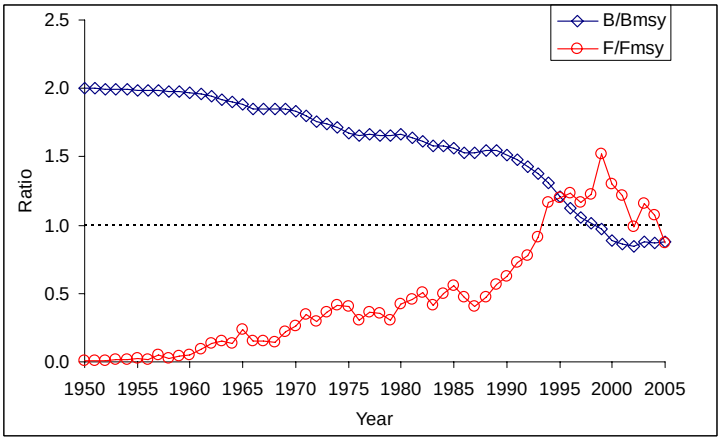


BET-Figure 3. Estimated longline IUU catches recorded as NEI in the ICCAT data base.

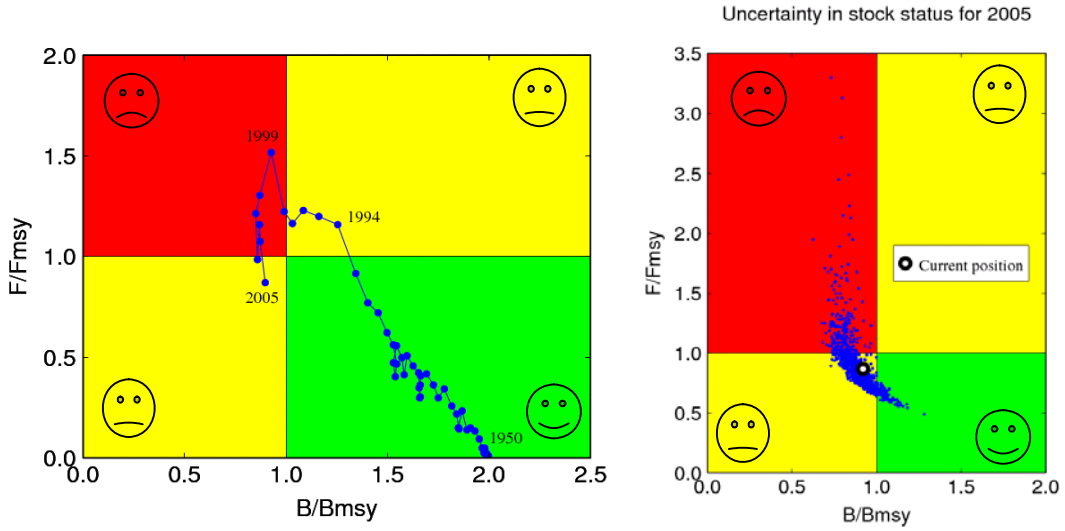




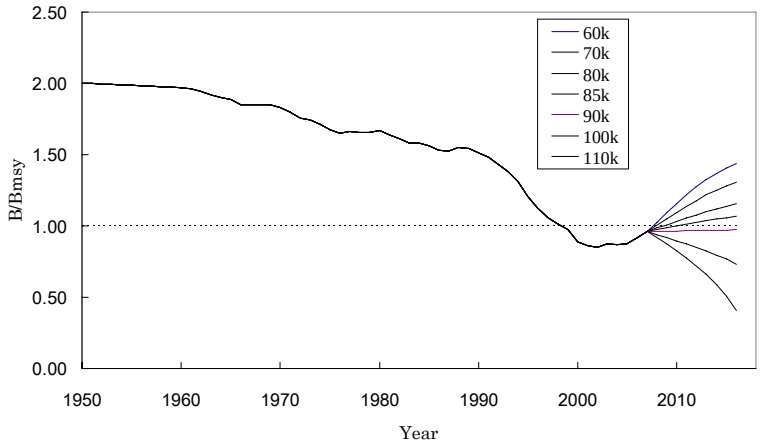
BET-Figure 4. Abundance indices provided for the 2007 assessment.



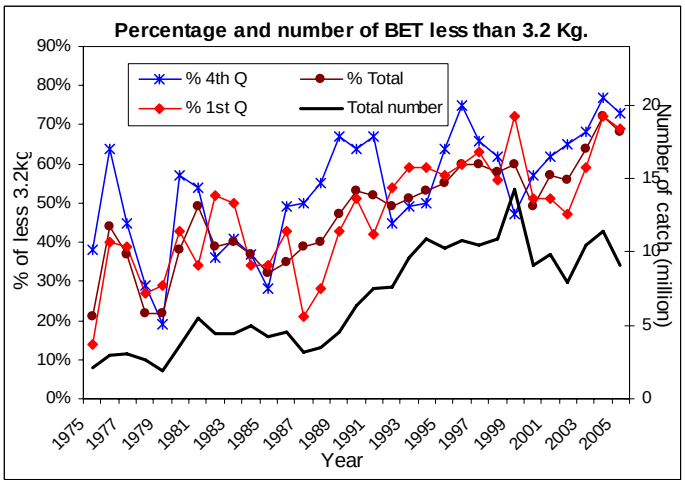
BET-Figure 5. Trajectories of B/B_{MSY} and F/F_{MSY} estimated from the assessment.



BET-Figure 6. Estimated range of stock status results (B/B_{MSY} and F/F_{MSY}) for 2005 which characterizes our uncertainty in stock status (right panel). Time series of B/B_{MSY} and F/F_{MSY} from 1950 to 2005 showing the progression of stock status as the Atlantic tuna fisheries evolved (left panel).



BET-Figure 7. Stock projections by ASPIC model assuming a catch of 71,000 t in 2006 and varying levels of the constant catch thereafter.



BET-Figure 8. Overall percentages and number of small bigeye tuna less than 3.2 kg calculated from catch-at-size data.

8.3 SKJ – SKIPJACK TUNA

No Atlantic skipjack stock assessment has been carried out since 1999, in spite of some signs of local over-exploitation. This report includes only the latest updates on the state of knowledge on this species.

SKJ-1. Biology

Skipjack tuna is a gregarious species that is found in schools in the tropical and subtropical waters of the three oceans **(SKJ-Figure 1)**. Skipjack is the predominant species under FADs where it is caught in association with juvenile yellowfin tuna, bigeye tuna and with other species of epipelagic fauna. One of the characteristics of skipjack is that from its first year of life it spawns opportunistically throughout the year and in vast sectors of the ocean and its growth varies according to the latitude. However, an analysis of tagging data in the Senegalese area showed that the growth curve parameters obtained in this region were in fact closer to the estimates made in the Gulf of Guinea or in other oceans than those made previously in Senegal.

The increasing use of fish aggregation devices (FADs) since the early 1990s seems to have changed the behavior of the tuna schools. It is noted that, in effect, the free schools of mixed species were considerably more common prior to the introduction of FADs. Furthermore, the association with FADs could also have a negative effect on growth and on the plumpness of skipjack tuna and could change the movements of this species ("ecological trap" concept).

SKJ-2. Fisheries indicators

The total catches obtained in 2006 in the entire Atlantic Ocean were close to 136,700 t **(SKJ-Table 1**, **SKJ-Figure 2)** which represents a decrease on the order of 4% as compared to the average of the last five years.

The numerous changes that have occurred in the skipjack fishery since the early 1990s (such as the use of FADs and the expansion of the fishing area towards the west) have brought about an increase in skipjack catchability and in the proportion of the skipjack stock that is exploited. At present, the major fisheries are the purse seine fisheries, particularly those of EC-Spain, EC-France, NEI, Cape Verde, Netherlands Antilles and Ghana, followed by the baitboat fisheries of Ghana, EC-Spain and EC-France. The catches made in 2006 in the East Atlantic amounted to 109,600 t, representing a decrease of 5% as compared to the average of 2001-2005 **(SKJ-Figure 3)**. The Committee again noted that important catches of skipjack are landed as "false tuna" in Côte d'Ivoire (unreported catches on the order of 6,000 to 8,000 t between 2004 and 2005) and it will try to integrate them in the most precise manner possible in the reported historical catches for the purse seiners.

In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. Catches in 2006 in the West Atlantic amounted to 25,800 t, a minor decline of 2% as compared to recent years **(SKJ-Figure 4)**.

There is no quantified estimate available on the effective fishing effort exerted on skipjack tuna in the East Atlantic although nominal purse seine effort has decreased regularly in recent years **(SKJ-Figure 5)**. It is supposed, however, that the increase in fishing power linked to the introduction to improved technologies on board the vessels as well as to the development of fishing under floating objects have resulted in an increase in the efficiency of the various fleets. The increase by a factor of three in the coefficient of total mortality (Z) between the early 1980s and the end of the 1990s, obtained using a tag-recovery model on fish measuring 40-60 cm FL, supports this hypothesis. The comparison of the size distributions of skipjack for the East Atlantic between the periods prior to and following the use of FADs also reinforces this interpretation insofar as an increase is observed in the proportion of small fish in the catches.

The updating of the skipjack catch-at-size matrix during the Inter-sessional Meeting of the Tropical Tunas Species Group permitted the completion of an estimate of Z for the most recent years based on the annual development of the average size of the catches. The regular increase in fishing pressure observed for the other indicators is confirmed up to about 1995, then the decline in apparent Z (a trend observed only for skipjack) could be a consequence of the moratoria on floating objects which has mainly affected skipjack **(SKJ-Figure 6)**.

From the data collected by the observers on-board Spanish purse seiners operating in the east Atlantic between 2001-2005, the average discard rate of skipjack tuna under FADs was estimated at 42 kg per ton of skipjack landed for the November to January period of the year.

Fishing effort of the Brazilian baitboats which comprise the major skipjack fishery in the West Atlantic seems to be stabilized over the last 20 years.

SKJ-3. State of the stocks

The last assessment on Atlantic skipjack tuna was carried out in 1999.

It is difficult to apply the traditional stock assessment models (e.g. global models, VPA, etc.) to skipjack because of its particular biological (continuous spawning, areal variation in growth) and fishery characteristics (non-directed effort, weak cohorts identified). For these reasons, no standardized assessment of the Atlantic skipjack stocks can be carried out. However, a study was made on the development of several fishery indictors that reflected the changes in the state of the stock over time.

Although the fisheries operating in the east are extending towards the west beyond 30°W longitude, the Committee decided to maintain the hypothesis in favor of two distinct stock units, based on available scientific studies. However, taking into account the biological characteristics of the species and the geographic distances between the various fishing areas **(SKJ-Figure 1)**, the use of smaller stock units continues to be the envisaged hypothesis.

Eastern stock

The indices from the purse seine fishery often show divergent trends depending on the area concerned. At the *Inter-Sessional Meeting of the Tropical Tunas Species Group* it was noted that the increase in CPUE of the European purse seiners in the late 1990s was due, in large measure, to the increase in the catches of positive sets under FADS. Also, the regular increase in the skipjack yields of the baitboats based in Senegal (contrary to the other two tropical tuna species) may only have been the result of an increase in catchability linked to the adoption of the so-called "baitboat associated school" fishing towards the mid-1990s. Furthermore, no marked trend has been observed for a peripheral fishery such as the Azorean baitboat fishery. The fact that a reduction in abundance for a local segment of the stock would have little repercussion on abundance in other areas, leads to suppose that only a minor proportion of skipjack carry out extensive migrations between areas (cf. notion of stock viscosity) **(SKJ-Figures 7 and 8)**. Generally, it is noted that the average weight observed in the east Atlantic (close to 2 kg; **SKJ-Figure 9**) is much lower than the estimates given in the other oceans (closer to 3 kg).

The presence of negative values in the annual development of the Grainger and García index could be interpreted as a sign of over-exploitation that would have occurred in 1994-1995, i.e., after the massive use of FADs in fishing operations **(SKJ-Figure 10)**. The group, however, expressed reservation as regards the generalization of this conclusion to the overall stocks in the East Atlantic, due to the moderate mixing rates that seem to occur among the different sectors of this region. The application of a non-equilibrium production model based on a generalized model confirms the previous analysis. This last model estimated a general increase in the efficiency of the fishing gears of about 5% annually for this species.

Western stock

The nominal CPUEs of Brazilian baitboats remain stable while that of Venezuelan purse seiners decreased in recent years **(SKJ-Figure 11)**. This decrease, also observed in the yellowfin CPUE time series, could be linked to specific environmental conditions (high surface temperatures, lesser accessibility of prey), and it is therefore difficult to draw conclusions on the state of the stocks. The average weight of skipjack caught in the western Atlantic is higher than in the east (3 to 4.5 kg vs. 2 to 2.5 kg), at least for the Brazilian baitboat fishery.

SKJ-4. Effects of current regulations

The Committee could not determine if the effect of the FADs on the resource is only at local level or if it had a broader impact, affecting the biology and behavior of the species. If this is the case, maintaining high concentrations of FADs could reduce the productivity of the overall stock.

There is currently no specific regulation in effect for skipjack tuna. However, with the aim of protecting juvenile bigeye tuna, French and Spanish boat owners voluntarily decided to apply a moratorium for fishing under floating between November and the end of January for the 1997-1998 period and 1998-1999. The Commission recommended the implementation of a similar moratorium that was from 1999 to January 2005. This moratorium has had an effect on skipjack catches made with FADs.

On the basis of a comparison of average catches between 1993-1996, prior to the moratoria, and those between the 1998-2002 period, the average skipjack catches between November and January for the purse seine fleets that applied the moratoria, were reduced by 64%. During the whole period when the moratoria had been applied (1998-2002), the average annual skipjack catches by purse seine fleets that applied the moratoria decreased by 41% (42,000 t per year). However, this decrease is likely a combined result of the decrease in effort and the impact of the moratoria (the average annual catch per boat decreased only 18% between these two periods).

The repealing in 2006 of Recommendation [Rec. 05-01] on the 3.2 kg minimum size limit on yellowfin tuna [Rec. 72-01] (even though it was still in force in 2005) and the establishment of a time/area closure of the surface fishery [Rec. 04-01], which replaces the old strata relative to the moratorium on catches under floating objects, are regulatory measures that are too recent to determine their effects on skipjack catches.

SKJ-5. Management recommendations

No management recommendations were proposed for this species.

ATLANTIC SKIPJACK TUNA SUMMARY

	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2006) Yield[1]	109,598 t	25,802 t
Current Replacement Yield	Not estimated	Not estimated
Relative Biomass (B_{2005}/B_{MSY})	Not estimated	Not estimated
Relative Fishing Mortality: F_{2005}/F_{MSY}	Not estimated	Not estimated
Management measures in effect	Rec. 04-01, (effective 2005[2]).	None

[1] Reports for 2006 should be considered provisional and in this case does not include carryovers from previous years.
[2] Although this time area measure was implemented to reduce mortality on bigeye juvenile tuna, as a total area closure has effected all the tropical tuna species.

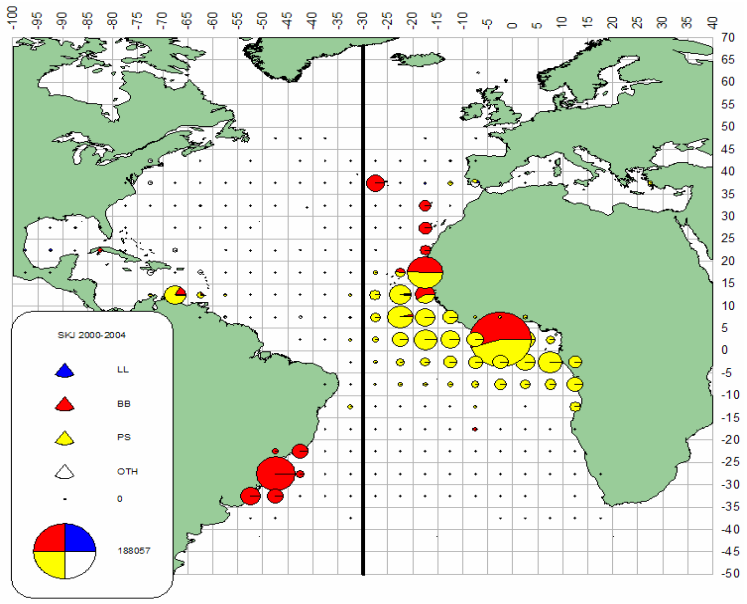
SKJ-Table 1. Estimated catches (t) of skipjack tuna (*Katsuwonus pelamis*) by major area, gear and flag.

			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			154909	135038	126826	118713	122172	114566	139962	116120	138659	208455	158283	191738	175332	161339	148110	141007	145909	159461	138959	148451	113607	139532	152057	156788	136681
	AT.E		122382	103022	91220	78428	90019	90389	116226	89738	112549	175052	128128	158515	145382	139437	120539	109291	116646	132053	109562	116923	91970	115275	124979	128654	109598
	AT.W		32527	32015	35596	40272	32151	24164	23736	26382	26110	33404	30155	33221	29949	21859	27562	31712	29087	27356	29307	31451	21600	24125	26917	28007	25802
	MEDI		0	2	10	13	2	13	0	0	0	0	0	2	0	43	9	4	176	53	90	77	37	132	161	127	1245
	UNCL area		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
Landings	AT.E	Bait boat	44488	34873	28075	29868	30009	38803	48015	41000	36569	41611	35660	31656	37817	33691	32047	37293	42045	37696	29967	46281	27590	29847	39539	43603	41118
		Longline	16	417	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	55	66	316	454	159
		Other surf.	3054	2240	1328	206	1638	1027	1332	1469	1178	1890	1449	1026	311	265	314	134	754	235	2245	585	503	373	1006	2205	5821
		Purse seine	74824	65492	61795	48348	58353	50553	66875	47260	74802	131545	91016	125831	107244	105478	88171	71818	73762	94080	77302	70004	63822	84989	84119	82392	62501
	AT.W	Bait boat	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737	21366	23537	25514	23214
		Longline	30	184	25	24	8	6	9	25	23	33	29	20	16	33	19	12	21	58	23	60	143	95	206	211	291
		Other surf.	390	653	842	567	1657	518	355	600	600	872	764	710	1577	2023	452	556	516	481	466	951	604	367	404	316	252
		Purse seine	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769	1967	2045
	MEDI	Bait boat	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	17	21	13	3
		Other surf.	0	2	0	13	2	13	0	0	0	0	0	2	0	43	9	4	176	53	90	77	32	12	40	16	12
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	103	101	99	1230
	UNCL area	Longline	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
Discards	AT.W	Longline	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
Landings	AT.E	Angola	2257	318	46	131	56	80	30	85	69	66	41	13	7	3	15	52	2	32	14	14	14	14	10	0	
		Benin	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	398	343	371	364	383
		Cayman Islands	30	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	4	0	0	0	0	0	0	0	
		Chinese Taipei	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	23	26	16	6	3
		Congo	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	0	0	0	0	0	0	0	0	0	
		Cuba	189	135	310	246	569	81	206	331	86	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1173	259	292	143	559	1259	1565
		EC.Bulgaria	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	38016	28933	46649	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25456	44837	38725	28139	22170
		EC.Estonia	0	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16615	19899	21879	14850	7034
		EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	
		EC.Latvia	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8504	4735	11158
		Gabon	0	0	0	0	0	0	0	0	0	0	0	1	11	51	26	0	59	76	21	101	0	0	0	0	
		Ghana	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	26336	34183	40216	28974	42489	30499	24597	25727	44671	30236
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6389	4967
		Japan	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		Korea, Republic of	2841	1908	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	3956	2531	885	1002	1220	1028	428	295	1197	254	559	310	248	4981	675	4509	2481	848	1198	268	280	523	807	1893	3784
		NEI (ETRO)	1560	3383	927	590	540	791	2994	2263	10516	11335	12409	20291	17418	16235	16211	6161	6748	8893	7127	8122	8550	9688	11137	9740	7629
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0	0	0	
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	10092	8708	0	3042
		Norway	0	0	0	0	0	581	738	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1559	281	342	0	7126	11490	13468
		Rumania	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0	0	0	0	392
		S. Tomé e Príncipe	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0	0	0	166	143
		Senegal	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1053	733	1333	4874	3534
		South Africa	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0	2	2	1	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	1	0	0	0	1
		U.S.A.	79	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.	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63	63	63	88
		Venezuela	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

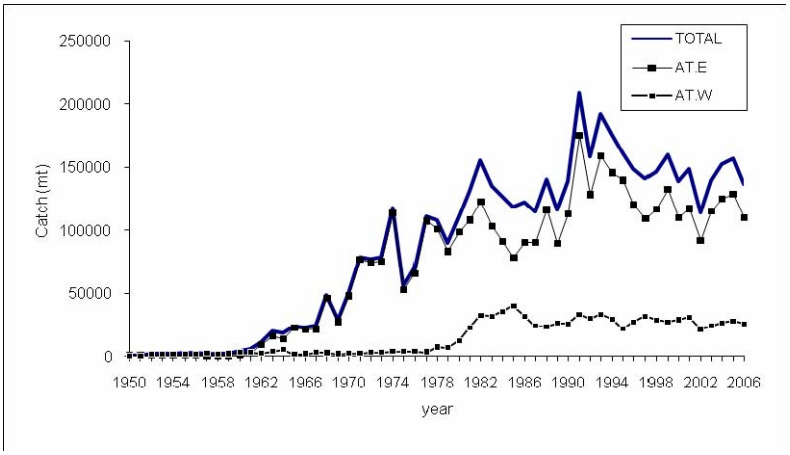
SKJ. Table 1.

			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*
	AT.W	Argentina	137	243	505	101	138	90	7	111	106	272	123	50	1	0	1	0	2	0	1	0	0	0	30	0	
		Barbados	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0	0	0	0	
		Brasil	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416	23037	26388	23270
		Canada	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	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	1	2	1	0	1	16	14	27	32	35
		Colombia	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	0	0	
		Cuba	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30	20	28
		Dominican Republic	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	0	0	0	0	
		EC.España	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0	0	0	0	
		EC.France	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	4	1	0	3	3	5	21
		Grenada	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16	21	22	15
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	0	0	
		Japan	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
		Korea, Republic of	7	175	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	6	51	13	54	71	75	9	7	10
		Netherlands Antilles	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	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	17	28	29	27	20	66	56	53	37	42	57	37	68	97	357	92	251	251	355
		Sta. Lucia	38	35	64	53	76	60	53	38	37	51	39	53	86	72	38	100	263	153	216	151	106	132	137	159	
		Trinidad and Tobago	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	88	79	103	30	61
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
		Venezuela	12645	12778	16526	10712	5690	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6870	2554	3247	3270	1093	2008
	MEDI	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0	0	0	0	
		EC.España	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	26	10	15
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	0	
		EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	99	99	
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34	17	
		Japan	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	1	0	13	2	13	0	0	0	0	0	2	0	43	9	4	5	10	1	0	1	1	2	1	
		Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1230
	UNCL area	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	36
Discards	AT.W	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

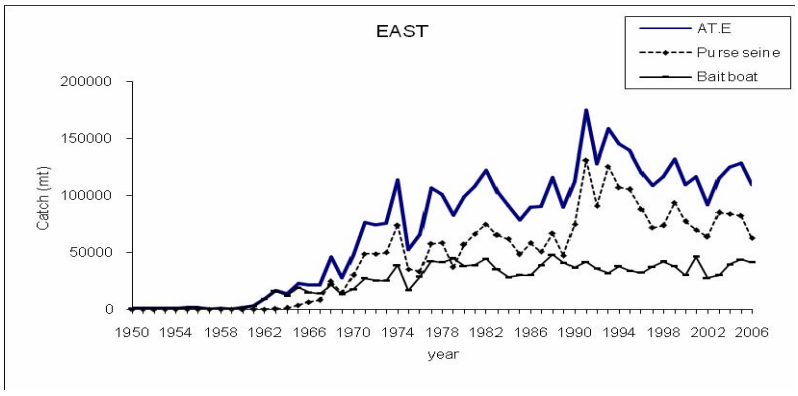
*An estimated Total Yield of 136972 t is obtained (0.2% greater), if 2005 figures of non-reporting flags in 2006 (shaded cells) are carried over to 2006.



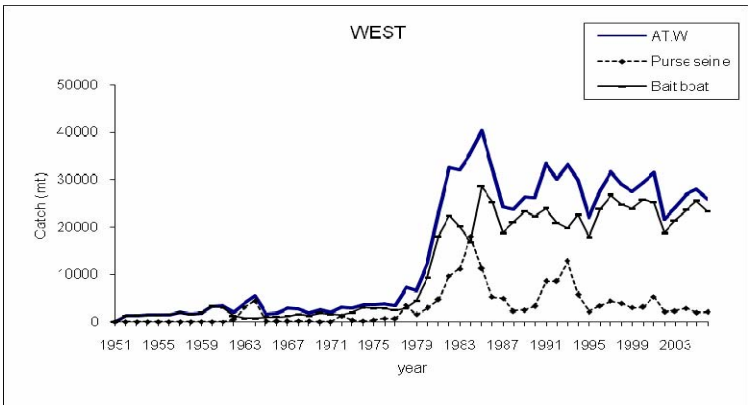
SKJ-Figure 1. Geographic distribution of skipjack catches for the recent period (2000-2004), by major tuna fishery. Ghana's catches have been included in the same 5x5º square, as no detailed information on the spatial distribution of these catches is available.



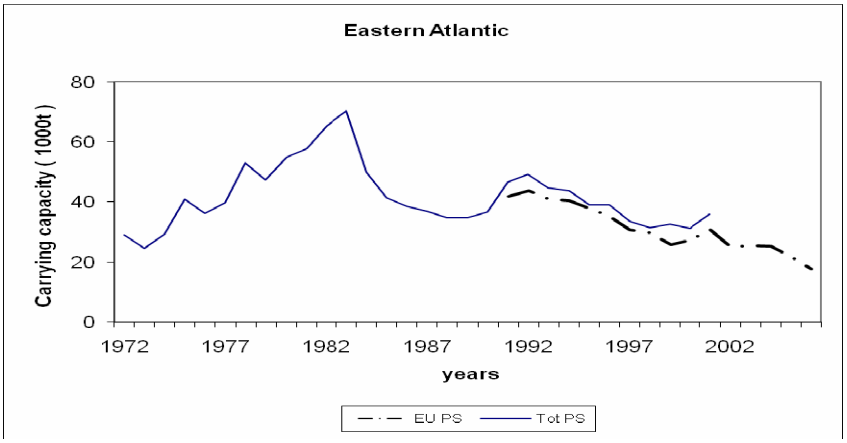
SKJ-Figure 2. Total eastern and western Atlantic skipjack landings (1950-2006).



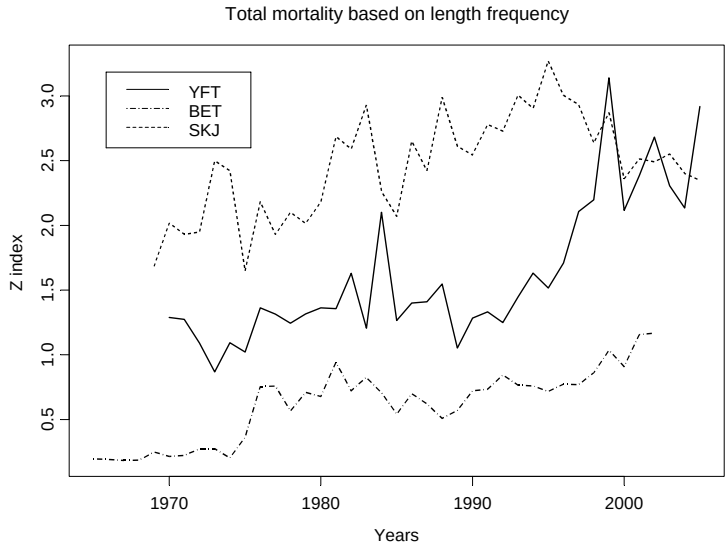
SKJ-Figure 3. Reported landings of skipjack in the eastern Atlantic, by major gears (1950-2006).



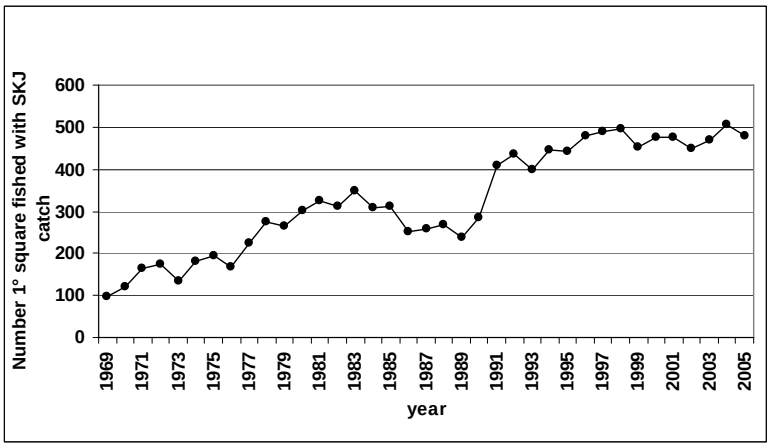
SKJ-Figure 4. Reported landings of skipjack in the western Atlantic, by major gears (1950-2006).



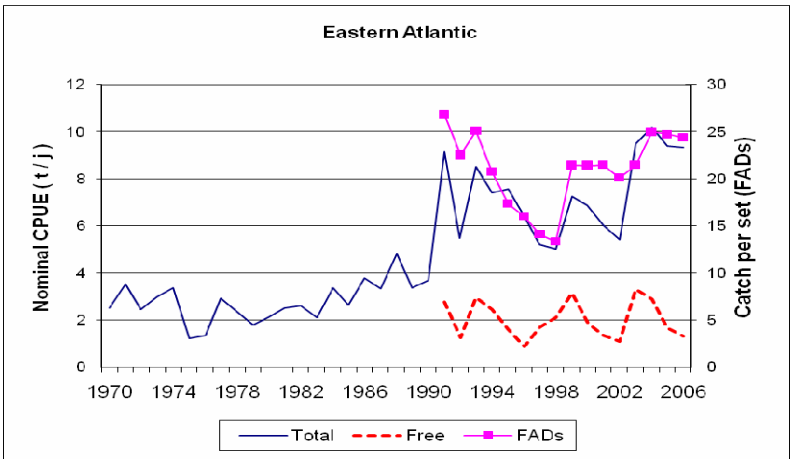
SKJ-Figure 5. Carrying capacity (in 1,000 t) for the overall purse seine fleet in the eastern Atlantic (1972-2001) and updated from 1991 to 2006 for EC purse seiners.



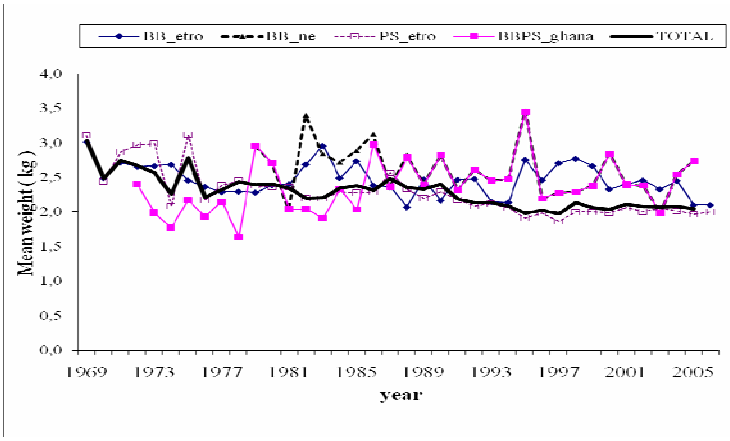
SKJ-Figure 6. Development of the Beverton Holt coefficient of total mortality (Z), calculated from catch-at-size date for the three tropical species in the eastern Atlantic.



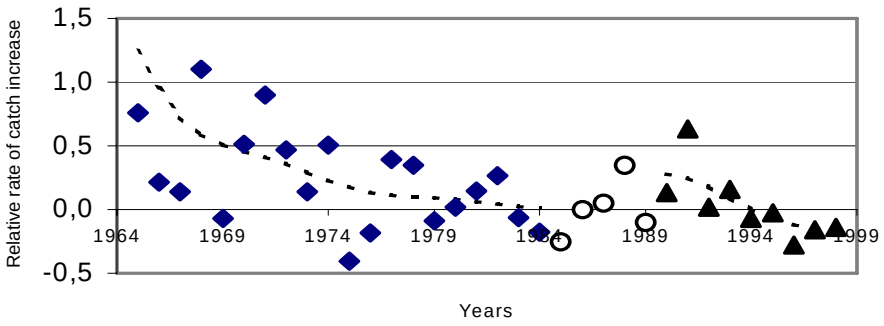
SKJ-Figure 7. Number of 1x1 degree strata (where there have been reported skipjack catches) for purse seiners fishing in the eastern Atlantic (1969-2005). The considerable increase observed since 1991 could be due in part to the modification of the multi-species correction of the catch composition carried out to date.



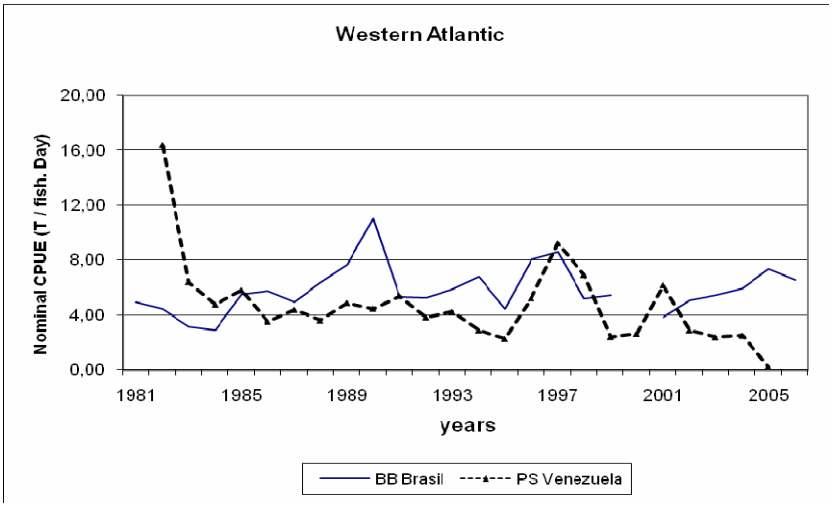
SKJ-Figure 8. Development of nominal CPUE of European purse seiners in the eastern Atlantic (1970-2006). Total CPUE and free school CPUE are expressed in tons per day fishing (left axis) while CPUE on FADs is expressed in tons per successful set (right axis). Prior to 1990, there was little or no distinction in the logbooks between these two fishing methods (free school vs. FAD).



SKJ-Figure 9. Development of the mean weight of skipjack landed in the eastern Atlantic (1986-2006). Given the fishing mode in which baitboats and Ghanaian purse seiners collaborate with each other, the mean weight of skipjack caught by this country is shown for the two gears combined. For reasons of time constraints, some fisheries could not be updated to 2006.



SKJ-Figure 10. Development of the Grainger and Garcia index (RRCI revised to account for the hypothesis concerning the increase in fishing effort) for eastern Atlantic skipjack for the two main historical periods of the fishery. Years for which changes in fishing effort did not allow the use of this approach were not used and are represented by empty circles.



SKJ-Figure 11. Development of nominal CPUEs of Brazilian baitboats (1981-2006) and Venezuelan purse seiners in the western Atlantic (1981-2005).

8.4 ALB – ALBACORE

An assessment of stock status for northern and southern Albacore was conducted in 2007. The previous assessment of the North stock was conducted in 2000 (using data from 1975-1999) and that of the Southern stock in 2003 using data up to 2002; no assessment of the Mediterranean stock has ever been carried out.

Complete information on the data preparatory meeting and north and south albacore stocks assessments can be found in the Report of the Ad Hoc Meeting to Prepare MULTIFAN CL-Inputs for the 2007 Albacore Assessment and document and the Report of the 2007 ICCAT Albacore Stock Assessment Session respectively.

ALB-1. Biology

Albacore is a temperate tuna widely distributed throughout the Atlantic Ocean and Mediterranean Sea. On the basis of the biological information available for assessment purposes, the existence of three stocks is assumed: northern and southern Atlantic stocks (separated at 5ºN) and a Mediterranean stock (**ALB-Figures 1.a,b**). Nevertheless, there is likely intermingling of Indian Ocean and South Atlantic immature albacore which needs further research. Present available knowledge about habitat distribution according to size, spawning areas and maturity estimates are based on limited studies and not new parameter estimates have been presented for the three albacore stocks considered, with the except of the new growth equation for the south.

ALB-2. Description of fisheries or fisheries indicators

North Atlantic

The northern stock is exploited by surface fisheries targeting mainly immature and sub-adult fish (50cm to 90 cm FL) and longline fisheries targeting immature and adult albacore (60-130 cm FL). The main surface fisheries are carried out by EC fleets (Ireland, France, Portugal and Spain) in the Bay of Biscay, in the adjacent waters of the northeast Atlantic, and in the vicinity of the Canary and Azores Islands in summer and fall. The main longline fleet is the Chinese Taipei fleet which operates in the central and western North Atlantic year round. Over time, the relative contribution of different fleets to the total catch of North Atlantic albacore has changed, which resulted in differential effects on the age structure of the stock.

The historical time series of catch was extended back to 1930 for the troll fishery after revision of data for the assessment with MULTIFAN-CL model. Total reported landings for the North Atlantic generally began to decline after 1986, largely due to a reduction of fishing effort by the traditional surface (trolling and baitboats) and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). Some stabilization was observed in the 1990s, mainly due to the increased effort and catch by new surface fisheries (driftnets and mid-water pair pelagic trawl) with a maximum catch in 1993 at 38,063 t.

Catches decreased to the lowest on record in 2002 (22,685 t) due to a decrease in catches in the surface fishery. Since then, a steady increase in the reported catch was observed reaching a peak of 36,077 t in 2006. The surface fisheries accounted for the bulk of the total 2006 catch (83%) **(ALB-Table 1)**. The reported EC-France catch in 2005 was the largest reported catch by this surface fishery in the recent period, but the catch in 2006 decreased approximately 30% with respect to 2005. The EC-Spain surface fleets (troll and bait boat) reported the highest catch in 2006 since 2002. In contrast, EC-Ireland catches have decreased since 2002. In 2006, the Spanish baitboat fleet increased its yield by 49% with respect to the 2005 catch, while the troll fleet reported similar catches to the 2005 yield. The troll fleet increased their nominal fishing effort of about 24% in 2006 while the baitboat effort decreased slightly. Overall catches by longline fisheries showed a decrease in the last year, mostly due to the a decrease in landings by the Chinese Taipei fleet of almost 60% in 2006 compared to 2005 due to decline in fishing effort.

South Atlantic

The recent total annual South Atlantic albacore landings were largely attributed to four fisheries, namely the surface baitboat fleets from South Africa and Namibia, and the longline fleets from Brazil and Chinese Taipei (**ALB-Table 1**; **ALB-Figure 2**). The surface fleets are entirely albacore directed and mainly catch juvenile and sub-adult fish (70-90 cm FL). These surface fisheries operate seasonally, from October to May, when albacore are available in coastal waters. Brazilian longliners target albacore during the first and fourth quarters of the

year, when an important concentration of adult fish (> 90 cm) is observed off northeast coast off Brazil, between 5º S and 20º S, being likely related to favorable environmental conditions for spawning, particularly of sea surface temperature. The longline Chinese Taipei fleet operates over a larger area and throughout the year, and consists of vessels that target albacore and vessels that take albacore as a by-catch in swordfish- or bigeye-directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets.

Total reported albacore landings for 2006 was 24,460 t and increased of about 5000 t compared to the 2005 catch. The Chinese Taipei catch increased in 2006 to 12,293 t. Regarding Brazilian catches, Chinese Taipei longliners (including boats flagged Belize and St. Vincent) stopped fishing for Brazil in 2003, which resulted in albacore only being caught as a by-catch in swordfish- and tropical tuna-directed longline fisheries. In 2006, the catch of the Brazilian longline fleet was 267 t, a decrease of about 50 % compared to the 2005 catch and much lower than the average catch during the period 2000-2003 of about 4,287 t. The decreased availability of albacore in the inshore waters of South Africa and unfavourable foreign currency exchange rates in the last three years has caused a general reduction in the number of active baitboat vessels.

Mediterranean

Reported landings in 2006 accounted for 5,947 t, which represented an increase with respect to the 2005 catches (**ALB-Table 1** and **ALB-Figure 2**).

ALB-3. State of stocks

In 2003 the Committee concluded that it was inappropriate to proceed with an assessment which assumed that catch-at-age is known without errors and until the catch-at-size to catch-at-age transformations were reviewed and validated. Since then, a number of data review meetings were held and the Committee conducted much quality assurance work regarding the Task II size frequency data. A thorough revision of North and South Atlantic Task I and Task II data was done and a more robust method for catch-at-size analyses was implemented for the 2007 assessment session. In addition, catch rate analyses were improved and updated with new information for the northern and southern albacore fisheries and a substantial effort was undertaken to implement assessment methods which do not assume the catch-at-age is perfectly known and to incorporate longer time-series of catch, effort and size information into the assessment to guide the evaluation. The approach provided the opportunity to evaluate a range of hypothesis about how the fisheries operated over time and their impact on the population. The results of these efforts are reflected in the following summaries of stock status.

North Atlantic

As previously noted, the CPUE trends based upon the most recent available data showed somewhat different patterns for the surface fleets, catching mostly immature fish, and the longline fleets, which catch mostly mature fish (**ALB-Figure 3**). The Spanish age 2 troll series, showed evidence of a relatively strong year class entering the fishery. For the Spanish age 3 troll series, the age-two signal is not yet fully reflected, leading to uncertainty about the possibility of a good year class. For the longline fleets, the general trend in CPUE indices is a decline over time, with varying rates. Given the variability associated with these catch rate estimates, definitive conclusions about recent trends could not be reached just by examining the CPUE trends alone which represent different parts of the population

Based on the current assessment which considers catch, size and effort since the 1930s, our view of the northern albacore resource status is that spawning stock size has declined and is currently about one quarter of the peak levels estimated for the late 1940s. Estimates of recruitment to the fishery, although variable, have shown generally higher levels in the 1960s and earlier periods with a declining trend thereafter until 2004. However, the most recent recruitment is estimated to be large albeit uncertain (**ALB-Figure 4**). The current assessment indicates that the stock recently rebuilt to levels near B_{MSY} (current SSB is approximately 20% below the MSY level, compared to 2000 when it was 50% below). Recent fishing mortality rates have generally been above F_{MSY} (current F is approximately 50% larger than Fmsy) (**ALB-Figure 5**).

While estimates of MSY varied over time as the relative combination of fisheries taking juvenile and mature albacore varies which results in different overall selectivity patterns across time, the biomass that supports that MSY has little variation. For the three more recent years, the estimate of MSY is about 30,000 t, but over time the estimates ranged from about 26,000 t to 34,000 t, depending on the relative importance of the surface and

longline fisheries catch levels. If recruitment were at the levels estimated in the 60s then the MSY would be higher. Total annual albacore average catch was 50.000 t during 30 years (1956-1986), which is higher than the current MSY estimated about 30,200 t.

Distribution of the pairs of current 2005 status of biomass and fishing mortality ratios estimated from the statistical model used are displayed to show the uncertainty around the estimates (**ALB-Figure 6**).

South Atlantic

In 2003 the Committee assessed the status of the Southern Atlantic albacore stock using the same specifications as were used in 2000, but with updated data. Because of the detailed review, revisions, and updates of the data since that time, the Committee found it possible to incorporate additional information into the model used for assessing the Southern Albacore stock and incorporated an assessment methodology that more objectively brought information about fishery selectivity into the evaluation.

For the Southern CPUE trends, those from the longline fisheries harvesting mostly mature albacore showed a strong declining trend in the early part of the time series, and less steep decline over the past decade; while those from the surface fishery, harvesting mostly juvenile albacore, are more recent and show no apparent trend (**ALB-Figure 7**).

Based on the current assessment which considers catch, size and effort since the 1950s, our view of the Southern albacore resource status stock is that the spawning stock has declined to about 25% of its unfished level (**ALB-Figure 8**). The Committee concluded that it is likely that the stock is currently below the maximum sustainable yield (MSY) level as it was estimated to about 90% of B_{MSY} in 2005, while the 2005 fishing mortality rate was about 60% of F_{MSY}. MSY was estimated to be around 33,300 t, whereas the replacement yield averaged over the last 10 years, is approximately 29,000 t.

Distribution of the pairs of current 2005 status of catch and fishing mortality ratios estimated from the production model are displayed to show the uncertainty around the estimates (**ALB-Figure 9**)

Mediterranean

Due to the lack of proper data, an assessment of the Mediterranean stock has never been carried out by the ICCAT Committee.

ALB-4. Outlook

North Atlantic

The assessment indicated that the spawning stock will decline from the levels estimated in 2005 over the next few years, particularly given the fact that the 2006 catch was higher than the 2005 level (**Figure 10**).

The spawning stock response to different catch levels after the next few years depends upon the real strength of the 2003 year class, which our assessment indicates could be relatively strong, although we do not have confidence in the overall level.

South Atlantic

The assessment indicates that the spawning stock will increase from the levels estimated in 2005 over the next few years, assuming catches in 2006 and 2007 remain about the 2005 level, which is below the estimated replacement yield of about 29,000 t. **(Figure 8)**

ALB-5. Effects of current regulations

North Atlantic

Since 2001, the Commission established a total allowable catch (TAC) of 34,500 t for this stock and, in 2003 extended it up to 2007. A 1998 Recommendation that limits fishing capacity to the average of 1993-1995 also

remains in force. The Committee noted that reported 2001-2004 catches had been below the TAC, but that 2005 and 2006 catches were above TAC **(ALB-Table 1).**

South Atlantic

Since 1999, the Commission established the total allowable catch (TAC) for this stock (in 2001-2003 the TAC has been set to 29,200 t) and, in 2003 extended it to 2004. The Committee noted that reported catches have not exceeded the TAC in 2005.

Mediterranean

There are no ICCAT regulations directly aimed at managing the Mediterranean albacore stock.

ALB-6. Management recommendations

North Atlantic

The current total allowable catch (TAC) for the Northern albacore stock is 34,500 t. The Committee noted that the reported catches for 2005 and 2006 were over the TAC. Furthermore, stock projections indicated that the northern stock will not recover from the overfished conditions if catch levels remain over 30,000 t. If a strong year class enters the fishery, which is uncertain but suggested by some CPUE series, the stock would recover faster. In either case, the Committee agreed that a reduction in the TAC should be implemented to recover the northern albacore stock from the overfished condition.

South Atlantic

In the case of the southern stock, the TAC is 29,200 t. Recent catches were below the TAC level. Although the assessment showed that the southern stock is overfished, model projections indicated that catches at about the 2006 level will recover the stock. The Committee considered that the current management regulations are sufficient for the recovery of the southern stock.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY

	North Atlantic	**South Atlantic**	**Mediterranean**
Current (2006) Yield	36,077 t	24,460 t	5,947 t
Maximum Sustainable Yield	30,200 t (26,800-34,100) [1]	33,300 t (29,900-36,700) [1]	Unknown
Replacement Yield (2006)	~ 32,000 t	28,800 t (25,800-29,300)[1]	Not estimated
B_{2005}/B_{MSY}	0.81 (0.68-0.97)[1]	0.91 (0.71-1.16)[1]	Not estimated
Relative Fishing Mortality			
F_{2005}/F_{MSY}	1.5 (1.3-1.7)[1]	0.63 (0.47-0.9)[1]	Not estimated
F_{2005}/F_{MAX}	2.6 (1.1-3.5)[2] – 1.0[3]	--	Not estimated
$F_{2005}/F_{0.1}$	5.5 (2.4-6.8)[2] - ~ 2.0[3]	--	Not estimated
Management measures in Effect	[Rec. 98-08]: Limit number of vessels to 1993-1995 average. TAC: 34,500 t [Rec. 03-06]	[Rec. 03-07]: Limit catches to 29,200 t.	None

[1] Approximately 80% confidence bounds from the base case analysis in the North stock and 95% confidence bounds in the South stock.

[2] Approximately 80% confidence bounds from bootstrapped VPA and yield per recruit analysis.

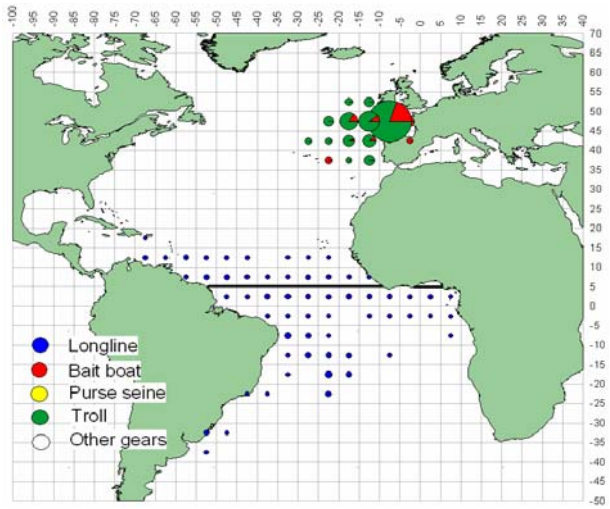
[3] From MULTIFAN-CL yield per recruit analysis not confidence bounds estimated.

ALB-Table 1. Estimated catches (t) of Albacore (*Thunnus alalunga*) by major area, gear and flag.

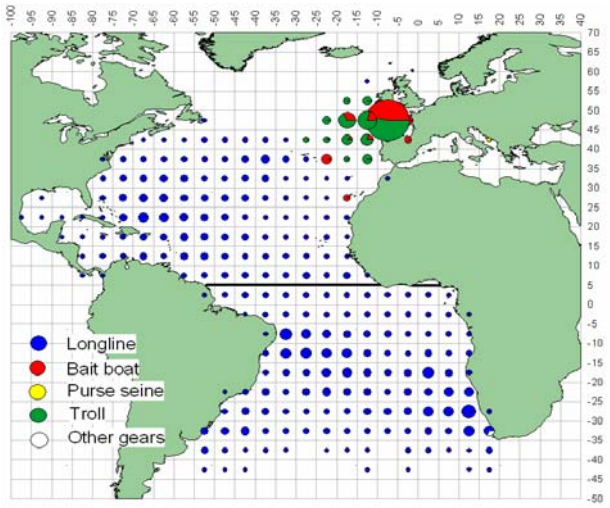
			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL			73617	67643	59850	76052	88554	82738	67229	63342	67167	56343	69598	73078	71613	67512	60353	59560	58888	67345	71458	70259	60039	61394	53006	58200	66485
	AT.N		42673	51490	41800	40826	47554	38115	33059	32070	36557	27949	30861	38135	35149	38376	28803	28997	25595	34852	34500	26592	22685	25505	25605	35830	36077
	AT.S		29672	14918	14599	31097	37288	40630	30107	27212	28714	26016	36533	32813	35115	27549	28426	28022	30595	27642	31380	38801	31746	27995	22527	18841	24460
	MEDI		1272	1235	3451	4129	3712	3993	4063	4060	1896	2378	2203	2130	1349	1587	3125	2541	2698	4851	5577	4866	5608	7893	4874	3529	5947
Landings	AT.N	Bait boat	15857	21108	8313	12589	15202	18756	15933	15374	18625	8985	12448	15646	11967	16411	11338	9821	7562	8780	12148	6099	6638	7918	8128	10458	14273
		Longline	13206	16863	19709	17413	21232	7296	3013	2228	2683	5315	3152	7093	7308	4857	4641	4051	3884	6634	7317	7344	6164	7287	6390	6269	5580
		Other surf.	694	367	2194	108	213	343	994	1662	3865	3999	5172	7279	7506	3555	3337	4378	6846	7646	6119	3089	427	1006	2163	8567	329
		Purse seine	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	118	211	348	63	237
		Trawl	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331	3675	1089	258	5363
		Troll	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5410	7487	10215	10295
	AT.S	Bait boat	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712	6973	7475	5084	5876
		Longline	25255	11941	9834	22672	29815	30964	21828	19407	21590	22008	27133	23947	24607	20036	21000	19547	19799	20626	24398	28039	21672	20619	14735	12936	17748
		Other surf.	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	127	0	73	58	377	323	82	299	288	395
		Purse seine	1349	699	365	182	244	948	185	0	4	416	2517	1448	1078	412	257	117	434	183	51	25	39	309	0	533	441
		Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	9	52	0	0	0	12	18	0	
	MEDI	Bait boat	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0	0	0	
		Longline	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	3706	4248	2345	2012	3010
		Other surf.	700	700	1753	2973	3552	3782	3879	3879	1098	1198	1534	879	766	1031	2435	1991	2426	4265	2689	2193	1755	3166	2176	1200	134
		Purse seine	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	0	1	478	353	317	2803
		Troll	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5	5	0	0	9
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	
		Canada	0	0	0	0	1	21	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27	52	27
		Cape Verde	0	10	10	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	14	8	20	0	0	21	16	57	196	155	32	112	202
		Chinese Taipei	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278	2540	2357
		Cuba	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	0	0	0	0	
		EC.España	25478	29557	15656	20672	24387	28206	26738	25424	25792	17233	18174	18380	16998	20197	16324	17295	13285	15363	16000	9177	8952	12530	15379	20447	24538
		EC.France	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4289	3641	2537	8170	5506
		EC.Ireland	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175	306	521
		EC.Portugal	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513	556	119
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0	0	6	19
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	7	2	
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25	29	19
		Iceland	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	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	688	1126	711	681	893	1391	1391
		Korea, Republic of	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0	0	0	59	45
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	81	120	178	98
		Mexico	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (Flag related)	0	0	0	0	0	0	0	0	0	11	19	13	10	8	11	3	8	12	0	0	0	0	0	0	
		Panama	494	357	2551	601	525	44	0	0	0	0	29	60	103	73	11	5	0	0	0	0	0	0	0	0	197
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	704	1370	300	1555	89	802	76
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	3	2	10	0	2	
		Trinidad and Tobago	0	268	194	318	0	0	0	0	4	0	247	0	0	0	0	2	1	1	2	11	9	12	12	9	
		U.S.A.	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	480	444	646	488	397
		U.S.S.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	
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	0	0	1	1	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414	507	235
		Venezuela	137	823	1076	467	172	26	137	41	95	319	205	246	282	279	315	49	107	91	1374	349	162	424	457	175	321

ALB-Table 1.

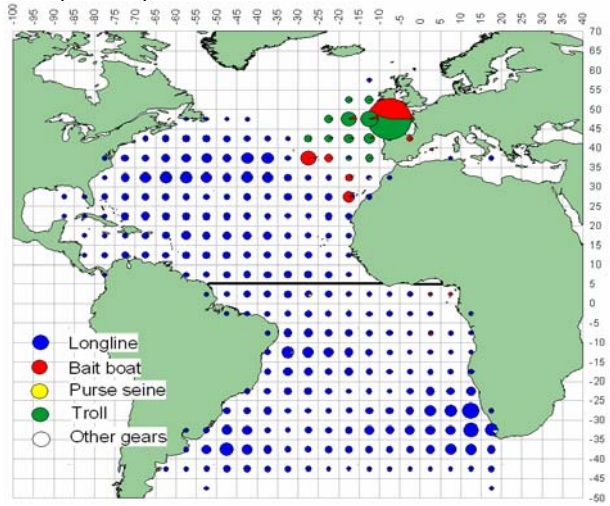
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
AT.S	Argentina	7	55	209	153	356	469	344	354	151	60	306	0	2	0	0	120	9	52	0	0	0	12	18	0	
	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
	Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0	0	0	0	
	Brasil	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522	556	361
	Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	39	89	26	30	26	112	95	100
	Chinese Taipei	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288	10730	12293
	Cuba	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.España	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	573	836	376	81	285	367
	EC.France	947	372	7	18	35	100	0	0	0	50	449	564	129	82	190	38	40	13	23	16	18	63	0	478	347
	EC.Portugal	0	0	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9	43	8
	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
	Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
	Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0	0	0	0	
	Japan	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	554	341	231	315	509	324	324
	Korea, Republic of	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0	5	37	42	66
	Maroc	113	0	0	0	0	41	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	4	8	122	68	55	63	41	5	27	0	0	10	14	53	0	15	46
	NEI (Flag related)	0	0	0	0	0	0	0	0	0	149	262	146	123	102	169	47	42	38	0	0	0	0	0	0	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	915	950	982	1199	1429	1162	2418	3419	2962	3152	3328	2344	5100
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	192	0	2	0	0	0	0	0	
	Panama	210	0	0	0	280	924	0	0	0	240	482	318	472	228	380	53	60	14	0	0	0	0	0	17	
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	0	
	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	
	South Africa	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502	3198	3735
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2116	4292	44	0	0	0	65
	U.S.A.	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2	1	0	
	U.S.S.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	
	UK.Sta Helena	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2	0	0	0	62
	Uruguay	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120	32	93
	Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	684	1400
MEDI	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30	255	425	507
	EC.España	572	535	1368	531	0	0	3	0	84	547	228	290	218	475	404	380	126	284	152	200	209	1	138	189	382
	EC.France	0	0	141	250	20	60	31	31	121	140	11	64	23	3	0	5	5	0	0	0	1	0	0	0	
	EC.Greece	0	0	0	0	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	950	773	623	402
	EC.Italy	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912	3671	2248	4584
	EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	2	0	10	15	
	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
	Japan	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-2	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0	0	0	
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	30	73
	Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



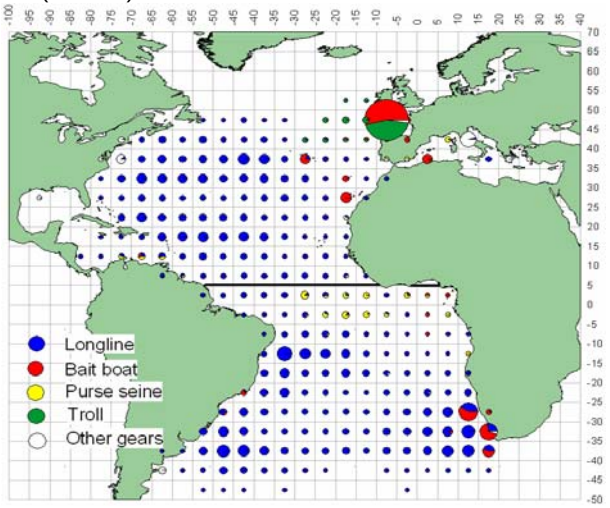
a. ALB(1950-59)



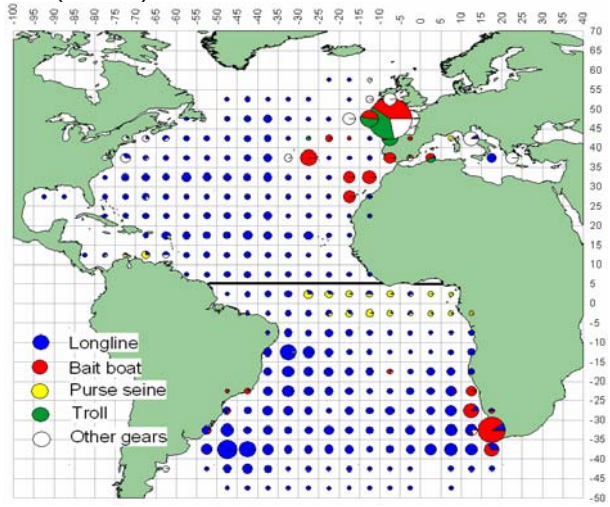
b. ALB(1960-69)



c. ALB(1970-79)

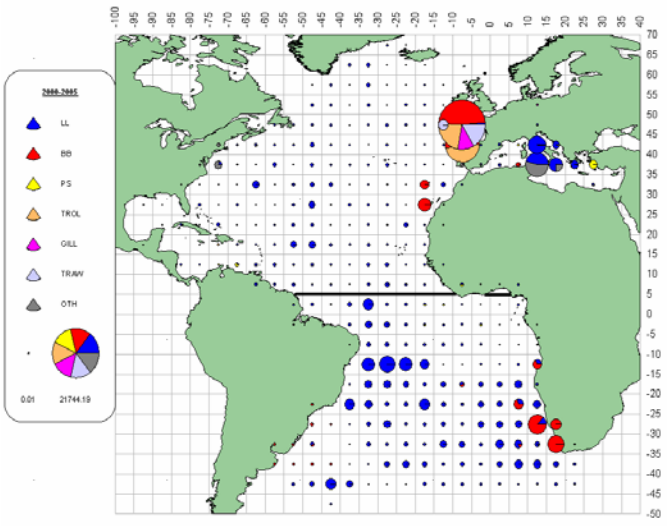


d. ALB(1980-89)

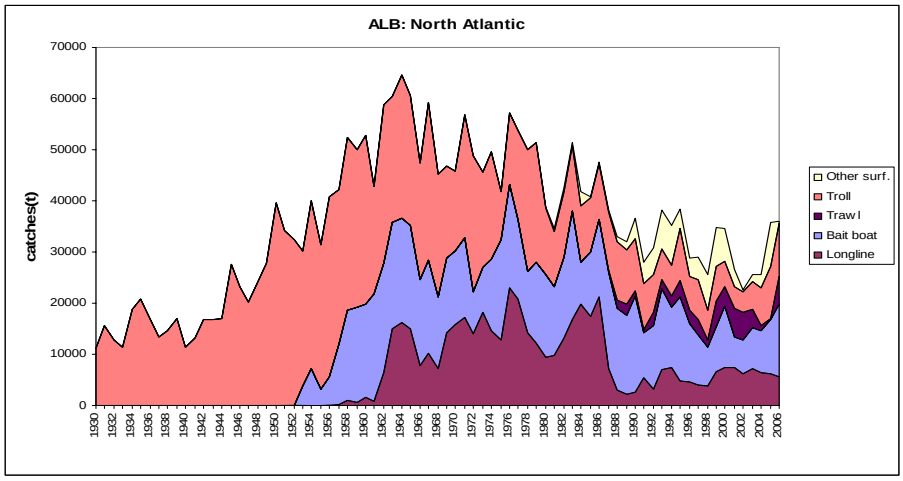


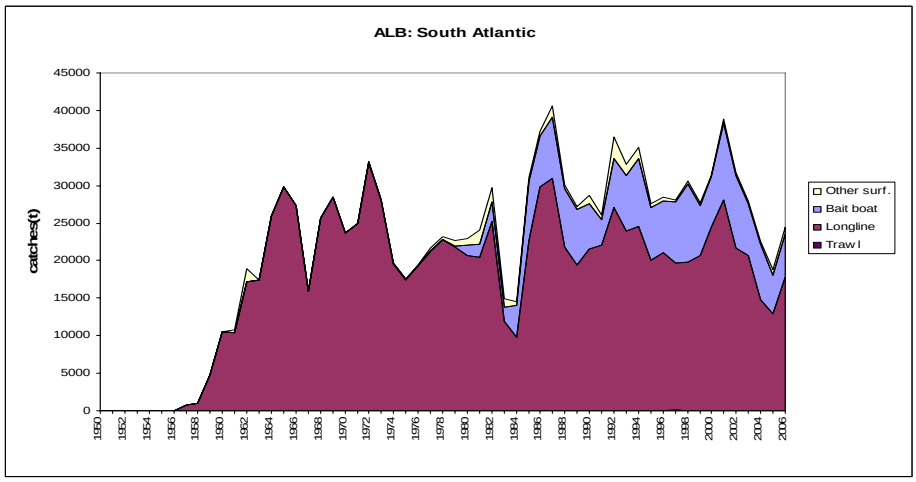
e. ALB (1990-99)

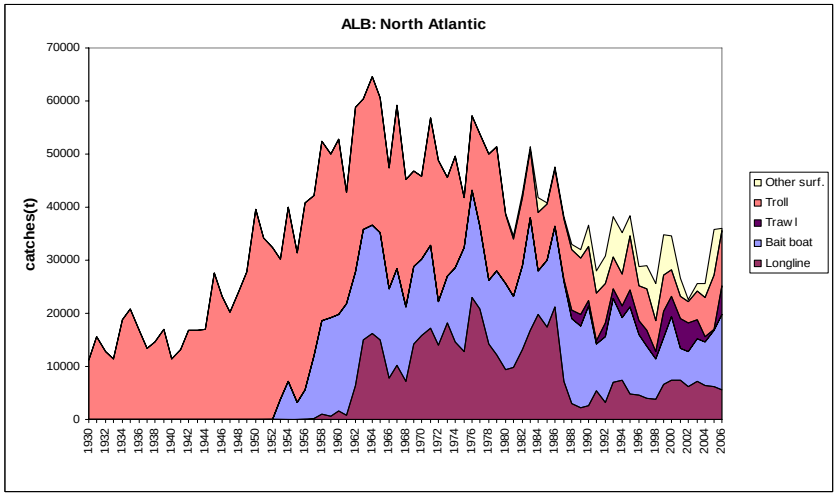
ALB-Figure 1.a Geographical distribution of albacore (ALB) catch by major gears and decades (1950-1999).



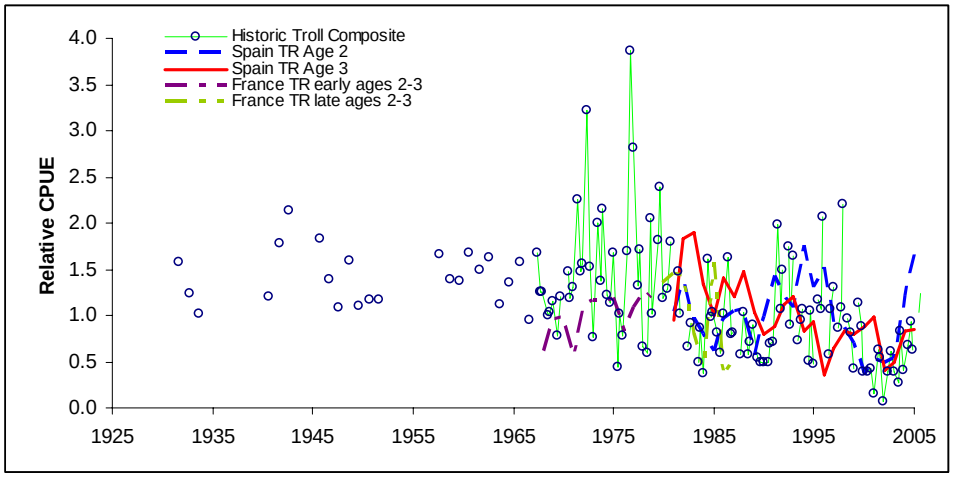
ALB Figure 1. Spatial distribution of average 2004-2005 albacore catches by gear**.**

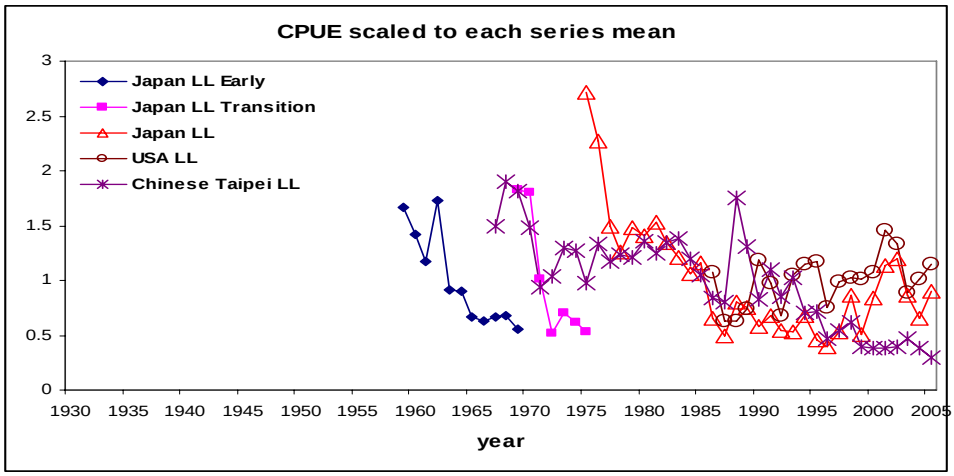




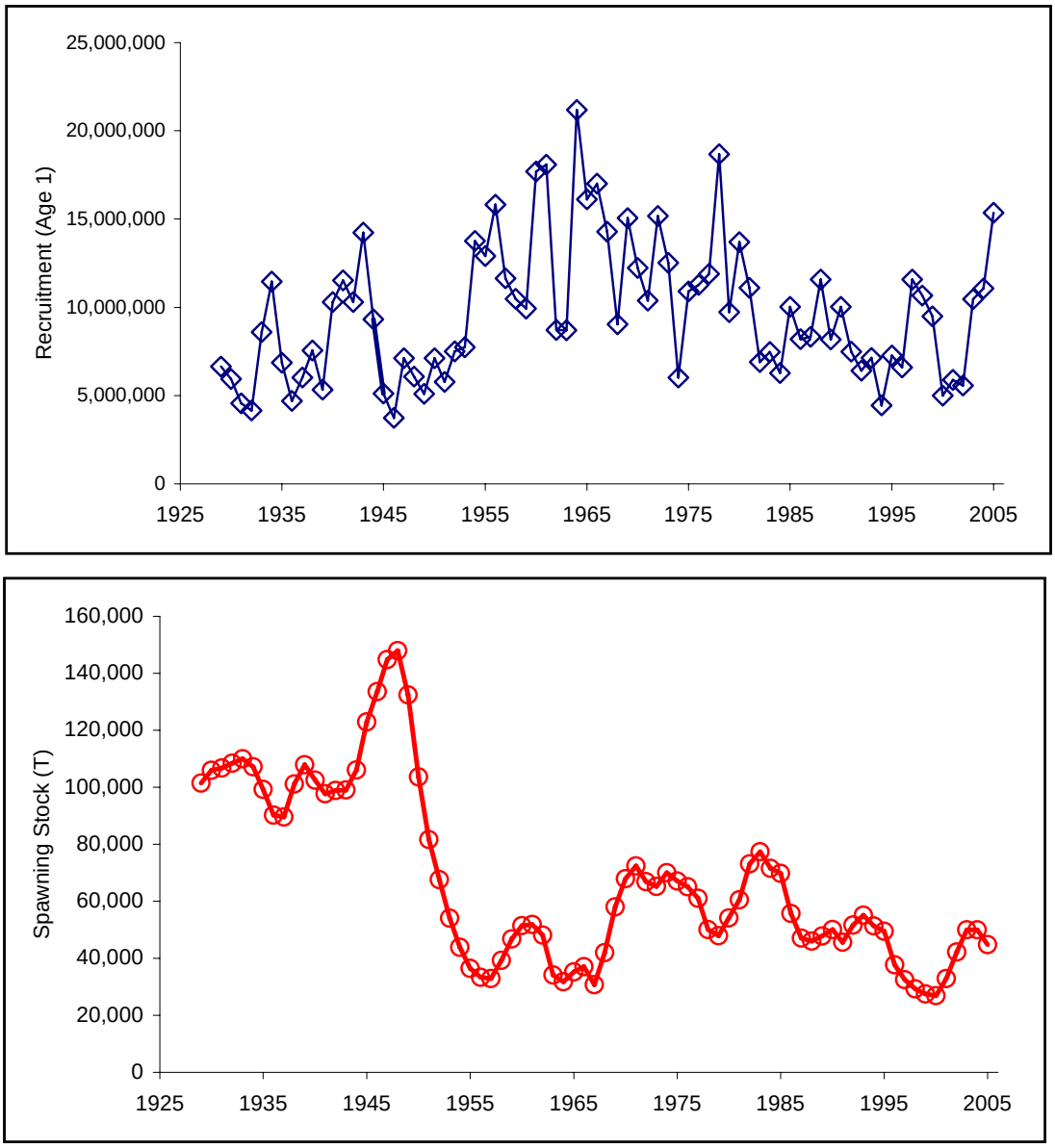


ALB-Figure 2. Total albacore catches reported to ICCAT (Task I) by gear for the northern, southern Atlantic and Mediterranean stock.

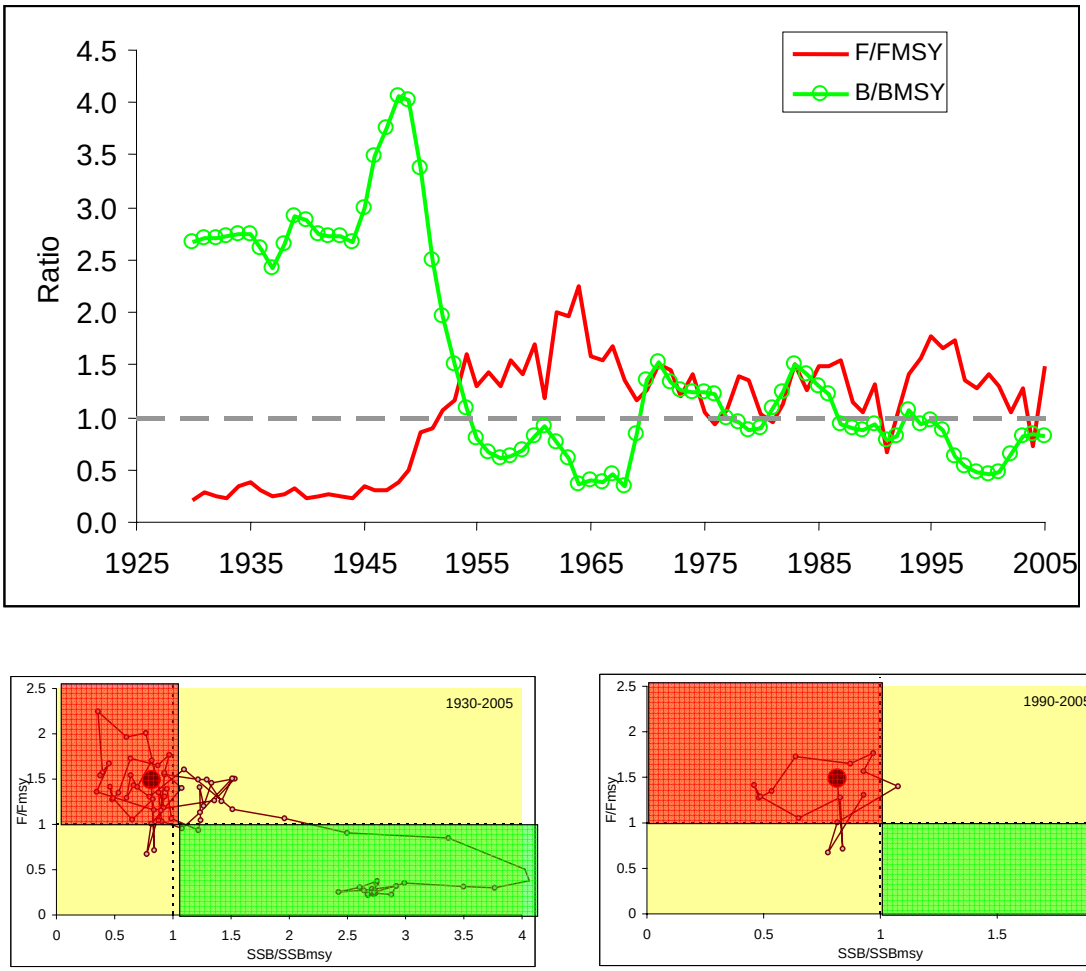




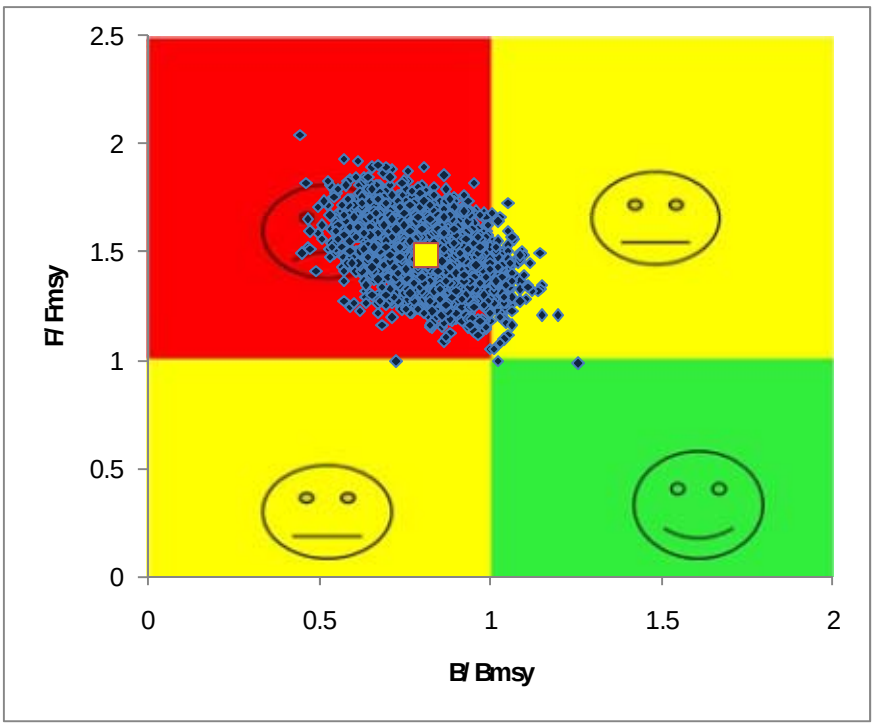
ALB-Figure 3. Standardized catch rates indices used in the 2007 Northern albacore stock assessment from the surface fisheries (top panel), which take mostly juvenile fish, and from the longline fisheries (bottom panel), which take mostly mature fish.



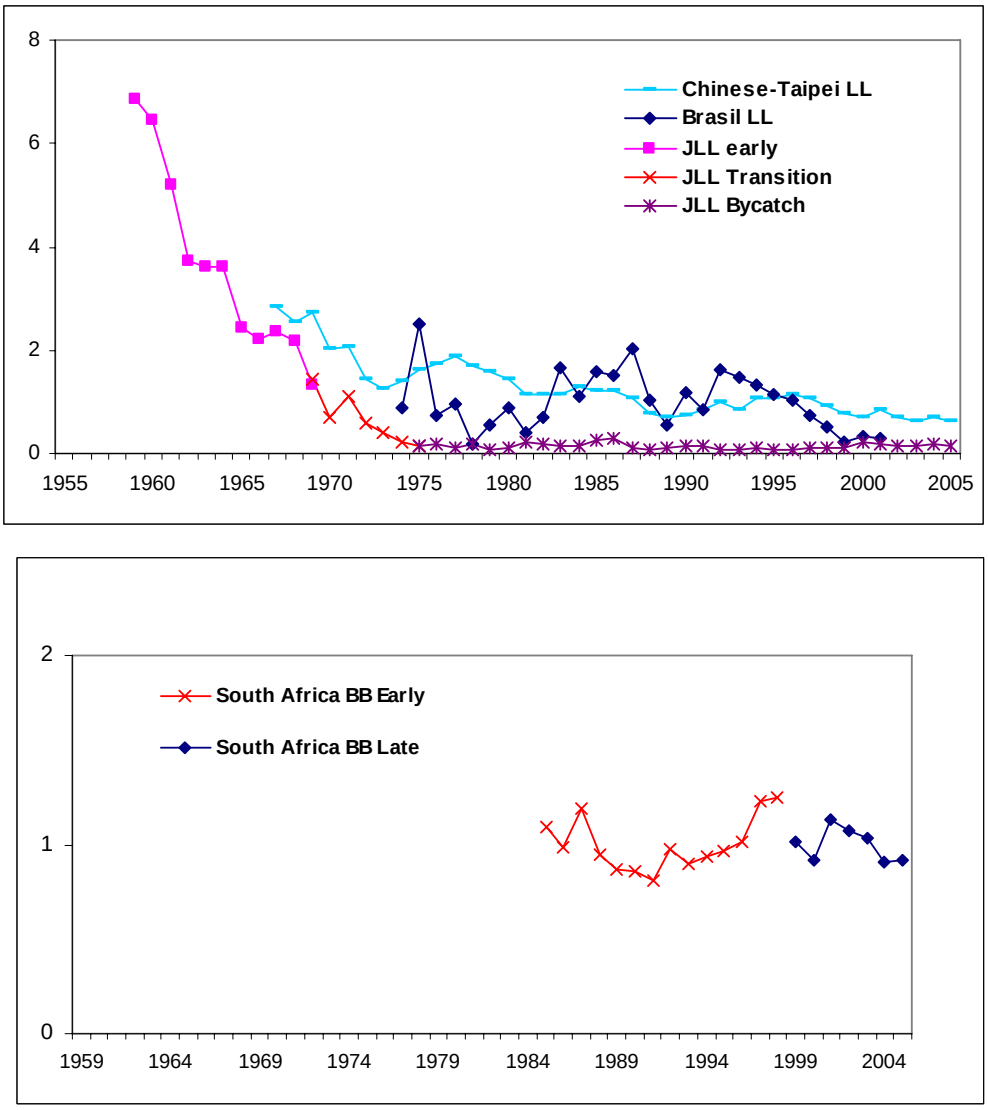
ALB-Figure 4. Estimates of Northern Atlantic albacore recruitment (age 1) and spawning stock size from 1930-2005 from MULTIFAN-CL output. Uncertainty in the estimates has not been characterized, but the uncertainty in recent recruitment levels is considered to be higher than in the past.



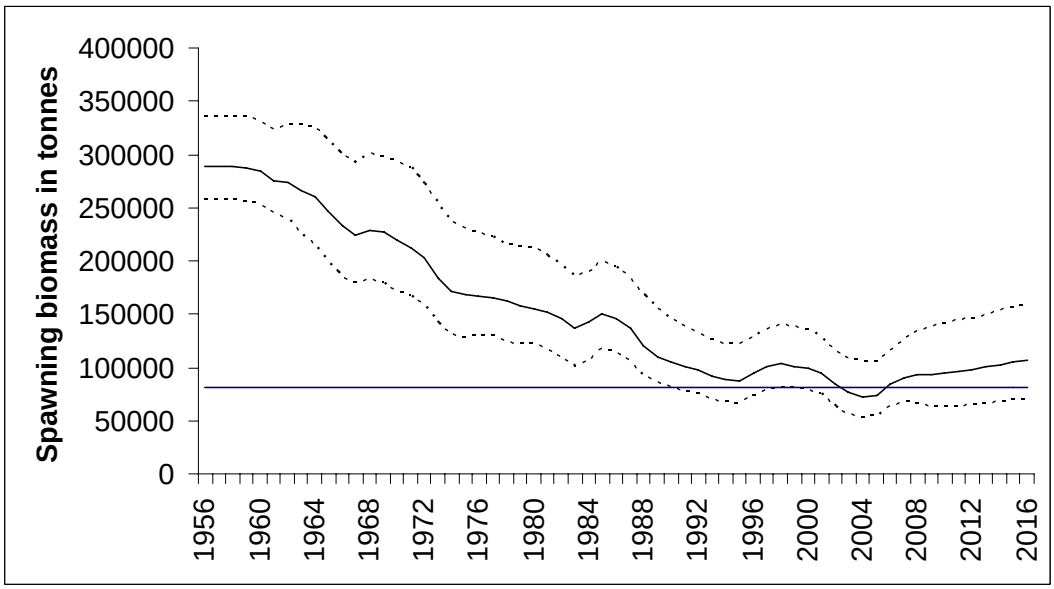
ALB-Figure 5. Relative biomass (B/Bmsy) and fishing mortality (F/Fmsy) of Northern albacore stock (upper panel) and stock status and fishing mortality rate (lower panel) estimated with MULTIFAN-CL over time expressed relative to the Convention's objective levels. The large closed circle in the lower panels represents the stock status in 2005.

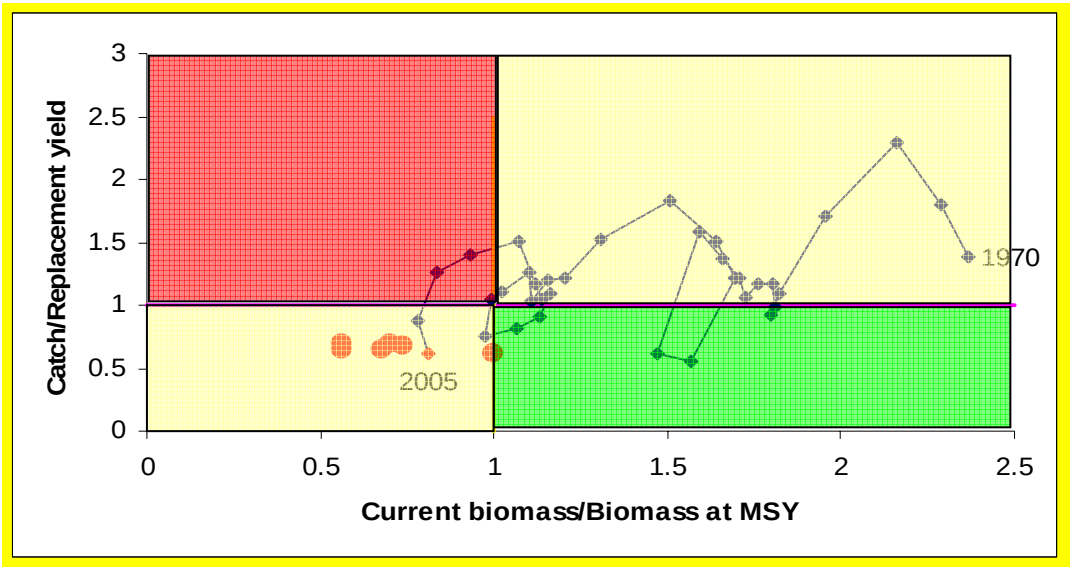


ALB-Figure 6. The distribution of stock status determination for North Atlantic albacore en 2005 indicating the uncertainty in this evaluation.

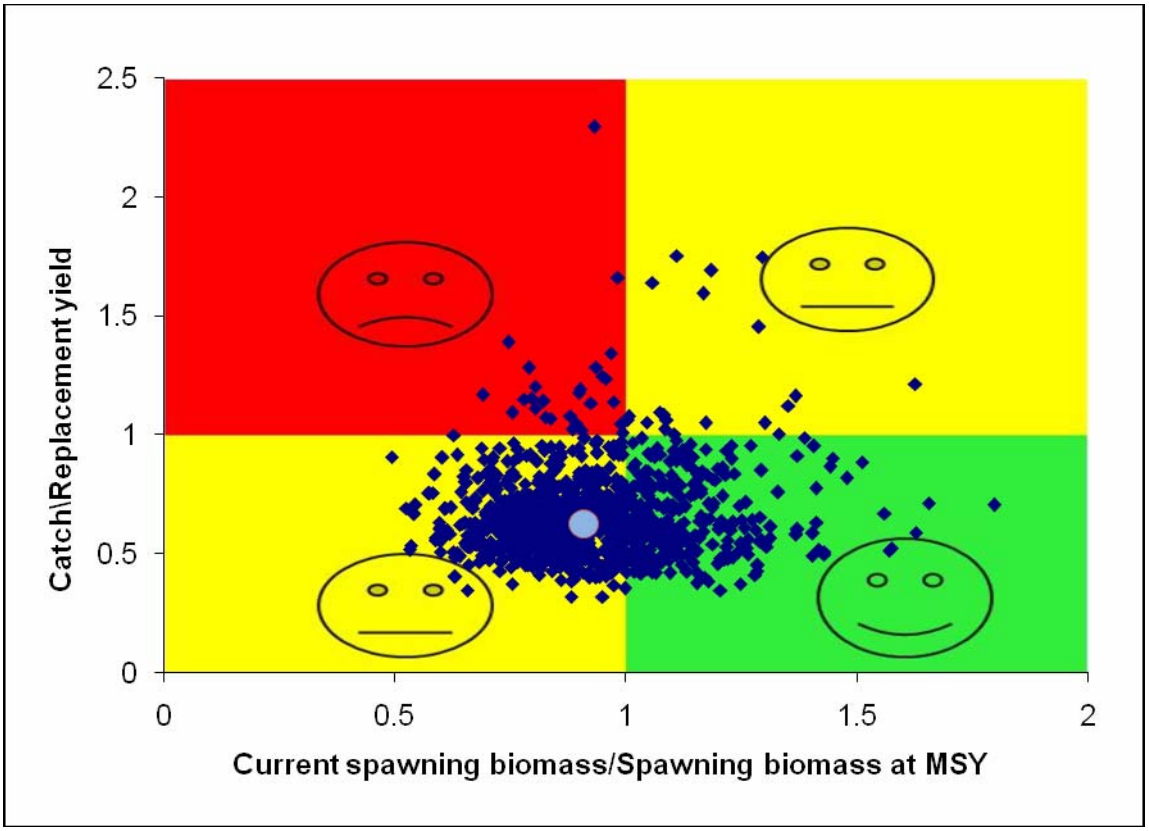


ALB-Figure 7. Standardized catch rates indices used in the 2007 Southern albacore stock assessment from the longline fisheries (upper), which take mostly mature fish, and from the surface fisheries (lower panel), which take mostly juvenile fish.

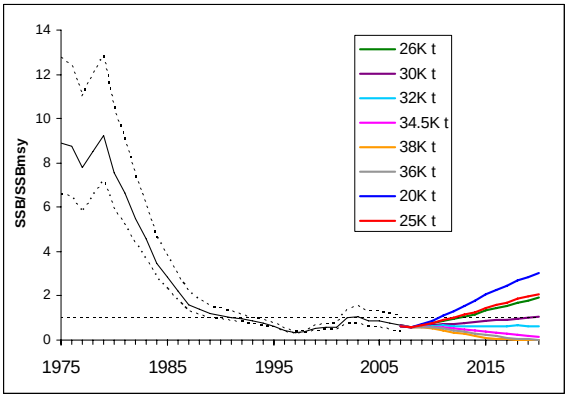


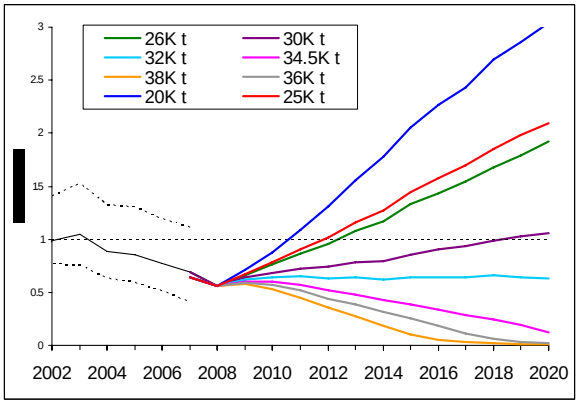


ALB-Figure 8. The upper plate indicates Southern albacore spawning biomass over time, projections with a constant catch of 25,000 t over next years and the reference B_{MSY} level with 80% confidence bounds. The lower plate indicates catch relative to replacement yield versus current biomass relative to the biomass at MSY for the period 1970-2005. The circles are the current state of the stock for all the sensitivity runs.



ALB-Figure 9. The distribution of stock status determination for South Atlantic albacore in 2005 indicating the uncertainty in this evaluation.





ALB-Figure 10. Estimated projections of relative SSB (SSB/SSB_{MSY}) for different scenarios of constant catch assuming average recent year-class strengths for the North Atlantic albacore stock. NOTE: The order of the lines is the same as the legends; the higher lines correspond to lower projected catches.

8.5 BFT – ATLANTIC BLUEFIN TUNA

BFT-1. Biology

There has been some progress in our knowledge of bluefin tuna biology, but the complex behaviour of this species, means that much research still needs to be carried out. At this meeting, we focused on potential changes in stock productivity related to updated growth and maturity parameters that differ from the ones previously used. Currently, our understanding is that fish in the Mediterranean mature at 4-5 years of age (approximately 25 kg), whereas fish are believed to mature at 8 years of age (196 cm) or older in the Gulf of Mexico. Recent research in reproductive biology, demographic modeling and age determination (SCRS/2007/143, SCRS/2007/135) indicates that western bluefin tuna may be less resilient to fishing than previously thought.

The Committee is also concerned about issues of mixing identified in previous SCRS documents, and in particular, the inability to quantify the kind and extent of mixing for use in assessment models. Evidence indicates that movement across the current assumed east/west boundary in the Atlantic does occur and that movements can be extensive and complex. While the importance of these migrations are noted, the quantitative proportions are uncertain. Recognizing that quantitative knowledge of mixing rates is an important aspect of assessment models that explicitly attempt to describe the dynamics of migratory fish stocks, there is a need to integrate recent and anticipated advances in otolith microconstituent analyses, age determination, archival tagging and genetics into the next assessment and management evaluation processes.

BLUEFIN TUNA - WEST

BFTW-2. Fishery indicators

The total catch for the West Atlantic including discards has stabilized due to the imposition of Total Allowable Catch (TAC) quotas since 1981 (**BFT-Table 1**, **BFT-Figure 1**). During 1983-2001 the lowest was 2,113 t in 1994 and the highest was 3,011 t in 1988. At this meeting, the annual catch data was reviewed for 2002-2004. Data for 2005 was only available from Canada and US although Japan did provide a very preliminary estimate for 2005 (302 t) for use in projections; that data was provisional and will be updated in the future. The total catch for the West in 2002 (3,319 t) was the highest since 1981, and all three major fishing nations indicated higher catches. After that year, the Canadian landed catch was stable at 500-600 t (733 t in 2006) as were Japanese catches in with the exception of 2003, which was low for regulatory reasons. However, the United States did not catch its quota in 2004, 2005 and 2006 with landed catches of 899 t, 717 t and 468 t, respectively. Early indications show that the trend of the United States under-catching its quota by about half will continue in 2007. It was noted that some nations have adopted a fishing year that is different from the calendar year to manage their quota. Thus, their calendar year annual catches do not match their allocated quota.

BFTW-Figure 4 shows the distribution of bluefin catches in the Atlantic and Mediterranean since 1950, by decade.

BFTW-3. State of the stock

The 2006 assessment is consistent with previous analyses in that spawning stock biomass (SSB) declined rapidly in the early 1970s followed by a more gradual decline in SSB through the early 1990s (**BFTW-Figure 2**) to about 21% of the 1975 level. During the period of 1994-1998 it appears that SSB recovered somewhat to about 28% of the 1975 level in 1998. However, the 2006 assessment indicates gradual declines since then to about 19% of the 1975 level by the year 2004 (**BFTW-Figure 2**). Conversely, after the large decline in recruitment in the early 1970's (**BFTW-Figure 2**), recruitment since then has varied from year to year without trend.

While the large decline in SSB since the early 1970s is clear from the assessment, the potential for rebuilding is less clear. The 1994 year class (recruitment in 1995) continues to be estimated as a relatively strong one, although it is still much less than the recruitment that occurred in the early 1970s. The Committee remains uncertain as to the causes of the relatively poor recruitment since 1976 and, therefore, is less certain about the outlook for recruitment in the future.

Also, note that the 2006 assessment incorporated data through 2004, since 2005 data were not fully available. Therefore, projections were made using preliminary catches for 2005. These data indicate that in 2005, about one third of the TAC was not taken, which is by far the largest shortfall since a TAC was established in 1981. Most of the shortfall was by the United States rod and reel fishery in terms of landings.

The plausible explanations for relatively low catch by the United States since 2004 are (1) that availability of fish to the United States fishery was abnormally low, and/or (2) the overall size of the population in the Western Atlantic declined substantially from the level of recent years. The fact that Canada and Japan did not have abnormally low catches in 2005 and 2006 supports the first explanation. Also, the CPUE series from the Gulf of St. Lawrence has been at high levels since 2004. On the other hand, other fishery indicators in 2005 (some abundance indices, declining size composition in some areas, small changes in the fishing mortality rate suggested by tagging data despite declining catches) support the second explanation. For more detail see SCRS/2007/171.

The SCRS in 2006 had no strong evidence to favor either explanation over the other, but it noted that the failure of a fishery to take about third of its TAC, particularly for a valuable species like bluefin tuna, is a reason for concern. The continuation of this trend in 2006, and probably 2007, and other new evidence reviewed by the committee, heightened concern that the estimate of stock status from the 2006 assessment may be optimistic (i.e., gives further weight to the second explanation above). It noted that this phenomenon has been seen in other fisheries prior to it becoming clear that they were in trouble. It should also be noted that the relatively low catch in 2005 was incorporated into short term projections (from 2004 to 2005). This leads to somewhat of an increase in projected abundance in the first few years of the projections. If the second explanation is correct, this is an overly optimistic outlook.

The SCRS cautioned that the conclusions of the 2006 assessment do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Furthermore, the projected trends in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment.

BFTW-4. Outlook

A short-term (five-year) outlook evaluation for changes in spawning stock size and yield under various management options was conducted in 2006. This period was selected to cover the time until a new assessment might be commissioned. Moreover, more than five years would be required before changes in regulations resulted in appreciable changes in spawning biomass. Accordingly, future recruitment is expected to fluctuate around recent recruitment levels and five-year projections assumed this.

In general, the outlook for bluefin tuna in the West Atlantic (**BFTW-Figure 3**) is more pessimistic than that presented in the previous assessment (Anon. 2003a) primarily because the 1994 and 1997 year classes, which were estimated to be about twice the average, are now estimated to be average. Projections show predictable degrees of short-term response in SSB, depending upon the amount of catch extracted. In contrast, projections using an alternative assessment methodology, i.e., BSP (SCRS/2007/143), are even more pessimistic than the 2006 assessment and suggest substantially lower short-term sustainable yield than indicated in **Table 1**.

BFTW-5. Effects of current regulations

Recommendation 06-06 is expected to result in a rebuilding of the stock towards the convention objective with fishing mortality rates at about the estimated MSY level. New evidence suggests that current regulations may be insufficient to achieve the objectives, however the committee will be unable to further evaluate this until the next assessment. The ability to achieve the convention objectives would be further hampered by future use of accumulated unused quota, particularly given the large amount involved for western bluefin tuna.

BFTW-6. Management recommendations

The Committee gave the following advice for consideration by the Commission in 2006:

1) Given the current recruitment that has been exhibited by western Atlantic bluefin, it is extremely unlikely that SSB can recover to levels that were exhibited in the 1970's in the next 15 years or so without reducing catch to near zero.
2) The current TAC (2,700 t) is not expected to result in major changes in SSB from 2007-2009 (small declines on the order of 3% per year).
3) Fishing at F_{MSY}(conditional on current recruitment) during the period 2007-2009 would be expected to increase SSB over that period by about 1.5% per year.
4) A constant TAC over the period 2007-2009 which would produce gains in SSB equivalent to those gains in 3) would be about 2,100 t.
5) The constant TAC over the period 2007-2009 which would be expected to maintain SSB at 2006 levels would be about 2,300 t.

The Commission responded positively by recommending option 4. However, the Committee is even more concerned about the status of the western stock than it was a year ago (as discussed above). Further advice will be provided after the next assessment (2008).

The SCRS notes that evidence is accumulating which indicates that both the productivity of western Atlantic bluefin and western Atlantic bluefin fisheries are linked to the eastern Atlantic and Mediterranean stock. One plausible explanation for the failure of the fishery in the west to take its TAC in recent years is that it is partly dependent on fish of eastern origin, and the population of eastern origin fish has become less available to the west. Therefore, management actions taken in the eastern Atlantic and Mediterranean are likely to impact the recovery in the western Atlantic, because even small rates of mixing from East to West can have significant effects on the West due to the fact that Eastern plus Mediterranean resource is much larger than that of the West. Further evaluations of management options that address mixing issues, about which the Commission has asked advice, were completed and are addressed under SCRS 2006 Agenda Item 15.6.

WEST ATLANTIC BLUEFIN TUNA SUMMARY
(Catches and Biomass in t)

Current (2006) Catch (including discards)	1,929 t [4]
Short-term Sustainable Yield	~2,300 t
Maximum Sustainable Yield (MSY|R[1,2])	3,200 (3,000-3,400)[2]
Relative Stock Biomass	
SSB_{2004}/SSB_{1975}	0.18
$SSB_{2004}/SSB_{MSY\|R}$	0.41 (0.29-0.54)[2]
Relative Fishing Mortality[3]	
$F_{2004}/F_{MSY\|R}$	1.7
$F_{2004}/F_{0.1}$	3.1
F_{2004}/F_{max}	1.7
Management Measures:	TAC of 2,100 t from 2007 including dead discards [Rec. 06-06]. TAC of 2,700 t from 2003 including dead discards [Rec. 02-07]. 30 kg (115 cm FL) minimum size with 8% tolerance [Rec. 98-07]. No directed fisheries in Gulf of Mexico [Rec. 98-07].

1 MSY calculated conditional that recruitment remains at recent (1976-2001) levels.
2 Median and approximate 80% confidence interval from bootstrapping from the assessment.
3 F_{2004} is taken to be the geometric mean of the estimates for 2001-2003.
4 Estimates for 2006 are preliminary.

BFT-Table 1. Estimated catches (t) of northern bluefin tuna (*Thunnus thynnus*) by major area, gear and flag.

			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			23853	24344	26717	24645	21374	20792	27128	23819	26045	29420	34131	36636	48853	49714	53302	49485	42375	35228	36541	37390	37089	33458	33483	37575	28789
AT.E+MEDI			22408	21802	24425	21960	19052	18200	24117	20952	23247	26429	31849	34268	46740	47291	50807	47151	39718	32456	33766	34605	33770	31163	31376	35671	26861
	AT.E		6702	8152	7393	4757	4492	4436	6950	5324	6040	6556	7619	9367	6930	9650	12663	13539	11376	9628	10528	10086	10347	7232	7406	8974	8111
	MEDI		15706	13650	17032	17203	14560	13764	17167	15628	17207	19872	24230	24901	39810	37640	38144	33612	28342	22828	23238	24519	23424	23931	23970	26697	18750
AT.W			1445	2542	2292	2685	2322	2592	3011	2867	2798	2992	2282	2368	2113	2423	2495	2334	2657	2772	2775	2785	3319	2295	2107	1905	1928
Landings	AT.E	Bait boat	831	1882	2262	2004	1414	1821	1936	1971	1693	1445	1141	3447	1980	2601	4985	3521	2550	1492	1822	2275	2567	1241	1790	2018	1116
		Longline	2705	2626	1538	535	770	904	1169	853	1496	3197	3817	2717	2176	4392	4788	4534	4300	4020	3736	3303	2896	2750	2070	2651	2593
		Other surf.	190	1425	949	501	973	668	1220	1020	562	347	834	1548	932	1047	646	511	621	498	703	712	701	560	402	1014	3401
		Purse seine	655	262	373	86	276	0	0	0	54	46	462	24	213	458	323	828	692	726	1147	150	884	490	1078	871	153
		Sport (HL+RR)	13	0	0	1	1	3	1	2	1	0	0	0	0	0	0	162	28	33	126	61	63	109	87	11	4
		Traps	2309	1956	2271	1630	1057	1040	2624	1478	2234	1522	1365	1631	1630	1152	1921	3982	3185	2859	2996	3585	3235	2082	1978	2408	844
	MEDI	Bait boat	53	0	1699	278	0	0	0	0	25	148	158	48	0	206	5	4	11	4	0	0	1	139	17	5	
		Longline	1550	980	1196	1228	678	799	1227	1121	1026	2869	2599	2342	7048	8475	8171	5672	2749	2463	3317	3750	2614	2476	2564	2988	1641
		Other surf.	521	674	1738	3211	3544	2762	2870	3289	1212	1401	1894	1607	3218	1043	1197	1033	1880	2976	1067	1096	990	2536	1106	480	333
		Purse seine	12131	10484	9888	11219	9333	8857	11198	9450	11250	13245	17807	19297	26083	23588	26021	24178	21291	14910	16195	17174	17656	17167	18785	22475	16335
		Sport (HL+RR)	87	194	275	507	322	433	838	457	1552	738	951	1237	2257	3556	2149	2340	1336	1622	1921	1321	1647	1392	1339	634	313
		Traps	1364	1318	2236	760	683	913	1034	1311	2142	1471	821	370	1204	772	601	385	1074	852	739	1177	515	221	159	115	129
	AT.W	Bait boat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Longline	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	730	176	626	573	737
		Other surf.	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	108	140	97	90	85
		Purse seine	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	178	4
		Sport (HL+RR)	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2035	1398	1139	924	1005
		Traps	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32	8	3
Discards	AT.W	Longline	0	0	0	0	514	192	215	248	133	199	211	88	83	138	167	155	123	160	222	105	211	232	181	131	94
		Other surf.	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	0	0	0	0	0	0	
Landings	AT.E	Cape Verde	0	10	1	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	85	103	80	68	39	19	41	24	
		Chinese Taipei	16	2	0	0	0	0	0	0	0	0	0	6	20	8	61	226	350	222	144	304	158	0	0	10	4
		EC.Denmark	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0	0	0	0	
		EC.España	2857	4587	4804	3628	2876	2479	4567	3565	3557	2272	2319	5078	3137	3819	6174	6201	3800	3360	3474	3633	4089	2138	2801	3102	2033
		EC.France	150	400	602	490	348	533	724	460	510	565	894	1099	336	725	563	269	613	588	542	629	755	518	561	818	1218
		EC.Germany	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.Greece	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21	52	22	8	15	3	1	1	2
		EC.Poland	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	41	174	34	29	193	163	48	3	27	117	38	25	240	35	199	712	323	411	441	404	186	61	26	17	85
		EC.Sweden	0	1	0	0	0	0	0	0	0	1	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	1	0	1	1	12	0	0	0	0	0	0	0
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	104	118	0	0	0	0	0	
		Guinée Conakry	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	27	0	0	1	0	0	0	
		Japan	2573	2609	1514	420	739	900	1169	838	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	2015	2598	2413
		Korea, Republic of	0	3	0	77	0	0	0	0	0	0	0	0	4	205	92	203	0	0	6	1	0	0	0	0	1
		Libya	0	0	0	0	0	0	0	0	0	0	312	0	0	0	576	477	511	450	487	0	0	0	0	0	
		Maroc	993	365	171	86	288	356	437	451	408	531	562	415	720	678	1035	2068	2341	1591	2228	2497	2565	1797	1961	2405	2354
		NEI (ETRO)	0	0	6	3	4	0	5	6	74	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (Flag related)	0	0	0	0	0	0	0	0	0	85	144	223	68	189	71	208	66	0	0	0	0	0	0	0	
		Norway	50	1	243	0	31	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	
		Panama	12	0	17	22	11	4	0	0	0	0	0	0	1	19	550	255	0	13	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	0	0	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		U.S.A.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

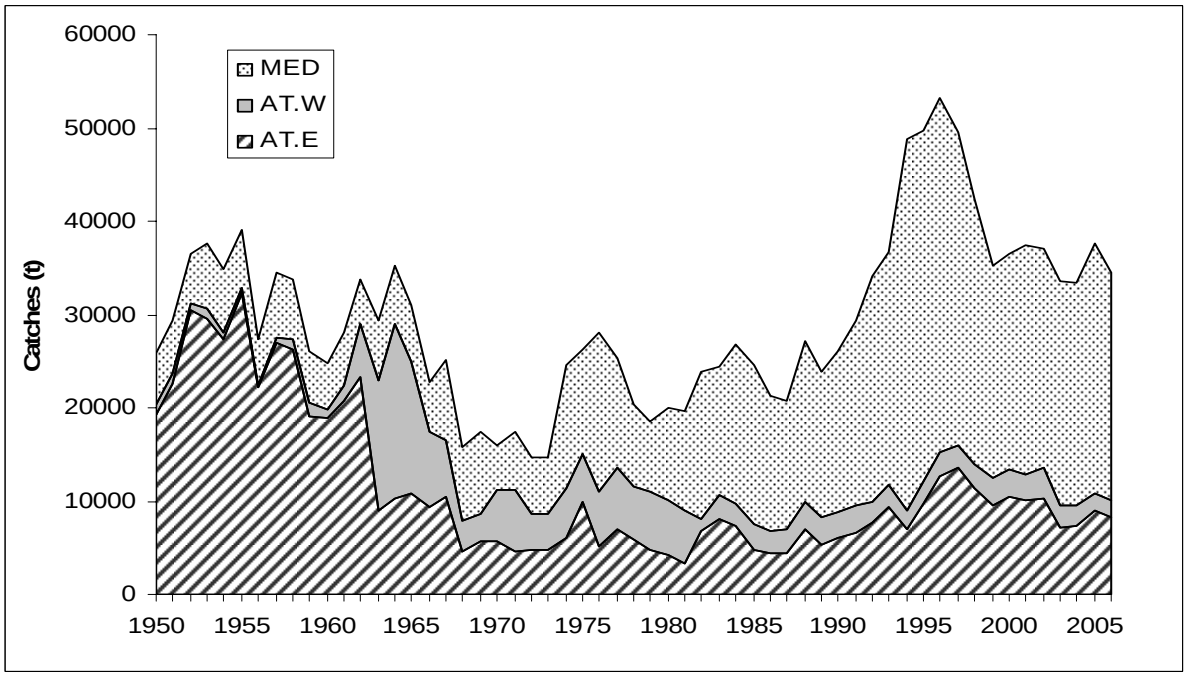
BFT. Table 1.

			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
	MEDI	Algerie	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	1586	1208	1530	1038
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	97	137	93	49	0	0	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	328	709	494	411	278	106	27	169	329	508	445	51	267	5
		Croatia	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139	827	1017	1022
		EC.Cyprus	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79	105	149	110
		EC.España	989	812	2743	1460	701	1178	1428	1645	1822	1392	2165	2018	2741	4607	2588	2205	2000	2003	2772	2234	2215	2512	2353	2758	2689
		EC.France	4878	3660	3600	5430	3490	4330	5780	4434	4713	4620	7376	6995	11843	9604	9171	8235	7122	6156	6794	6167	5832	5989	6471	8638	7663
		EC.Greece	0	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422	389	318	255
		EC.Italy	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973	4686	4841	4695
		EC.Malta	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255	264	346	263
		EC.Portugal	0	0	0	0	0	0	0	0	0	278	320	183	428	446	274	37	54	76	61	64	0	2	0	0	11
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	
		Japan	961	677	1036	1006	341	280	258	127	172	85	123	793	536	813	765	185	361	381	136	152	390	316	638	265	161
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	684	458	591	410	66	0	0	0	0	0	700	1145	
		Libya	310	270	274	300	300	300	300	84	328	370	425	635	1422	1540	812	552	820	745	1063	1941	638	752	1300	1091	
		Maroc	0	1	4	12	56	116	140	295	1149	925	205	79	1092	1035	586	535	687	636	695	511	421	760	819	92	32
		NEI (ETRO)	1	0	19	0	168	183	633	757	341	1750	1349	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (Flag related)	0	0	0	0	0	0	0	0	0	0	0	0	427	639	171	1066	825	140	17	0	0	0	0	0	
		NEI (combined)	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	610	709	0	
		NEI-2	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	72	67	0	74	287	484	467	1499	1498	2850	236	0	0	0	0	0	0	0	0	
		Serbia & Montenegro	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0	0	0	0	
		Tunisie	298	293	307	369	315	456	624	661	406	1366	1195	2132	2773	1897	2393	2200	1745	2352	2184	2493	2528	791	2376	3249	
		Turkey	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	3300	1075	990	806
		Yugoslavia Fed.	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	0	0	0	6	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
		Brasil	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	
		Canada	291	433	264	142	73	83	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557	537	600	733
		Chinese Taipei	11	2	3	3	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	0	0	
		EC.Poland	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	1	62	18
		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	
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1	10	5	
		Japan	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575	57	470	378	549
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	52
		Mexico	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12	22	9	10	14
		NEI (ETRO)	14	1	0	0	0	0	0	30	24	23	17	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI (Flag related)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	429	270	49	0	0	0	0	
		Norway	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	12	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	1	3	2	14	14	14	2	43	9	3	0	0	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1840	1426	899	717	468
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	0	
		Uruguay	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	0	0	0	
Discards	AT.W	Canada	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14	15	0	2
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	
		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
		U.S.A.	0	0	0	0	514	192	215	248	133	199	211	88	83	138	171	155	110	149	176	92	174	218	167	131	91

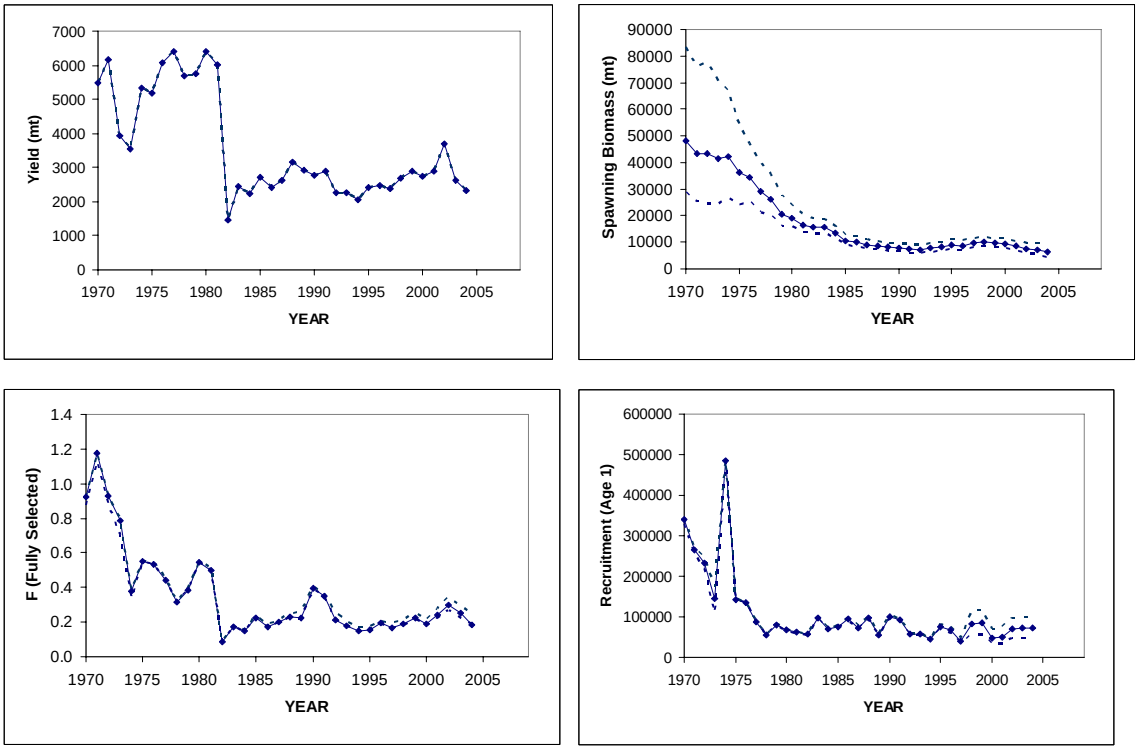
[1] The total yield for 2006 only includes reported catches at the date of the meeting. It may be seen as provisional because of the lack of catches for some important fisheries. A first approximation of the total 2006 yield is given in the text and the summary table.

[2] National Report of China PR mentioned 42 tonnes of BFT catches in the East Atlantic in 2006.

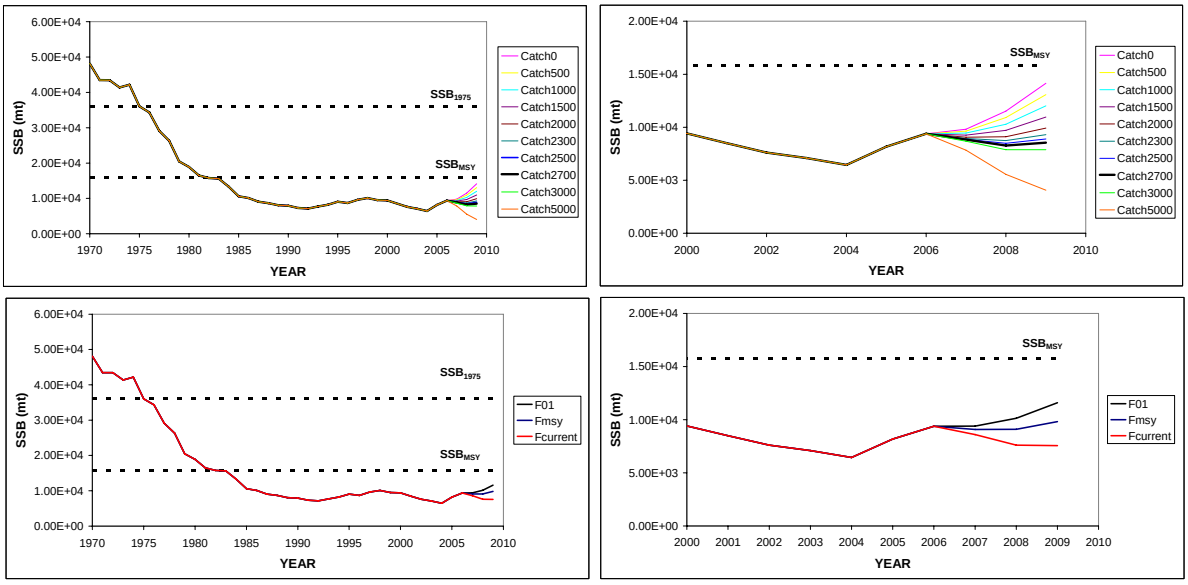
[3] During the plenary Libya reported 1280 tonnes of BFT catches in the Mediterranean in 2006 and 47 for the Atl.East.



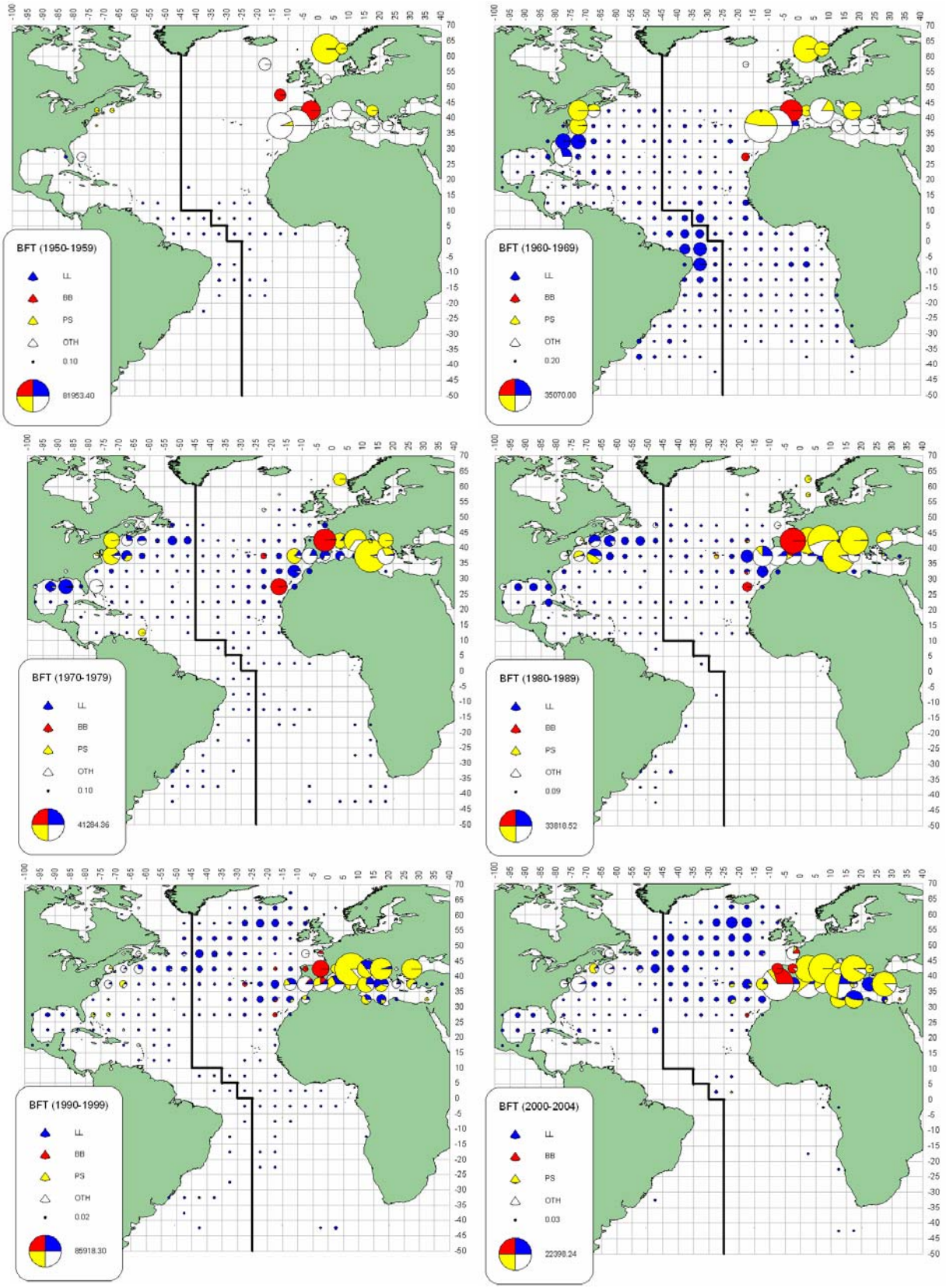
BFT-Figure 1. Atlantic bluefin catches (in t., including discards) by region.



BFTW-Figure 2. Median estimates of yield, spawning biomass, fishing mortality and recruitment for the base VPA model. The 80% confidence intervals are indicated with dotted lines.



BFTW-Figure 3. Western Atlantic bluefin tuna: Median projections of spawning stock biomass (SSB) for the Base Case assessment under various levels of constant catch (top) and under various levels of constant fishing mortality rate (bottom). The figures in the right hand side are restricted to the more recent time period. NOTE: Lines are arranged sequentially in the same order as the legends.



BFT-Figure 4. Geographical distribution of bluefin tuna catch by major gears and decade.

BLUEFIN TUNA – EAST

BFTE-2.Fishery Indicators – East Atlantic and Mediterranean

It is well known that introduction of farming activities into the Mediterranean in 1997 and good market conditions resulted in rapid changes in the Mediterranean fisheries for bluefin tuna. Currently, nearly all of the declared Mediterranean bluefin fishery production is exported overseas. Declared catches in the East Atlantic and Mediterranean reached a peak of over 50,000 t in 1996 and, then decreased substantially, stabilizing around TAC levels established by ICCAT for the most recent period **(BFT-Table 1 and BFTE-Figure 1)**. Both the increase and the subsequent decrease in declared production occurred mainly for the Mediterranean **(BFTE-Figure 1)**. In 2003 and 2004, total declared catches for the East Atlantic and Mediterranean were 31,163 t and 31,376 t, respectively, of which about 24,000 t were declared for the Mediterranean. In 2005, reported catches were 35,671 t (8,974 t and 26,697 t for the East Atlantic and the Mediterranean, respectively). In 2006, reported catches were incomplete at the time of the meeting, but a first estimate indicates that they could be at around 32,660 t. Information available reinforces our belief that catches of bluefin tuna from the eastern Atlantic and Mediterranean have been seriously under-reported in recent years. The group thinks that this under-reporting is likely to originate from both Contracting and non-Contracting Parties. An estimate made by the Committee, based on the number of vessels operating in the Mediterranean Sea and their respective catch rates, indicates that the volume of catch taken in recent years likely significantly exceeded TAC levels and probably is close to the levels reported in the mid-1990s, *i.e.* about 43,000 t in the Mediterranean and thus about 50,000 t in the East Atlantic and Mediterranean in recent years, including 2005 and 2006 **(BFT-Figure 1, BFTE-Table 2)**. This apparent lack of compliance with the TAC and underreporting of the catch will undermine conservation of the stock.

Available indicators from small fish fisheries in the Bay of Biscay did not show any consistent trend since the mid 1970s **(BFTE-Figure 2)**. This result is not particularly surprising because of inter-annual variation in year class strength, which makes trend detection difficult for young ages. Indicators from fisheries taking spawning aged fish show evidence of recent decline for older fish and one indicator shows a general decline since the mid-1970s **(BFTE-Figure 2)**.

BFTE-3. State of the stock

The 2006 assessment used ICCAT Task I catch data from 1970 to 2004, which likely represents significant underestimates of total catch in recent years (see above). Therefore, methods that assume that the catch-at-size/age is known exactly, such as VPA, are likely to be biased to some extent. Consequently, the group has based its overall advice on a large variety of methods and not mostly on VPA outputs as done in the past. Even so, the assessment results indicate that the spawning stock biomass (SSB) continues to decline while fishing mortality is increasing rapidly, especially for large fish.

The decline in SSB is evident from the results of an age-structured model that used reported catch and CPUE information, which estimates that recent (2000-2004) SSB is 48% of the estimated level at the start of the time series (1970-1974). The decline in SSB appears to be more pronounced during the more recent four or five years **(BFTE-Figure 3)**. Although model estimates for recent years should be judged with caution due to increasing uncertainties about catch, the decline in SSB is also evident from fishery indicators such as the drop in catch rates of Moroccan and Spanish fixed traps located in the eastern Atlantic that capture large bluefin (generally ages 10 and older) as they enter the Mediterranean for spawning. Catches of giant bluefin made by some sport fisheries have also declined abruptly over the most recent years.

The increase in mortality estimated with the age-structured model for large bluefin is consistent with a shift in targeting towards larger individuals destined for fattening/farming. Independent year-class analyses which do not rely upon fishery-wide data conducted with Spanish trap and Japanese longline data (both of which capture primarily large bluefin) also indicate that total mortality on large spawners has increased.

This result is especially of concern since large spawners contribute more to recruitment success than medium-size spawners. Estimates of current recruitment are uncertain, but there is some indication of a recent decline **(BFTE Figure 3),** which makes increasing fishing pressure on spawners even more worrisome.

This view of stock status presented above only accounts for the limited information available through 2004. Developments since 2004 could have accelerated the recent patterns described.

BFTE- 4. Outlook

During the last decade, there has been an overall shift in targeting towards large bluefin. As the majority of these fish are destined for fattening/farming operations, their size and age composition are becoming more difficult to determine precisely, which in turn affects the quality of the analyses. Furthermore, to the detriment of the assessment, unenforced TACs were allowing under-reporting of overall catches, and incomplete compliance with size limit regulations may have affected information on catches of small bluefin. With these factors combined with the lack of reliable historical information for many fleets, the stock cannot be monitored with confidence and therefore severe over-fishing can easily go undetected. A collapse in the near future is a possibility given the 2006 stock assessment estimations of the SCRS of the fishing capacity of all fleets combined and current fishing mortality rates, unless adequate management measures are implemented and enforced **(BFTE-Table 2, BFTE-Figure 3)**.

It should be noted that if the overall selectivity pattern has indeed shifted towards larger fish **(BFTE-Figure 3)**, this could result in improved yield-per recruit levels. For example, the equilibrium yield-per-recruit obtained with the 2003-2004 fishing mortality pattern is 25% higher than the value that was computed at the 2002 assessment using the selectivity pattern for 2000. In practice, such changes in yield-per recruit would take many years to translate into changes in actual equilibrium yield due to the longevity of the species; their realization would also depend on the constancy of recruitment and stability in the selectivity of all fleets combined.

The current selectivity and overall fishing mortality pattern estimated in this assessment imply that current fishing mortality is more than 3 times the level which would permit the stock to stabilize at the MSY level (approximated by $F_{max,}$ see **BFTE-Table 3**). Current fishing is expected to drive the spawning per recruit relative to virgin levels (%SPR), and thus the spawning stock biomass, to very low levels; i.e. about 6% SPR and about 17% of the spawning biomass per recruit estimated for 1970. This combination of high F and low SPR is considered to result in a high risk of fisheries and stock collapse.

A suite of per-recruit analyses that can be considered as long-term evaluations of alternative minimum size and closure options, based on the monthly catches pattern **(BFTE-Figure 4)**, were conducted to provide advice to the Commission on their likely impacts on the stock and on the fisheries. The results show that only scenarios considering the closure of the entire Mediterranean around the spawning season (i.e. mid-May until early July) together with increasing size limits for both the East Atlantic and the Mediterranean (minimum sizes of 10, 25 and 30 kg overall) are able to significantly reduce fishing mortalities and to rebuild the SSB up to levels that are considered safe enough to avoid fishery and stock collapse (**BFTE-Table 3** and **BFTE-Figure 5**). Most of these scenarios further induce significant gain in global YPR (and thus higher catch in the long-term under current assumptions), but with contrasting results depending on the fleets. An assumption of these analyses is that reduction in fishing effort resulting from time/area closures is not redirected to make up for the foregone catch. If this effort is redirected, the analyses may be optimistic in terms of conservation benefits.

BFTE-5. Effect of current regulations

Catch limits have been in place for the eastern Atlantic and Mediterranean management unit since 1998. In 2002, the Commission fixed the Total Allowable Catch (TAC) for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Rec. 02-08]. Reported catches for 2003 and 2004 are slightly below that level, but these of 2005 are substantially higher. First estimate of total reported catches in 2006 would be slightly higher. As indicated earlier, however, the Committee strongly believes, based on the knowledge of the fisheries and fattening/farming practices, that substantial under-reporting is occurring and that actual catches are well above TAC. The SCRS estimates for the recent years (including 2005 and 2006) actual catches were probably close to the levels reported in the mid-1990s, *i.e.* about 43,000 t in the Mediterranean and thus about 50,000 t in the East Atlantic and Mediterranean. Based on our analysis, it is apparent that the TAC regulation until 2006 was not respected and was largely ineffective in controlling overall catch.

In 2006, the Commission has adopted a 15 year recovery plan for the East Atlantic and Mediterranean bluefin tuna stock [Rec. 06-05]. This plan includes various conservation measures, mostly a TAC, extended time/area closures and minimum size whose effects are investigated below. The plan also includes multiple elements related to monitoring, control and surveillance whose effects cannot be yet evaluated but, are expected to improve significantly the quality and quantity of catch data in near future.

During the 2007 species BFT group meeting, the effects of recent conservation measures on stock status have been investigated. The interpolations of the yield-per-recruit outcomes (i.e. assuming equilibrium and constant fishing mortality rates) from the 2006 stock assessment indicate that the biomass would be at about 50% of B_{MSY} while F would remain twice the F_{MSY} proxy (**Figure BFTE-5**), indicating that such F levels would not achieve Convention objectives (SCRS/2007/151). Additionally, the Committee examined non-equilibrium constant F and catches projections through simulation models to examine the effects of these regulations in a more dynamic context (SCRS/2007/147, SCRS/2007/169).

Overall, preliminary results indicate that the current measures are a step in the right direction, but are unlikely to fully fulfil the objective of the plan to rebuild to the MSY level in 15 years with 50% probability. This depends on several factors, particularly how well regulations are implemented (including severe reduction in fishing effort by 2023) and future recruitment. If implementation is perfect and if future recruitment is at about the 1990s level and is unaffected by recent spawning biomass level, there is about 50% probability of rebuilding by 2023 under the current regulations. However, perfect implementation is unlikely because, even with perfect enforcement, the committee thinks that it is not feasible to avoid totally discard mortality of small fish (in excess of tolerance) and while continually and severely reduce fishing effort to very low levels to achieve the objectives of the rebuilding plan. With other plausible assumptions (either imperfect implementation or recruitment that decreases from recent levels as spawning biomass decreases, or both) the objectives of the rebuilding plan will not be met.

Note that the above projections do not take into account for the possibility that fishing behaviour (e.g. such as the recent observed displacement of the fishing effort from Western to Southern and Eastern Mediterranean) may change in comparison to that of the early 2000s. After the next stock assessment (in 2008), the Committee should be able to update its advice, providing that new and reliable information are available for the meeting.

BFTE-6. Management recommendations

The Committee stands by the advice given in 2006 which follows. The available information indicates that the 2003-2004 fishing mortality rate (under the current overall fishing pattern) may have been more than three times the level which would permit the stock to stabilize at the MSY level. This level of fishing is expected to drive the spawning biomass to a very low level. Those low levels are considered to give rise to a high risk of fishery and stock collapse.

In order to reverse these declines and to initiate rebuilding, substantial reductions in fishing mortality and catch need to be implemented. The SCRS evaluated a number of alternative management scenarios which might be used to begin recovery **(BFTE-Table 3)**. The only scenarios which have potential to address the declines and initiate recovery are those which (in combination) close the Mediterranean to fishing during spawning season and decrease mortality on small fish through fully enforced increases in minimum size. Realized catches during the next few years implied by *fully implementing* these actions are expected to be in the order of 15,000 t. The long-term gain resulting from these actions could lead to catches of 45,000 t or more with substantial increases in spawning biomass. For a long lived species such as bluefin tuna, it will take some time (> 10 years) to realize the benefit. In the short-term, actions like those above should be taken to reduce the catch to a level that will reverse the decline in spawning biomass and initiate rebuilding.

Clearly, an overall reduction in fishing effort and mortality is needed to reverse current trends. Current fishing capacity largely exceeds the current TAC. Overcapacity is known to impair management actions, therefore further steps to mitigate the impacts of overcapacity will be needed to achieve the recovery plan. In 2006 the Commission agreed on a number of management measures which are viewed by the Committee as unlikely to rebuild the stock to the Convention objectives in 15 years with 50% probability, unless additional actions are taken, such as described in previous paragraph.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current (2006) Yield	Reported: 32,665[1] t	SCRS Estimate: **50,000 t**
Short-term F_{MSY} Yield[2]	On the order of 15,000 t	
Long-term potential yield[3]	~45,000 t or more	
Relative biomass		
$SSB_{2000-2004}/SSB_{1970-74}$	0.48	
Relative fishing mortality		
F_{2004}/F_{max}	3.1	
TAC (annually, 2003-2006)[4]	32,000 t	

[1] Some contracting parties had not reported their 2006 yields at the time of the meeting. Therefore, these missing yields have been approximated by carrying over the 2005 yields.

[2] Approximated from the short-term yields obtained in the YPR analyses for which %SPR were > 20% **(see BFTE-Table 3).**

[3] Approximated as yield at Fmax and conditional on the 2003-2004 recruitment level **(BFTE-Table 3)**.

[4] In 2006, a 15-year recovery plan has been adopted that includes a large variety of conservation, monitoring and control measures, see [Rec. 06-05]. A TAC of 29,500; 28,500; 27,500 and 25,500 tonnes/year has been adopted for 2007, 2008, 2009 and 2010, respectively.

BFTE-Table 2. Top table: Estimations of the total number of vessels fishing bluefin tuna (as a targeting or as a by-catch) in the Mediterranean Sea during the most recent years (2004 and 2005), together with catch estimates by vessel (PS large and LL large are vessels > 30 m long; multi-species vessels are vessels targeting other species during at least part of the fishing season). The total number of vessels by category and catch rates by category (in t/year) were extracted from the ICCAT Vessel Record, databases from national surveys, and from the knowledge of national experts.

Table below: Estimations of total yearly catch (in t) in the Mediterranean Sea estimated from the number of vessels and catch estimates by vessel.

Vessel category	*Number of Vessels*	*Low estimate / Vessel*	*Best estimate / Vessel*	*Max estimate / Vessel*
PS large	41	200 t/yr	**300 t/yr**	400 t/yr
PS medium	103	100 t/yr	**150 t/yr**	200 t/yr
PS mult-ispecies	170	10 t/yr	**40 t/yr**	60 t/yr
LL large	56	20 t/yr	**50 t/yr**	70 t/yr
LL medium	25	6 t/yr	**30 t/yr**	40 t/yr
LL multi-species	352	1 t/yr	**3.5 t/yr**	8 t/yr
Handline	390	0.5 t/yr	**3 t/yr**	5 t/yr
Trap	6	7 t/yr	**30 t/yr**	60 t/yr
Artisanal	564	0.3 t/yr	**4.3 t/yr**	6 t/yr
Sport & recreational	10663	0.01 t/yr	**0.03 t/yr**	0.06 t/yr
Total commercial vessels	**1707**			
Total commercial & recreational vessels	**12370**			

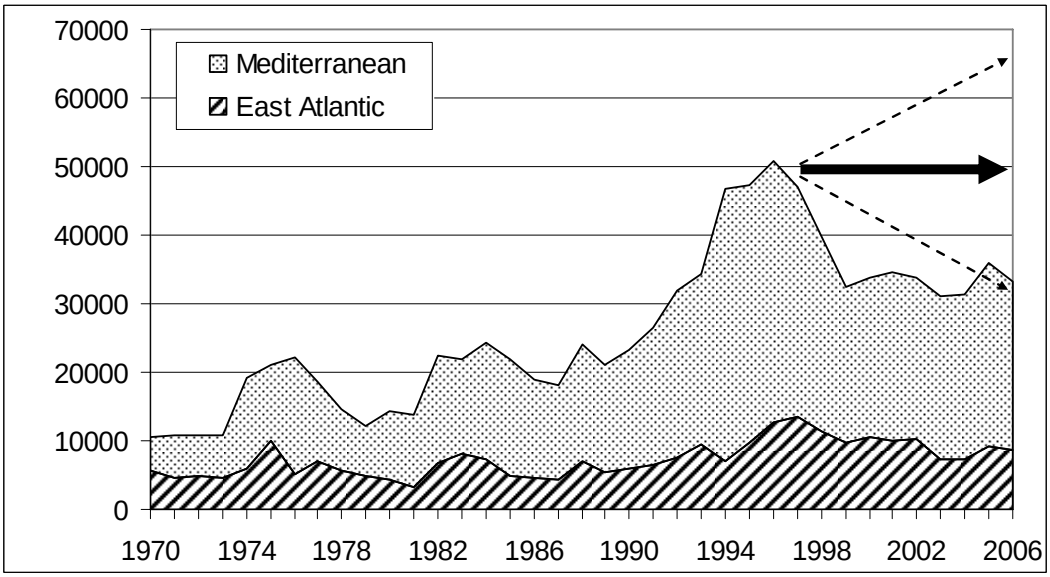
Estimated yield from commercial vessels	22,228 t	**43,107 t**	60,630 t
Estimated yield from commercial & recreational vessels	22,376 t	**43,417 t**	61,316 t

BFTE-Table 3. The modeled cases ranked by expected spawning biomass per recruit relative to virgin levels (%SPR) and change in effort needed to achieve F corresponding to long term potential yield[1]. SQ: statu quo (situation corresponding to Rec. [02-09]). MED: Mediterranean. EA: Eastern Atlantic.
Cases in the red (darkest shading) zone (danger zone, substantial risk of severe decline and stock collapse) are those for which result in a %SPR level lower than the threshold of 20% and additional effort reductions would be required. The cases in the yellow (lightest shading) zone (caution zone, over-fishing/overfished) are those which would, if perfectly implemented, result in %SPR levels at or above the threshold but would still require additional effort reductions to achieve MSY fishing levels. The cases in the green (medium shading) zone (safely sustainable) are those which, if perfectly implemented, would achieve %SPR at or above the threshold and fishing mortality rates at or somewhat below the MSY level. Also indicated are projected annual transitional yield expectations for the modeled cases assuming recruitment remains at recent levels and spawning biomass remains sufficient to permit catch. levels indicated.

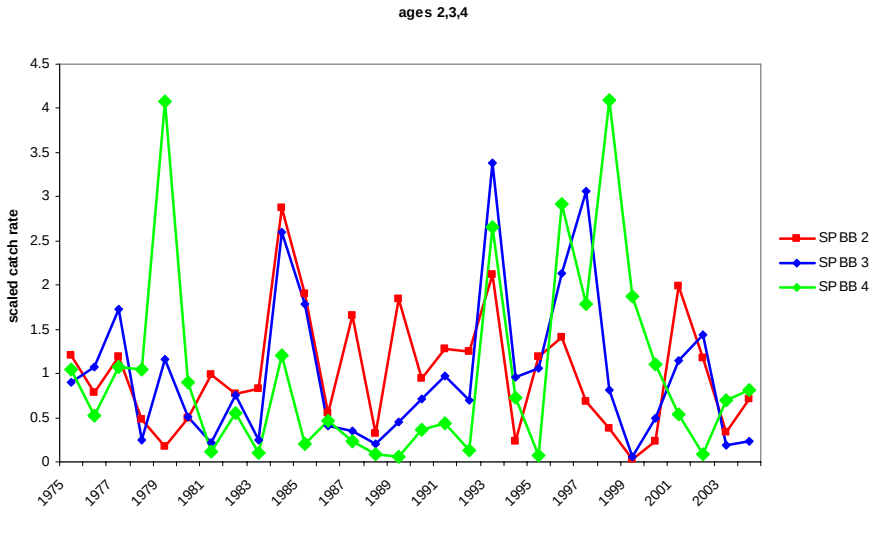
		Closure			Benchmarks		Further %Reduction in F needed to Reach F_{max}	Expected Catch (t) in Outyears Indicated under F Level Modeled					Long-term[1] Potential Yield
case	Min Size	Area	Months	Gears	Fmax/F	%SPR		Projected year 1	Projected year 2	Projected year 3	Projected year 4	Projected year 5	
1	SQ	SQ	SQ	SQ	0,32	6,0%	68%						
16	10kg	SQ	SQ	SQ	0,35	7,4%	65%						
2	SQ	MED	J	PS	0,45	9,7%	55%						
3	SQ	MED	J	ALL	0,46	10,0%	54%						
10	SQ	MED.EA	JJ	PS	0,50	11,2%	50%						
4	SQ	MED	JJ	PS	0,50	11,2%	50%						
17	10kg	MED	J	PS	0,52	11,8%	48%						
18	10kg	MED	J	ALL	0,52	12,2%	48%						
5	SQ	MED	JJ	ALL	0,54	12,6%	46%						
6	SQ	MED	MJJ	PS	0,55	12,8%	45%						
12	SQ	MED.EA	MJJ	PS	0,55	12,8%	45%						
31	25kg	SQ	SQ	SQ	0,49	13,4%	51%						
25	10kg	MED.EA	JJ	PS	0,58	13,7%	42%						
19	10kg	MED	JJ	PS	0,58	13,7%	42%						
8	SQ	MED	JJAS	PS	0,56	13,9%	44%						
14	SQ	MED.EA	JJAS	PS	0,56	13,9%	44%						
11	SQ	MED.EA	JJ	ALL	0,58	14,6%	42%						
20	10kg	MED	JJ	ALL	0,62	15,2%	38%						
46	30kg	SQ	SQ	SQ	0,55	15,3%	45%						
21	10kg	MED	MJJ	PS	0,65	15,6%	35%						
27	10kg	MED.EA	MJJ	PS	0,65	15,6%	35%						
23	10kg	MED	JJAS	PS	0,65	16,3%	35%						
29	10kg	MED.EA	JJAS	PS	0,65	16,3%	35%						
7	SQ	MED	MJJ	ALL	0,71	16,8%	29%						
9	SQ	MED	JJAS	ALL	0,66	17,3%	34%						
26	10kg	MED.EA	JJ	ALL	0,69	17,5%	31%						
24	10kg	MED	JJAS	ALL	0,76	19,7%	24%						
32	25kg	MED	J	PS	0,78	20,1%	22%	13.927	16.500	19.432	21.957	24.479	48.892
22	10kg	MED	MJJ	ALL	0,84	20,2%	16%	15.259	17.959	20.412	22.141	23.826	39.981
33	25kg	MED	J	ALL	0,79	20,4%	21%	13.662	16.231	19.160	21.687	24.209	48.917
15	SQ	MED.EA	JJAS	ALL	0,78	21,6%	22%	13.010	15.546	17.616	19.484	21.576	42.941
34	25kg	MED	JJ	PS	0,88	22,1%	12%	12.588	15.089	17.857	20.322	22.951	48.867
40	25kg	MED.EA	JJ	PS	0,88	22,1%	12%	12.588	15.089	17.857	20.322	22.951	48.867
38	25kg	MED	JJAS	PS	0,91	22,6%	9%	12.211	14.594	17.309	19.821	22.514	49.230
44	25kg	MED.EA	JJAS	PS	0,91	22,6%	9%	12.211	14.594	17.309	19.821	22.514	49.230
35	25kg	MED	JJ	ALL	0,96	23,7%	4%	11.564	14.012	16.733	19.167	21.756	48.983
42	25kg	MED.EA	MJJ	PS	0,99	24,2%	1%	11.302	13.757	16.492	18.981	21.548	48.787
36	25kg	MED	MJJ	PS	0,99	24,2%	1%	11.302	13.757	16.492	18.981	21.548	48.787
30	10kg	MED.EA	JJAS	ALL	0,94	24,4%	6%	11.484	14.176	16.735	18.759	20.951	46.194
13	SQ	MED.EA	MJJ	ALL	1,00	24,7%	0%	13.885	15.773	17.132	18.424	19.785	33.671
41	25kg	MED.EA	JJ	ALL	1,03	25,4%	-3%	10.531	12.858	15.386	17.704	20.321	49.363
39	25kg	MED	JJAS	ALL	1,07	25,9%	-7%	10.273	12.532	15.132	17.558	20.144	49.536
45	25kg	MED.EA	JJAS	ALL	1,24	29,1%	-24%	8.635	10.681	12.984	15.208	17.754	50.134
28	10kg	MED.EA	MJJ	ALL	1,24	29,5%	-24%	11.724	14.184	16.338	17.805	19.300	37.968
37	25kg	MED	MJJ	ALL	1,35	30,2%	-35%	8.991	11.254	13.785	16.076	18.400	47.934
43	25kg	MED.EA	MJJ	ALL	2,04	41,0%	-104%	6.496	8.352	10.356	12.186	14.150	46.581

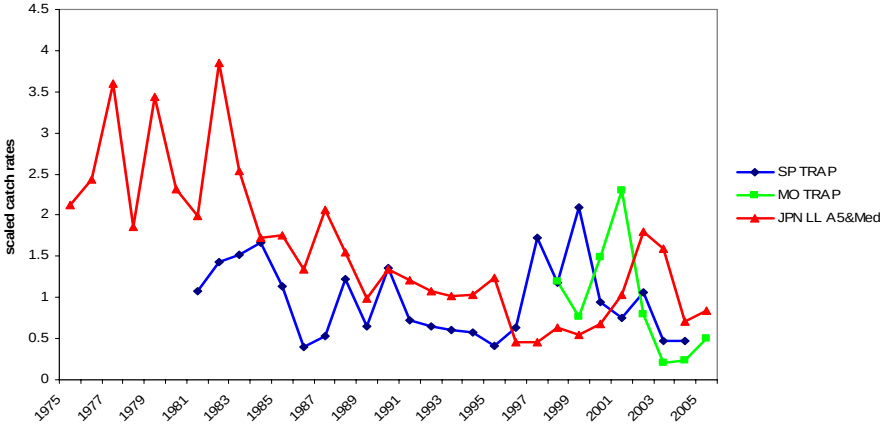
Notes: Case numbers are shown in the associated figures.
Min Size modeled: SQ (status quo) represents the currkg minimum, 25kg is a 25kg stock-wide minimum, and 30Kg is a 30kg stock-wide minimum
Areas modeled for additional closures: SQ, present time/area/gear closures as measured in 2003-2004, MED is all of Mediterranean, EA is all of Eastern Atlantic, MED.EA is all of Mediterranean and Eastern Atlantic.
Months modeled for additional closures: SQ is present time/area/gear closure as measured in 2003-2004, J is June, JJ is June and July, MJJ is May, June and July, JJAS is June, July, August and September.

[1] Approximated as yield at F_{max} and conditional on 2003-2004 recruitment

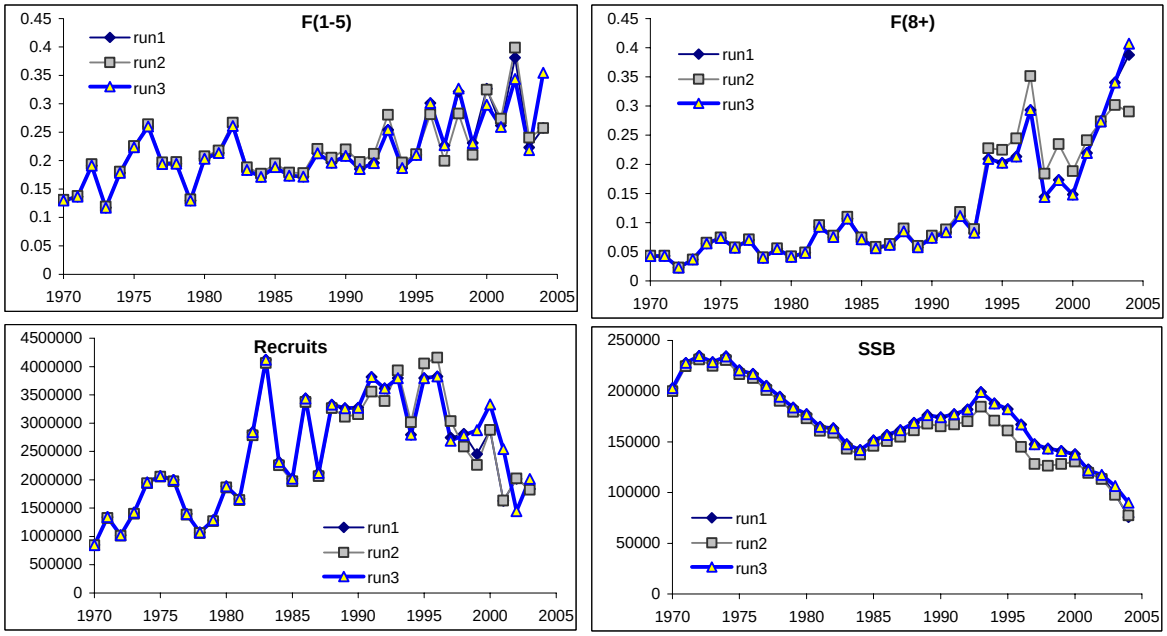


BFTE-Figure 1. Total bluefin tuna Task I for the Mediterranean Sea and east Atlantic. SCRS 'best' estimate (with a high and low range) of actual Mediterranean catch is about 43,000 t and is superimposed with the east Atlantic reported catch for 2004, resulting in a total for the East stock of about 50,000 t. For reference, TAC was set at 32,000 t for years 2003-2006.

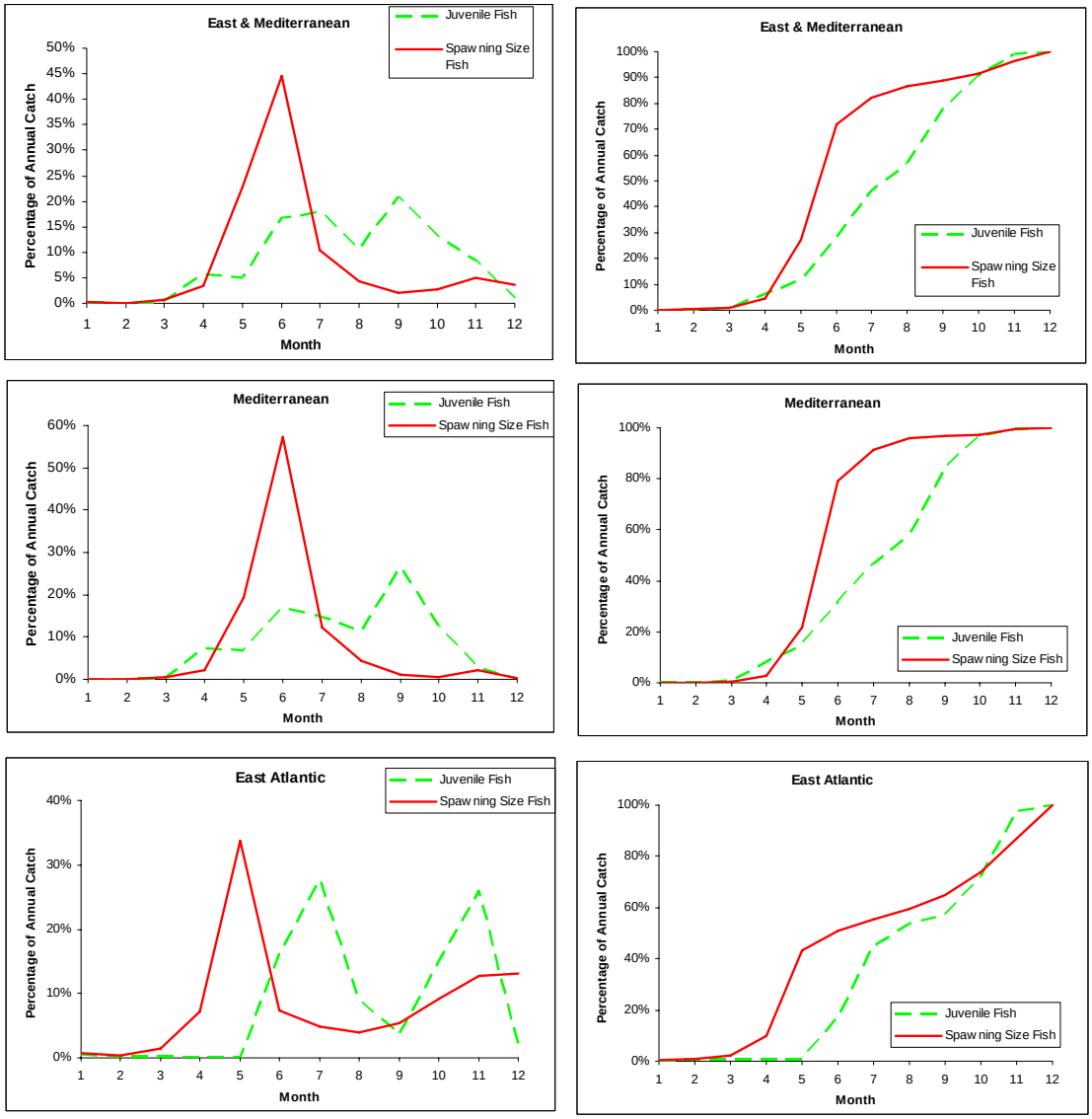




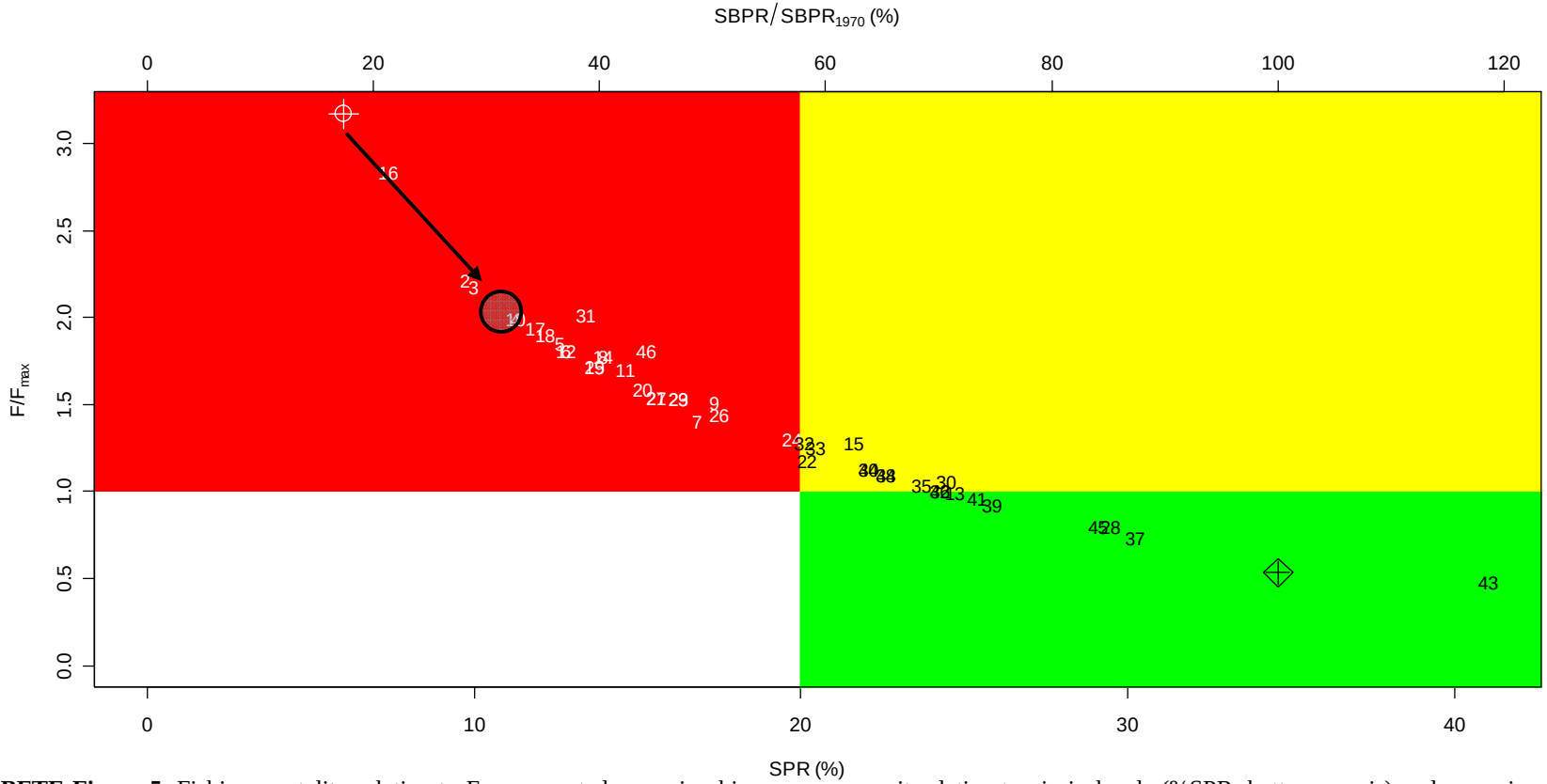
BFTE-Figure 2. Standardized catch rate indicators from fisheries harvesting small (left hand panel) and large (right hand panel) bluefin in the east Atlantic and Mediterranean.



BFTE-Figure 3. Comparison between the estimates obtained with the three VPA runs applied to east Atlantic and Mediterranean bluefin. The top figures show average fishing mortality for ages 1 to 5, and 8. and older. The bottom figures show trends in recruitment and SSB. (NOTE: these figures are based upon analyses that assumed that reported catches were not underreported)



BFTE-Figure 4. Estimated temporal pattern in monthly catches of spawning size (>130 cm FL) and juvenile (< 130 cm FL) bluefin tuna in the east Atlantic and Mediterranean fisheries in combination (upper panels), the Mediterranean alone (center panels) and the east Atlantic alone (lower panels). Calculations are based on the 2003 and 2004 catches which are further been used for YPR analyses. Figures on the left represent monthly proportional catches by size category, when those on the right represent the cumulative proportional catches over the year.



BFTE-Figure 5. Fishing mortality relative to F_{max}, expected spawning biomass per recruit relative to virgin levels (%SPR, bottom x-axis) and spawning biomass per recruit relative to spawning biomass per recruit in 1970 (top x-axis, $SBPR/SBPR_{1970}$) for each management scenarios described in **BFTE-Table 3**. Cross overlaid on circle represents the current management at the time of the stock assessment (i.e. June 2006), cross overlaid on diamond represents stock status in 1970 if fishing mortality rates would have continued into the future. Black circle represents the effects of the 2006 management measures on stock status if fishing mortality rates from 2007 through 2010 would continue into the future. Cases in the red (darkest shading) zone (danger zone, substantial risk of severe decline) are those for which result in a spawning biomass per recruit relative to virgin spawning biomass per recruit lower than the threshold of 20% and additional effort reductions would be required. The cases in the yellow (lightest shading) zone (caution zone, overfishing/overfished) are those which would, if perfectly implemented, result in spawning biomass per recruit at or above the threshold but would still require additional effort reductions to achieve MSY fishing levels. The cases in the green (medium shading) zone (safely sustainable) are those which, if perfectly implemented, would achieve spawning biomass at or above the threshold and fishing mortality rates at or somewhat below the MSY level.

8.6 BLUE MARLIN AND WHITE MARLIN

BUM/WHM-1. Biology

New information on the timing and location of spawning for blue and white marlin, the size at first maturity and the fecundity for different size fish, has been recently made available. In the western central Atlantic white marlin spawns from April to June in the area between 61-70°W and 20-23°N. Previous reports have mentioned spawning of white marlin off northeast Brazil for the same months of April to June. Female white marlin attain maturity at 158 cm LJFL in the same area of the western central Atlantic, and their potential annual fecundity is estimated at 19 to 27 million oocytes. In northeast Brazil female white marlins have been reported to mature at 147 cm. Considerable amount of new information on the habitat preference of marlins has been obtained in the Atlantic and other oceans. An active research program continues to try to develop methods to best incorporate this information into population assessments.

Three lines of evidence (scale and anus position morphometrics and DNA sequences) have validated the existence of round scaled spearfish (*Tetrapturus georgei*) in the eastern and western Atlantic. Roundscale spearfish and white marlin may have been misidentified in the past in the areas where these two species overlap. The significance of this misidentification is still to be evaluated, but more effort is been made to train observers to separate the two species in the catches.

BUM/WHM-2. Catch

The Committee used Task I catches as the basis for the estimation of total removals. In recent years large catches of billfish continue to be reported as unclassified billfish **(BUM/WHM-Figure 1)** and reporting gaps remain for some important fleets, as was identified in (Anon. 2006). Total removals for the period 1990-2004 were obtained during the 2006 assessment by modifying Task I values with the addition of blue marlin and white marlin that the Committee estimated from catches reported as billfish unclassified. Additionally the reporting gaps were filled with estimated values for some fleets.

During the 2006 marlin assessment it was noted that catches of blue marlin and white marlin continued to decline through 2004. Task I catches of blue marlin (**BUM/WHM Table 1)** in 2005 were 3,451 t, including large catches newly reported from Caribbean FAD fleets. In 2006 task I catches of blue marlin were 2,060 t. Task I catches of white marlin in 2005 and 2006 were 598 t and 342 t, respectively (**BUM/WHM Table 2)**. Task I catches of white marlin and blue marlin for 2006 are preliminary because they do not include reports from several important fleets, including some of the eastern Caribbean fleets that reported large catches of blue marlin for 2005. Historical reports of unclassified billfish remain an important issue in the estimation of historical removals from marlin stocks.

BUM/WHM-3. Fishery indices

A number of relative abundance indices have been estimated during the 2006 assessment however, given the apparent shift in landings from industrial to non industrial fleets in recent times, it is imperative that CPUE indices are developed for all fleets that have substantial landings.

During the 2006 assessment combined indices for both species were estimated to have declined during the period 1990-2004. However, the trends for 2001-2004 suggest that the decline in abundance of blue marlin may have slowed or halted, and that the decline in white marlin may have reversed, with abundance increasing slightly in the most recent years. As evidenced by differences between the trends from the individual and combined indices, four years is likely to be too short a period to reach definitive conclusions about abundance trends. Several years of additional data will be required to confirm recent changes in these abundance trends. No updates of abundance indices have been obtained since the 2006 assessment.

BUM/WHM-4. State of the stocks

Blue marlin

No new information on stock status has been provided since the 2006 assessment. The recent biomass level most likely remains well below the B_{msy} estimated in 2000. Current and provisional diagnoses suggest that F has recently declined and is possibly smaller than $F_{replacement}$[1] but larger than the F_{msy} estimated in the 2000 assessment. Over the period 2001-2005 several abundance indicators suggest that the decline has been at least partially arrested, but some other indicators suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend will require at least an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

White marlin

No new information on stock status has been provided since the 2006 assessment. The recent biomass most likely remains well below the B_{msy} estimated in the 2002 assessment. Current and provisional diagnoses suggest that F is probably smaller than $F_{replacement}$ and probably also larger than the F_{msy} estimated in the 2002 assessment. Over the period 2001-2004 combined longline indices and some individual fleet indices suggest that the decline has been at least partially reversed, but some other individual fleet indices suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend will require at least an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

BUM/WHM-5. Outlook

No new information on the recovery/outlook for marlins has been provided since the 2006 assessment. The Commission's current management plan has the potential of recovering the stocks of blue marlin and white marlin to the B_{MSY} level. However, reports of recent increases in catches of blue marlin by artisanal fisheries in both sides of the Atlantic may negate the effectiveness of the ICCAT plan that aims to recover this stock.

Recent analyses suggest that the recovery of blue marlin stock might proceed faster than would have been estimated at the 2000 assessment, provided catches remain at the level estimated for 2004. Some signs of stabilization in the abundance trend are apparent in the most recent catch per unit of effort data of blue marlin. Similarly, some signs of a recovery trend are apparent in the most recent catch per unit of effort data for white marlin

It should be noted that these trends are based only on a few years of observations. Confirmation of these recent apparent changes in abundance trends of white marlin and blue marlin will require at least an additional four or five years of data.

BUM/WHM-6. Effect of current regulations

Recommendations [Rec. 00-13], [Rec. 01-10] and finally [Rec. 02-13] placed additional catch restrictions for blue marlin and white marlin. The latter established that "the annual amount of blue marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% for white marlin and 50% for blue marlin of the 1996 or 1999 landing levels, whichever is greater". That recommendation established that, "All blue marlin and white marlin brought to pelagic longline and purse seine vessels alive shall be released in a manner that maximizes their survival. The provision of this paragraph does not apply to marlins that are dead when brought along the side of the vessel and that are not sold or entered into commerce".

More countries have started reporting live releases in 2006. Additionally, more information has come about, for some fleets, on the potential for using gear modifications to reduce the by-catch and increase the survival of marlins. Such studies have also provided information on the rates of live releases for those fleets. However there is not enough information on the proportion of fish being released alive for all fleets, to evaluate the effectiveness of the ICCAT recommendation relating to the live release of marlins.

[1] $F_{replacement}$ is the fishing mortality that will maintain the biomass constant from one year to the next. Thus, biomass is expected to grow when $F<F_{replacement}$ and vice-versa.

BUM/WHM-7. Management recommendations

- The Commission should, at a minimum, continue the management measures already in place because marlins have not yet recovered.
- The Commission should take steps to assure that the reliability of the recent fishery information improves in order to provide a basis for verifying possible future rebuilding of the stocks. Improvements are needed in the monitoring of the fate and amount of dead and live releases, with verification from scientific observer programs. In addition verification of current and historical landings from some artisanal and industrial fleets needs to be conducted.
- Should the Commission wish to increase the likelihood of success of the current management measures of the marlin rebuilding plan, further reduction in mortality would be needed, for example by:
  - implement plans to improve compliance of current regulations,
  - encouraging the use of alternative gear configurations, including certain types of circle hooks, hook/bait combinations etc., in fisheries where its use has been shown to be beneficial,
  - broader application of time/area catch restrictions.
- Given the recent importance of the catch from artisanal fisheries, and to increase the likelihood of recovery of marlin stocks, the Commission should consider regulations that control or reduce the fishing mortality generated by these fisheries.
- While substantial research into habitat requirements of blue and white marlin have been undertaken since the last assessments, the results of this research are not yet sufficient to allow the Committee to reach scientific consensus on the best method for directly estimating MSY benchmarks for these species based on the complete time-series of data. The Commission should encourage continued research on development of methods to incorporate this information into stock assessments in order to provide a basis for increasing the certainty with which management advice can be provided.

Atlantic blue marlin and Atlantic white marlin summary

	WHM	**BUM**
$B_{2004} < {}^{1}B_{MSY}$	Yes	Yes
Recent Abundance Trend (2001-2004)	Slightly upward	Possibly stabilizing
$F_{2004} > F_{replacement}$	No	Possibly
$F_{2004} > {}^{1}F_{msy}$	Possibly	Yes
${}^{2}Catch_{recent}/Catch_{1996}$ Longline and Purse seine	0.47	0.52
${}^{3}Catch_{2004}$	610 t	2,916 t
Rebuilding to B_{msy}	Potential to rebuild under current management plan but needs verification.	Potential to rebuild under current management plan but needs verification.
${}^{1}MSY$	[4] 600-1,320 t	~ 2,000 t (1,000 ~ 2,400 t)

[1] As estimated during the 2000 and 2002 assessments.
[2] Catch recent is the average catch for 2000-2004.
[3] Estimate of total removals obtained by the Group. The Task I catch reported for 2005 is 3,451 t for blue marlin and 598 t for white marlin. The preliminary Task I catch reported for 2006 is 2,060 t for blue marlin and 342 t for white marlin. Final estimates for 2006 are likely to be greater.
[4] Range of estimates were obtained in the previous assessments, but recent analyses suggest that the lower bound for white marlin should be at least 600.

BUM-Table 1. Estimated catches (t) of Atlantic blue marlin (*Makaira nigricans*) by major area, gear and flag.

			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			2708	2130	2748	3311	1993	2053	2736	4215	4524	4134	2964	3019	3975	3802	4607	5087	4034	3849	3757	3037	2613	2686	2117	3451	2060
	AT.N		1650	1214	1378	1566	1069	836	909	1540	1946	1411	1080	1057	1510	1447	1745	1712	1519	1260	1101	551	516	631	687	1558	763
	AT.S		884	749	1252	1623	789	1085	1690	2530	2378	2586	1768	1817	2331	2229	2652	3119	2376	2431	2335	2276	1962	1735	1430	1893	1297
	UNCL area		174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	211	134	320	0	1	
Landings	AT.N	Longline	1162	809	920	1223	695	327	415	1009	1601	981	628	600	1065	926	1269	1228	980	764	664	331	391	441	513	565	512
		Other surf.	189	206	252	174	160	190	184	197	137	225	223	217	212	292	214	331	432	377	341	176	60	151	113	951	133
		Sport (HL+RR)	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17	19	27	16	83
	AT.S	Longline	822	533	975	1362	661	964	1530	2017	1958	2286	1490	1434	1671	1565	2036	2296	1594	1525	1485	1284	886	1204	844	1004	627
		Other surf.	60	216	276	260	127	121	159	512	418	299	277	382	658	662	605	753	780	904	850	991	1076	531	586	887	666
		Sport (HL+RR)	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	0	0	0	2	1
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	
		Other surf.	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	210	130	320	0	0	
Discards	AT.N	Longline	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37	19	34	34	24
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1	1	1
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Landings	AT.N	Barbados	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	0	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	
		Canada	0	0	0	0	0	1	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	41	48	41	51	79	133	9	31	15	17	10	49	
		Chinese Taipei	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	48	66	104	40	49
		Cuba	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	36	44	55
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	0	0	0	0	
		EC.España	0	0	3	4	1	0	8	7	5	1	6	7	6	2	25	5	36	15	25	8	1	6	27	12	23
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	776	
		EC.Portugal	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1	31	27	24	64
		Grenada	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72	45	42	33
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	
		Japan	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	442	155	125	148	174	265	265
		Korea, Republic of	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	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	12	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90	86	64
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	0	0	0	0	
		Netherlands Antilles	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	38	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	1	1	5	0	0	5	5	5	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	1	0	0	1	2	2	2	0	1	0	0	0	0	15	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	10	5	0	18	17	21	
		Trinidad and Tobago	0	3	8	3	17	2	0	28	4	6	4	3	27	46	21	81	70	33	55	17	16	4	11	5	
		U.S.A. *	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19	26	16	38
		U.S.S.R.	0	0	0	0	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	2	2	2	2	2	2	2
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		Ukraine	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	
		Venezuela	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	108	72	76	84	83	138	131

BUM-Table 1.

			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
	AT.S	Benin	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	0	0	0	0	
		Brasil	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577	195	612	298
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	21	25	21	27	41	68	15	61	73	72	49	47	
		Chinese Taipei	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	253	211	111	50
		Cuba	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109	115	107	178
		EC.España	0	0	0	0	0	0	0	15	0	12	40	37	49	38	133	117	159	110	115	86	27	6	24	12	68
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	1	0	24	69
		Gabon	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	0	0	0	0	0	0	0	0	0	
		Ghana	52	216	166	150	16	5	7	430	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470	759	405
		Japan	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	180	142	294	366	200	200
		Korea, Republic of	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	0	0	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	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	38	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	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	35	0	0	0	0	0	7	0	21	26
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	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	1	0	0	0	
		U.S.S.R.	0	0	0	7	16	22	32	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	
		Vanuatu	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
	UNCL area	Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	38	55	56	0	3	0	0	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	207	0	0	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	122	59	37	187	131	130	110	0	0	
		Mixed flags (FR+ES)	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	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	
		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	
Discards	AT.N	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
		U.S.A.	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49	19	35	25	36
	AT.S	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	2
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0	0	0	
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	

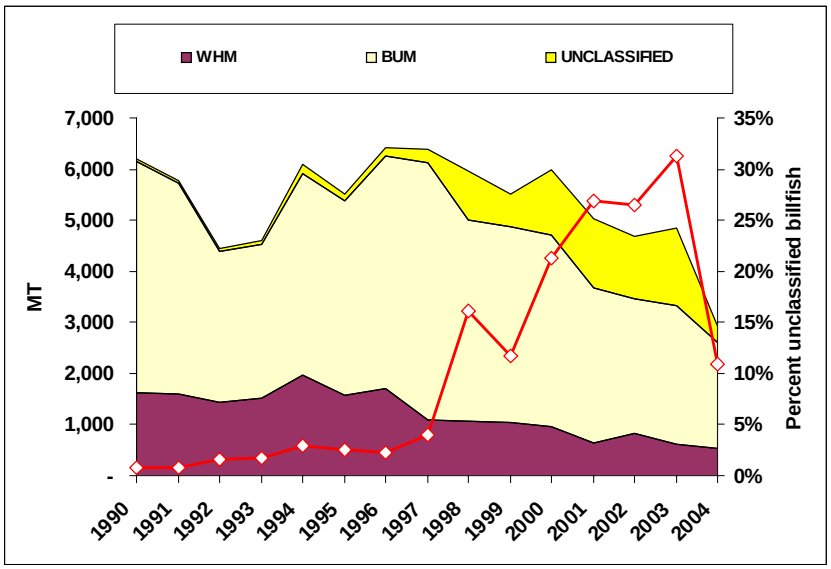
* Recent USA updates reduces BUM 2006 catches in ATL.N from 38 to 17 t

WHM-Table 2. Estimated catches (t) of Atlantic white marlin (*Tetrapturus albidus*) by major area, gear and flag .

			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			1100	1772	1200	1727	1611	1491	1352	1805	1634	1598	1439	1526	1966	1584	1752	1113	1101	1013	961	642	821	613	573	598	342
	AT.N		605	1280	653	860	905	587	406	368	401	236	610	565	657	624	651	425	411	368	362	291	264	203	252	264	172
	AT.S		463	461	525	844	680	879	921	1410	1196	1351	819	949	1298	952	1095	678	681	634	579	350	556	394	321	334	170
	UNCL area		32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	11	21	1	1	15	0	0	
Landings	AT.N	Longline	548	1196	570	788	812	433	167	234	259	106	466	436	528	458	536	334	360	287	282	248	208	176	204	231	140
		Other surf.	12	5	17	29	61	54	150	11	40	21	35	34	57	48	30	49	13	18	38	22	17	10	20	14	21
		Sport (HL+RR)	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6	1	1	1	2
	AT.S	Longline	442	308	471	825	654	870	832	1333	1152	1328	805	927	1297	946	681	590	557	622	570	327	487	387	318	299	135
		Other surf.	21	153	54	19	26	9	89	76	40	23	14	22	1	2	3	50	123	11	9	23	69	7	2	35	34
		Sport (HL+RR)	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	0	0	0	0	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	
		Other surf.	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	11	21	0	1	15	0	0	
Discards	AT.N	Longline	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29	17	27	27	17
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	0	0	0	0
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	117	11	39	17	24	29	26	43	15	41	33	25	25	0	0	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
		Canada	0	0	0	0	0	1	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1	2	5	3
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	6	7	6	7	10	20	1	7	4	2	1	4	
		Chinese Taipei	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	61	15	45	24	42
		Cuba	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	
		EC.España	0	0	9	14	0	0	61	12	12	9	18	15	25	17	97	89	91	74	118	43	4	19	19	48	28
		EC.France	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	5	11	30	3
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	8	0	33	10	12
		Japan	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	15	10	21	23	30	30
		Korea, Republic of	12	6	18	147	37	2	2	82	39	1	9	4	23	3	7	2	0	0	0	0	0	0	0	4	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	2	8	8	0	5	6	11	18	44	15	15	28	25	16
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	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	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	44	0	0	
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	9	6	5	
		U.S.A.	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6	1	1	1	1
		U.S.S.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	
		UK.Bermuda	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1
		Vanuatu	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	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	25	72	110	55	55	60	26
	AT.S	Argentina	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	
		Brasil	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266	80	244	90
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	4	5	10	1	13	19	6	6	4	
		Chinese Taipei	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	89	127	32	2
		Cuba	45	112	153	216	192	62	24	22	6	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	5	1	2	2	3	1	1	1
		EC.España	0	0	0	0	0	0	1	1	0	17	6	12	2	19	54	4	10	45	68	18	2	3	45	10	23
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	19

WHM-Table 2.

			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
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	0	0	0	0	
		Ghana	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1	1	0
		Honduras (foreign obs.)	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	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	41	5	12	13	6	6
		Korea, Republic of	57	9	44	225	34	25	17	53	42	56	1	4	20	20	52	18	0	0	0	0	0	11	40	3	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	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	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	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	45	0	0	0	0	0	3	0	33	29
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
		U.S.S.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	
		Uruguay	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	0	0	0	0	0	0	0	
	UNCL area	Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	14	0	0	1	0	0	
		EC.France	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	1	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	14	0	0	
		Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	
		Mixed flags (FR+ES)	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	0	0	0	0	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	AT.N	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
		U.S.A.	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33	17	27	17	9
	AT.S	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	2
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0	0	0	
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	



BUM-WHM Figure 1. Total catch of blue marlin, white marlin, and billfish for 1990-2004, and percentage of the ratio of unclassified billfish (line with symbols) with respect to the total blue marlin and white marlin catch as estimated in the 2006 assessment.

8.7 SAI - SAILFISH

The last sailfish assessment was conducted in 2001.

SAI-1. Biology

Sailfish *(Istiophorus platypterus)* has a pan-tropical distribution. ICCAT has established, based on life history information on migration rates and geographic distribution of catch, that there are two management units for Atlantic sailfish, eastern and western **(SAI-Figure 1)**. Considerable amount of research continues to be done on the vertical distribution of sailfish.

SAI-2. Description of the fisheries

Sailfish are targeted by coastal artisanal and recreational fleets and, to a less extent, are caught as by-catch of longliners and purse seiners **(SAI-Figure 1)**. Historically, catches of sailfish were reported together with spearfish by many longline fleets. At present it is not possible to appropriately separate the catches of these two species **(SAI-Table 1)**. Large historical catches of unclassified billfish continue to be reported to the Committee making the estimation of sailfish catch difficult.

Preliminary and incomplete reports to ICCAT suggest that the 2006 Task I catch was 935 t and 697 t, respectively, for the east and west region **(SAI-Figure 2)**. Task I catches of sailfish for 2006 are preliminary because they do not include reports from several important fleets.

SAI-3. State of the stocks

No new assessments of the sailfish stocks have been conducted since 2001. No relative abundance indices have been presented since 2001.

Although the 2001 attempts at quantitatively assessing the status of these two stocks (eastern and western sailfish) proved to be unsatisfactory, there were indications of early decreases in biomass for these two stocks. These decreases probably lowered the biomass of the stocks to levels that may be producing sustainable catches, but it is unknown whether biomass levels are below those that could produce MSY.

SAI-4. Outlook

There is no new information available to change the outlook as presented in the 2001 report. It is unknown if the western or eastern sailfish stocks are undergoing over-fishing ($F>F_{MSY}$) or if the stocks are currently over-fished ($B<B_{MSY}$) and for these reasons the outlook for future conditions of the stocks are best interpreted based on the recent trends of CPUE and catch.

Because no assessment has been conducted since 2001, no relative abundance indices are available after 2000, and given the uncertainty in the catch, the outlook for both the eastern and western stock is uncertain.

SAI-5. Effect of current regulations

No ICCAT regulations for sailfish or spearfish are in effect.

SAI-6. Management recommendations

Management recommendations here are the same as those made in 2006. The previous management recommendations indicated that the Commission should consider methods for reducing fishing mortality rates. The current western Atlantic assessment leads the Committee to recommend that the western Atlantic sailfish catches should not exceed current levels. For the east Atlantic, sailfish catches should not exceed current levels and the Commission should consider practical and alternative methods to reduce fishing mortality and assure data collection systems.

The Committee is concerned about the incomplete reporting of sailfish catches, particularly for the most recent years. The Committee recommends all countries landing sailfish and spearfish or having dead discards of these, report these data by species to the ICCAT Secretariat.

Before the next sailfish assessment can proceed there needs to be a review of sailfish catch and effort data, with particular attention to catch estimates from artisanal fleets, separation of spearfish out of those historic catch reports where both species were reported as combined and relative abundance indices for the coastal artisanal fleets. This should be done in an inter-session meeting in 2008 leading to a sailfish assessment in 2009.

ATLANTIC SAILFISH SUMMARY[1]

	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	Not estimated	Not estimated
Recent Yield (2000)	506 t	969 t
2000 Replacement Yield	~ 600 t	Not estimated
Management Measures in Effect	None	None

[1]As estimated in 2001.

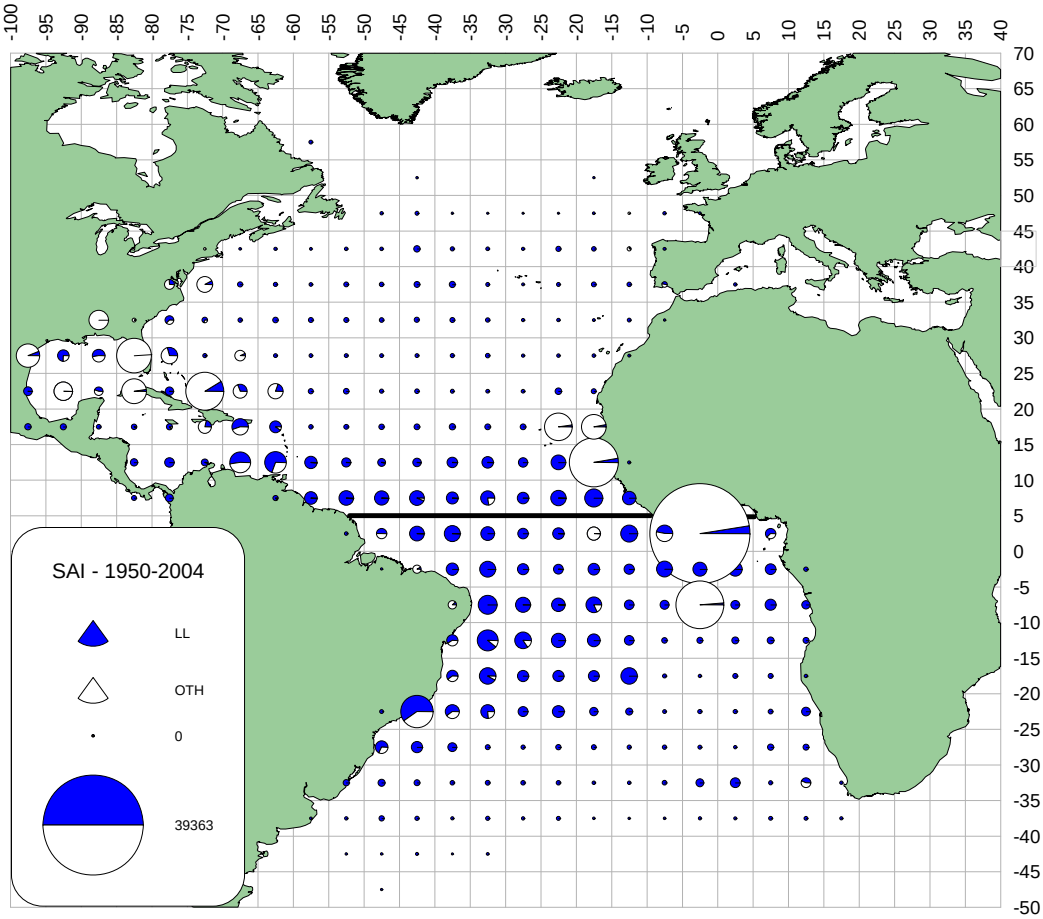
SAI-Table 1. Estimated catches (t) of Atlantic sailfish (*Istiophorus albicans*) and spearfish by major area, gear and flag.

			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	4883	3713	3421	3386	3737	3359	2729	3540	2685	3052	3943	2488	2815	3118	2466	2903	2521	2508	2328	3100	2655	2288	2394	1980
	AT.E		2876	3687	2492	2328	2105	2566	2064	1664	2314	1486	1707	2485	1207	1559	1944	1304	993	1209	1004	1043	1091	1347	1104	1274	935
	AT.W		1119	1196	1221	1093	1281	1171	1294	1065	1225	1199	1345	1458	1281	1256	1164	1162	1910	1312	1503	1271	1977	1301	1122	1120	697
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	14	32	7	62	0	348
Landings	AT.E	Longline	309	270	224	148	140	112	126	152	153	61	52	535	179	240	181	225	195	265	165	159	352	288	257	294	282
		Other surf.	1999	2911	2107	1940	1394	1870	1401	1067	1143	918	917	1117	801	732	1232	524	535	537	433	884	738	1059	847	980	653
		Sport (HL+RR)	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407	0	0	0	0	0	
	AT.W	Longline	471	320	512	506	489	451	558	417	382	243	377	665	568	386	348	242	1053	453	770	801	1264	855	666	985	436
		Other surf.	173	141	173	274	295	187	208	238	514	521	599	498	468	484	507	503	553	615	602	401	603	440	449	131	194
		Sport (HL+RR)	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103	0	0	0	61
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	5	57	0	348
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	12	2	2	5	0	
Discards	AT.W	Longline	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	3	5
		Other surf.	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
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E	Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	0	0	0	0	0	
		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	3	3	3	3	5	9	4	5	11	4	4	8		
		Chinese Taipei	67	20	8	9	1	0	0	7	13	0	0	420	101	155	65	150	117	178	120	0	124	74	30	30	91
		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	
		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
		EC.España	10	0	4	7	9	0	28	14	0	13	3	42	8	13	42	38	15	20	8	148	188	183	148	177	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	11	3	8	7	13	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	0	0	0	109	7	0	0	0	1	0	0	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
		Honduras (foreign obs.)	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	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	20	21	70	53	53
		Korea, Republic of	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	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	15	
		Mixed flags (FR+ES)	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98	0	0	0	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	11	15	10	10	10	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	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0	0	23	0	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	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	7	0	0	0	1
		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	
	AT.W	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	0	0	0	0	0	
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	
		Brasil	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	598	412	547	585	534	416	139
		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	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22	0	70	25	19	61	4
		Cuba	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	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	0	0	
		EC.España	0	0	0	0	0	0	0	0	0	8	13	13	19	36	5	30	42	7	14	277	471	196	125	113	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2	12	12	110	19
		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

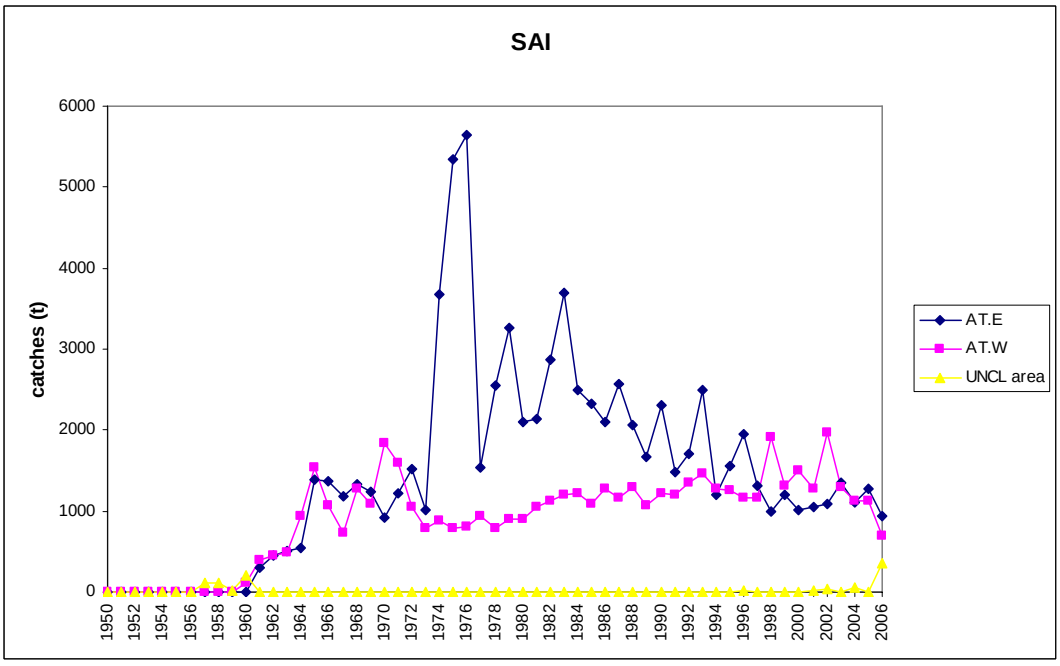
SAI-Table 1.

			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
		Japan	135	22	34	38	28	6	22	22	25	73	1	2	8	2	4	17	3	10	12	3	3	8	5	23	23
		Korea, Republic of	19	0	52	72	14	1	0	17	25	0	3	0	8	8	22	8	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	2	19	19	0	9	646	40	118	36	34	45	51	55	41
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	31	30	30	30	30	0	0	0	0	0	0	0	0	
		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	
		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	
		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	0	131	3	86	0	59
		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	0	4	3	7	6	8	10	9	
		U.S.A.*	452	734	495	282	462	454	451	324	242	343	294	202	179	345	231	349	267	163	76	58	103	0	0	0	59
		Venezuela	57	119	81	81	77	80	22	24	24	65	71	206	162	103	165	185	258	179	93	126	159	133	158	178	184
	UNCL area	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	2	2	0	0	
		Chinese Taipei	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	57	0	348
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	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	2	30	0	0	0	
Discards	AT.W	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	1
		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
		U.S.A.	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7	4	5
	UNCL area	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	

*Recent USA updates reduces SAI 2006 catches in AT.W from 59 to 0.8 t



SAI-Figure 1. Geographic distribution of sailfish catches by major gears, from the entire period 1950-2004.



SAI-Figure 2. Reported Task I catches of sailfish and spearfish combined in the Atlantic from 1956 to 2006 for the east and west stocks.

8.8 SWO-ATL-ATLANTIC SWORDFISH

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

SWO-ATL-1. Biology

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

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

Two scientific documents related to swordfish biology were presented during the 2007 species group meeting. SCRS/2007/120 presented an analysis of the genetic and growth patterns of swordfish. The results suggested the presence of three main populations in the Mediterranean, Atlantic and Indo-Pacific. Moreover, in the Atlantic, the authors noted a north to south gradient of increasing membership to the Indo-Pacific cluster. This may be a major reason for the statistically significant differences between South and North Atlantic reported by many studies. SCRS/2007/111 addressed the reproductive activity of swordfish in the Atlantic based on different macroscopic indicators. The main conclusions were that the reproductive activity of females appears to be related to the temperatures in the epipelagic layers and is largely restricted to the warm tropical regions of the western Atlantic. In addition, the size at first maturity of females was estimated to be 146 cm (LJFL). Furthermore, the results indicate the segregation of the Atlantic swordfish between regions of intense reproduction and regions with sporadic seasonal or non-existent reproduction.

SWO-ATL-2. Fishery indicators

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

Total Atlantic

The total Atlantic estimated catch of swordfish (North and South, including discards) reached a historical high of 38,624 t in 1995 **(SWO-ATL-Table 1** and **SWO-ATL-Figure 3**). The 2006 estimated catch (reported and carried over) was 25,262 t (reported catch was 24,799 t). A substantial number of countries have not yet reported their 2006 catches so values should be considered provisional and subject to revision.

North Atlantic

For the past decade, the North Atlantic estimated catch (landings plus discards) has averaged about 11,600 t **(SWO-ATL-Table 1** and **SWO-ATL-Figure 3)**, and the 2006 landings (including carry-overs) plus discards were 11,814 t (reported catch was 11,445 t). In 2006, there has been a 42% decrease in estimated catches (including discards and carry-overs) since the 1987 peak in North Atlantic landings (20,236 t), in response to ICCAT recommendations. Reduced landings have also been attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic. In addition, some fleets, including Canada, EC-Portugal, EC-Spain, and the United States, have changed operating procedures to opportunistically target other large pelagic species (tuna and/or sharks), taking advantage of market-price conditions and their high relative catch rates.

The available age-specific indices of abundance from the various fleets harvesting northern Atlantic swordfish show generally consistent trends over the period of overlap, with a few exceptions especially in the most recent period. There appears a pattern of relatively strong recruitment in the mid-1990s which then progressed into medium size and spawning-size swordfish. This, in combination with lower catches resulted in an increase in spawning biomass. Unfortunately, there is little information available with which to judge the most recent recruitment levels. The overall indicator of northern Atlantic swordfish biomass from the major fisheries reflected an increase in biomass in the late 1990s **(SWO-ATL-Figure 4)**; the trend has been generally flat since 2000. The only indices available for 2006 (from the U.S. and Canadian longline fisheries) show a decline, but this is slight in the case of the United States and attributable to market factors in the Canadian nominal catch rate series. Information from the Spanish surface longline fleet has indicated a rapid increase of CPUE from 1999 to 2000, and relative stability from 2000 until 2005.

South Atlantic

The historical trend of catch (landings plus discards) can be divided in two periods: before and after 1980. The first one is characterized by relatively low catches, generally less than 5,000 t (with an average value of 2,300 t). After 1980, landings increased continuously up to a peak of 21,780 t in 1995, levels that match the peak of North Atlantic harvest (20,236 t). This increase of landings was in part due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Expansion of fishing activities by southern coastal countries, such as Brazil and Uruguay, also contributed to this increase in catches. The reduction in catch following the peak in 1995 resulted from regulations and is due in part to a shift to other oceans and target species. In 2006, the estimated 13,448 t catches (13,354 t reported) were about 39% lower than the 1995 reported level but 2% higher than the 2005 reported catches (13,071 t). The reported 2006 catch should be considered provisional and is probably an underestimate.

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

Two new standardized swordfish CPUE series were presented for Brazilian longliners, based on set by set data, one restricted to the fishing vessels operating from São Paulo, from 1998 to 2006, and another one encompassing the whole fleet, including São Paulo based longliners, from 1978 to 2006. While the CPUE of swordfish caught by longliners based in São Paulo State, southern Brazil, showed a decline in 2006, the overall results were similar to those presented in the previous assessment, with the data from the whole fleet confirming a continued trend of CPUE increase for swordfish in the southwestern Atlantic in recent years.

Discards

Since 1991, several fleets have reported discards (see **SWO-ATL-Table 1**). The volume of Atlantic-wide reported discards since then has ranged from 215 to 1,139 t. The most recent (2006) reported level of discards is 333 t, a reduction of 72% from the peak level reported for 2000.

SWO-ATL-3. State of the stocks

North Atlantic

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

South Atlantic

The 2006 assessment indicated that if the available CPUE information is used in a simple production model, two different conclusions are reached about the status of southern Atlantic swordfish. Using by-catch fishery data leads to overly-pessimistic results while using target fishery data leads to optimistic results (**SWO-ATL-Figure 5**). The Committee believes that in the case of the by-catch CPUE data, the estimates of MSY and intrinsic growth rate obtained could not be supported by current knowledge of swordfish population dynamics and historical catch levels. On the other hand, the Committee believed that the recent increase in the target pattern CPUE was more likely due to changes in catchability than it was to an increase in abundance, possibly leading to an overestimation of the intrinsic growth rate. As a result, the Committee based its base case analyses on a composite CPUE pattern that has been constructed from both types of fisheries. Recognizing that further research is required in order to make better use of the available data, the results obtained indicate that the stock is in good condition: The current estimated fishing mortality rate is likely below that which would produce MSY, and the current biomass is likely above that which would result from fishing at Fmsy in the long term (**SWO-ATL-Figure 7**). The estimated MSY (about 17,000 t) is 33% higher than current reported landings.

SWO-ATL-4. Outlook

North Atlantic

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

South Atlantic

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

SWO-ATL-5. Effects of current regulations

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

Catch limits

The total allowable catch in the North Atlantic in 2002 was 10,400 t (10,200 t retained and 200 t discarded). The reported landings in 2002 were about 9,700 t and the estimated discards were about 615 t. The total allowable catch in the North Atlantic in 2003 was 14,000 t (13,900 t retained and 100 t discarded). The reported landings in 2003 were about 11,400 t and the estimated discards were 623 t. The total allowable catch in the North Atlantic in 2004 was 14,000 t. The reported landings and discards in 2004 were about 12,200 t and 320 t, respectively. The total allowable catch in the North Atlantic remained 14,000 t in 2005, and the reported catch was 12,500 t, and the estimated discards were about 320 t. The TAC in 2006 remained 14,000 t. The North Atlantic catch in 2006 was about 11,000 t, with estimated discards of 330 t. Reports for 2006 are considered provisional and subject to change.

The total allowable catch in the South Atlantic for the years 2002 through 2006 were respectively, 14,620 t, 15,631 t, 15,776 15,956 and 16,055 t. The reported landings and discards for the same years were respectively 14,000 t, 12,500 t, 12,900 t, 13,100 t and 13,200 t. Reports for 2006 are considered provisional and subject to change.

Minimum size limits

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

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

Other implications

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

SWO-ATL-6. Management recommendations

North Atlantic

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

South Atlantic

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

Atlantic swordfish summary		
	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,133 t (12,800-14,790)[3]	~17,000t[4]
Current (2006) Yield[2]	11,445 t	13,354 t
2006 Replacement Yield	14,438 t	Not estimated
Relative Biomass (B_{2006}/B_{MSY})	0.99 (0.87 - 1.27)[3]	Likely >1
Relative Fishing Mortality		
F_{2005}/F_{MSY}[1]	0.86 (0.65 - 1.04)[3]	Likely <1
F_{2005}/F_{max}	1.2	Not estimated
$F_{2005}/F_{0.1}$	2.4	Not estimated
$F_{2005}/F_{30\%SPR}$	2.4	Not estimated
Management Measures in Effect:	Country-specific TACs [Rec. 02-02]; 125/119 cm LJFL minimum size.	TAC target [Rec. 02-03]; 125/119 cm LJFL minimum size [Rec. 02-02].

[1] Base Case production model (Logistic) results based on catch data 1950-2005.
[2] Provisional and subject to revision. If the 2006 catches for non-reporting countries were the same as 2005, the estimated catches would be 11,814 t and 13,448 t for the north and south stocks, respectively.
[3] 80% confidence intervals are shown.
[4] Provisional and preliminary, based on production model (Exponential) results based on catch data 1970-2005.

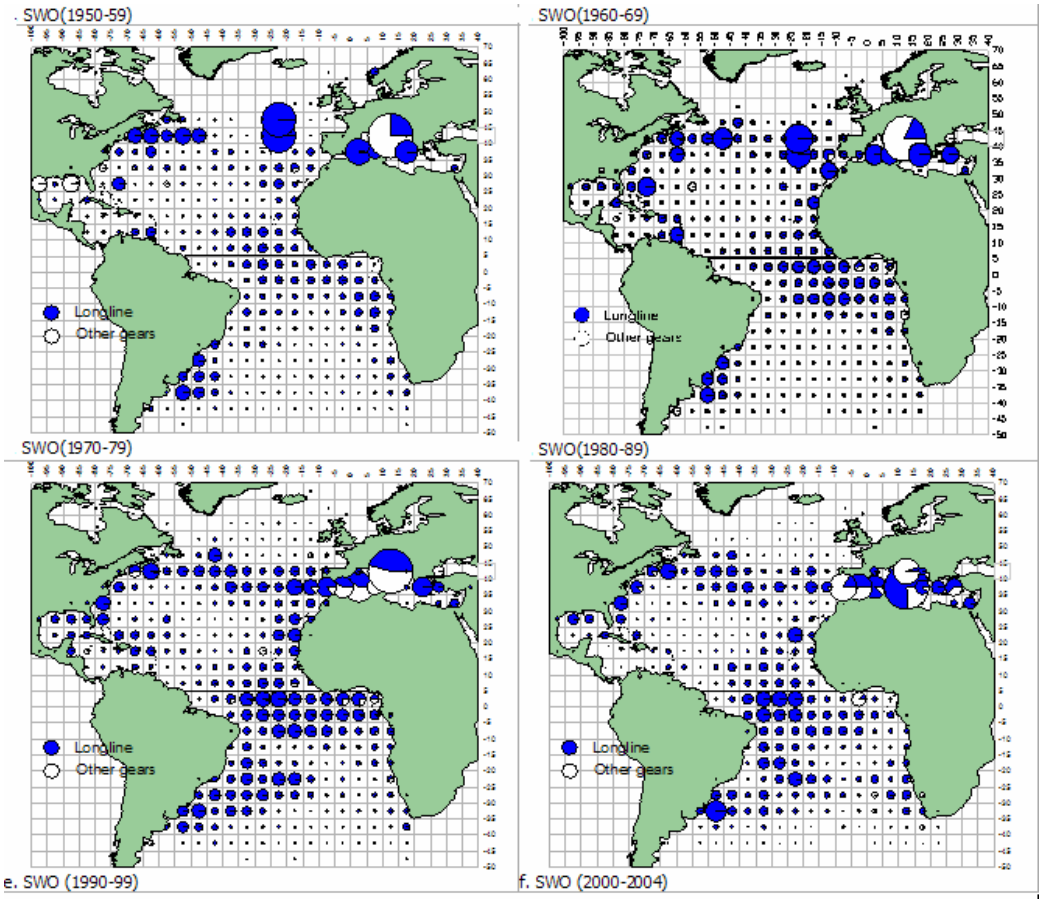
SWO-ATL-Table 1. Estimated catches (t) of Atlantic swordfish (*Xiphias gladius*) by gear and flag.

			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 Atlantic			19662	19929	21930	23969	24380	26266	32469	34098	32796	28647	29027	32659	34247	38624	33324	31432	26101	27001	27047	25019	23639	23942	25098	25700	24799
	AT.N		13215	14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16717	15475	16844	15172	12997	12195	11591	11439	10011	9654	11429	12157	12482	11445
	AT.S		6447	5402	9139	9586	5894	6030	12956	16848	17124	13713	13633	15942	18772	21780	18152	18435	13906	15410	15608	15008	13985	12513	12942	13218	13354
Landings	AT.N	Longline	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8423	8664	9986	11389	11534	10810
		Other surf.	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	687	374	820	447	615	413
	AT.S	Longline	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13720	14819	15448	14302	13577	11712	12485	12936	12834
		Other surf.	103	95	219	723	943	584	552	450	419	426	460	395	1407	974	352	175	176	586	159	706	408	801	456	282	520
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	1137	896	607	618	313	323	213
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7	10	8
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10	10	10	10	39
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	0	
		Canada	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203	1558	1404
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316	56	108	
		Chinese Taipei	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30	140	172
		Cuba	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		EC.Denmark	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	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586	5376	5521	5448
		EC.France	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102	178	92
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12	1	1	3
		EC.Italy	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.Poland	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	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320	900	949
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0	0	0	0	0
		FR.St Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3	36	48	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	0	
		Grenada	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73	56	30
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		Japan	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	575	740	740
		Korea, Republic of	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	0	51	65
		Liberia	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335	334	341
		Mexico	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32	44	41	31
		NEI (ETRO)	0	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	0	0	0	14	3	131	190	185	43	35	111	0	0	0	0	0	0	0	0	0	0	0	0	
		Norway	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	0	17	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	44	5	5	8
		Rumania	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	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0	108	108	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	22	22	7	7	7	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3	
		Trinidad and Tobago	0	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83	91	
		U.S.A.	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2380	2160	1865
		U.S.S.R.	69	0	16	13	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	5	3	3	2	0	0	1	1	
		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	4	4	
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	29	14
		Venezuela	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45	53	55	22

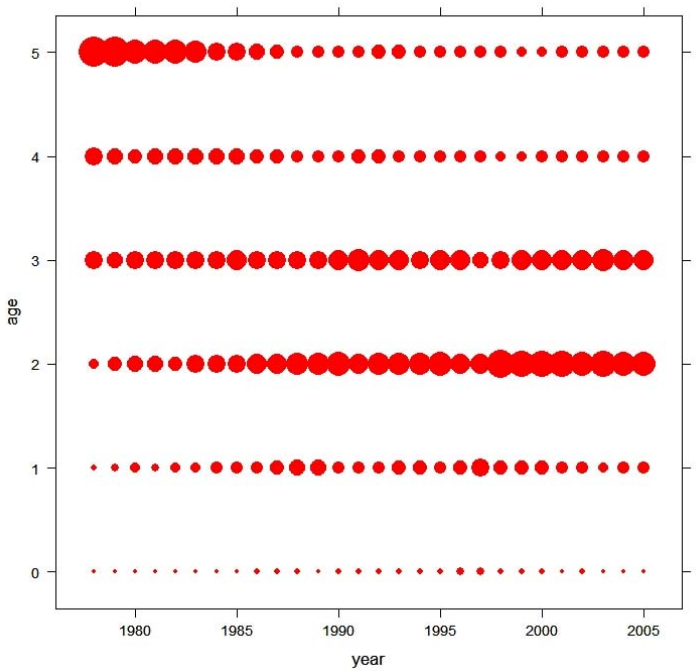
SWO-ATL. Table 1.

			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*
	AT.S	Angola	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
		Argentina	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	38	0	5	10	8	0	0	
		Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	0	0	
		Benin	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	0	0	
		Brasil	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998	3785	4430
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	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	29	534	344	200	423	353	278	91	
		Chinese Taipei	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745	744	377
		Cuba	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29	75	39
		EC.Bulgaria	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	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483	5402	5300
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345	493	440
		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	49
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	
		Ghana	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343	55	32
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	
		Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	0	0	0	
		Japan	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	790	685	833	924	686	501	501
		Korea, Republic of	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	24	70	36	94
		Liberia	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	0	0	0	0	0	0	
		Mixed flags (FR+ES)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	856	439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730	469	751	504	191	549	832	1118
		Nigeria	0	83	69	0	0	0	0	0	0	0	3	0	0	0	9	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	0	105	0	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	8	1	1	4
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	0	0	0	147	138
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	
		South Africa	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295	199	186
		Togo	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	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	171	396	160	179	142	43	200	21	15	0	
		U.S.S.R.	26	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	
		Uruguay	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105	843	620
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	26
Discards	AT.N	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45	106	38
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	598	567	319	263	0	0	
		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
		U.S.A.	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	308	263	282	275	227	183
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	0	

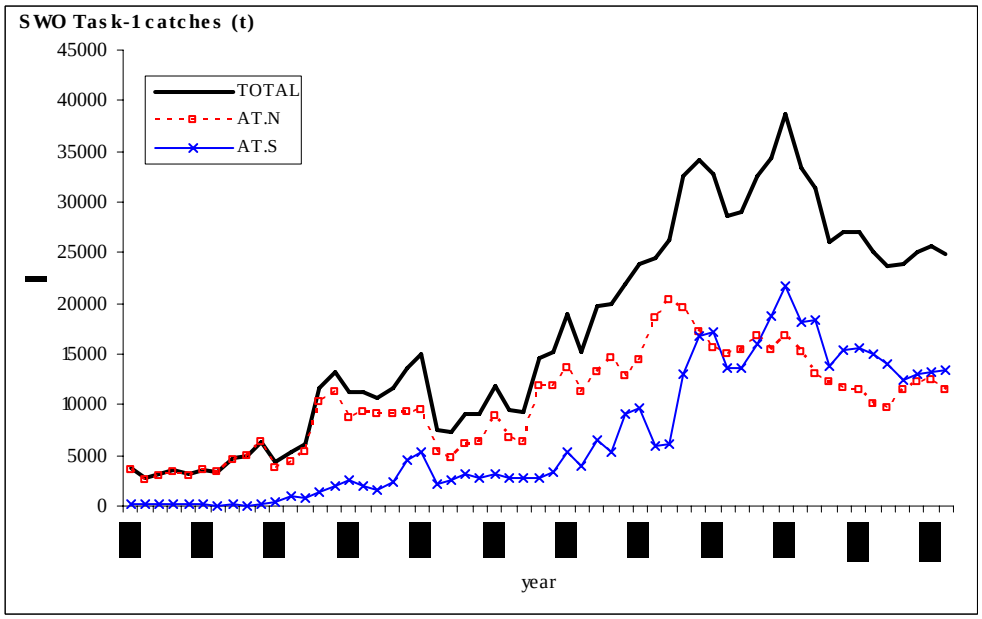
* An estimated Total Yield of 11,814 t for the SWO-ATL.N stock and, 13,448 t for the SWO-ATL.S stock is obtained if 2005 figures of non-reporting flags in 2006 (shaded cells) are carried over to 2006.



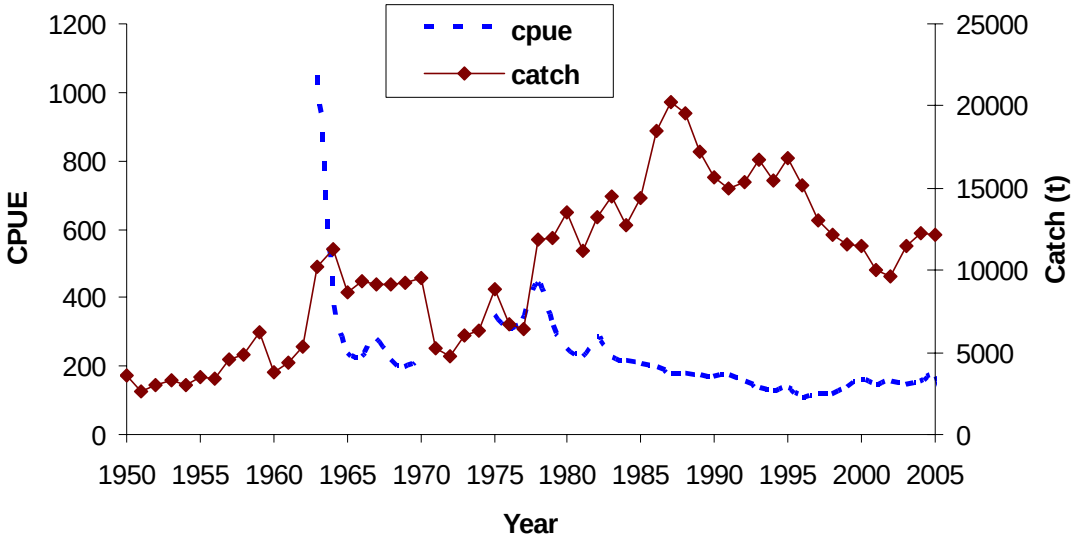
SWO-ATL Figure 1. Geographical distribution of swordfish cumulative catch (t) by gear, in the Convention area. The period 1970-1979 is shown in the top left panel, 1980-1989 is shown on the top right panel, 1990-1999 is shown on the bottom left, and the more contemporary period 2000 to 2004 is shown on the bottom right.



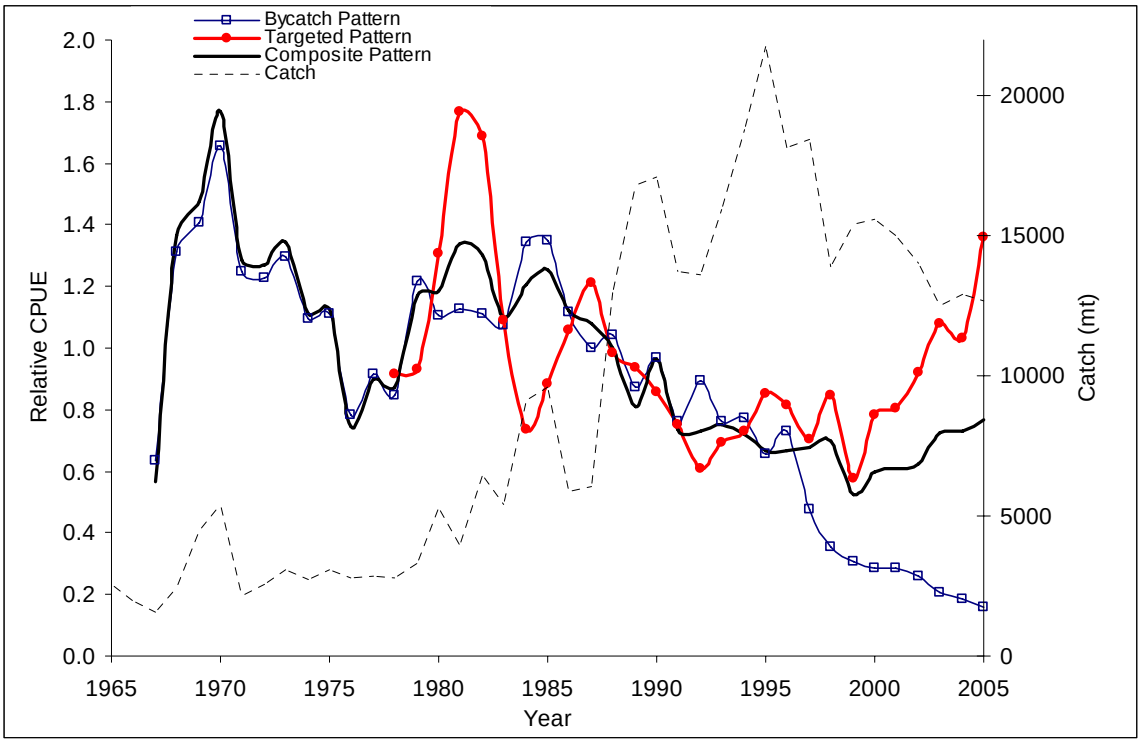
SWO-ATL Figure 2. Catch at age, in numbers, of North Atlantic swordfish, with the area of the filled circle showing proportional catch at age. Note: Age 5 is a plus group.



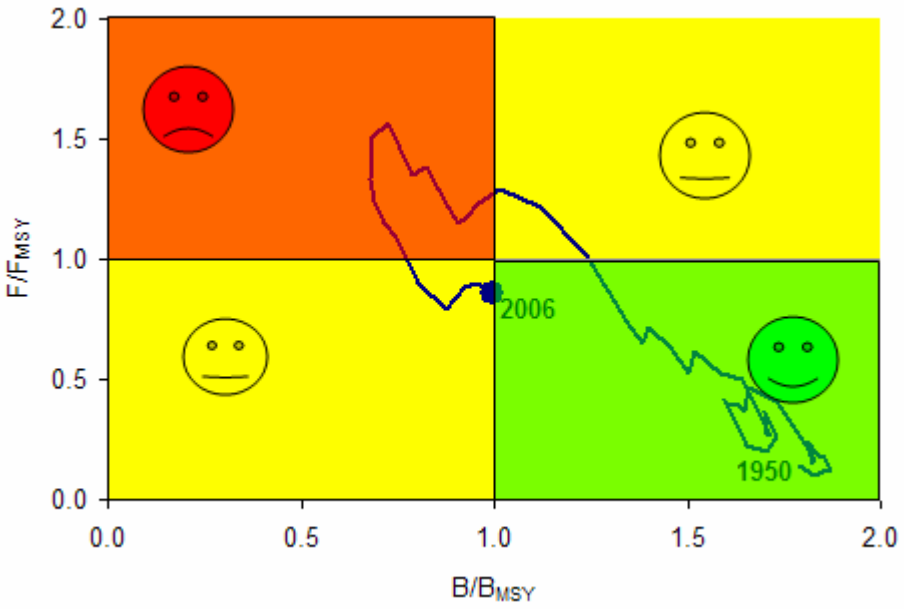
SWO-ATL Figure 3. Swordfish catches for North, South and total Atlantic, in tons, for the period 1950-2006.



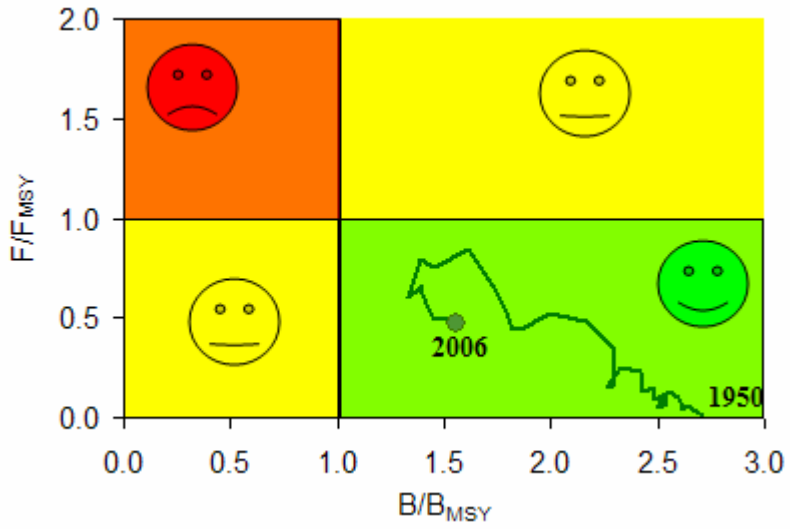
SWO-ATL Figure 4. Estimated catches of north Atlantic swordfish (in t, including discards) for 1950-2005, and the combined CPUE index based on weight.



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



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



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

8.9 SWO-MED-MEDITERRANEAN SWORDFISH

The most recent assessment was conducted in 2007, making use of catch and effort information through 2005. The present report focuses on results of the assessment; readers interested in a more complete summary of the state of knowledge on Mediterranean swordfish should consult the report of the 2007 stock assessment session. Notably for this assessment, catch and effort data ranging back to 1950 were further investigated and analyzed. This has led to an improved capacity to evaluate the state of the stock relative to MSY benchmarks.

SWO-MED-1. Biology

Research results have demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic ones, although there is incomplete information on stock mixing and boundaries. However, mixing between stocks is believed to be low and generally limited to the region around the Straits of Gibraltar.

According to previous knowledge, the Mediterranean swordfish have different biological characteristics compared to the Atlantic stock. The growth parameters are different, and the sexual maturity is reached at younger ages than in the Atlantic, although more recent information for the Atlantic indicates that these differences may be smaller than was previously thought. In the Mediterranean, mature females as small as 110 cm LJFL have been observed and the estimated size at which 50% of the female population is mature occurs at about 140 cm. According to the growth curves used by SCRS in the past for Mediterranean swordfish, these two sizes correspond to 2 and 3.5 year-old fish, respectively. Males reach sexual maturity at smaller sizes and mature specimens have been found at about 90 cm LJFL. Based on the fish growth pattern and the assumed natural mortality rate of 0.2, the maximum yield would be obtained through instantaneous fishing at age 6, while current catches are dominated by fish less than 4 years old.

SWO-MED-2. Fishery indicators

Annual catch levels have been rather stable in the last decade, fluctuating between 12,000-16,000 t. Those levels are relatively high and similar to those of bigger areas such as the North Atlantic. This could be related to higher recruitment levels in the Mediterranean than in the North Atlantic, different reproduction strategies (larger spawning areas in relation to the area of distribution of the stock) and the lower abundance of large pelagic predators (e.g. sharks) in the Mediterranean. Updated information on Mediterranean swordfish catch by gear type is provided in **SWO-MED-Table 1** and **SWO-MED-Figure 1**. The total 2005 catch is estimated to exceed 14,000 t, while 2006 catch data are largely incomplete. A final figure for recent years cannot be given as the currently available Task I data do not include all Mediterranean countries. The biggest producers of swordfish in the Mediterranean Sea in recent years are EC-Italy, Morocco, EC-Spain and EC-Greece. Also, Algeria, EC-Cyprus, EC-Malta, EC-Portugal, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Minor catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Egypt, Israel, Lebanon, Monaco and Syria, but the data are not reported to ICCAT or FAO.

Mediterranean swordfish landings showed an upward trend from 1965-1972, stabilized between 1973-1977, and then resumed an upward trend reaching a peak in 1988 (20,365 t; **SWO-MED-Table 1, SWO-MED-Figure 1**). The sharp increase between 1983 and 1988 may be partially attributed to improvement in the national systems for collecting catch statistics. Since 1988, the reported landings of swordfish in the Mediterranean Sea have declined, and in the last decade, they have fluctuated between about 12,000 to 16,000 t.

The main fishing gears used are surface longline and gillnets. Minor catches are also reported from harpoon, trap and recreational fisheries. Surface longlines are used all over the Mediterranean, while gillnets are still used in some areas and there are also countries known to be fishing with gillnets but not reporting their catches. However, following ICCAT recommendations for a general ban of driftnets in the Mediterranean, the gillnet fleet has been decreasing, although the total number of vessels cannot be determined from ICCAT statistics.

Preliminary results of a study presented during the 2006 SCRS meeting indicated that selectivity of the surface longline targeting swordfish was more affected by the type and size of the bait, the depth of the set and the distance between branch lines rather than the type (circular vs J-shaped) and the size of the hook. In general, American-style longlines capture less juvenile fish than the traditional Mediterranean longline gear, while a significant reduction of swordfish catches was found when using circle hooks.

There is even still a high and growing demand for swordfish for fresh consumption in most Mediterranean countries.

SWO-MED-3. State of the stocks

Two forms of assessment gave a consistent view of declining stock abundance, but differed in the extent of the decline, in the sense that some models suggested relatively modest changes in the last decade. Estimates of population status from production modelling using a longer time-series of catch and effort (a series for which we have less confidence) indicated a 2005 stock level that was most likely about 13% below that necessary to achieve the ICCAT Convention objective while recent fishing mortality was about 25% above the level that would permit the stock to attain MSY levels. The results of the production model assessment indicate that the fishery underwent a rapid expansion in the 1980s resulting in F's likely at or above F_{MSY} and a slowly declining stock biomass which has recently most likely fallen below the level which can support MSY. Estimates of stock status from virtual population analysis using a shorter time series of catch and effort data, for which we have more confidence, indicated about a 40% reduction in spawning stock level but stable recruitment over the past 20 years. That spawning stock level is less than half that necessary to achieve the ICCAT Convention objective and estimates of recent fishing mortality rates from this form of assessment are more than twice that which, if continued without abatement, is expected to drive the spawning biomass to a very low level (about 10% SPR) within a generation. Those low levels are considered to give rise to non- negligible risks of rapid declines in the stock although such a signal has not yet been observed in the Mediterranean swordfish fisheries (**SWO-MED-Figures 2 and 3**).

The Committee again noted the large catches of small size swordfish, i.e., less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches. Fish less than three years old usually represent 50-70% of the total yearly catches in terms of numbers and 20-35% in terms of weight **(SWO-MED-Figure 4)**. A reduction of the volume of juvenile catches would improve yield per recruit and spawning biomass per recruit levels.

SWO-MED-4. Outlook

The assessment of Mediterranean swordfish indicates the stock is below the level which can support MSY and that current fishing mortality exceeds F_{MSY}. The degree to which biomass is below B_{MSY} and F is above F_{MSY} differs between assessment models. Overall results indicate fishing mortality (and near-term catches) needs to be reduced to move the stock toward the Convention objective of biomass levels which could support MSY and away from levels which are considered to result in non-negligible risks of rapid stock decline. While one modelling approach indicates the current stock status is only about 13% below B_{MSY}, it also indicates that future catches in excess of 12,000 t will not result in improvement in stock status. In contrast, the modelling approach that provides a more pessimistic view of current status at less than half B_{MSY} indicates future catches that allow rebuilding are somewhat higher, up to about 14,000 t, assuming that the current high selectivity for juvenile fish continues and recruitment does not improve (**SWO-MED-Figure 5**).

Provisional seasonal closure projections based on highly-aggregated data and which assume no compensation in effort, no interaction with other management actions in place, and an improvement in recruitment with increasing spawning stock biomass (SSB), are forecast to be beneficial in moving the stock condition closer to the Convention objective, resulting in increased catch levels in the medium term, and reductions in the volume of juvenile catches. However, seasonal closures, especially the longer ones, would result in significant catch reductions within the first few years after their application. A six-month (September through February) closure of the Mediterranean to swordfish fishing is projected to permit the stock to rebuild to about MSY levels within a generation (about 7 years). A four-month closure (October-January) projects some improvement in SSB, to about 65% of B_{MSY} within a generation. A two-month closure (October-November) projects a much smaller gain in SSB to about 50% of $B_{MSY.}$ These effects would be diminished if closure is applied in months of low fishing activity (December-January). Results of the seasonal closure projections are summarized in **SWO-MED-Figure 6**.

SWO-MED-5. Effects of current regulations

Although ICCAT has no specific regulatory measures for Mediterranean swordfish fisheries, several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems. The EC introduced a driftnet ban in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. Rec. 04-12 forbids the use of various types of nets and longlines for sport and recreational fishing for tuna and tuna-like species in the Mediterranean.

In past meetings, the Committee has reviewed the various measures taken by member countries and noted the difficulties in implementing some of the management measures, particularly that of minimum landing size.

SWO-MED-6. Management recommendations

The Commission should adopt a Mediterranean swordfish fishery management plan with the goal of rebuilding the stock to levels that are consistent with the ICCAT Convention objective. One technical measure the Committee has thus far evaluated is Mediterranean – wide fishing closures during the recruitment period (see section 4), which could initiate rebuilding, depending on their duration and timing. The Committee recommends the Commission consider adoption of such measures which will move the stock condition to the level which will support MSY.

Following the results from recent studies (SCRS/2006/163), technical modifications of the longline fishing gears as well as the way they are operated can be considered as an additional technical measure in order to reduce the catch of juveniles. The Committee recommends this type of measures be considered as part of a Mediterranean swordfish management plan.

The Committee recognizes the limitations of the analyses of minimum size and seasonal closure scenarios that have been conducted to date. Further, the Committee recommends that national scientific delegations conduct additional research into technical measures and time-area closures which could optimize protections of juvenile Mediterranean swordfish.

It is evident from the stock status evaluation that the current capacity in the Mediterranean swordfish fishery exceeds that needed to efficiently extract MSY. Management measures aimed at reducing this capacity should also be considered part of a Mediterranean swordfish management plan adopted by the Commission.

MEDITERRANEAN SWORDFISH SUMMARY

Maximum Sustainable Yield	14,250-15,500 [1]
Current (2005) Yield[2]	14,600 t
Current (2007) Replacement Yield	~12,000-14,000 t[1]
Relative Biomass (B_{2005}/B_{MSY})	0.26-0.87 [1]
Relative Fishing Mortality	
F_{2005}/F_{MSY}	1.3 (0.6-2.5) [3]
F_{2005}/F_{MAX}	2.9 (2.4->5) [4]
$F_{2005}/F_{0.1}$	4.6 (3.7->5)[4]
$F_{2005}/F_{20\%SPR}$	3.0 (2.6->5)[4]
$F_{2005}/F_{30\%SPR}$	4.2 (3.6->5) [4]
Management measures in effect	No ICCAT regulations[5]

[1] Range indicated is median estimates from production models and age-structured models. The uncertainty in the estimates is broader than indicated.

[2] The 2006 reported catch is considered incomplete and too provisional to use in this table.

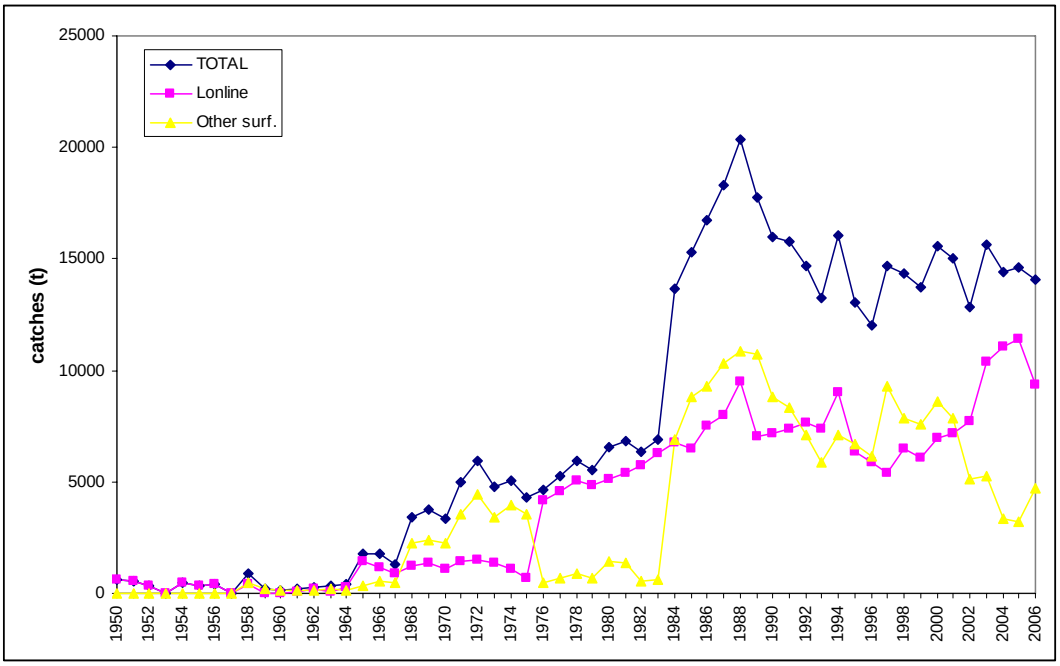
[3] Based on production model analysis using a long time series of catch effort data for which we have less confidence, range represents approximate 80% confidence region for the model assumptions.

[4] Based on age-structured analysis using a shorter times-series of catch effort data for which we have greater confidence, range represents approximate 80% confidence region for the model assumptions.

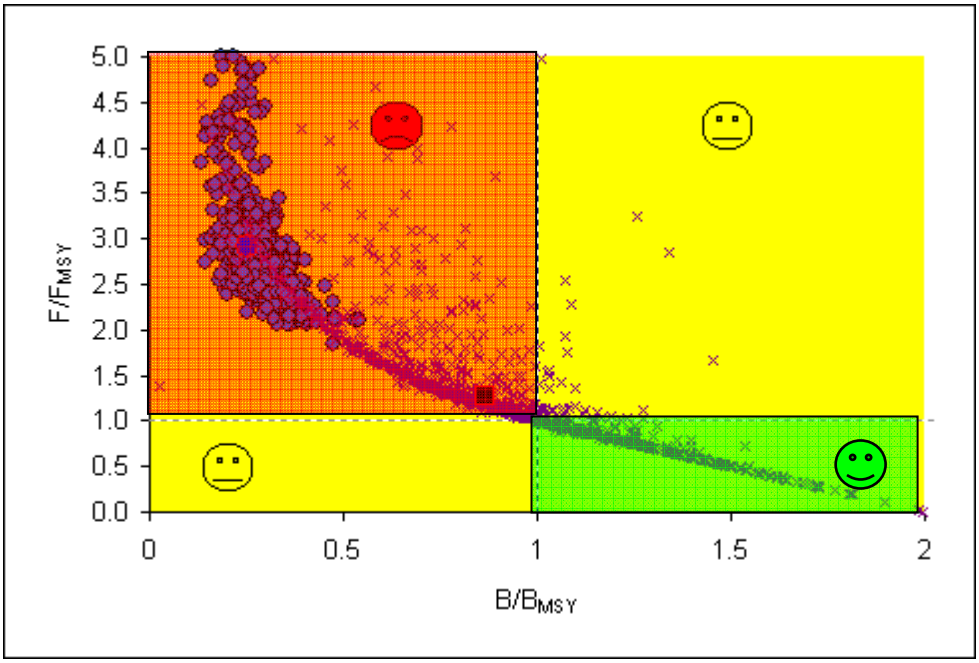
[5] Various technical measures, such as closed areas, minimum size regulations and effort controls are implemented at the national level.

SWO-MED-Table 1. Estimated catches (t) of swordfish (*Xiphias gladius*) in the Mediterranean sea by gear and flag.

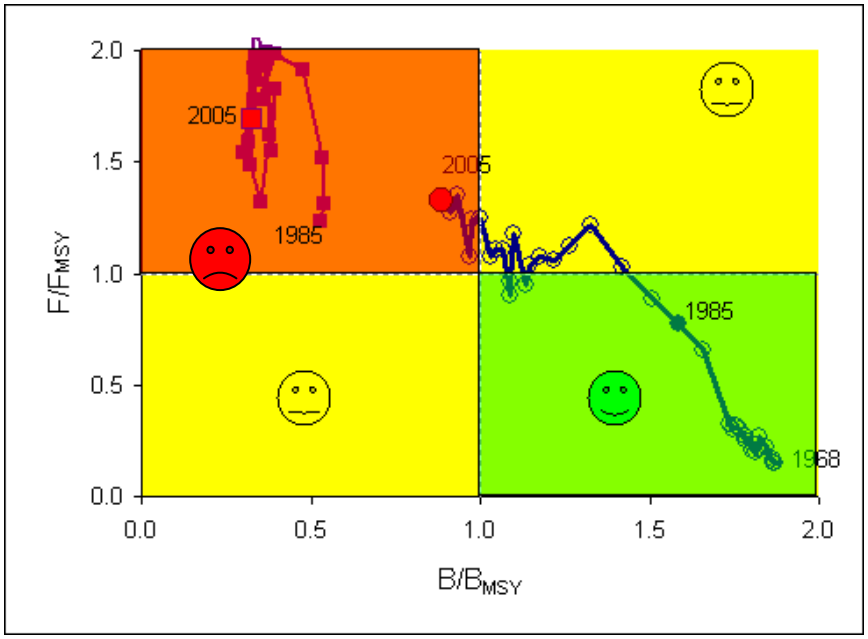
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL		6343	6896	13666	15292	16765	18320	20365	17762	16018	15746	14709	13265	16082	13015	12053	14693	14369	13699	15569	15006	12814	15674	14405	14600	14047
Landings	Longline	5770	6313	6749	6493	7505	8007	9476	7065	7184	7393	7631	7377	8985	6319	5884	5389	6496	6097	6963	7180	7697	10415	11053	11274	9354
	Other surf.	573	583	6917	8799	9260	10313	10889	10697	8834	8353	7078	5888	7097	6696	6169	9304	7873	7602	8606	7826	5117	5259	3343	3214	4693
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	
Landings	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	0	0	0	0	
	Algerie	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	665	564	635	702
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	0	0	0	0	
	Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0	0	0	
	EC.Cyprus	103	28	63	71	154	84	121	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49	53	43
	EC.España	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	1226	951	910	1592
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	0	19	0	
	EC.Greece	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120	1311	1358
	EC.Italy	2939	3026	9360	10863	11413	12325	13010	13009	9101	8538	7595	6330	7765	7310	5286	6104	6104	6312	7515	6388	3539	8395	6942	7460	7626
	EC.Malta	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195	362	239
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120	14	16
	Japan	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	4	2	1	1	0	2	4	4
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	0	10	2	0	
	Maroc	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253	2523	2057
	NEI-2	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Tunisie	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	791	791	
	Turkey	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	370	360	370	350	386	425	410
Discards	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	113	



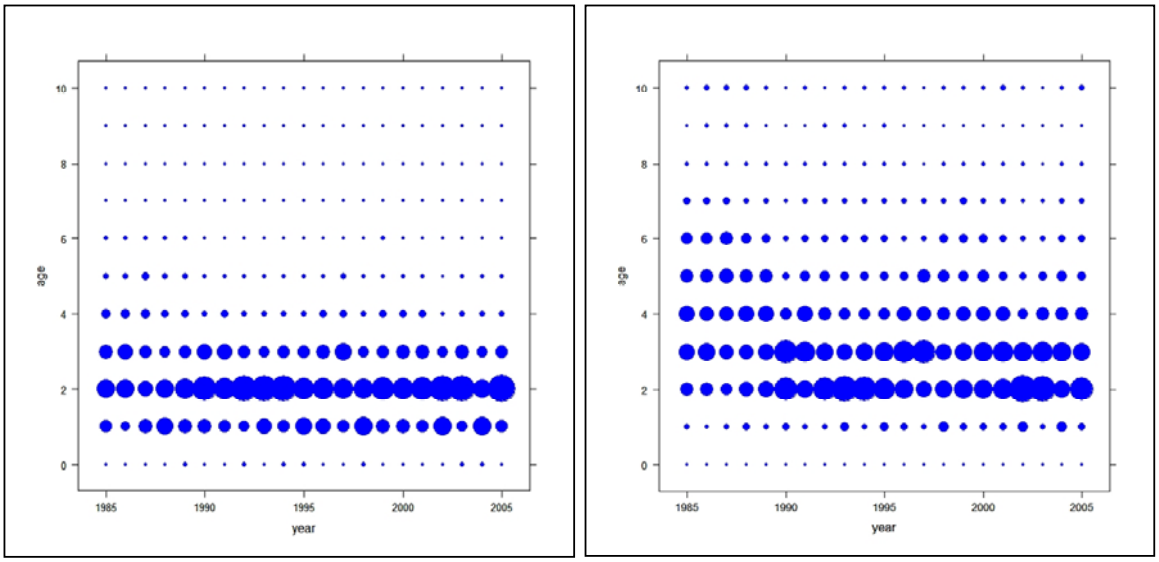
SWO-MED-Figure 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2005.



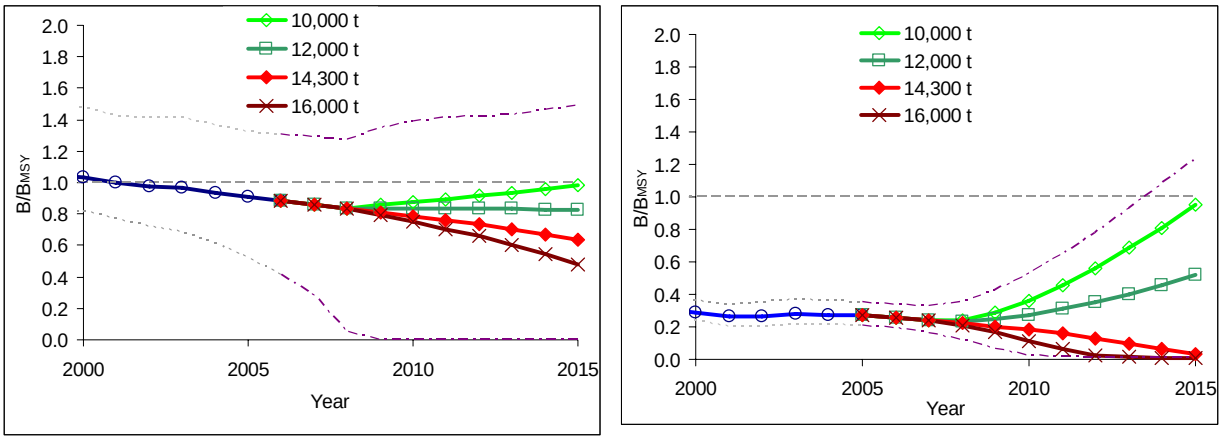
SWO-MED-Figure 2. Current (2005) stock status (B/B_{MSY} and F/F_{MSY}) outcomes from production model analysis (crosses) of a long time-series of catch and effort data for which we have less confidence and from age structured analysis (solid circles) of a shorter time-series of catch-effort data for which we have more confidence. The median outcome from the production model analysis is shown as a large solid square and that of the age-structured analysis, a large solid circle.



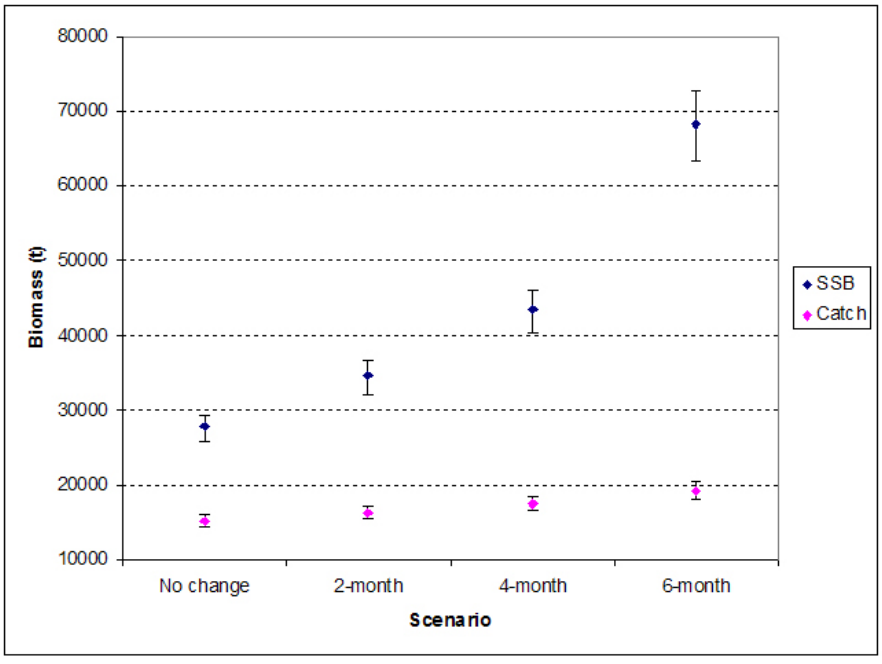
SWO-MED-Figure 3. Time trend for stock status (B/B_{MSY} and F/F_{MSY}) outcomes from production model analysis (circles) of a long time-series of catch and effort data for which we have less confidence and from age structured analysis (squares) of a shorter time-series of catch-effort data for which we have more confidence. The 2005 outcome from the production model analysis is shown as a large solid circle and that of the age-structured analysis, a large solid square. The beginning and ending years for the time-series shown are indicated for each form of analysis.



SWO-MED-Figure 4. Proportion of catch numbers (left) and catch weight (right) at age by year.



SWO-MED-Figure 5. Median forecasts of stock status from production model analysis (left) and age-structured analysis (right) for different levels of future constant catch, as indicated, starting in year 2008. The dashed horizontal at a biomass ratio of 1 represents the ICCAT Convention objective of B_{MSY}. Confidence bounds (80%) for the projections are also indicated as broken, irregular lines.



SWO-MED-Figure 6. Median SSB and annual catch levels with the associated 80% confidence limits as predicted by the seasonal closure scenarios. These results assume increasing levels of recruitment with increased levels of spawning stock biomass, which is not well demonstrated for Mediterranean swordfish. Estimates refer to the last ten years of the projection period, i.e. after stabilization.

8.10 SBF - SOUTHERN BLUEFIN TUNA

Southern bluefin tuna stock status is reviewed by the Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). In 2007, CCSBT will not be issuing a stock status report until after its annual meeting, which will take place after SCRS. For this reason, no Executive Summary for southern bluefin tuna is included in this Report.

8.11 SMT - SMALL TUNAS

SMT-1. Biology

Small tunas include the following species:

- Blackfin tuna (*Thunnus atlanticus*) – BLF
- Bullet tuna (*Auxis rochei*) – BLT
- Bonito (*Sarda sarda*) – BON
- Plain bonito (*Orcynopsis unicolor*) – BOP
- Serra Spanish mackerel (*Scomberomorus brasiliensis*) – BRS
- Cero (*Scomberomorus regalis*) – CER
- Frigate tuna (*Auxis thazard*) – FRI
- King mackerel (*Scomberomorus cavalla*) – KGM
- Scomberomorus unclassified (*Scomberomorus* spp.) – KGX
- Atlantic black skipjack (*Euthynnus alletteratus*) – LTA
- West African Spanish mackerel (*Scomberomorus tritor)* – MAW
- Atlantic Spanish mackerel (*Scomberomorus maculatus)* – SSM
- Wahoo (*Acanthocybium solandri*) – WAH

Knowledge on the biology of small tunas is very fragmented and not all the information available has been presented at this meeting. Furthermore, the quality of the knowledge is very different according to the species concerned. This is due in large part because many of these species are considered to have little economic importance to the Atlantic tuna fleets, and to the difficulties to conduct sampling of the landings from artisanal fisheries, which constitute a high proportion of the fisheries exploiting small tuna resources. The large industrial fleets often discard small tuna catches at sea or sell them on local markets mixed with other by-catches, especially in Africa. The amount caught is rarely reported in logbooks. Scientific collaboration amongst sub-regions may help to advance understanding of the biology of these species.

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean and some even in the Mediterranean Sea and the Black Sea. They often form large schools with other small sized tunas or related species in coastal and high seas waters. They have a varied diet with a preference for small pelagics (e.g., clupeids, mullets, carangids and ammodytes), crustaceans, mollusks and cephalopods. The reproduction period varies according to species and spawning generally takes place near the coast, where the waters are warm. The growth rate currently estimated for these species is very rapid for the first two or three years, and then slows as these species reach size-at-first maturity. Furthermore, these species are mainly coastal ones and seem to show no large migrations.

New information was submitted on age and growth for three species (bullet tuna, Atlantic little tuna and Atlantic bonito) from the trap fishery in the Western Mediterranean based on spine readings. For bullet tuna the results confirmed previous studies in the area. As regards Atlantic little tuna and Atlantic bonito some differences were detected as compared to previous studies.

New information was also submitted on the Atlantic black skipjack population structure in the Central-Eastern and South-Eastern Atlantic Ocean.

SMT-2. Description of the fisheries

Small tunas are exploited mainly by coastal fisheries and often by artisanal fisheries, although substantial catches are also made as target species and as by-catch, by purse seine, mid-water trawlers (i.e., pelagic fisheries of West Africa-Mauritania), handline and small scale gillnet. Unknown quantities of small tuna also comprise the incidental catches of some longline fisheries. The increasing importance of FAD fisheries in the Eastern Caribbean has improved the efficiency of artisanal fisheries in catching small tunas. Various species are also caught by the sport fisheries.

SMT-Table 1 shows historical landings of small tunas for the 1980 to 2006 period although data for last year are preliminary. This table does not include species reported as “mixed” or “unidentified”, as was the case in previous years, since these categories include large tuna species. There are more than 10 species of small tunas, but only five of these account for about 86% of the total reported catch by weight each year. These five species are: Atlantic bonito *(Sarda sarda),* frigate tuna *(Auxis thazard* which may include some catches of *Auxis rochei),* Atlantic black skipjack *(Euthynnus alletteratus),* king mackerel *(Scomberomorus cavalla),* and Atlantic Spanish mackerel *(Scomberomorus maculatus)* **(SMT-Figure 2)**. In 1980, there was a marked increase in reported

landings compared to previous years, reaching a peak of about 139,412 t in 1988 **(SMT-Figure 1)**. Reported landings for the 1989-1995 period decreased to approximately 87,941 t, and then an oscillation in the values in the following years up to 2006. Overall trends in the small tuna catch may mask declining trends for individual species because annual landings are often dominated by the landings of a single species. These fluctuations seem to be related to unreported catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch.

A preliminary estimate of the total nominal landings of small tunas in 2006 is 27,536 t. The Committee pointed out the relative importance of small tuna fisheries in the Mediterranean Sea, which account for about 26% of the total reported catch in the 1980-2006.

In order to improve statistics, cooperation with FAO has continued and FAO figures continue to be incorporated into the ICCAT database for small tuna species where no report is received by ICCAT. Notwithstanding, this procedure should be carried out with caution since in some fisheries the problem of mixed species has been detected.

Despite the recent improvements in the statistical information provided to ICCAT by some countries, the Committee also noted that uncertainties remain regarding the accuracy and completeness of reported landings in all areas, including the Mediterranean. There is a general lack of information on the mortality of these species as by-catch, exacerbated by the confusion regarding species identification.

SMT-3. State of the stocks

There is little information available to determine the stock structure of many small tuna species. The Committee suggests that countries be requested to submit all available data to ICCAT as soon as it is possible, in order to be used in future meetings of the Committee.

Generally, current information does not allow the Committee to carry out an assessment of stock status of the majority of the species. Nevertheless, few regional assessments have been carried out. Gulf of Mexico and South Eastern United States Atlantic king mackerel were assessed in 2004. During the period 2004-2007, the CRFM undertook assessments of the Spanish mackerel, king mackerel and wahoo fisheries operating within the southeastern Caribbean. Further progress in the CRFM assessments requires improvements in statistics and estimation of key biological parameters, as well as close collaboration with neighbouring non-CRFM countries sharing these fisheries within the sub-region.

SMT-4. Outlook

The results of an ICCAT questionnaire circulated in 1996 indicate that the small tuna fisheries are very diverse and complex, involving both artisanal and industrial fisheries that employ a large variety of gears, as well as different types and sizes of vessels. The results also indicate that data collection and research, including size sampling, age and growth research, and studies on maturity and tagging, are being conducted by several countries. However, the results of these studies are often not reported to ICCAT.

Catch and effort statistics for small tunas remain incomplete for many of the coastal and industrial fishing countries. There is also a general lack of available biological information needed to assess the stocks of most of these species. On the other hand, many of these species are of importance to coastal fishermen, especially to some developing countries, both economically and as a source of protein. The Committee therefore recommends that studies be conducted on some of these species due to the small amount of information that is available to the species group. The Committee reiterates its previous recommendations on carrying out studies to determine the state of these stocks and the best way to manage them. Probably, such studies would be more effective if they are carried out at the local or sub-regional level.

SMT-5. Effects of current regulations

There are no ICCAT regulations in effect for these species of small tunas.

SMT-6. Management recommendations

Based on the information available for the major part of the stocks, the Committee recommends that these species be managed at the regional or sub-regional level.

CRFM analyses of eastern Caribbean stocks have been limited by the quality and quantity of the available data, and in view of this, changes in current management approaches have not yet been recommended.

SMT-Table 1. Estimated landings (t) reported to ICCAT for small tunas species by region and flag.

			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
BLF TOTAL			1941	1738	1908	1403	2822	3462	3322	2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2358	4034	4756	1303	1926	1031	1737
	Brasil		89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1	118	91	242
	Cuba		622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0	0	
	Dominica		0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42	20	38	47
	Dominican Republic		144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0	0	0	0	
	EC.España		0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.France		842	809	821	755	729	669	816	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0	0	
	Grenada		143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268	306	371
	Jamaica		0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0	0	
	Liberia		0	0	0	0	0	0	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mexico		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	10	9	10	10
	NEI (ETRO)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
	Netherlands Antilles		55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0	0	0	
	St. Vincent and Grenadines		0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0	0	
	Sta. Lucia		0	0	0	0	0	2	1	1	17	14	13	16	82	47	35	40	100	41	45	108	96	169	96	126	
	Trinidad and Tobago		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	5	
	U.S.A.		41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	334	414	675	225	821
	UK.Bermuda		5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9	4	5	8
	Venezuela		0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1902	1210	319	732	225	237
BLT TOTAL			0	0	0	0	2	0	357	723	3634	2206	814	394	177	100	0	0	28	579	1230	1577	950	1348	402	930	1920
	EC.Portugal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231	300	791	867
	Russian Federation		0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468	128	102	139	22
	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	
	Tunisie		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989	0	0	
	Turkey		0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316	0	0	0	1031
	U.S.A.		0	0	0	0	2	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	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BON TOTAL			41106	42386	21907	24905	21320	29712	46382	29721	28941	33561	22025	30584	21505	20841	24692	24641	39937	36196	28306	28533	25400	14228	13875	77067	35471
	ATL TOTAL		12169	6840	6849	6946	5892	7395	22354	17766	6844	8306	6914	4587	5823	5652	7497	10563	10207	8026	6334	6297	9684	3112	2975	2692	3820
		Angola	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118	0	0	138	
		Argentina	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	138	108	130	12	68	19	235	1	129	269	110	
		Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	
		Benin	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0	0	90	
		Cuba	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	16
		EC.Bulgaria	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23	9	2	15
		EC.Estonia	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	587	547	569	492	431	331	395	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0	0	0	
		EC.Germany	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0	0	0	
		EC.Greece	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.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	
		EC.Latvia	0	0	0	0	0	0	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	793	0	0	0	
		EC.Poland	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0	0	
		EC.Portugal	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40	50	38	318
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	0	35
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0	0	
		Georgia	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Germany Democratic Rep.	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	71	13	8	10	0	943	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	24	6	14	16	7	10	10	0	0	0	
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	
		Maroc	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928	989	1411	1744
		Mexico	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	1632	1861	1293	1113	1032	1238	1066	654	1303
		Netherlands Antilles	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	0	0	2	0	0	0	0	0	
		Rumania	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0	0	0	0	

SMT. Table 1.

			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
		Russian Federation	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441	461	16	79	316
		Senegal	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441	0	159	0	
		Sierra Leone	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	11	245	44	0	0	0	
		South Africa	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	15	18	0	16
		Sta. Lucia	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0	1	0	
		Togo	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	452	188	280	81	
		U.S.A.	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44	70	68	39
		U.S.S.R.	6329	2375	1290	2073	1085	1083	8882	7363	706	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		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	
		UK.Turks and Caicos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ukraine	0	0	0	0	0	0	1385	985	0	0	25	0	0	0	0	342	2786	1918	1114	399	231	1312	30	0	0
		Uruguay	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13	0	16	18
	MEDI TOTAL		28937	35546	15058	17959	15428	22317	24028	11955	22097	25255	15111	25997	15682	15189	17195	14078	29730	28170	21972	22236	15716	11117	10900	74375	31651
		Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	
		Algerie	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	0	609	575	684
		Croatia	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	0	0	0	0	0	0	
		EC.Bulgaria	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35	0	0	0	
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	10	6	4	3
		EC.España	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544	272	215	429
		EC.France	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27	0	0	0	
		EC.Greece	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	1538	1321	1390	845
		EC.Italy	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091	2009	1356	
		EC.Malta	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0	0	0	
		Egypt	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	0	0	0	
		Libya	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	71	92	75	57	51	127	108	28	69	69	31	25	93	37	67	45	39	120	115	5	61	85	78	38	
		NEI-2	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	0	0	0	0	0	0	0	0	
		Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Serbia & Montenegro	0	0	0	0	0	0	0	0	0	45	0	3	2	6	10	12	12	14	17	17	0	0	0	0	
		Tunisie	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	848	1251	0	
		Turkey	23397	29034	7220	12281	10756	16793	17613	4667	14737	19151	8863	19548	10093	8944	10284	7810	24000	17900	12000	13460	6286	6000	5354	70797	29690
		U.S.S.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	
		Yugoslavia Fed.	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BOP TOTAL	BOP		584	38	49	133	87	564	1482	1116	457	588	600	601	775	640	2136	476	159	844	1193	984	917	729	513	139	3
	ATL TOTAL		584	38	49	124	86	538	1474	1109	420	487	424	349	599	525	2004	249	29	627	1048	830	780	706	506	137	3
		Benin	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0	0	
		EC.Portugal	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	3
		Maroc	483	0	0	83	33	487	1422	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780	706	503	132	
		Mauritania	99	37	40	40	50	50	50	50	50	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	0	0	0	0	0	0	0	0	0	0	0	3	0	
	MEDI TOTAL		0	0	0	9	1	26	8	7	37	101	176	252	176	115	132	227	130	217	145	154	137	23	8	2	
		Algerie	0	0	0	0	0	0	0	0	0	87	135	198	153	92	119	224	128	216	135	145	128	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	1	
		Libya	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	0	0	0	9	1	26	8	7	37	14	1	14	23	23	13	3	2	1	10	9	9	20	7	1	
		Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	
BRS TOTAL			6019	6632	8129	3501	6549	6212	9510	10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	5137	3410	3712	1809
		Brasil	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881	814	471	1432
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	389	494	521	377
		Trinidad and Tobago	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472	1867	2103	2720	
		Venezuela	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	0	0	0	
CER TOTAL			687	677	680	574	500	392	219	234	225	375	390	450	490	429	279	250	250	0	3	5	1	2	1	1	1
		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	1
		Dominican Republic	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0	0	0	
		EC.France	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	1	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	3	5	1	2	0	1	

SMT. Table 1.

			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
FRI TOTAL			25240	21690	25903	22876	20306	23407	25151	21416	23333	15424	8026	11209	10477	9870	17809	16519	14446	12615	12307	14465	15547	5192	8394	4675	4813
	ATL TOTAL	ATL	19197	15870	19566	17636	15249	19667	19025	15029	14973	8853	3125	8182	5354	5569	11900	13449	12160	10548	9613	10223	10447	2742	2863	2187	2852
		Angola	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38	0	0	0	
		Argentina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860	414	532	603
		Cape Verde	0	0	0	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	278	321	0	0	160
		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	4	170
		EC.Bulgaria	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635	34	166	73
		EC.Estonia	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	0	168	47	6
		EC.Latvia	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4	6	0	3
		Germany Democratic Rep.	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	151
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	
		Japan	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	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184	542	61	247
		Mixed flags (FIS)	1984	2800	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	0	0	0	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768	0	0	0	
		NEI (ETRO)	0	333	46	0	0	17	381	155	237	1	4	32	68	70	180	120	309	491	291	420	186	71	180	297	149
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	505	474	0	150
		Panama	0	0	0	0	0	0	0	0	0	243	57	118	341	328	240	91	0	0	0	0	0	0	394	975	970
		Rumania	0	0	0	0	51	15	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	3249	1441	220	505	456	46	500	761	477	0	0	300	50	56	63	6
		S. Tomé e Príncipe	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	245	0	0	0	414	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	
		U.S.S.R.	5623	1655	5903	6055	3465	2905	5638	5054	2739	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	48	0	43	0	0	0	
		Venezuela	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	444	32	113	182	42	165
	MEDI TOTAL	MEDI	6043	5820	6337	5240	5057	3740	6126	6387	8360	6571	4901	3027	5123	4301	5909	3070	2286	2067	2694	4242	5099	2450	5531	2488	1960
		Algerie	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391	547	586
		Croatia	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0	0	0	
		EC.España	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009	845	1101
		EC.France	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0	0	
		EC.Greece	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226	180	274
		EC.Italy	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819	866	
		EC.Malta	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0	0	0	0	
		Maroc	77	57	52	48	175	178	811	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246	326	50	
		Serbia & Montenegro	0	0	0	0	0	0	0	0	0	13	1	0	0	2	6	6	6	7	8	8	0	0	0	0	
		Tunisie	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	32	93	45	15	2300	932	0	1760	0	
		Yugoslavia Fed.	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
KGM TOTAL			18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12439	14462	13868	14916	17775	19712	16392	17678	16161	15349	17277	15855	12667	11609	11652
		Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
		Argentina	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	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311	247	202	316
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	35	2	0	0	0	0	0
		Dominican Republic	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226	0	0	0	
		Grenada	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5	0	0	0	
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390	312	245	168
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	
		Mexico	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	3583	4121	3688	4200	4453	4369	4564	3447	4201
		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
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	9	1	1	0	1	1	
		Trinidad and Tobago	0	20	43	11	38	82	752	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457	802	578	747	
		U.S.A.	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	6081	6983	6966	6966	6966
		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	1	0	
		Venezuela	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	0	0	0	

SMT. Table 1.

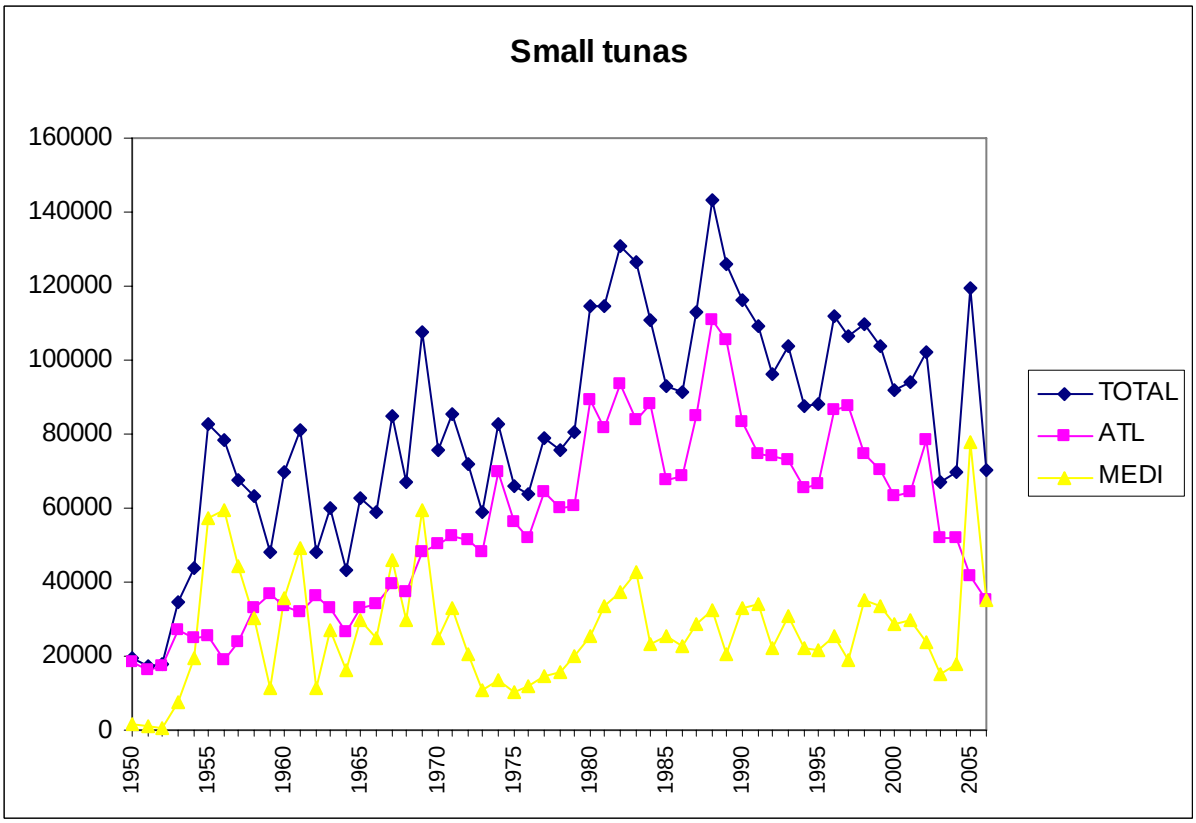
			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
KGX TOTAL			283	20	485	22	149	261	491	105	131	225	266	301	508	512	824	156	251	1	229	48	0	15	0	1	26
		Barbados	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	0	0	0	0	0	0	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Colombia	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	0	0	0	0	0	0	0	0	0	
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0	0	
		EC.France	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	1	26
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	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	0	0	0	
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0	0	44	48	0	0	0	0	
		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	
		Puerto Rico	0	0	0	0	0	0	0	0	0	0	53	84	86	134	106	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	14	0	0	0	0	15	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0	0	0	
		Trinidad and Tobago	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ukraine	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LTA TOTAL			15839	22214	20625	12896	8809	19741	25135	29855	14359	10910	21554	13681	11607	12026	14786	14147	14510	13341	13737	12994	16994	11228	12679	8437	2708
	ATL TOTAL	ATL	13359	20653	18975	10856	6643	17317	22730	27820	11742	8587	19798	12415	10402	10124	12667	12543	11596	10465	10443	10131	14352	10545	11241	7397	2336
		Angola	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	0	0	2	
		Argentina	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Benin	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0	0	
		Brasil	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	0	320	280	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	262	168	0	0	404
		Cuba	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	0	0	270	298
		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
		EC.Bulgaria	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	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1	489	50	16
		EC.Estonia	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	696	631	610	613	0	10	27	12
		EC.Germany	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Italy	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.Latvia	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16	19	21	24
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173	0	0	
		Germany Democratic Rep.	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541	7060	5738	216
		Israel	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	26	19	15	447	47	108	49	14	367	57	370	44	43	230	588	195	189	67	101	87	308	76	91	33	
		Mauritania	77	54	60	60	50	50	50	50	50	4	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	0	0	0	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681	0	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33	2	0	22	
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	0	
		Rumania	291	216	266	126	81	7	88	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	617	306	265	189	96	49	0	88	0	0	0	74	13	0	0	
		S. Tomé e Príncipe	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0	0	0	182	179
		Senegal	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1097	1094	1094	0	1865	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	1	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	2	2	2	0	1	10	1	0	0	
		U.S.A.	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1492	1382	765	1181
		U.S.S.R.	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4	5	7	5
		Venezuela	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50	0	0	
	MEDI TOTAL	MEDI	2480	1561	1650	2040	2166	2424	2405	2035	2617	2323	1756	1266	1205	1902	2119	1604	2914	2875	3294	2863	2642	682	1438	1040	372
		Algerie	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158	116	187
		Croatia	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0	0	

SMT. Table 1.

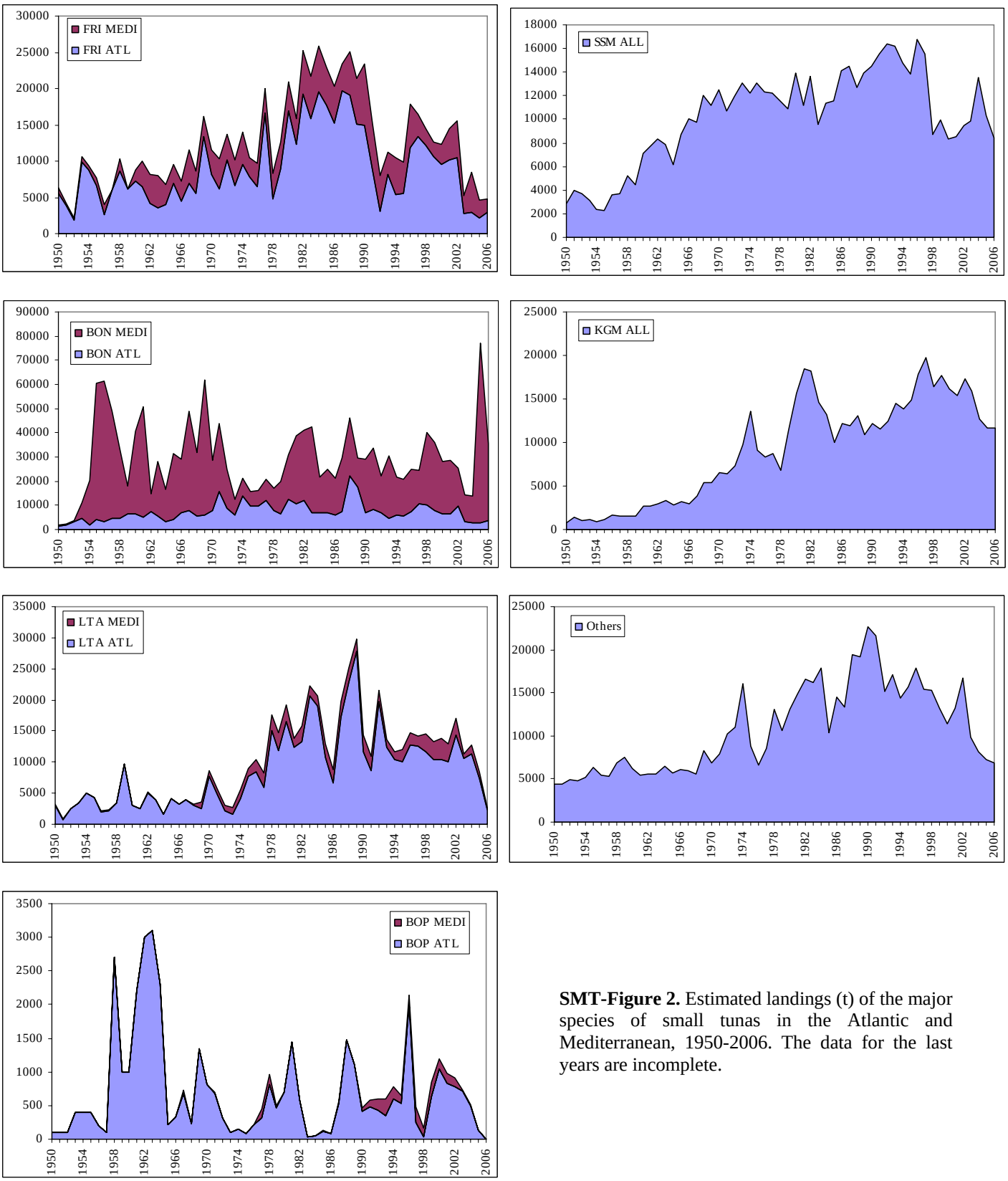
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
	EC.Cyprus	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0	0	
	EC.España	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41	262	116
	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	0	0	112	69
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	24	38	34	
	EC.Malta	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0	0	0	0	
	Israel	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0	0	
	Maroc	12	0	1	0	0	0	12	0	16	0	0	0	0	1	0	1	14	8	0	0	3	1	0	9	
	NEI-2	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0	0	
	Palestinian Territory, Occupied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0	0	
	Serbia & Montenegro	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0	0	
	Syrian Arab Republic	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0	0	
	Tunisie	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	633	0	
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750	0	568	507	
	Yugoslavia Fed.	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAW TOTAL		5312	4716	4498	3989	3292	1799	3915	2934	5610	4025	1527	1775	1270	1264	1316	871	1108	727	748	727	1067	12	375	12	14
	Angola	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Benin	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205	0	0	0	
	EC.Estonia	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Latvia	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Lithuania	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	298	0	0	0	
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0	0	
	Germany Democratic Rep.	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ghana	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	0	0	0	0	0	0	0	0	0	1
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	12	13
	Senegal	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522	0	375	0	
	U.S.S.R.	602	1170	223	206	219	28	143	195	1240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ukraine	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	21	0	42	12	0	0	
SSM TOTAL		13633	9574	11362	11590	14117	14531	12712	13946	14500	15546	16346	16231	14777	13857	16725	15501	8723	9973	8336	8492	9461	9853	13582	10334	8468
	Colombia	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0	0	0	0	
	Cuba	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0	0	0	0	
	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
	Dominican Republic	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	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
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	0	0	
	Grenada	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0	0	0	
	Mexico	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	5483	6431	4168	3701	4350	5242	3641	5723	3856
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5330	0	
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27	0	0	
	Trinidad and Tobago	1218	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.	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	4660	4611	4611	4611	4611
WAH TOTAL		2280	2366	2159	920	1151	1235	1612	1507	1470	1687	1807	2571	2104	2362	2515	3085	2483	2943	2020	2296	2201	1998	1983	1620	1344
	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
	Aruba	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0	0	
	Barbados	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0	43	0	0	41
	Benin	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Brasil	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405	519	449	111
	Cape Verde	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	500	340	0	0	537
	Dominica	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6	8	15
	Dominican Republic	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0	0	
	EC.España	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48	305	237	110
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
	Grenada	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44	0	0	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	
	Netherlands Antilles	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230	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	33
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52	0	0	88	76
	Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6	7	
	Senegal	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	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40	60	0	241
	Sta. Lucia	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169	238	169	

SMT. Table 1.

	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
Trinidad and Tobago	0	0	0	0	0	0	0	0	0	118	1	0	0	0	0	1	1	1	2	1	9	7	6	6	
U.S.A.	0	0	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	846	789	712	558	79
UK.Bermuda	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87	88	83	86
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	
UK.Sta Helena	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	0	0	0	0	0	0	0	0	0	
UK.Turks and Caicos	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	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7	16	13



SMT-Figure 1. Estimated landings (t) of small tunas (combined) in the Atlantic and Mediterranean, 1950-2006. The data for the last years are incomplete. The continuous line represents the total, the line with squares represents the Atlantic, and the line with triangles represents the Mediterranean.



SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2006. The data for the last years are incomplete.

8.12 SHK - SHARKS

The last assessments for Atlantic blue and shortfin mako sharks were conducted in 2004. In June 2007, a data preparatory meeting of the Shark Group was held in Uruguay, in preparation for the next stock assessment scheduled in 2008. The present document focuses on changes that may have taken place since these two meetings. Readers interested in a more complete summary of the state of knowledge on Atlantic blue and shortfin mako sharks should consult the report of the 2004 SCRS stock assessment meeting, as well as the report of the 2007 Data Preparatory Meeting. Within the Detailed Report of the stock assessment session (Anon. 2005c) there is a complete discussion of the uncertainties about stock structure, movements, life history and characteristics of some of the fisheries affecting these stocks. Some of this information was updated during the Data Preparatory meeting, and it is available in its Report of the 2007 Data Preparatory Meeting of the Shark Species Group.

SHK-1. Fishery indicators

Previous reviews of the shark data base resulted in recommendations to improve the data reporting for sharks, but a measurable progress in the quantity and quality of the overall shark catch statistics has not yet resulted, in spite of a few isolated improvements. The Committee noted, with great concern, that more than two years after the Recommendation 04-10 entered into force in June 13, 2005, making it mandatory for Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) to annually report Task I and Task II data for catches of sharks, in accordance with ICCAT data reporting procedures, including available historical data, most parties are still not complying with it. Reported catches are presented in **SHK-Table 1**. This information is considered incomplete and inadequate for stock assessment purposes. As already noted in previous years, data on less abundant large pelagic shark species, which stocks might be more vulnerable based on biological characteristics, are virtually non-existent. Regarding blue and mako sharks, in view of the very incomplete nature of the catch reporting to the Secretariat during the 2004 stock assessment meeting, the Committee attempted to construct a more accurate picture of shark catch and mortality in the Atlantic Ocean from tuna fleets based on ratios of shark to tuna landings from fleets reporting both types of data to ICCAT, and using these ratios to reconstruct catch history by major gear type. During the Data Preparatory meeting in 2007, this exercise was updated. The estimated catches of blue and shortfin mako sharks based on Hong Kong fin trade data were compared with Task I reports and estimates based on a ratio method involving scaling to Atlantic tuna catches described in the 2004 Shark Stock Assessment Report **(SHK-Figures 1 and 2)**. Although this might provide a somewhat more realistic picture of the catches of these species, such approximations, in both occasions, were done with little guidance from scientists with expert knowledge about several important fleets catching them. The Committee concluded that a further effort to reconstruct catch history of these species must be attempted, prior to the next stock assessment. For this exercise, participation of scientists with expert knowledge about the history of tuna fleets with important shark catches in the Atlantic Ocean is considered as crucial.

Considering the limitations on the quantity and quality of the information available to the Committee, the following results, achieved during the stock assessment carried out in 2004, should be considered very preliminary.

Figures 3 and **4** show the relative standardized CPUEs series by fleet for blue shark and shortfin mako, respectively, believed to cover a large portion of the range of the stocks. Other relative abundance series presented at the Data Preparatory Meeting were not included because they are more localized and likely not representative of the full range of the stocks. The CPUE series depicted were scaled to the mean of the overlapping years to appear on a common scale. The trends for the blue shark series are consistent, whereas those for (shortfin) mako are highly variable.

SHK-2. Blue shark

For both North and South Atlantic blue shark, the biomass appeared to be above the biomass that would support MSY. In many model runs (using surplus production models, age-structured models and catch-free models), stock status appeared to be close to unfished biomass levels. The results were highly conditional on the assumptions made. Those assumptions included (i) estimates of historical shark catch, (ii) the relationship between catch rates and abundance, (iii) the initial state of the stock in 1971, and (iv) various life-history

parameters. A full evaluation of the sensitivity of model outcomes to these assumptions was not possible at the meeting and such studies should be carried out before drawing stronger conclusions.

SHK-3. Shortfin mako shark

The North Atlantic shortfin mako shark stock is likely to have experienced some level of stock depletion as suggested by the historical CPUE trend and model outputs. The Committee could not rule out the possibility that the stock size was below the biomass that could support MSY, because trends in CPUE suggested depletions of fifty percent or more. For the South Atlantic, the stock might have decreased since 1971, but the magnitude of the decline appeared to be less than in the North Atlantic. The stock biomass might have been then above the biomass at MSY, but due to the lack of a clear signal from the catch rates, there was a wider variety of possible historical stock trends: from virtually undepleted to fully exploited. The assessment of shortfin mako stocks was also highly conditional on the assumptions listed above for blue shark. In particular, life history parameters of shortfin mako shark are more uncertain than for blue shark. A full evaluation of the sensitivity of model outcomes to these assumptions to shortfin mako shark was also not possible at the meeting and such studies should be carried out before drawing stronger conclusions.

SHK-4. Management recommendations

Presently, there are only two ICCAT recommendations relating to sharks: Rec. 04-10, which made it mandatory to all Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) to report annually Task I and Task II data for catches of sharks, while prohibiting vessels to have onboard fins that total more than 5% of the weight of sharks, up to the first point of landing, and Rec. 05-05, which basically demanded all CPCs to report on the implementation of Recommendation 04-10, including the need to reduce North Atlantic shortfin mako shark (*Isurus oxyrinchus*) mortality. Before the results of the next assessment become available next year, on the basis of which new management recommendations might become advisable, the Commission should ensure the effective implementation of Recs. 04-10 and 05-05. Of particular concern is the very low level of compliance with the obligation of CPCs to provide Task I and II data for sharks caught by their vessels, greatly hampering, when not completely impeding, the assessment of the status of the exploited shark stocks.

New information presented on the fin to body weight ratio indicated that, for EC surface longline fleets, this ratio is above 6%, confirming previous analyses by the Committee suggesting that the 5% ratio is not appropriate for some fleets because of different fin cutting and body processing practices. Therefore, for an effective implementation of Rec. 04-10, the fin to body weight ratio needs to be better defined in terms of the kind of fins considered in the ratio as well as the kind of processing of both fins and body. Because of these reasons, no specific ratio was recommended by the Committee. Conversion factors between fins and body weights need to be implemented on a species and/or fleet-specific basis.

BSH-Table 1. Estimated catches (t) of blue shark (*Prionace glauca*) by major area, gear and flag.

		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		9	613	121	380	1162	1467	867	832	2348	3533	2343	7879	8310	8422	9036	36895	33211	34208	38512	33859	31867	35301	35359	20596	13066
Landings	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	259	
	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	27	0	0	0	0	0	0	
	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743	1103	0	179	1689	2173	1971	2166	1667	2523	2591
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	276	12	11	5	54	18	0	5	6	0	11	4
	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	
	China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	420	600	0	0	
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	692	1006	1155	2560
	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	3	6	5	
	EC.Denmark	0	0	0	0	0	0	0	2	2	1	1	0	1	2	3	1	1	0	2	1	13	0	0	0	
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29917	28137	29005	31094	25110	21037	22601	24682	0	
	EC.France	9	8	14	39	50	67	91	79	130	187	276	322	350	266	278	213	163	0	395	207	109	0	106	120	
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	9	66	11	0	0	0	
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	113	1	95
	EC.Portugal	0	0	0	0	0	0	0	0	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602	7486	3888	7267	7111
	EC.United Kingdom	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0	0	1	0	12	9	6	0	0	5	242
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	2596	1589	1044	996	850	893	494	532	729	890	1245	1967	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2213	0	1906	6616	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	22	0	0	0	0	0	82
	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	18	
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	456	0	0	0	
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	0	83	63	232	128	154	90
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	2	1	
	U.S.A.	0	605	107	341	1112	874	355	271	87	308	215	680	29	23	283	211	255	217	291	42	0	1	7	2	2
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
	Uruguay	0	0	0	0	0	0	0	0	0	8	84	15	93	64	252	286	242	126	119	59	159	620	492	400	234
	Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	26	10
Discards	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	
	U.S.A.	0	0	0	0	0	526	421	480	741	772	184	1136	572	618	710	185	195	101	137	106	68	0	65	66	45
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	8	0	0	0	0	0	0	

SMA-Table 1. Estimated catches (t) of shortfin mako (*Isurus oxyrinchus*) by major area, gear and flag.

		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		1681	899	1734	3747	1892	953	1457	1513	1245	1210	1302	2957	2952	4866	2771	5577	5275	4002	4858	4683	5380	7370	7510	3801	3346
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	190	0	27	219	409	226	283	238	256	183
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	111	67	110	69	70	78	69	78	73	80	91	
	China P.R.	0	0	0	0	0	0	0	0	0	0	0	34	45	23	27	19	74	126	306	22	208	260	0	0	
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	710	178	118	115
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	9	13	7	17	12	15	23	10	10	9	15	15	30	15	14	22
	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3777	3347	2895	2769	2921	2859	3226	4107	0	
	EC.Portugal	0	0	0	0	0	0	0	0	193	314	220	796	649	749	785	519	425	446	706	523	471	1874	485	1366	1449
	EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	0	0	0	5
	Japan	976	411	603	682	548	452	638	825	759	663	778	1126	1583	2209	1304	502	1159	271	402	161	571	385	970	0	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	16	0	10	6	9	5
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	459	0	509	1415	1243
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0	0	
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	13	0	79	19	138	126	125	99
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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	1	1	1	1	
	U.S.A.	613	368	929	2947	1296	462	795	670	268	210	250	945	628	1703	465	408	148	69	292	395	415	142	410	187	130
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0
	Uruguay	92	120	202	118	48	39	24	18	25	14	15	29	12	21	24	28	21	43	63	70	58	239	275	185	73
	Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	12	13
	Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	20	6
Discards	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	26	20	18	28	0	0	0	0	0	0	0	0	0	0	
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	

LMA-Table 1. Estimated catches (t) of longfin mako (*Isurus paucus*) by major area, gear and flag.

		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		0	0	0	1	0	1	3	2	1	1	29	8	18	17	3	29	10	2	20	51	67	63	52	0	
Landings	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	8	0	20	51	65	62	51	0	
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	
	U.S.A.	0	0	0	1	0	1	3	2	1	1	2	3	8	2	3	2	2	2	0	0	0	0	0	0	
Discards	U.S.A.	0	0	0	0	0	0	0	0	0	0	26	5	10	14	0	0	0	0	0	0	0	0	0	0	

BTH-Table 1. Estimated catches (t) of bigeye thresher (*Alopias superciliosus*) by major area, gear and flag.

		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		0	0	0	0	0	0	0	0	0	0	0	20	18	39	14	185	114	0	43	108	114	133	121	74	83
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	37	0	0	0	46	71	111	82	73	83
	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	
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	114	0	36	62	43	22	38	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	1	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	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	0	
Discards	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	20	18	39	0	0	0	0	0	0	0	0	0	0	

ALV-Table 1. Estimated catches (t) of thresher (*Alopias vulpinus*) by major area, gear and flag.

		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		0	0	0	0	0	0	0	0	0	0	0	2	7	9	0	30	45	1	14	25	136	30	65	104	108
Landings	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	45	0	14	25	13	13	18	0	
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	19	
	EC.Ireland	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	1	0	0	111	18	24	85	108
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	
	Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
	Venezuela	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
Discards	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	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	2	7	4	0	0	0	0	0	0	0	0	0	0	

OCS-Table 1. Estimated catches (t) of oceanic whitetip shark (*Carcharhinus longimanus*) by major area, gear and flag.

		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		0	1	0	0	0	0	0	1	0	0	8	11	10	14	8	12	15	2	642	543	205	179	189	82	77
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	638	534	203	174	187	78	76
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9	0	3	7	1	1	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
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	2	3	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	0	
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
	U.S.A.	0	1	0	0	0	0	0	1	0	0	0	8	3	3	8	8	6	2	2	3	2	3	2	3	1
Discards	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	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	8	4	4	6	0	0	0	0	0	0	0	0	0	0	

FAL-Table 1. Estimated catches (t) of silky shark (*Carcharhinus falciformis*) by major area, gear and flag.

		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		0	0	0	0	0	0	0	0	0	13	341	138	90	125	531	343	33	140	118	42	358	476	316	72	4
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503	279	0	15	23	0	328	307	286	20	0
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	163	22	11	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	13	19	4	13	18	0	0	0	0	1	2	0	0	0	27	3
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	0	1	1	30	0	4	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	1	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	24	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	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	2	0	12	21	16	17	11	15	16	7	0	6	4	13	2
Discards	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	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	320	134	66	62	12	46	12	109	77	32	0	0	0	0	

POR-Table 1. Estimated catches (t) of porbeagle (*Lamna nasus*) by major area, gear and flag.

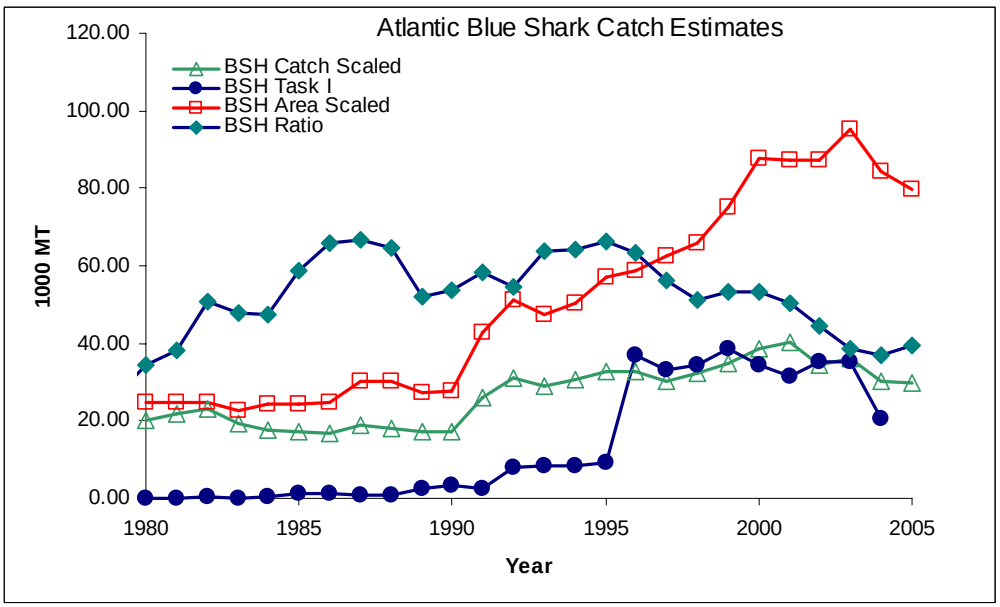
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL		584	1141	706	664	706	813	957	971	1282	1944	2588	1889	2676	2121	1548	1859	1468	1143	1467	998	848	332	725	556	272
Landings	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0	
	Canada	1	9	20	26	24	59	83	73	78	329	813	919	1575	1353	1051	1334	1070	965	902	499	237	142	232	202	192
	Chile	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	EC.Bulgaria	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.Denmark	84	45	38	72	114	56	33	33	46	85	80	91	93	86	72	69	85	107	73	76	42	0	0	0	
	EC.España	0	0	0	0	0	0	0	0	0	1	0	0	0	0	31	27	27	0	20	25	57	35	15	0	
	EC.France	199	791	411	254	260	280	446	341	551	300	496	633	820	565	267	315	219	0	410	361	461	0	413	276	
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	3	0	0	0	
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	6	3	0	0	0	
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1
	EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	0	0	0	0	0	3	3	2	2	1	0	0	0	0	0	0	0	0	7	4	10	101	54	16	6
	EC.Sweden	6	5	9	10	8	5	3	3	2	2	4	3	2	2	1	1	1	1	1	1	0	0	0	0	
	EC.United Kingdom	1	2	5	12	6	3	3	15	9	0	0	0	0	0	0	0	1	6	8	12	10	0	0	24	11
	Falklands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	Faroe Islands	259	256	126	210	270	381	373	477	550	1189	1149	165	48	44	8	9	7	10	0	0	0	0	0	0	
	Iceland	1	0	1	0	0	0	0	0	0	0	1	3	4	6	5	3	4	2	2	3	2	0	0	0	
	Japan	0	0	0	0	0	0	1	0	0	0	0	1	0	0	8	18	0	1	0	0	0	0	0	0	
	Norway	33	33	96	80	24	25	11	25	43	32	41	24	24	26	28	17	27	32	22	11	14	19	0	8	27
	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	
	U.S.A.	0	0	0	0	0	1	0	2	2	5	1	50	106	35	78	56	13	3	1	1	1	0	1	0	0
	Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	13	2	4	0	8	34	8	28	34
Discards	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	

SPL-Table 1. Estimated Catches (t) of scalloped hammerhead (*Sphyrna lewini*) by major area, gear and flag.

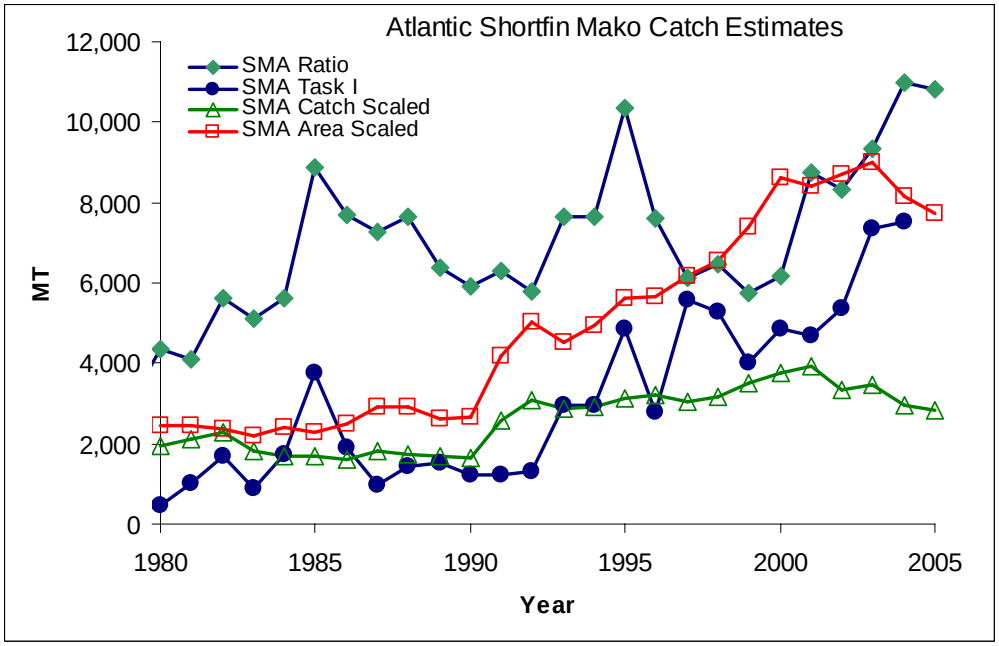
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL		0	0	0	0	0	0	0	0	0	0	363	14	33	93	50	185	16	23	272	319	16	22	20	0	
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	170	0	9	262	297	0	0	0	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	15	13	14	10	21	16	22	8	0	
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2	0	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	10	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	9	0	
Discards	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	
	U.S.A.	0	0	0	0	0	0	0	0	0	0	363	14	33	82	0	0	0	0	0	0	0	0	0	0	

SPZ-Table 1. Estimated catches (t) of smooth hammerhead (*Sphyrna zygaena*) by major area, gear and flag.

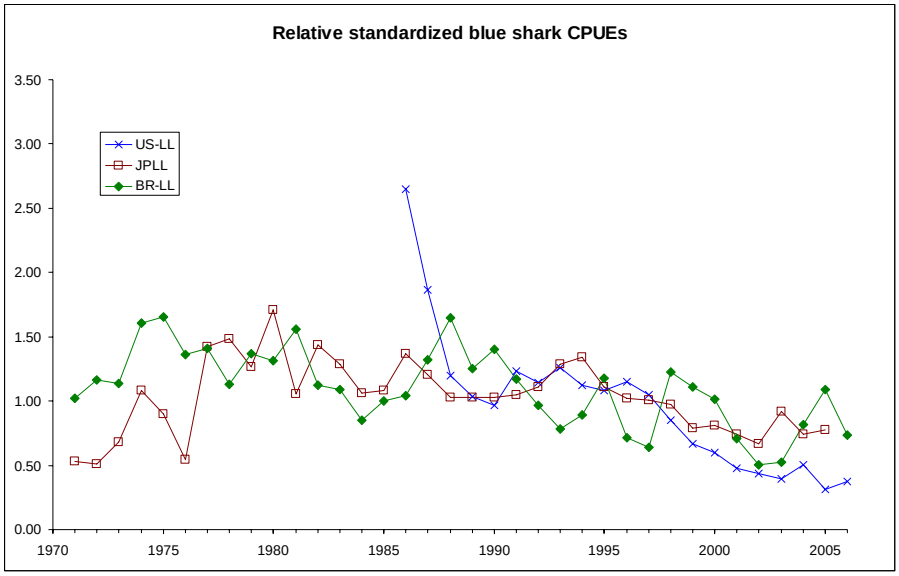
		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
TOTAL		0	0	0	0	0	0	0	0	0	0	4	0	3	1	42	83	48	38	40	38	1472	58	40	49	376
Landings	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	6	9	0	0	0	0	0	0	
	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	46	28	29	24	28	32	49	24	32	57
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	14	0	5	10	12	1	13	0	
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	12	18
	Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	11	0	0	0	3	5	301
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	3	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	0	
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1428	0	0	0	
Discards	U.S.A.	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	



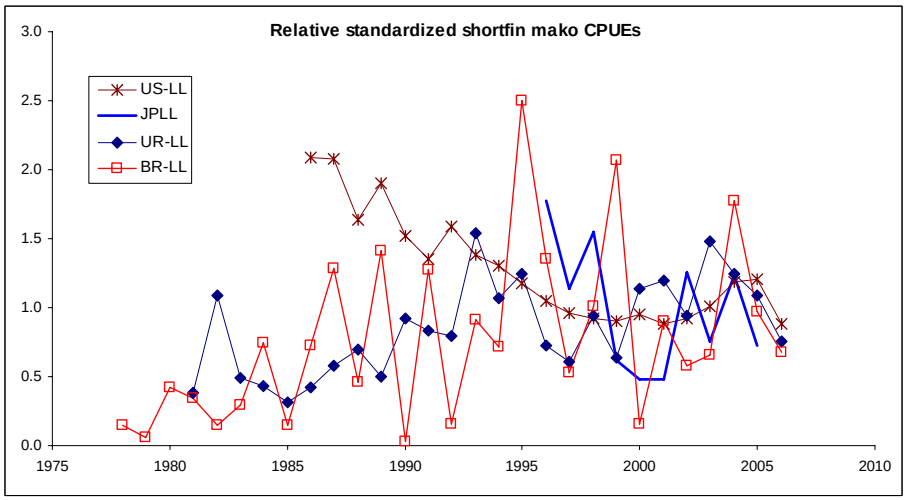
SHK-Figure 1. Comparison of Task I (circles) reports of blue shark (BSH Task I) catches and several estimates of overall catch based on different methods (note that the 2005 Task I report is incomplete and not shown). The BSH Ratio method (diamonds) is that applied by the 2004 Shark Species Group based on Atlantic tuna catch levels. The BSH Catch Scaled (triangle) and BSH Area Scaled (squares) methods are based on Hong Kong fin trade data for year 2000 as described in SCRS/2007/077.



SHK-Figure 2. Comparison of Task I (circles) reports of shortfin mako (SMA Task I) catches and several estimates of overall catch based on different methods (note that the 2005 Task I report is incomplete).. The SMA Ratio method (diamonds) is that applied by the 2004 Shark Species Group based on Atlantic tuna catch levels. The SMA Catch Scaled (triangles) and SMA Area Scaled (squares) methods are based on Hong Kong fin trade data for year 2000 as described in SCRS/2007/077.



SHK-Figure 3. Relative standardized blue shark CPUEs for the main longline fleets. CPUEs have been scaled by the mean value of the overlapping period.



SHK-Figure 4. Relative standardized shortfin mako CPUEs for the main longline fleets. CPUEs have been scaled by the mean value of the overlapping period.

9. Report of inter-sessional meetings

9.1 Inter-sessional Meeting of the Sub-Committee on Ecosystems

The meeting was held in Madrid, Spain, February 19 to 23, 2007. Document SCRS/2007/010 contains the detailed report of the meeting.

The meeting included an in-depth discussion of the terms of reference of the Sub-Committee, with consideration on future lines of work and future action, and discussed the need for data, infrastructure and economic resources to attain the objectives of the Sub-Committee.

The meeting also addressed the approach to assess the mortality of sea birds in the ICCAT fisheries (in accordance with the Resolution by ICCAT on Incidental Mortality of Seabirds [Res. 02-14]). As a first step towards the planned assessment, the Sub-Committee undertook the estimation of nominal number of hooks in 5x5 squares for all major longline fisheries. National Scientists have been asked to comment on the adequacy of some of the assumptions and the usefulness of the results.

Finally, the meeting reviewed information available on experiments with various types of hooks and their effect on by-catches.

9.2 Ad Hoc Meeting to Prepare Multifan-CL Inputs for the 2007 Albacore Assessment

The meeting was held in Madrid, Spain, March 12 to 14, 2007 with the main goal of preparing data for the assessment session of North and South Atlantic albacore stocks. Several objectives were pursued by the WG:

1) Definition of main "fishery" components for the Multifan-CL model to be fit to the N and S albacore stocks.
2) Review of Task I data for both North and South stocks
3) Time stratification of catch: quarter time strata
4) Review of size data for North and South albacore stocks
5) Review and estimates of available catch per unit effort (CPUE) for North and South albacore fisheries.
6) Estimates of year quarterly fishing effort for each "fishery" component.

1) Main fisheries components in the North and South Atlantic

Fisheries were aggregated by national fleet and gear based on knowledge of similarities in spatial/temporal distribution, catchability and selectivity patterns between fleets. The Group discussed various criteria for fleet aggregations in agreement with the characteristics of the observed fleet information based on the expert knowledge of participants. Finally, fleet aggregation resulted in the definition of 10 fishery components in the North stock and 8 fishery components in the South stock.

2) Review of Task I data information

For the purposes of the analyses of albacore North and South stocks the nominal annual catch in weight (t) by country/flag/gear, the Secretariat compiled the Task I data available as of March 12, 2007. Some unclassified catches were identified and properly classified by gear/fleet according to the experts attending the meeting.

3) Yearly catch (Task I) stratification by quarter

The WG decided to use quarterly time steps for the Multifan-CL applications. The CATDIS data catalogue containing total catches in weight (t) by flag and gear on a quarterly time strata by year was updated by the Secretariat using data available as of March 12 and matched to the fisheries components identified by the WG.

4) Review of size data for North and South stocks

The Working Group reviewed the summary catalogue of available Task II data (size composition) compiled by the Secretariat and updated as of March 12. A roadmap on all available size information for the composite fisheries was prepared according to the defined fisheries (10 North; 8 South) by year and quarter for the North Atlantic beginning in 1957 and South Atlantic beginning in 1956.

A number of quality assurance evaluations were employed by the Working Group to examine the available data and identify potential anomalies requiring further investigation prior to the assessment. Across time, size

sampling has diminished at different rates, depending on fishery definitions, but the available information from the most recent few years was particularly sparse. In general, the degree of substitution needed to estimate the overall catch at size of the South stock is greater than for the North Atlantic stock.

5) Review of available indices (North and South fleets)

As required in preparation for Multifan-CL modeling of Atlantic albacore stocks, the available CPUE time series by year and quarter, were analyzed, presented and discussed. Procedures for estimating quarterly patterns across time for the various fisheries were compared. Differences in pattern can result from different analytical choices for estimation and the Working Group referred the issue to the Methods Working Group for further investigation of alternative approaches.

One remarkably long time series of catch and effort is represented by the troll fleet which has been operating since the early 1930s in the North Atlantic. The Working Group analyzed older catch and effort records from the French and Spanish fleets in combination with the most recent decades and computed a combined index named "Composite TROLL CPUE for North Atlantic Albacore", for the ensemble of French and Spanish troll fleet activity from 1930 to 2005. The French and Spanish troll fishery CPUE index from early years (1968-1986) and the Spanish troll fishery CPUE index for recent years (1981-2005) were incorporated into this "new CPUEs index".

6) Effort data for North and South stocks

The catch and effort time series of major Atlantic albacore fisheries were analyzed by national scientists who presented standardized, quarterly time-series of CPUE from those national fleets for the North and South stocks. For fleets for which no analysis was prepared in advance, Task II data (catch and effort) was prepared by the Secretariat to estimate CPUE for those fleets in the North and South Atlantic.

Document SCRS/2007/017 contains the detailed report of the meeting.

9.3 Ad Hoc Working Group on Tagging Coordination

The meeting was held in Madrid, Spain, March 15 to 16, 2007. This was the first meeting of this Group which was established to coordinate ICCAT tagging activities. During the meeting, tagging programs which are currently active were identified. Tagging information available at the Secretariat was reviewed as was the structure of the databases. Analysis was made of the difficulties concerning the lack of a protocol for the exchange of data, payment of rewards and the limited information received on the tagging carried out using the tags supplied by ICCAT. The Committee recognized the Secretariat's efforts with regard to maintenance of the database and the web page for the dissemination of tagging information. Various proposals were made to harmonize the tagging activity, notably the preparation of posters publicizing this activity, standardization of the tag codes and rewards, as well as the information on tagging programs that should be provided to ICCAT.

Document SCRS/2007/018 contains the detailed report of the meeting.

9.4 Meeting of the Working Group on Stock Assessment Methods

The meeting was held in Madrid, Spain, March 19 to 23, 2007 with three primary objectives:

a) To evaluate methodologies for estimating missing catch series and make recommendations.

b) To develop a plan to produce a document on best practices for CPUE standardization, including data screening, model design, and diagnostics.

c) To examine methods available for estimating fishing capacity and apply them, to the extent possible, to data readily available to ICCAT.

Estimating missing catch series

The Working Group focused on how to extrapolate catches back in time when catch reports only start after the fishery has already been operating and has been capturing a species for some time, which is a common case for some by-catch species. Testing was conducted by splitting known data series in two parts, and using a model estimated on the basis of the more recent time period to predict the catches in the earlier time period. The performance of the methods was quantified by comparing the known catches and the predictions. In general,

methods that assumed that species catch ratios for a fishery change linearly through time performed well. While further testing is needed, the Working Group recommended that Species Groups that face the problem of missing catch data consider using extrapolation methods based on species catch ratios.

CPUE standardization manual

The diversity of available standardization methodologies, coupled with the multiple catch data and effort unit definitions, often makes it difficult for the Species Groups to adequately compare and integrate the relative indices of abundance that are presented during stock assessment sessions. The Working Group recommended developing a comprehensive manual, written in a language and technical level that makes reachable to most analysts and which can serve as reference tool for CPUE standardization. An *Ad hoc* team of scientists will undertake the task of writing the manual based on an outline developed initially by the Working Group, with a target for completion in one year. The Working Group recommended that an annotated outline of the manual be presented at the 2007 SCRS species group meeting for comments by attending experts.

Fishing capacity

While the term "capacity" is generally understood as the potential to catch fish, precise definitions are not universally accepted. The Working Group recommended using the definitions provided by a 2006 FAO Workshop (La Jolla, CA, USA), many of which can be expressed either in tons or in fishing mortality. When associating estimates of current capacity with the potential long-term productivity, it is important to consider the factors that affect productivity (e.g., overall selectivity patterns and environmental cycles) as well as the scale that is the focus of interest (e.g., a component of a stock, an entire stock, a multi-species group of stocks, etc.). Methodologically, it is easier to estimate capacity at fine scales (e.g. a particular fishing fleet at a particular time) than broadly (e.g. for all Atlantic tuna and tuna-like fisheries).

The Working Group considered the available data that can be used for estimating capacity. The fleet statistics that are submitted with Task I reports were found to be widely incomplete when compared with information obtained from scientific sources. On the other hand, datasets such as the ICCAT Record of Large Scale Vessels authorized to fish in the Atlantic contain many vessels that do not actually operate in the Atlantic. Furthermore, this Record is limited to vessels > 24 m. The Working Group concluded that it is impossible to estimate capacity accurately with available data. Nevertheless, the Working Group attempted to obtain several estimates of fishing capacity in order to provide inputs to the 2007 meeting of the Commission's *Working Group on Capacity*.

Details are provided in the meeting report, but the following preliminary conclusions were reached:

- There are more than 3,400 vessels > 24 m authorized to potentially fish for ICCAT species. The total gross registered tonnage for these is over 860,000 t, and the carrying capacity for large scale longliners, purse seiners and baitboats combined is about 561,000 t. A provisional estimate of 6,600 vessels in the 15-24 m range would raise the fleet potential of vessels > 15 m to more than 10,000 vessels. Total potential carrying capacity is therefore likely to substantially exceed the recent level of catches for ICCAT species (600,000 to 700,000 t annually). As such, there appears capacity to substantially increase Atlantic tuna fishery production, if the resource level could sustain that production, which seems unlikely. It should be noted that many of the > 24 m longline and purse seine vessels are also registered to other tuna RFMOs and do not necessarily operate in the Atlantic, although they are authorized to do so.

- Available information in ICCAT databases relating catch by flag and gear to the effort expended to realize that catch is sparse, and the diversity of units used in reporting effort make it difficult to estimate capacity in a comprehensive manner. However, very complete information is available to National Scientists for some fleets, and these can be used for case-studies. An example of this is the well-documented European purse seine fleet fishing for Atlantic tropical tunas. Using this information as a basis for extrapolating to the tropical purse seine fleet for all flags combined gives an estimate in 2005 of 39 vessels with a carrying capacity of 50,000 t, which produced 175,000 t of tunas.

- An analysis of the available data from the tropical purse seine fleets operating in all Oceans suggests that the relationship between carrying capacity and actual catch over time is rather poor due to a number of factors, including technology creep. The same is likely to be the case for other major fleets that fish with other gears. Therefore, measures aimed at managing Atlantic tuna fisheries to achieve the Convention objective that are solely based on limiting carrying capacity are likely to be of limited usefulness and ineffective in the long term, unless very conservative limits are established.

- The ICCAT record of farming facilities indicates that the farming/fattening capacity for bluefin in the Mediterranean is about 56,000t, which represents approximately 45,000t round weight of fish at time of capture. Estimates of fleet characteristics within the Mediterranean alone, indicates that fishing capacity exists to fully supply the farms, providing resource levels remain available. The estimated farming/fattening capacity is about 150% of the TAC agreed by the Commission at its 2006 meeting and represents an excess capacity of more than 30,000 t above the predicted short-term catch level that would permit eastern bluefin stock to rebuild to B_{MSY}.

- Very conservative estimates of overcapacity (the difference between short-term fishing capacity and long-term resource productivity potential) suggest that there is overcapacity for North Atlantic albacore, eastern Atlantic and Mediterranean bluefin tuna, and blue marlin, and possibly for yellowfin, western Atlantic bluefin, and white marlin as well. These estimates are confirmed by recent stock assessments which indicate in aggregate, effective fishing effort for these stocks exceed the levels necessary to achieve the Convention objective.

Document SCRS/2007/011 contains the detailed report of the meeting.

9.5 Inter-Sessional Meeting of the Tropical Species Group

The meeting was held in Recife, Brazil, April 11 to 16, 2007. Document SCRS/2007/012 contains the detailed report of the meeting.

The main objective of the meeting was to analyze the indicators that had been defined during the previous 2006 inter-sessional meeting in Sète. In doing so, the catch-at-size matrices for the three species were updated. In the case of skipjack, a major revision of historical catch-at-size data was made.

In addition, the Group examined the available data on so-called "faux poisson" and concluded that substantial amounts are being caught by some fleets. The Committee noted, with satisfaction, that substantial work has been concluded to refine estimates of the magnitude of the catches by species, particularly in Abidjan. During discussions, it was noted that there is a risk of double counting fish once these estimates are included in the Task I database, and that this risk can only be minimized if concerned scientists maintain close collaboration on this subject.

9.6 Bigeye Tuna Stock Assessment Session

The meeting was held in Madrid, Spain, June 5 to 12, 2007. The Bigeye Tuna Executive Summary reflects the major results of this assessment. The detailed report of the meeting can be found in document SCRS/2007/013.

9.7 Data Preparatory Meeting of the Shark Species Group

The meeting was held in Punta del Este, Uruguay, June 25 to 29, 2007. Document SCRS/2007/014 contains the detailed report of the meeting.

According to the *Recommendation by ICCAT Concerning the Conservation of Sharks Caught in Association with Fisheries Managed by ICCAT* [Rec. 04-10], the Atlantic shortfin mako (*Isurus oxyrinchus*) and blue shark (*Prionaca glauca*) stocks should be assessed in 2007. However, at its 2006 meeting, the SCRS recommended to postpone the assessment until 2008, and to hold a data preparatory meeting in 2007. The Commission approved this plan at its 2006 annual meeting and therefore the meeting in Uruguay was held to carry out the necessary analyses and data compilations that would facilitate the 2008 assessment work. The meeting drafted a workplan to guide the work of national scientists and the Secretariat until the 2008 assessment.

9.8 Albacore Stock Assessment Session

The meeting was held in Madrid, Spain, July 5 to 12, 2007. The Albacore Executive Summary reflects the major results of this assessment. The detailed report of the meeting can be found in document SCRS/2007/015.

9.9 Mediterranean Swordfish Stock Assessment Session

The meeting was held in Madrid, Spain, September 3 to 7, 2007. The Mediterranean Swordfish Executive Summary reflects the major results of this assessment. The detailed report of the meeting can be found in document SCRS/2006/016.

10. Report of Special Research Programs

10.1 Bluefin Year Program (BYP)

Dr. N. Miyabe, Program Coordinator for the West Atlantic and Mr. J.M. de la Serna, Program Coordinator for the East Atlantic, presented the report on the Bluefin Year Program (BYP) activities carried out in 2006 and 2007, the research plan and the corresponding budget for 2008.

Several delegations expressed concern that the current magnitude of the program's budget is vastly insufficient to tackle the important and complex questions that remain unanswered about Atlantic bluefin tuna biology. It was noted that previously (in 2004), at the request of the Commission, the Committee had prepared a more comprehensive research proposal that amounted to several million Euros, which was subsequently rejected by the Commission. The Committee made a recommendation for the Commission to re-consider the need for a more realistic level of funding (see Section 14).

The report was adopted and is attached as **Appendix 6**.

10.2 Enhanced Research Program for Billfish

The report of the Enhanced Research for Billfish, together with the proposed budget for 2008, was presented by the Program Coordinator, Dr. D. Die.

The report was adopted and is attached as **Appendix 7**.

11. Report of the Meeting of the Sub-Committee on Statistics

The Convener of the Sub-Committee on Statistics, Dr. Mauricio Ortiz, presented the report of the meeting and was pleased that two days had been set aside to hold the meeting. On the basis of the information provided by the Secretariat in the Report on Research and Statistics, the Sub-Committee stressed the need to meet the deadline dates established for the submission of information, and the transmittal of information collected in the form regarding fleet characteristics.

The Sub-Committee, however, recognized that quality control of the basic data could be one of the causes for non-compliance with these deadline dates, and furthermore, considered the possibility of establishing new, more realistic deadline dates.

In order to improve communication among the scientists responsible for the collection and processing of data, the Sub-Committee recommended that the Secretariat publish the list of the ICCAT Statistical Correspondents on the web page.

Furthermore, the Sub-Committee discussed possible positive measures that the Commission could undertake to encourage the Parties to report their information within the established deadlines. With the aim of evaluating the consequences of missing data cited in the *Recommendation by ICCAT on Compliance with Reporting Obligations* [Rec. 05-09], the Sub-Committee developed and transmitted to each Species Group Rapporteur a questionnaire for Species Groups to complete and which will result in an evaluation of the impact of data deficiencies on the stock assessments.

Recognizing the high importance of U.S. tagging data, the Sub-Committee recommended that a member of the Secretariat travel to Miami (United States) to define a data exchange protocol in collaboration with U.S. scientists.

The SCRS discussed the need for a protocol that describes the calculation process to estimate the unreported catches based on trade data from the ICCAT Statistical Document Program. In order to be able to incorporate these data in the Secretariat files, the SCRS recommended the various Species Groups to establish conversion factors for bigeye tuna and swordfish products aimed at making better use of this information.

The SCRS wholeheartedly congratulated the Secretariat for the recent publication of a DVD of the scientific documents.

Dr. Alain Fonteneau introduced the project to publish an Atlas, by EC-France, with a cartographic summary of tuna catches and time/area diagrams of the catches and sizes, which is in a small scale, by country and gear for the Atlantic and Indian Oceans. The project will be financed by EC-France and it will be essentially dedicated to tropical tuna fisheries. Publication is expected in the last quarter of 2008. The IRD representative requested collaboration in this project from ICCAT and IOTC. The SCRS favorably received this project.

The SCRS, which was informed of the use of albacore catch data for years prior to 1950, recognized the importance of collecting the maximum amount of data possible and to maintain these in a safe ICCAT database.

Uruguay informed the SCRS of the development of software to follow-up the observer and noted that this software would be made available to other Parties.

The Sub-Committee recommended the purchase of computer equipment and the hiring of more computer specialists at the Secretariat. After some clarifications requested by the Executive Secretary, a small working group was set up to prepare detailed information on the requirements of this recommendation **(Appendix 8)**. Other general recommendations are included under Agenda item 15.

12. Report of the Sub-Committee on Ecosystems

Dr. H. Arrizabalaga, Convener of the new Sub-Committee on Ecosystems chaired the meeting of the Sub-Committee. The report of the meeting is attached as **Appendix 9**. The pertinent recommendations of this Sub-Committee are listed under Agenda item 15 of this Report.

The Delegates congratulated the Sub-Committee for the important advances that have been made in the short time that it has been in existence. The Convener noted that the Sub-Committee's work had been enriched by the active presence by scientists from other organizations who have an expertise that complements that of the ICCAT scientists

13. Consideration of plans for future activities

13.1 Inter-sessional meetings proposed for 2008

Taking into account the assessments mandated by the Commission in 2008 and 2009, and the Committee's recommendations for research coordination and stock monitoring, the proposed inter-sessional meetings for 2008 are shown in **Table 13.1**. The Committee notes that the schedule is ambitious and that there is a need to maintain some flexibility in order to account for any changes that may result from the deliberations held by the Commission in November 2007.

In regards to the proposed Symposium on bluefin tuna, the draft terms of reference are included as **Appendix 12.**

13.2 Annual Work Plans for 2008

The rapporteurs presented the 2008 Work Plans for the various Species Groups. These Plans were adopted and are attached as **Appendix 5.**

13.3 Date and place of the next meeting of the SCRS

The Committee decided to hold its next annual meeting in Madrid, Spain, between September 29 and October 3, 2008.

Table 13.1. Proposed ICCAT scientific meeting schedule for 2008.

ICCAT SCRS MEETINGS 2008

	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Jan				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
Feb							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
																															Med SWO						
Mar	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31						
										SC-ECO																											
																		Halifax - Precaut.[1]/ICCAT																			
Apr				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
										AD-HOC METH/CAPACITY														BFT Symposium?												
May							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
										SMT GFCM/ICCAT														SAI												
Jun		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30						
																								BFT Assessment													
Jul				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
				BFT Assessment																											SHK							
Aug							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
							SHK																														
Sep			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
			YFT - SKJ																					Species Groups							SCRS						
Oct					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
				SCRS																																	
Nov	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30							
Dec			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				

[1] See Item 16.3.

14. General Recommendations to the Commission

The Committee expressed concern that ICCAT stocks are being subjected to higher and higher exploitation rates, and that this increase has not been accompanied by the types of enhanced research and data collection activities that are necessary in order to ensure resource conservation.

The increase in exploitation rates on most ICCAT stocks has produced severe declines of some stocks that may hamper their conservation. Comprehensive research is thus needed to enhance the advice on the state of the stocks of high concern to the Commission, especially those which are currently estimated to be below the Convention objectives. These include northern albacore, bluefin, marlins and Mediterranean swordfish. In the view of the Committee, these increasing conservation concerns should oblige the Commission to take action. The SCRS identified below high priority recommendations to the Commission.

- The quality of the fishery statistics (Task 1 and 2) has decreased for a few stocks over the last decade. This trend must be reversed if the Commission wishes to enable the SCRS to provide accurate and precise advice. This implies an improvement in the quality and quantity in catch, catch-at-size, CPUE, tagging and biological data. Furthermore, the SCRS assessments are impaired by having to rely almost exclusively on fisheries-dependent information. Therefore, fisheries independent information, such as could be obtained through large-scale scientific and coordinated tagging surveys (see below), should be regarded as a basic requirement.

- The high value of bluefin tuna (in terms of both ecology and economy) together with the serious concern regarding its conservation (risk of fisheries and stock collapse being recently stressed) lead the SCRS to re-iterate the critical necessity to develop an ambitious coordinated research program on this species. Such an ambitious program is needed to fulfill important gap in our knowledge, especially concerning the biology, socio-economics, stock structure, and spatial dynamics. Such a program, which should also encompass activities of compiling and collecting currently unavailable or new data as well as modeling, is rather difficult to fund at National levels because of its high cost (i.e. three million euros which, however, represents less than 1% of the gross revenue related to bluefin tuna exploitation). Furthermore, the large spatial distribution of bluefin tuna implies strong research coordination between the Contracting Parties from various areas, i.e. Mediterranean, East and West Atlantic countries. Such a task can hardly be done at national levels, but is straightforward within the SCRS. Finally, the SCRS believes it is an important responsibility of the ICCAT Commission and Contracting Parties to ensure research when it is urgently needed to improve the management and to ensure the conservation of endangered species.

- The Committee continues to recommend, if they have not yet done so, that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) institute data collection procedures which permit quantifying the total catch (including by-catch) composition and disposition by the tuna-fleets and report those data to ICCAT. The Committee recommends that scientific observer and logbook programs, in combination, be used for this purpose and further recommends that CPCs adequately fund such programs in order to meet data reporting obligations. Further, the Commission should consider the merits of instituting an ICCAT scientific observer program similar to those operated by other tuna RFMOs to collect and make available the needed scientific data.

- For the longer term, large-scale, coordinated and well designed tagging programs for tropical and temperate species stocks of high interest to the Commission, similar to those underway in other Tuna Commission Convention areas (e.g. IOTC, IATTC, WCPFC), should be initiated to provide data which will enable the SCRS to improve the assessment advice. In the absence of such data, the Commission might need to take more precautionary actions to assure achieving the Convention objectives.

- Given the increase in the Secretariat's workload and acknowledging the recent appointment of a compliance expert within the Secretariat, the Committee recommends that the Commission provides additional human resources to the Secretariat for (in order of priority): (i) a population dynamics modeling expert to fill the existing vacancy (see section 16.5), (ii) a database management and webpage specialist (see **Addendum 3 to Appendix 8**) and (iii) a by-catch coordinator.

The above recommendations carry significant financial implications for the Commission. The following ones may have lower financial implications, but are still of high priority in the Committee's view.

- The Committee reiterates the fact that its general advice is unlikely to change significantly within a period of two years for long-lived species, such as bluefin tuna, and the inherent delay in the ability to detect change in

population status as new regulations are implemented. The Committee recommends that a four-year period between each comprehensive stock assessment would be more appropriate, unless fisheries indicators suggest substantial changes in stock status. This approach would allow the group more time for inter-sessional work that would focus on important or novel issues regarding data and models which are generally not possible with a high frequency assessment schedule. This would improve the quality and credibility of future assessments.

- The Committee emphasized that the stock assessments of many species (e.g. blue and mako sharks and swordfish) have been hampered, or even impeded, because CPUE series from the main fisheries catching those species have not been provided. In this regard, it is particularly critical that standardized CPUE series from those which have not yet been submitted be provided prior to the assessments. The Committee also emphasized the need for participation by scientists with knowledge of these fisheries in the assessments and recommends that this participation be improved upon.

− The SCRS recommends that National Scientific delegations conduct additional research into technical measures and time-area closures which could optimize protections of juvenile Mediterranean swordfish. It is proposed that this research would be reviewed and further planned during an inter-sessional workshop, proposed for 2008.

− The Committee noted there may be seabird and shark species identified as high priority for which very few by-catch or distribution data currently exist. The Commission should consider the adoption of precautionary management actions, such as the introduction of mitigation measures in advance of complete knowledge of the impact of ICCAT fisheries on these species. The Commission should also develop educational materials for distribution to fisherman active in the Convention area. These materials should identify conservation issues related to seabirds, marine turtles, sharks and other species of concern and also identify easily implemented mitigation measures that have been demonstrated to reduce their unintentional catch and/or decrease incidental mortality.

− The Committee recommends that CPCs enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics. It is anticipated that funding for the seabird assessment framework might need to continue into the future.

− The Committee noted with satisfaction that extra-budgetary funds had been contributed to assist scientists of Contracting Parties to participate in this work. Consequently, it was recommended that the Commission insist in maintaining the participation of these same scientists in this research and work.

15. Responses to the Commission's requests

15.1 Calls for an evaluation of data deficiencies at ICCAT with emphasis on how such deficiencies may affect management advice Recommendation by ICCAT on Compliance with Statistical Reporting Obligations [Rec. 05-09]

Recommendation 05-09 calls for an evaluation of data deficiencies at ICCAT with emphasis on how such deficiencies may affect management advice.

The first paragraph of [Rec. 05-09] requires the Secretariat to include a list of specific data elements that are lacking for each stock as part of its Report on Statistics and Coordination of Research. Based on the deliberations held by the different Species Groups, the Sub-Committee on Statistics, the report of the *ad hoc* Data Workshop (Madrid, Spain, October 11, 2003), and the report prepared by the Secretariat, the Committee prepared this response.

The Secretariat introduced it's recently drafted *Manual of Procedures for the Submission of Information Required by ICCAT*. The Executive Secretary explained that this Manual was not a legal instrument, but instead it was a tool intended to assist CPCs in understanding what types of information needs to be submitted, when it should be submitted, and how it should be submitted. The Committee congratulated the Secretariat and deemed that this tool would indeed be useful to better understand reporting obligations on both compliance and statistical information.

The SCRS Chairman expressed the view that a comprehensive approach was necessary to deal with data deficiencies, given the existing overlap between compliance-related data and other fisheries information. It was noted that lack of meeting basic obligations for data reporting was impeding the Committee's ability to provide the type of management advice the Commission has requested. Several delegates expressed the view that the Committee's capabilities could be enhanced substantially if many of the detailed fishery (catch-effort, etc) datasets that are available to National Scientists were assimilated into the Secretariat's databases. However, it was generally felt that it would require a decision by the Commission before such datasets could be submitted to the Secretariat. In addition, there would be a need to develop confidentiality rules for access to such data.

The items below focus on recent data deficiencies. The Committee notes, however, that there have also been recent improvements in data collection and reporting, especially for some developing Contracting Parties. The Committee acknowledges the successful role that the projects directed at capacity-building (Japan Data Improvement Project and Data Fund) are having in this respect. The Committee also notes that other programs such as the Enhanced Research Program for Billfishes and the Bluefin Year Program have been used to collect valuable data that would probably not be available otherwise. The Committee strongly recommends that Contracting Parties, individually and collectively, continue to support and enhance these programs, as the current levels of funding are judged to be inadequate to fully address the data limitations that the Committee has identified.

In response to [05-09] the Committee distributed a questionnaire that is intended to track changes in data availability, quality and improvements. The Committee will use the responses to the questionnaire to monitor data improvements and facilitate future evaluations.

Mediterranean swordfish

The latest assessment for this stock was accomplished in 2007. Task I data were available from the main producing Parties through 2005, but other Parties did not report data separately for the Atlantic and Mediterranean areas. Catch at size samples were available with which to estimate an overall catch at size (and catch at age), but the samples are sparse, and estimating catch at size required making many substitutions, the uncertainty resulting from which has not yet been evaluated.

The Committee also noted that there may be additional fleets from non-Contracting Parties taking swordfish in the Mediterranean. The magnitude of these catches is relatively small and thus it should not have a severe impact on the assessment, but nonetheless, it adds to the overall uncertainty in our evaluation.

A comparison of the precision in the estimates of stock status for Mediterranean and north Atlantic swordfish **(Figure 1)** reflects the relative lack of information regarding Mediterranean swordfish largely due to the sparse data for assessing this stock. Improvements in data collection and reporting might provide a basis for increasing the precision of our assessment of this stock which could lead to improved management advice.

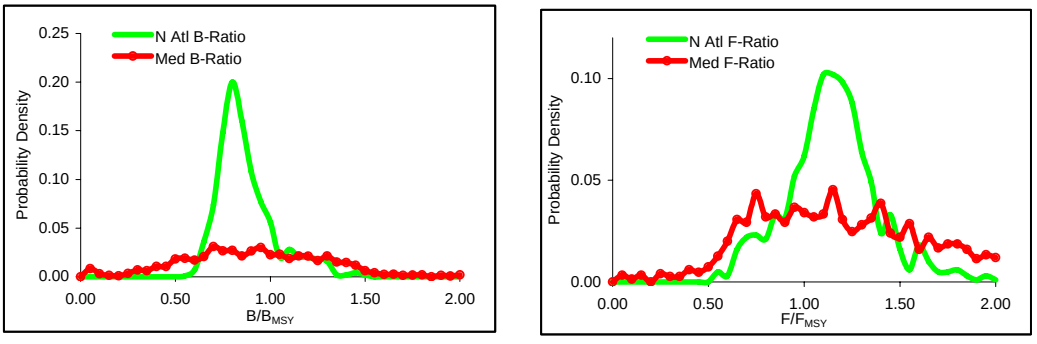


Figure 1. Uncertainty in the estimates of recent status (B/BMSY, left plate; F/FMSY right plate), contrasting the information content in the data rich, North Atlantic swordfish assessment and the data poor, Mediterranean swordfish assessment.

Sharks

A data preparatory meeting to review the available information for assessing shark stock status was held in 2007. The next shark stock assessment is scheduled for 2008 [Rec. 05-05]. Previous reviews of the shark data base resulted in Recommendations [04-10, 05-05] to improve the data reporting for sharks, but a measurable progress in the quantity and quality of the overall shark catch statistics has not yet resulted, in spite of a few isolated improvements. The Committee noted, with great concern, that more than two years after Recommendation 04-10 entered into force (June 13, 2005), making it mandatory for Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) to annually report Task I and Task II data for catches of sharks, in accordance with ICCAT data reporting procedures, including available historical data, most Parties are still not complying. The very low level of compliance with the obligation of CPCs to provide Task I and Task II data for sharks caught by their vessels, greatly hampers, if not completely impeding, assessment of the status of the exploited shark stocks. The absence of reliable information on the impact of ICCAT fisheries on shark stocks could result in high, but unmonitored, levels of overfishing in contravention of the Convention objectives. As a consequence of these data deficiencies, increasingly conservative management measures might be needed to be implemented by the Commission, in order to limit the risk of collapse for some shark populations.

Atlantic albacore stocks

An ad hoc meeting was held in Madrid, Spain, on March 12-14, 2007 to prepare MULTIFAN-CL inputs for the 2007 albacore assessment.

The assessment of North and South Atlantic stocks took place In July 2007.

The Committee noted that important improvements were made to the assessment of North Atlantic albacore in terms of the level of detail of the data used and also in the length of the time series used (the assessment spans a 75-year time period). Nonetheless, there remain data gaps that need to be filled, such as fishing effort and size information for some of the major fisheries.

Results of the assessment also showed improvements in the data used for the South Atlantic stock:

A revision of logbook records was performed which resulted in an increase in the number of size samples available for the assessment, therefore, reducing the number of substitutions needed to estimate catch-at-size. Nevertheless, size samples available from the South stock have many more gaps than the North stock, indicating that sampling efforts need to be increased to obtain better temporal and spatial coverage of the stock to reduce uncertainties associated with the estimation of catch-at-size.

Even though there were improvements in the knowledge of growth for the South Atlantic albacore stock, the Committee's view is that more research on basic biological parameters is still needed in order to reduce uncertainty in the assessments.

Mediterranean albacore stock

Even though catches of Mediterranean albacore have been increasing for the past few years, there is a lack of general information on this stock and the SCRS is not in a position to provide advice on the status of the stock due to the lack of information.

It was noted that although some Parties exploiting this stock report Task I data, large uncertainties in the total landings exists. As for Task II, data are very incomplete.

An assessment of this stock has never been performed and it should not until serious improvements in Task I and II data are carried out.

Tropical species

During 2007, different improvements of the main information collected by the ICCAT Secretariat with respect to tropical species have been carried out. However, some problems are still to be solved:

Fleet information: relatively few CPCs are submitting complete fleet size and fleet characteristics information together with Task I data, as required. As it is especially important to have complete historical fleet information

in order to understand changes in exploitation over time, the Group recommends that the SCRS consider ways in which existing gaps in fleet information may be filled, and ways in which future reporting may be improved.

Catch: many improvements were achieved since the Sète meeting in 2006; however, some work remains to be done on historical data (Angola and Cape Verde for the years prior to 1960, split by Parties of the "FIS" fleet). It was also recommended that the "EC-NEI" is disaggregated according to their flag in order to facilitate checking by the Secretariat.

Sizes: In addition to the global update of the bigeye and yellowfin data base, catch at size for skipjack has been updated through 2005 and was used during the inter-sessional meeting of the tropical Species Group. One of the major difficulties is the limited sampling for size of the longline fisheries for yellowfin and bigeye. For skipjack, size data for some fleets are lacking, such as the gillnet fishery of Morocco. Also, discards and by-catch (e.g., "*faux-poisson*") data are lacking for the EC and Ghanaian fisheries. The Group commends the Secretariat's quality control efforts to improve the size frequency data. However, there are limitations about how much the Secretariat can do in terms of data validation. For this reason, it is recommended that national scientists review all of the size frequency data maintained in the Secretariat databases for validation purposes

Tagging: the tagging data are still undergoing a revision process. Taking into account the interest shown by the SCRS in preparing an assessment for yellowfin and skipjack in 2008, it is recommended that revision of the tagging data base for these two tuna species continue.

With the aim of updating catch at size in the most recent period, ICCAT Contracting Parties and Cooperating non-Contracting Parties, Entities and Fishing Entities and associated Parties are encouraged to submit relevant statistics before the dead line period corresponding to the preparation of these meetings.

Bigeye

A new assessment of bigeye stock status was completed in 2007. In general, the data were of sufficient quantity and quality to carry out an assessment using various types of models. In general, data availability has improved but there is still some lack of information regarding detailed fishing and size data from certain fleets, in addition to the past catch and fishing activities of IUU fleets (e.g., size, location and total catch), leading to the need to assume catch-at-size for an important part of the overall catch. Species composition of Ghanaian fisheries catch was reconstructed for 1997 through 2005 based on improved sampling and catch-at-size estimated in recent years as part of the data improvement projects of ICCAT (SCRS/2004/015). In particular, our assumption that IUU catch has been eliminated, resulting in a declining catch pattern over the past few years, could have led to an overly optimistic view of bigeye stock status. The assessment and subsequent management recommendations made by the Committee are conditional on the reported and estimated history of catch for bigeye in the Atlantic. The Committee reiterates its concern that unreported catches from the Atlantic might have been poorly estimated and maybe continuing, but available statistical data collection mechanisms are insufficient to fully investigate this possibility. Coordination amongst the tuna RFMOs should be encouraged with an eye to, among other objectives, examining the possibility of "fish laundering" for bigeye and other species.

Billfish

Impact on last assessment

During the last marlin assessment in May 2006 the Billfish Working Group noted that Task I data contained large amount of unclassified billfish, up to 30% of the total billfish landings in 2003, and incomplete reports for some Parties. The Working Group obtained new estimates of historical catch up to the year 2004 for both marlins by splitting the unclassified catch and filling data gaps by extrapolating historical data for the most important fleets. The resulting catch estimates were substantially larger than those calculated from Task I data (36% more for blue marlin and 28% for white marlin in 2004). After the May 2006 assessment ICCAT has received Task I reports for 2005 from fisheries off West Africa and the Caribbean, that albeit incomplete, suggest that recent catch estimates made during the last assessment, especially of blue marlin, possibly underestimate the true catch. As a result estimates of recent fishing mortality of blue marlin made during the May 2006 assessment are likely to be underestimated.

During the last marlin assessment, in May 2006, abundance estimates provided for some pelagic longline fisheries were deemed to be biased. This was the result of the low observer coverage for some fleets that led some Parties to develop indices based on logbook data which are known to be less accurate for by-catch species.

This bias is likely to have lead to a more pessimistic view of the abundance of marlins. The Committee, therefore, recommends that observer programs be expanded to reduce this bias. Furthermore, the continued failure to classify catches of billfish by species leads to increased uncertainty in the estimates of harvest and thus of recent stock status for all billfish.

Impact on next assessment

The more years that pass with uncertain estimates of catch, the more uncertain the benchmarks derived from the next assessment will become, and the more uncertain the predictions of future biomass will be. Continued low observer coverage of some pelagic longline fleets will perpetuate the bias in the abundance indices derived from those fleets, and thus will continue to undermine the accuracy of estimates of recent abundance trends.

Impact on management advice

Uncertain or biased benchmarks may lead to incorrect management advice regarding the future desired state of stocks and their present status. Higher uncertainty in benchmarks will require more conservative management measures if the Commission wishes to limit the risk of further decline in resource status and to attain the Convention objectives.

It should be noted that for species for which no revision was carried out in 2007 the SCRS response for 2006 is still valid.

Bluefin tuna

Bluefin tuna-West

The Committee noted that the quality of size data from some western longline fisheries has diminished in the recent period and if this trend continues, it could undermine our ability to assess western BFT resource status. For the present assessment, the Committee noted no recent data deficiencies which seriously impede our ability to conduct analytical assessments of resource status in the western stock management unit. However, lack of data from the eastern fisheries, particularly in the Mediterranean, does seriously impede our ability to model and estimate mixing rates between eastern and western origin bluefin, thus limiting our ability to predict the consequences of changing abundance of eastern bluefin on western fisheries and vice versa. Until sufficient data are available to quantify mixing rates and overall eastern management unit resource abundance levels, it will not be possible to quantitatively predict the outcome of management measures which take account of mixing in any realistic way.

As a consequence, increasingly conservative management measures might need to be implemented throughout the Atlantic and Mediterranean if the Commission is concerned with limiting the risks of further decline in western origin bluefin spawning stock.

Bluefin tuna-East

Previously, the SCRS has advised that the data deficiencies for eastern Atlantic and Mediterranean bluefin were so serious that a reliable assessment could not be conducted in 2000 or 2002 (Anon. 2005b); also see Report of the Ad Hoc Data Workshop, held in Madrid, Spain, October 11, 2003 (ICCAT, 2004). During the last two decades, there has been an overall shift in targeting towards large bluefin tuna. As the majority of these fish are destined for farming/fattening operations, their size and age composition are becoming more difficult to determine precisely, as well as the origin of the catches, which in turn affects the quality of the catch data. Following Rec. 05-04, caging statistics are somewhat improved but this information remains largely incomplete and not yet fully useful for assessment purposes. Furthermore, and also to the detriment of the assessment, TACs are likely inducing under-reporting of overall catches. The minimum size limit regulations could affect information on catches of small bluefin tuna.

The available catch and catch-at-size data are woefully inadequate, at the level of the overall stock of the east Atlantic and the Mediterranean, which affects in large measure some analyses, such as age structured analysis. In fact, the species group established its diagnosis in 2006 based not only on the results of the age structured analysis, but above all on the experience of numerous national scientists present, as well as the overall indicators (CPUE indices, fishing capacity) and supplemental analyses (analysis of yield per recruit, analysis of age-classes) which are less data demanding than age structured analysis, but less sensitive to the size data and/or

which are based on combination of good quality data (in general linked to a fishery). All the results of these analyses converge in a diagnostic of strong over-fishing and over-exploitation. However, the quality of the current data, in large measure, limits the capacity of the SCRS to carry out more precise analysis, e.g. to estimate quantitatively the impact of mixing between the east and West Atlantic stocks. It was also pointed out that the CPUE indicators currently available for some fleets represent a relatively small proportion of the overall catch. In the Secretariat Report on Statistics and Coordination of Research detailed information is provided on the gaps in the data and on the current situation regarding data transmission. Currently almost half of the reported Mediterranean catches have no associated size samples to estimate catch at size. Without an immediate improvement in the quality and quantity of data collected in these fisheries, the Committee's capacity to provide precise management advice based on current and future assessments will be very limited.

With these factors, combined with the lack of reliable historical information for many fleets, it is impossible to carry out precise quantitative monitoring of the stock with a certain level of security. Consequently, an important level of over-fishing could easily happen unnoticed. It is possible that a collapse of the stock could occur in the near future given our estimation of the fishing capacity of all fleets combined and current fishing mortality rates. As a consequence, if the Commission wishes to limit the risks of over-fishing and stock collapse it would be necessary to implement increasingly conservative and precautionary management measures.

Atlantic swordfish

North Atlantic

The SCRS noted that North Atlantic swordfish is considered one of the more data-rich stocks in ICCAT. In general, the level of detail is very good and there is confidence in the stock assessment.

However, the radio reporting system for live released swordfish (SCRS/2006/121) has had a negative impact on recent Japanese CPUE data. In addition, the current data collecting system regarding live released swordfish in the North Atlantic should be improved. Japanese longline data are important for SWO and many ICCAT assessments because they usually cover a long time period and broad spatial strata.

The more recent years of these data were not used in the current assessment and the Committee is concerned that the loss of such valuable information will have an impact on future assessments.

The absence of reliable catch-at-size information for the northern stock for recent years resulted in imprecise estimates of the magnitude of recent year-classes. This reduces the predictive capacity of the Committee in the medium term.

South Atlantic

Data availability for this stock has improved relative to the 2002 assessment. However, several important fleets have few data (inadequate size samples, and lack of catch and effort information).

Furthermore, there are conflicting signals in the relative abundance trends inferred from targeted and non-targeted fisheries, and this requires that management advice rely more heavily on assumptions. While this is not strictly a problem of data gaps, it does indicate the potential need for collecting more detailed information from each fishery before these uncertainties can be resolved.

Other species

Other species that are under the purview of ICCAT, such as small tunas, are not assessed regularly by the SCRS. It is known that the ICCAT database for some of these species is incomplete.

15.2 Consideration of information on fishing capacity [Res. 06-19]

Through [Res. 06-19], the Commission established a Capacity Working Group which, among other items, requested the Committee to provide (a) Information on short- and long-term stock conditions and harvest levels in ICCAT fisheries for the most recent year(s) available, and (b) Data on effort and CPUE by flag, gear, season and area. The 2007 meeting of the Methods Working Group was utilized as an inter-sessional mechanism to examine the available data on fishing capacity (see Item 9.4). The report of the Methods Working Group was

subsequently made available to the first meeting of the Capacity Working Group (Raleigh, USA, July 16-18, 2007).

The 2007 Capacity Working Group meeting reviewed the scientific information mentioned above and concurred that there was sufficient evidence that overcapacity existed for eastern Atlantic and Mediterranean bluefin tuna. However, the Working Group requested that SCRS at its 2007 annual meeting to "examine the latest 2007 information on vessels authorized to fish actively for bluefin tuna and to assess, if possible in a refined quantitative manner, the level of overcapacity." The Committee is unable to undertake a more such detailed and refined analyses at this time, but it hopes to be able to do so at the 2008 bluefin tuna assessment meeting, provided that complete and accurate vessel data are submitted by Parties.

The 2007 Capacity Working Group meeting also noted that in order to further its work, it required an individual report (to be prepared by the Secretariat and SCRS) on each stock outlining the current status of the stock and information on the different fleets actively engaged in the fisheries. In this respect, the Committee took note of the conclusion reached by the Methods Working Group that "available information in ICCAT databases relating catch by flag and gear to the effort expended to realize that catch is sparse, and the diversity of units used in reporting effort make it difficult to estimate capacity in a comprehensive manner." The Committee notes, however, that in cases where fishing mortality rate exceeds that needed to result in MSY, this would be considered a minimum estimate of fleet-wide overcapacity. Very conservative estimates of overcapacity (the difference between short-term fishing capacity and long-term resource productivity potential) suggest that there is overcapacity for North Atlantic albacore, eastern Atlantic and Mediterranean bluefin tuna, Mediterranean swordfish and blue marlin, and possibly for yellowfin, western Atlantic bluefin, and white marlin as well. These estimates are confirmed by recent stock assessments which indicate in aggregate, effective fishing effort for these stocks exceed the levels necessary to achieve the Convention objective. The Committee also notes that very detailed information is readily available to national scientists for some of the major fleets. Therefore, the Committee believes that much of the pertinent work could be carried out if the Commission requires and enforcing reporting of the following from each Party on its fisheries, by stock:

- Annual catch
- Annual fishing effort (in standard units such as number of hooks for longlines, fishing days for baitboats, and searching days for purse seine)
- Fleet characteristics (with the vessel numbers and size information by gear type that are requested each year by the Secretariat)
- Classification of the fleet in terms of "actively targeting", or not.

15.3 Consideration of information on sport and recreational fisheries [Res. 06-17]

Resolution [06-17] calls for the creation of a Working Group on Sport and Recreational Fishing Activities, and requests SCRS to provide relevant available information in support of the Working Group discussions. The Committee noted that in [Rec. 06-05] the Commission has defined sports and recreational fisheries as being "non-commercial" and that the difference between the two types of fisheries depends on whether or not the anglers belong to national or sports associations.

The Secretariat prepared a summary of the currently available information regarding sport and recreational fisheries in the ICCAT database. The gear codes SP (sport fishery) and RR (rod and reel) were assumed to represent the sport and recreational fisheries. In some cases, it is likely that some catches registered to RR also include those made other than for recreational or sport fishing reasons (i.e., destined for sale). Summaries of catch and effort trends are presented in **Table 1**. In addition, the Secretariat provided a summary table of a survey carried out in 1997 that identified recreational fisheries by party and species, and linked this information with the summary catch and effort series (Task I and Task II) available in the ICCAT database.

The Committee noted several important limitations of these results:

a) It is clear that not all Parties have collected and/or reported recreational statistics to ICCAT for all years and species. Furthermore, several Parties do not have the mechanism or the infrastructure to collect reliable sport/recreational catch and effort data.

b) The gear rod and reel (RR) is not reported exclusively as a recreational gear (as defined to be a non-commercial removal). There were several instances where the RR classification likely represented some commercial captures. For example, recent catches of bluefin tuna reported by Canada have a large

component of RR, which correspond to commercial operations. There are also examples where RR gear may refer to artisanal operations and not to recreational or sport activities. It was concluded that the discrimination between recreational and non-recreational catches under the RR gear code may not always be feasible.

c) Although catch is an important indicator of the impact of sport/recreational fisheries upon stocks, it is imperative that statistics on live releases of fish are also collected, especially for billfish, because not all fish that are released survive.

The Committee reviewed and updated the summary of the information with participation of the national scientists. Comments received by the Committee were taken into consideration and the results are shown in **Table 1**.

For most species, sport/recreational fisheries contribute a small part of the total catch for that species, with the exception of some billfish **(Figure 1)**. Similarly, and with few exceptions, sport/recreational fisheries contribute a small part of the total catch of all species reported by CPCs **(Figure 2)**.

Table 1. Results of survey on recreational fisheries conducted in 1997 and updated in 2007.

Country	*Gear*	*Recreat./ Sport*	*Species*	*Catch\Landings*	*CPUE*	*Size*	*Remarks*
Brasil	RR	Sport	BIL	YES	YES	YES	Partially monitored.
Canada	RR	Sport	BFT Sharks	YES 100%	Partial	Partial	The latest catch of BFT from RR was commercial. There is no mechanism to separate sport vs. commercial.
Cap-Vert		Recreational		None	None	None	Sport catch is increasing but no data.
Cote d'Ivoire		Sport	Billfish	None	None	None	Sport fishery stopped since 2000 due to civil war.
EC-France	RR	Sport	BFT	YES 100% coverage	Could be obtained from fishing tournaments.		In Martinique & Guadeloupe there are recreational fisheries but data are not available. See also SCRS/2006/
	TROL	Sport	BFT	YES 100%			
EC-Spain		Recreational	BFT	YES			7.8 t of BFT caught in Mediterranean during 2006. In Bay of Biscay there is a recreational fishery targeting ALB and in the Canary Is. for Bill. ALL sport fisheries catching BFT should be reported.
			ALB				
			BILL				
EC-Italy	LL	Sport	SWO	Partial	Poor	Poor	
	GILL	Sport	SMT	Partial	Poor	Poor	
	HL	Sport	BFT	Partial	None	Poor	
	HL	Sport	SMT	Occasional	None	Poor	
	RR	Sport	BFT	Partial	Occasional	Partial	
Maroc	RR	Sport	BILL	None	None	None	
Senegal	RR	Sport	SAI, BON	YES	YES	YES	
		Sport	LTA, BON				
UK-Bermuda	RR	Sport	BUM	YES	YES	Estimates	Occasional survey of recreational fishery.
		Sport	WHM	YES	YES		

USA	RR	Sport	YFT	YES	YES	YES	Various degrees of precision, but all species monitored.
		Sport	BFT	YES	YES	YES	
		Sport	ALB	YES	YES	YES	
		Sport	BLM	YES	YES	YES	
		Sport	WHM	YES	YES	YES	
		Sport	SAI	YES	YES	YES	
		Sport	BET	YES	YES	YES	
		Sport	KGM	YES	YES	YES	
		Sport	SSM	YES	YES	YES	
		Sport	SWO	YES	YES	YES	
		Sport	WAH	YES	YES	YES	
		Sport	SKJ	YES	YES	YES	
		Sport	BON	YES	YES	YES	
		Sport	BLT	YES	YES	YES	
		Sport	SMT	YES	YES	YES	
		Sport	Sharks	YES	YES	YES	
Venezuela		Sport	Bill.	YES	YES	YES	Exist catches on billfishes
Antigua	TR, RR	sport	Tunas+BILL	YES	YES	YES	Where data availability is indicated, these data reflect catches taken only during tournaments
Barbados	TR, RR	Sport	Tunas+BILL	YES	YES	YES	
Belize	TR, RR	Sport	Tunas				
Dominica	TR, RR	Sport	Tunas+BILL				
Grenada	TR, RR	Sport	Tunas+BILL	YES		Yes (BIL)	
Jamaica	TR, RR	Sport	Tunas+BILL	YES		Yes (BIL)	
St. Kitts	TR, RR	Sport	Tunas+BILL				
St. Lucia	TR, RR	Sport	Tunas+BILL	YES			
Trinidad	HL, TR, RR	Sport	Tunas+BILL	YES			

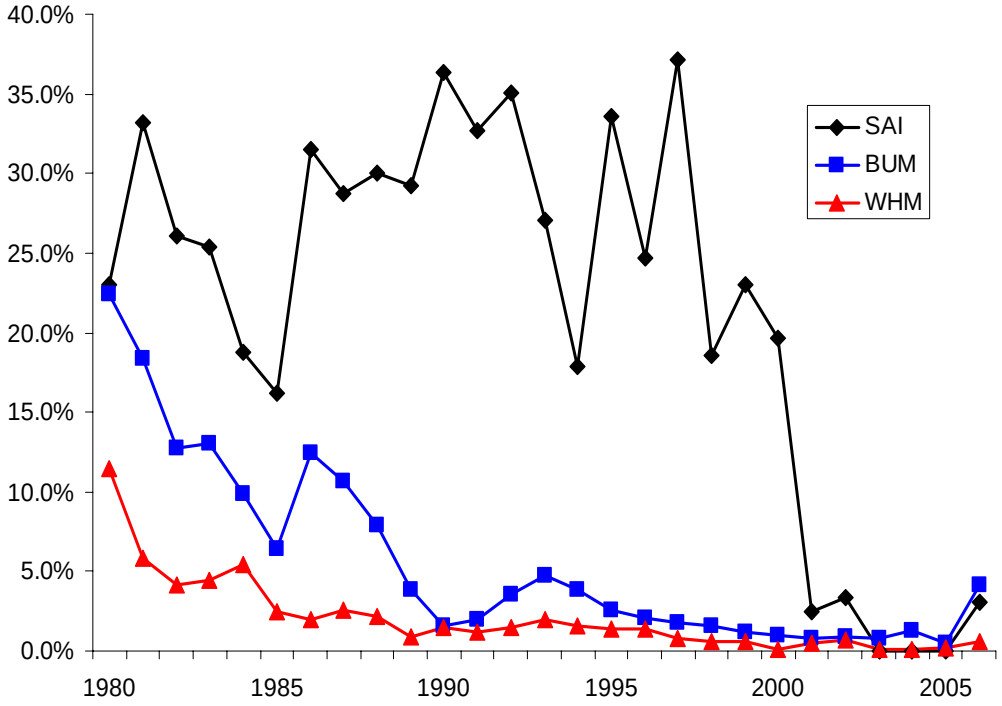


Figure 1. Proportion of sailfish, blue marlin and white marlin reported to be caught by sport-recreational fisheries for 1980-2006.

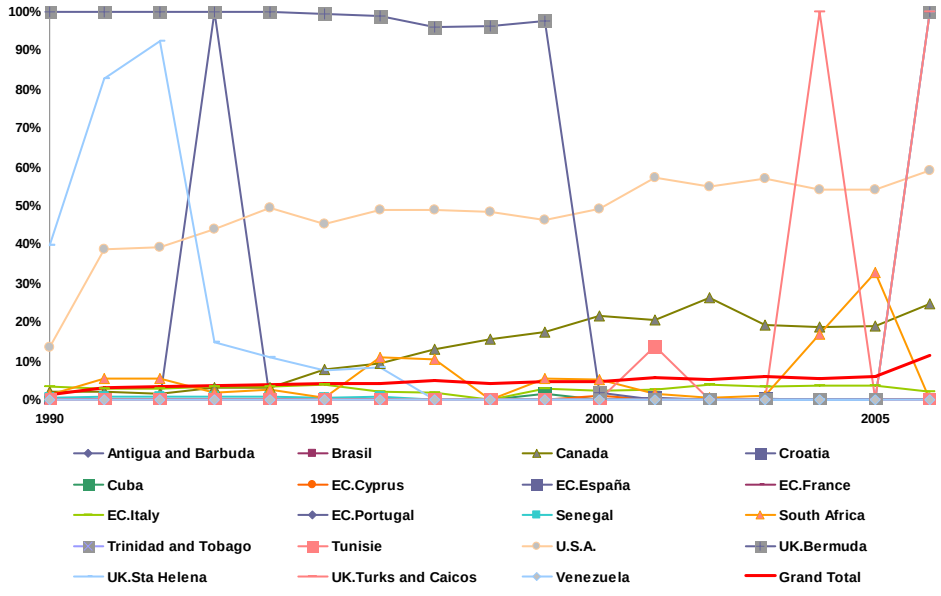


Figure 2. Trends in the percentage of sport/recreational catch compared to total catch reported by party for all species combined, 1990-2006. Gear types used in this figure are SP (sport) and RR (rod-and-reel), which may include some non-sport/recreational catches.

15.4 Progress on assessing the impact of circle hooks on dead discards from longline fisheries [Res. 05-08]

The [Res. 05-08] requests that, "when feasible and appropriate, the SCRS should present the Commission with an assessment of the impact of circle hooks on the dead discard levels in ICCAT pelagic longline fisheries". In 2006, some information regarding this topic was presented. The following represents an updated summary of the available information.

There is a long debate regarding the positive or negative effects of using circle vs. J hooks. Besides hook type, there are other factors such as shape of the hook, degree of offset, hook size, and bait type that can affect the results obtained. In addition, the experimental design, the methodology selected to analyze the data, area-time-depth factors, fishing patterns, etc. could affect the outcome of the experiments. Therefore, the Sub-Committee considered that a generalized simplification of the debate regarding hook types is not appropriate.

According to the results from scientific experiments, some types of circle hooks tend to reduce the catch rate and increase survivorship of some incidentally caught species (e.g., sea turtles, marlin), while other types of circle hooks tend to have the opposite effect (e.g. sharks). However, in many of these cases the results were conditional on the bait type used such us with blue sharks or sea turtles. In the case of targeted species for which information is available, catch rates seemed to be higher for yellowfin tuna. But, in the case of other targeted species such as swordfish, and bigeye tuna the circle hook effect was also dependent on the bait type (mackerel vs. squid) yielding either higher or lower catch rates for the targeted species compared to J hooks. The results of some experiments have shown that circle hooks may reduce sea bird by-catch.

Fish bait (e.g. mackerel, sardines) compared to squid bait tends to reduce the catch rate of sea turtles. The squid was identified in recent experiment as a key element for increasing their catch rates, regardless of the hook types tested. The effect on targeted catch and other by-catch species is also affected by bait size for mackerel.

For hardshell sea turtles (i.e. other than leatherbacks) some experiments done using circle hooks resulted in a reduced proportion of hooks swallowed when compared to J hooks which may increase post release survival rates. Several studies reported an increase in live releases of all discarded fish species due to circle hook tendency to hook in the mouth. However, other experiments that compared different hook types showed that bait type was the main factor affecting the proportion of internal or external hooking, where squid bait increased the proportion of swallowed hooks.

Comparing results among different studies that tested the performance of circle and J hooks types is further complicated by the fact that hook shapes and sizes can vary. In the case of circle and J hooks, different shapes and sizes can change the performance of the hooks. For example, a circle hook with a large gap or more than 10°of offset can perform similarly to a J hook and the use of very large J hooks generally translates in lower catch rates of sea turtles.

Overall, the Sub-Committee felt that the results of the studies reviewed during the meeting are encouraging, and the use of some types of circle hooks combined with certain types of bait could reduce mortality of species incidentally caught and released from longlines. The Sub-Committee encourages the continuation of these types of studies since it is not completely clear that the use of circle hooks alone is the best technological solution to minimizing by-catch while maintaining productive fisheries in all cases.

15.5 Review of information on farmed bluefin tuna growth rates [Rec. 06-07]

Following Recommendation [06-07], the Committee reviewed available scientific information for identification of growth rates of caged bluefin tuna. This information is rather limited at present. Based on available information for the SCRS, the Committee assumed that large fish held for several months for fattening gain on average weight 25% of their capture weight (i.e. a conversion factor of 0.8). SCRS/2005/114 reported significantly higher growth rates for small (juvenile) bluefin tuna in the cages. A more detailed study presented by Tičina *et al.* (2007) indicated that small bluefin tuna are able to increase their initial biomass by more than 340% within 511 days. In other words, juvenile bluefin would gain weight twice as fast in cages as compared to the wild.

The Committee expects that weight gain is highly variable depending on various factors, such as season, year, duration of caging, initial size of the fish, feeding, location, environmental conditions, etc. Therefore, the Committee is soliciting proposals to collect needed scientific information to complete our advice to the Commission.

16. Other matters

16.1 Proposal related to publications

The Secretariat presented two proposals concerning publications.

− *Aquatic Living Resources*

In 2007, an agreement was reached with the journal *Aquatic Living Resources* (ALR) for the inclusion of SCRS papers as a permanent section in the ALR journal for tuna and tuna-like species. The publication will start in 2008 and will include some relevant documents (10 to 15) presented to the SCRS in 2007. The agreement also includes the possibility of publishing, with a periodicity decided by SCRS, a special ICCAT volume of the ALR journal compiling those documents published in the journal during that period. Documents will follow a pre-selection by the Editorial Committee (EdC), comprised of Drs. D. Die, F. Hazin, J-M. Fromentin, N. Miyabe, G. Scott (SCRS Chair), under the general supervision of Dr. Pallarés. Pre-selected documents may be written in any of the three official languages of ICCAT, and those submitted in Spanish will be translated by the Secretariat to English or French. Suggestions regarding the content of the documents selected, possible additional authors, further analysis or developments and general improvements of the documents will be forwarded to the author(s) from the EdC. Revised documents should be sent to the Secretariat before a deadline no later than the end of February. The Secretariat will then submit these documents to undergo the ALR´s normal peer review process.

The Secretariat also provided information on the budgetary implications as regards the editing costs.

− *Thomson Scientific Journal*

The Secretariat also explained that the *Thomson Scientific Journal* (TSJ) provides comprehensive coverage of the world's most important journals through an extensive database, which undergoes continuous updating. The inclusion of ICCAT´s *Collective Volume of Scientific Papers* would considerably increase its dissemination among the scientific community and enhance the prestige of this publication. The Collective Volume series appears to meet all the requirements for inclusion, particularly the periodicity of its publication, the inclusion/translation of abstracts, key words, verification of references to tables and figures, verification / correction of bibliographic references, etc.

A question was raised as to whether the use of indexing of abstracts precludes publication of SCRS documents in other peer reviewed literature. In response it was noted that certainly this would depend on each specific scientific journal. At any rate, the Publications Coordinator will find out more information and inform the Committee.

After discussion, the Committee recommended that the Secretariat proceed along the lines proposed. The Committee invited the scientists to make personal proposals for the inclusions of scientific documents in the Thomson Scientific Journal.

16.2 Progress on the ICCAT Observer Program

The Executive Secretary noted that the program to place observers on cargo vessels involved in transshipment was adopted in 2006. He indicated that an agreement had been reached with a South African/UK Consortium, and that a Training Manual was made available and transmitted to participating Parties, Entities or Fishing Entities.

The Assistant Executive Secretary further explained that the program has been implemented in 2007, with 12 observer deployments, mostly embarked in South Africa, Canary Islands, Cape Verde and Gabon. These are, on average, 35-day trips and 1,100 tons have been observed, with bigeye tuna being the most common species observed. He pointed out that the data reported to the SCRS will be lagged by one year, just as the data reviewed by the Committee are also lagged by one year, for which 2007 data will be presented in 2008.

Appreciation was expressed, in particular, to the People's Republic of China, the Republic of Korea, Chinese Taipei and the Philippines for their assistance in assuring a smooth initial implementation of this important program.

The Committee welcomed the initiation of this observer program and recommended that the Secretariat examine the feasibility of expanding its scope to include scientific observations.

16.3 ***Precautionary Approach Workshop***

Canada reported that it will be convening a working group meeting in 2008 to review requirements for Precautionary Approach and develop a proposal that complies with Canadian national policy, legislative obligations and ICCAT protocols. The example stock will be western bluefin tuna. During the course of the workshop, candidate reference points will be developed. A report of the meeting will be prepared, and submitted for review at the 2008 meeting of ICCAT SCRS. Participants could include SCRS scientists, and outside experts. Some limited travel funds are available to help defray the costs of scientists from nations with a major interest in western bluefin tuna, but the workshop is open for self-funded participants. There is also a possibility of financial contribution from ICCAT sources, for those countries fishing western bluefin tuna that may require travel assistance.

The venue for the meeting will be Halifax, Nova Scotia, and the dates will be March 18-21, 2008. More information on the meeting will be circulated shortly, using SCRS distribution lists. Interested scientists are requested to contact either John Neilson (neilsonj@mar.dfo-mpo.gc.ca) or Straits Gavaris (gavariss@mar.dfo-mpo.gc.ca).

The Committee welcomed this information and encouraged broad participation by SCRS scientists.

16.4 Farewell and good wishes to Drs. R. Pianet and V. Restrepo

The Committee was informed that Dr. Renaud Pianet (EC-France) would no longer be directly involved in ICCAT work. A specially prepared commemorative poster of the major ICCAT tuna species was presented to Dr. Pianet with the Committee's sincere appreciation for his more than 25 years of dedicated work in tropical tunas research and his numerous contributions to the work of this Committee. The Committee gave Dr. Pianet a warm round of applause and wished him well in his future work in the Seychelles Islands.

Dr. Pianet thanked the Committee for the kind gesture and thoughtful words.

As concerns the departure of Dr. Victor Restrepo, Assistant Executive Secretary, the Committee paid great tribute to him, emphasizing his contribution to the work of the SCRS and the ICCAT in general. In his intervention, the Executive Secretary pointed out Dr Restrepo's professional qualities and his great dedication to the service of ICCAT, emphasizing the difficulties that the Secretariat will have to replace him. The Executive Secretary presented, on behalf of the Secretariat, a commemorative plaque to Dr. Victor Restrepo for all his loyal services. The Scientific Committee also presented him with a poster, as an expression of their gratitude for the service he rendered to ICCAT.

Dr. Restrepo expressed his deep appreciation to the Committee and the Executive Secretary for all the support provided throughout the past eight years. He expressed sadness to be leaving Madrid, but at the same time satisfaction in knowing that he would remain involved in the work of the SCRS, and would thus be returning soon in a different capacity.

16.5 Profile for the Population Dynamics Position

The Committee was referred to the document on the Population Dynamics position, which provided the job description that had been developed by the Committee for this position when it was first announced in 1998 (and subsequently filled by Dr. Restrepo). While the list of qualifications seemed somewhat extensive, a suggestion was made to prioritize these and redefine some qualifications to adapt them to the current needs of the SCRS. The Committee recommended forming a Recruitment Committee, comprised of not more than five members from among those SCRS scientists who would like to serve in this capacity[1]. The Committee considered that the time frame for the overall selection process would be almost a full year. The SCRS Chairman indicated that the Committee had to finalize the job description after the Commission decides if other duties of an administrative or management nature might be part of this job profile. Dr. Scott noted that, even though a Compliance Officer has been hired, as the Commission becomes more involved in compliance-related issues, such work detracts

[1] During the meeting, the following SCRS scientists volunteer to participate in this Committee: F. Hazin, G.P. Scott, J-M.Fromentin, N. Miyabe, J.M. Nielson and M. Idrissi.

from the scientific needs of the SCRS. Hence, if the person hired has to do such work, this would be detrimental to the SCRS. The SCRS Chair advises increasing the staff at the Secretariat rather than reducing the scientific work. The Chair indicated that the SCRS would be kept duly informed all events concerning the filling of this position at the Secretariat. The job description of the Population Dynamics Position is attached as **Appendix 11**.

16.6 Electronic formats

The Committee expressed its satisfaction, and congratulated the Secretariat, for the improvements made in the organization of the meeting noting, in particular, the advantage of having access to the documents in electronic format, for the smooth running of the meeting. As a result of the procedure, the documents were available in real time, including the final report was available to the Committee at the time of adoption. The Secretariat announced its objective to adopt the electronic format in the near future and to dispense with the paper format during the Committee's meetings.

17. Election of Chairman

Dr. Gerry Scott (United States) was re-elected Chairman of the SCRS, by acclamation, for a second two-year term. Dr. Scott thanked the Committee for the confidence placed in him.

18. Adoption of report and closure

The report was adopted and the meeting adjourned.

Appendix 1

AGENDA

of the

STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

(Hotel Velázquez, Madrid, October 1 to 5, 2007)

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Introduction of Contracting Party delegations*
4. Introduction and admission of observers*
5. Admission of scientific documents
6. Report of Secretariat activities in research and statistics
7. Review of national fisheries and research programs**
8. Executive Summaries on species:
   YFT-Yellowfin, BET-Bigeye, SKJ-Skipjack, ALB-Albacore, BFT-Bluefin, BIL-Billfishes, SWO-Atl. Swordfish, SWO-Med. Swordfish, SBF-Southern Bluefin, SMT-Small Tunas, SHK-Sharks
9. Report of inter-sessional meetings
   - 9.1 Inter-sessional Meeting of the Sub-Committee on Ecosystems
   - 9.2 Ad Hoc Meeting to Prepare Multifan-CL Inputs for the 2007 Albacore Assessment
   - 9.3 Ad Hoc Tagging Coordination Working Group
   - 9.4 Working Group on Stock Assessment Methods
   - 9.5 Inter-Sessional Meeting of the Tropical Species Group
   - 9.6 Bigeye Tuna Stock Assessment
   - 9.7 Data preparatory meeting for sharks
   - 9.8 Albacore-N and Albacore-S Stock Assessment
   - 9.9 SWO-Med Stock Assessment
10. Report of Special Research Programs
    - 10.1 Bluefin Year Program (BYP)
    - 10.2 Enhanced Research Program for Billfish
11. Report of the Sub-Committee on Statistics
12. Report of the Sub-Committee on Ecosystems
13. Consideration of plans for future activities
    - 13.1 Inter-sessional meetings proposed for 2008
    - 13.2 Date and place of the next meeting of the SCRS
14. General recommendations to the Commission
    - 14.1 General recommendations to the Commission that have financial implications
    - 14.2 Other recommendations
15. Responses to Commission's requests***
    - 15.1 Continuation of the evaluation of data elements pursuant to [Rec. 05-09]
    - 15.2 Consideration of information on Fishing Capacity [Res. 06-19]
    - 15.3 Consideration of information on sport and recreational fisheries [Res. 06-17]
    - 15.4 Progress on assessing the impact of circle hooks on dead discards from longline fisheries [Res. 05-08]
    - 15.5 Review of information on farmed bluefin tuna growth rates [Rec. 06-07]
16. Other matters
17. Election of the Chairman
18. Adoption of report and closure

* The Executive Secretary will list the Contracting Parties and Observer Delegations present. Any statements should be presented in writing only.

** The text to be included in the SCRS report should be very short and presented in writing on or before October 2. Oral presentations, if any, should be brief and focus on aspects that are not covered elsewhere by the individual species groups.

*** Responses derived from the results of 2007 stock assessments for bigeye, Atlantic albacore and Mediterranean swordfish are included in Agenda Item 8.

Appendix 2

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Appendix 3

LIST OF 2007 SCRS DOCUMENTS

Number	*Title*	*Author(s)*	*Subject*
SCRS/2007/010	Report of the 2007 Inter-sessional Meeting of the Sub-Committee on Ecosytems *(Madrid, Spain, February 19 to 23, 2007)*	Anonymous	SC-ECO
SCRS/2007/011	Report of the 2007 Meeting of the Working Group on Stock Assessment Methods *(Madrid, Spain, March 19 to 23, 2007)*	Anonymous	METHODS WG
SCRS/2007/012	Report of the 2007 Inter-sessional Meeting of the Tropical Tunas Species Group *(Recife, Brazil, April 11 to 16, 2007)*	Anonymous	TROP
SCRS/2007/013	Report of the 2007 ICCAT Bigeye Tuna Stock Assessment Session *(Madrid, Spain, June 5 to 12 2007*)	Anonymous	BET_ASSESS
SCRS/2007/014	Report of the 2007 Data Preparatory Meeting of the Shark Species Group (Punta del Este, Uruguay, *June 25 to 29, 2007*	Anonymous	SHK
SCRS/2007/015	Report of the 2007 ICCAT Albacores Stock Assessment Session (*Madrid, Spain, July 5 to 12, 2007*)	Anonymous	ALB-Assess
SCRS/2007/016	Report of the 2007 Mediterranean Swordfish Stock Assessment Session (*Madrid, Spain, September 3 to 7, 2007*)	Anonymous	SWO-MED Assess
SCRS/2007/017	Report of the *Ad Hoc* Meeting to Prepare MULTIFAN CL Inputs for the 2007 Albacore Assessment *(Madrid, Spain - March 12 to 14, 2007)*	Anonymous	*Ad hoc* MULTIFAN-CL
SCRS/2007/018	Report of the 2007 Meeting of the A*d Hoc* Working Group on Tagging Coordination *(Madrid, Spain - March 15-16, 2007)*	Anonymous	*Ad hoc* Tagging
SCRS/2007/019	Report of the Meeting of the Tropical Species Group	Anonymous	SCRS
SCRS/2007/025	Interaction of the false killer whale (*Pseudorca crassidens*) and depredation on the swordfish catches of the Spanish surface longline fleet in the Atlantic, Indian and Pacific oceans	Ramos-Cartelle, A. and J. Mejuto	SC-ECO
SCRS/2007/026	The impact of longline fisheries on seabirds in the Benguela current large marine ecosystem	Petersen, S.L., Honig M and Nel DC	SC-ECO
SCRS/2007/027	Turtle by-catch in longline fisheries operating within the Benguela current large marine ecosystem	M.B. Honig, Petersen S.L. and Duarte A.	SC-ECO
SCRS/2007/028	Seabird distribution, abundance and by-catch in longline fisheries off southern Brazil	Neves, T., P. L. Mancini and L.ascimento	SC-ECO
SCRS/2007/029	Studies of distribution, population dynamics and by-catch rates of seabirds in the Atlantic	Phillips, R.A., C. Small and E. Howgate	SC-ECO
SCRS/2007/030	Assessment of the impact of ICCAT fisheries on seabirds: proposed methodology and framework for discussion	Phillips, R.A., G. Tuck and C. Small	SC-ECO
SCRS/2007/031	Incidental catches of seabirds in the Atlantic Ocean from Taiwanese observer data of 2002-2005	Shui-Kai Chang , Ju-Ping Tai and Chih-Hao Shiao	SC-ECO
SCRS/2007/032	Abstracts of Taiwan's National Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (NPOA-Seabirds)	Anonymous	SC-ECO
SCRS/2007/033	The effect of circle hooks and straight ('J') hooks on the catch rates andnumber of white marlin *(Tetrapterus albidus)* and blue marlin *(Makaira nigricans)* released alive by the U.S. pelagic longline fleet targeting tuna in the U.S. Gulf of Mexico	Diaz, G.A.	SC-ECO

SCRS/2007/034	Remote tracking data of albatrosses and petrels in the ICCAT area	ACAP	SC-ECO
SCRS/2007/035	Clave visual de identificación de especies del género Thalassarche para uso de observadores científicos	González Blázquez, F., A. Carroceda	SC-ECO
SCRS/2007/036	Factores estratégicos y tecnológicos que influyen en la captura de especies asociadas en la pesquería de pez espada con palangre de superficie en el Mediterráneo	de la Serna, J. M., J. M. Ortiz de Urbina and S. García Barcelona	SC-ECO
SCRS/2007/037	Swordfish tagging with pop up satellite tags in the Mediterranean Sea	Canese, S., F. Garibaldi, L. Orsi Relini and S.Greco	*Ad hoc* Tagging
SCRS/2007/038	Bluefin tuna (*Thunnus thynnus*) conventional tagging carried out by the Spanish Institute of Oceanography (IEO) in 2005 and 2006. Results and analysis including previous tagging activities	Rodríguez-Marín, E., C. Rodríguez-Cabello, E. Alot, J.L. Cort; J.M.De La Serna, J.M.Ortiz de Urbina and M. Quintans	*Ad hoc* Tagging
SCRS/2007/039	Effects of release factors affecting the recovery rates of tagged tunas: Application to bigeye tuna	Gaertner, D., P. Kebe and C. Palma	*Ad hoc* Tagging
SCRS/2007/040	Standardized fishing effort of the Spanish bait boat fleet targeting albacore, *Thunnus alalunga*, in the northeast Atlantic, 1981-2005	Ortiz de Zárate, V. and J.M. Ortiz de Urbina	*Ad hoc* MULTIFAN-CL
SCRS/2007/041	Standardised catch rates of albacore tuna (*Thunnus alalunga*) from the Irish mid-water paired trawl fleet 1998-2005	Cosgrove, R.	*Ad hoc* MULTIFAN-CL
SCRS/2007/042	Note for the Japanese longline CPUE for MULTIFAN-CL analysis	Uosaki, K.	*Ad hoc* MULTIFAN-CL
SCRS/2007/044	South Atlantic albacore standardized CPUE per quarter from the South African bait boat fishery for MULTIFAN CL application	Glazer, J.P. and C.D. Smith	*Ad hoc* MULTIFAN-CL
SCRS/2007/046	Review of AZTI-Tecnalia's tuna tagging activities	Arregui, I., H. Arrizabalaga and R. Cosgrove	*Ad hoc* Tagging
SCRS/2007/047	Secretariat Review on Tagging Activities	Kebe, P. and C. Palma	*Ad hoc* Tagging
SCRS/2007/048	Primera recaptura en el Atlántico de un pez espada *(Xiphias gladius)* marcado en el Mediterráneo	de la Serna, J. M, .J. M. Ortiz de Urbina, S. García Barcelona and D. Espino	*Ad hoc* Tagging
SCRS/2007/049	Possibilities and problems in tag-recovery data collection from tuna farms in the Adriatic Sea (Croatia)	Ticina, V.	*Ad hoc* Tagging
SCRS/2007/050	A simulation study to compare the performance of Least Square Means and Weighted Least Square Means	Garcia, D. and H. Arrizabalaga	METHODS WG
SCRS/2007/051	Estimation of shortfin mako catches by Japanese tuna longline vessels in the Atlantic Ocean by two methods	Matsunaga, H. anf Y. Takeuchi	METHODS WG
SCRS/2007/052	A catch rate index of yellowfin tuna *(Thunnus albacares)* from the United States recreational fishery in the western North Atlantic Ocean, 1986-2005	Shannon L. Cass-Calay	TROP
SCRS/2007/054	Length-frequency compositions of yellowfin *(Thunnus albacares)* and skipjack *(Katsuwonus pelamis)* tuna from the United States pelagic longline fishery, 1992-2006	John F. Walter	TROP
SCRS/2007/055	Standardized catch rates for yellowfin tuna *(Thunnus albacares)* from the United States pelagic longline fishery based upon logbook data, 1987-2006	John F. Walter, Craig Brown and Shannon Cass-Calay	TROP
SCRS/2007/056	Standardized catch rates for yellowfin tuna *(Thunnus albacares)* based upon United States Pelagic Longline Observer Program data, 1992-2006	Craig Brown	TROP
SCRS/2007/057	Variability of the growth parameters of the skipjack tuna *(Katsuwonus pelamis)* between areas in the eastern Atlantic. Analysis from tagging data	Gaertner, D., A. Delgado de Molina, J. Ariz and R. Pianet	TROP

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SCRS/2007/061	Bigeye (*Thunnus obesus*) bycatch estimates from the albacore Spanish surface fishery in the north east Atlantic: 2004-2006 years	V. Ortiz de Zárate, C. Rodriguez-Cabello, S. Barreiro	BET_ASSESS
SCRS/2007/062	Dynamics stock assessment of the Atlantic bigeye tuna *(Thunnus obesus)* using the verhulst's logistic model in the period 1950-2005	J. M. Grande-Vidal	BET_ASSESS
SCRS/2007/063	Standardized catch per unit effort of bigeye tuna in the Atlantic Ocean for Taiwanese longline fishery by general additive model	Chien-Chung Hsu	BET_ASSESS
SCRS/2007/064	Stardardized purse seine CPUE for juvenile Atlantic bigeye tuna, 1991-2005	Restrepo, V. and P. Pallares	BET_ASSESS
SCRS/2007/065	A comparison of bigeye tuna standardized CPUE series, for Brazilian tuna longline fisheries, from 1978 to 2005, with and without target species as a factor in the GLM analysis	Hazin, F.	BET_ASSESS
SCRS/2007/066	Note on the procedure followed to split fishing effort by fishing mode in the tropical purse seine fishery	Pallares, P., A. Delgado de Molina and J. Ariz	BET_ASSESS
SCRS/2007/067	Japanese longline CPUE for bigeye tuna standardized for two area definitions in the Atlantic Ocean from 1961 up to 2005	Okamoto. H.	BET_ASSESS
SCRS/2007/068	Summary of bigeye tuna catch status of Chinese Taipei longline fleet in the Atlantic Ocean	Hung-I Liu, Hsiang-Wen Huang and Shui-Kai Chang	BET_ASSESS
SCRS/2007/069	Standardized catch rates for bigeye tuna (*Thunnus obesus*) from the pelagic longline fishery in the northwest Atlantic and the Gulf of Mexico	John Walter, Mauricio Ortiz and Craig Brown	BET_ASSESS
SCRS/2007/070	Indices of blue, mako and thresher shark abundance derived from U.S. Atlantic recreational fishery data	Babcock, E.A. and G. Skomal	SHK
SCRS/2007/071	Updated standardized catch rates for blue and mako sharks in the Virginia-Massachusetts (U.S.) rod and reel fishery, 1986-2006	Brown, C.A	SHK
SCRS/2007/072	Catches of pelagic sharks from the western North Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea	Cortés, E.	SHK
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SCRS/2007/077	Use of shark fin trade data to assist in estimating historic total shark removals in the Atlantic Ocean	Clarke, Sh.	SHK

SCRS/2007/078	An overview of pelagic shark fisheries in the NE Atlantic	Clarke, M., J. Ellis and P. Apostolaki	SHK
SCRS/2007/079	Length-weight relationships and morphometric conversion factors between weights for the blue shark (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*) caught by the Spanish surface longline fleet in the Atlantic ocean	Mejuto, J., A.M. Ramos-Cartelle, M. Quintans, F. González and A. Carroceda.	SHK
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SCRS/2007/081	Estandarización de la CPUE del tiburón azul (*Prionace glauca*) capturado por la flota de palangre pelágico de Uruguay (1992-2006)	Pons. M and A. Domingo	SHK
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SCRS/2007/084	Standardized catch rate of shortfin mako (*Isurus oxyrinchus*) and bigeye thresher (*Alopias superciliosus)* caught by São Paulo longliners off southern Brazil	Mourato, B.L.; A. F. Amorim and C.A. Arfelli	SHK
SCRS/2007/085	Historical catch rates of blue shark (*Prionace glauca*) in the southwestern equatorial Atlantic Ocean between 1958 and 1962	Carvalho, F., F. H. V. Hazin, H. G. Hazin, P.Travassos	SHK
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SCRS/2007/091	Estimation of catches for blue shark and shortfin mako by the Japanese tuna longline fishery in the Atlantic Ocean, 1994-2005	Matsunaga, H.	SHK
SCRS/2007/092	Standardized CPUE for shortfin mako caught by the Japanese tuna longline fishery in the Atlantic Ocean, 1994-2005	Matsunaga, H.	SHK
SCRS/2007/093	Standardized northern Atlantic albacore *(Thunnus alalunga)* CPUE, from 1967 to 2005, based on Taiwanese longline catch and effort statistics	Chi-Heng Hsieh, Feng-Chen Chang and Shean-Ya Yeh	ALB-ASSESS
SCRS/2007/094	Standardized CPUE of South Atlantic albacore (*Thunnus alalunga*) based on Taiwanese longline catch and effort statistics dating from 1967 to 2005	Feng-Chen Chang and Shean-Ya Yeh	ALB-ASSESS
SCRS/2007/095	Assessment of South Atlantic albacore resource based on 1959-2005 catch and effort statistics from ICCAT	Liang-Kang Lee and Shean-Ya Yeh	ALB-ASSESS
SCRS/2007/096	Factors, predicted by GAM procedures, dominating South Atlantic albacore (*Thunnus alalunga*) distribution revealed by 1982-2005 Taiwanese longline catch and effort data	Feng-Chen Chang and Shean-Ya Yeh	ALB-ASSESS
SCRS/2007/098	Spanish albacore *(Thunnus alalunga)* surface fishery statistics in the north eastern Atlantic in 2006	Ortiz de Zarate, V., S. Barreiro and C. Rodriguez-Cabello	ALB-ASSESS
SCRS/2007/099	Standardized age specific catch rates of albacore, *Thunnus alalunga*, from the Spanish troll fishery in the north east Atlantic, from 1981 to 2006	Ortiz de Zárate, V. and J.M. Ortiz de Urbina.	ALB-ASSESS
SCRS/2007/100	Sex ratios, sexual maturity, fecundity and spawning seasonality of white marlin *(Tetrapturus albidus)* from the western-central Atlantic	Arocha, F. and A. Barrios	SCRS

SCRS/2007/101	Data on blue shark from the Irish recreational fishery	Green, P., W. Roche, P. Fitzmaurice, M. Clarke and G. Kierse	SHK
SCRS/2007/102	Age estimation in albacore tuna, *Thunnus alalunga* (Bonn. 1788) using three different calcareous structures; preliminary findings of an inter-laboratory comparison	Davies, C. A., D. Brophy, P. Megalofonou, E. Gosling, N. Griffin, B. Leroy and N. Clear	ALB-ASSESS
SCRS/2007/103	Standardized CPUE for albacore using log-normal and negative binominal models for the Japanese longline in the Atlantic Ocean	Koji Uosaki and Hiroshi Shono	ALB-ASSESS
SCRS/2007/104	Integral revision of the albacore (*Thunnus alalunga*) catch-at-size composition for the northern and southern stocks, between 1975 and 2005	Palma, C.; Kebe, P.	ALB-ASSESS
SCRS/2007/105	Standardization CPUE series of albacore, *Thunnus alalunga*, caught by Brazilian longliners in the Atlantic Ocean	Hazin, H., T. Frédou, P. Travassos, F. Hazin, and F. Carvalho	ALB-ASSESS
SCRS/2007/106	By catches and discards of the Greek swordfish fishery	Peristeraki, P., N. Kypraios, G. Lazarakis and G. Tserpes	MED-SWO ASSESS
SCRS/2007/107	Standardization of swordfish *(Xiphias gladius)* catch rates from the Greek and Italian Mediterranean longline fisheries	Tserpes, G., P. Peristeraki and A. Di Natale	MED-SWO ASSESS
SCRS/2007/108	Discards of undersized swordfish individuals in the Greek swordfish fisheries	Tserpes, G. and P. Peristeraki	MED-SWO ASSESS
SCRS/2007/109	Estimates of Mediterranean swordfish stock by means of a non-equilibrium surplus production model approach	Tserpes, G.	MED-SWO ASSESS
SCRS/2007/110	Activity of the Spanish surface longline fleet catching swordfish *(Xiphias gladius)* in the Atlantic ocean during the year 2005	Mejuto, J., B. García-Cortés, J. M. de la Serna and A. Ramos-Cartelle	MED-SWO ASSESS
SCRS/2007/111	Reproductive activity of swordfish *(Xiphias gladius)* in the Atlantic ocean on the basis of different macroscopic indicators	Mejuto, J. and B. García-Cortés	MED-SWO ASSESS
SCRS/2007/112	Relationships between the wet fin weight and body weights of blue shark *(Prionace glauca)* in the Spanish surface longline fleet	Mejuto, J. and B. García-Cortés	SCRS
SCRS/2007/113	Trials using different hook and bait types in the configuration of the surface longline gear used by the Spanish swordfish (*Xiphias gladius*) fishery in the Atlantic Ocean	Mejuto, J. B. García-Cortés and A. Ramos-Cartelle	SCRS
SCRS/2007/114	Production des marlins bleus *(Makaira nigricans)*, voiliers *(Istiophorus albicans)* et espadons *(Xiphias gladius)* de la pechèrie artisanale maritime: esquisse d'amélioration de la récolte des données	N'Da K. and R.G. Dedo	SCRS
SCRS/2007/115	A time series of swordfish longline CPUE in the nothwestern Mediterranean: search for exploitation and/or climatic factors influencing fish abundance	Orsi Relini, L et al.	MED-SWO ASSESS
SCRS/2007/116	Standardized catch rates of swordfish *(Xiphias gladius)* from the Moroccan driftnet fishery operated in the Mediterranean Sea, period: 1998- 2006	Abid, N., and M. Idrissi	MED-SWO ASSESS
SCRS/2007/117	Age and growth of swordfish *(Xiphias gladius)* in the western Mediterranean Sea	Valeiras, X., J.M. de la Serna, D. Macías, M. Ruiz, S. García-Barcelona, M.J. Gómez and J.M. Ortíz de Urbina	MED-SWO ASSESS
SCRS/2007/118	Updated standardized catch rates in number and weight for swordfish (*Xiphias gladius* L.) caught by the spanish longline fleet in the Mediterranean Sea, 1988- 2005	Ortiz de Urbina, J. Mª, J. M. de la Serna, J. Mejuto and D. Macías	MED-SWO ASSESS
SCRS/2007/119	CPUE series (1985-2006) for swordfish (*Xiphias gladius* L.) by gear type in the Tyrrhenian Sea and in the Strait of Sicily	Di Natale, A. and Mangano	MED-SWO ASSESS

SCRS/2007/120	Genetic and growth profiles of several specimens of sworfish *(Xiphias gladius)* tagged and recaptured in the Atlantic, Indian and Pacific Oceans	Kasapidis, P. , X. Valeiras, B. García-Cortes and J . Mejuto'.	SCRS
SCRS/2007/121	Actividades desarrolladas en el Programa de Investigación Intensiva sobre Marlines en Venezuela. Período 2006-2007	Marcano, Arocha, Alío, Marcano, Lárez & Gutiérrez	SCRS
SCRS/2007/122	Distribución y composición de tallas de *Thunnus albacares* en el Atlántico SW, en base a la información del programa nacional de observadores de la flota palangrera uruguaya (1998-2006)	Domingo, A., M. Pons, P. Miller, C. Passadore, O. Mora y G. Pereyra	SCRS
SCRS/2007/123	Estadísticas del atún aleta amarilla *(Thunnus albacares)* en la pesquería de palangre pelágico de Uruguay (1981-2006)	Domingo, A., M. Pons, P. Miller, C. Passadore, O. Mora y G. Pereyra	SCRS
SCRS/2007/124	Las aguas del Atlántico sudoccidental y su importancia en el ciclo de vida de la tortuga cabezona *(Caretta caretta)*: Evidencias a través del análisis del ADNmt	Caraccio, M.N., A.Domingo, A. Márquez, E. Naro-Maciel, P. Miller,y A. Pereira	SCRS
SCRS/2007/125	Distribución y estructura poblacional de la raya negra *(Pteroplatytrygon violacea)* en el Atlántico Sur (1998-2006)	Forselledo, R., M. Pons, P. Miller y A. Domingo	SCRS
SCRS/2007/126	Los grandes albatros (*Diomedea* spp.) capturados con palangre pelágico en el Atlántico sudoccidental	Jiménez, S., M. Abreu, A. Domingo	SCRS
SCRS/2007/128	Presencia de mamíferos marinos y captura incidental en la flota uruguaya de palangre pelágico (1998-2007)	Passadore, C., M.Szephegyi and A. Domingo	SCRS
SCRS/2007/129	Results of the preliminary risk prioritization exercise for the ICCAT seabird assessment: updated	Phillips, R.A. and C. Small	SCRS
SCRS/2007/131	Estimating the total annual seabird by-catch in the ICCAT Convention area: Proposed methodology.	Klaer, N.	SCRS
SCRS/2007/132	Morphometry, population structure and migration of Atlantic black skipjack *(Euthynnus alletteratus)* in the eastern Atlantic Ocean	Gaykov, V.Z. AND D.V. Bokhanov	SCRS
SCRS/2007/133	Nominal catch rates for Canadian bluefin tuna in 2006	Paul, S.D., S. Smith and J. D. Neilson	SCRS
SCRS/2007/134	Nominal CPUE for the Canadian swordfish longline fishery 1988-2006	Paul, S.D., S. Smith and J. D. Neilson	SCRS
SCRS/2007/135	An update on bluefin tuna age validation, and plans for further age and growth research	Neilson, J. D. and S. E. Campana	SCRS
SCRS/2007/136	2007 Summary of ongoing Canadian bluefin tuna sampling activities supported by the ICCAT Bluefin Tuna Year Program	Smith, S.C., J. D. Neilson and S. D. Paul	SCRS
SCRS/2007/137	Estimates of fishing mortality rates for Atlantic Bluefin tuna in 1990-2006 from Bayesian statistical analysis of three kinds of tag records	Kurota, H., M. McAllister, B. Block, G. Lawson, J. Nogeira and S. Teo	SCRS
SCRS/2007/138	Searching for biological tags from bluefin tuna *(Thunnus thynnus)* ectoparasites	Barreiro, S., Rodríguez-Marín E., Montero F. , Carbonell E., Carmona L.	SCRS
SCRS/2007/139	Age and growth of bullet tuna *(Auxis rochei)* in western Mediterranean sea	Valeiras, X. , D. Macías, M.J. Gómez, L. Lema, S. García-Barcelona, J.M. Ortiz de Urbina and J.M. de la Serna	SCRS
SCRS/2007/140	Age and growth of Atlantic little tuna *(Euthynnus alleteratus)* in western Mediterranean sea	Valeiras, X., D. Macías, M.J. Gómez, L. Lema, D. Godoy, J.M. Ortiz de Urbina and J.M. de la Serna	SCRS
SCRS/2007/141	Age and growth of Atlantic bonito *(Sarda sarda)* in western Mediterranean sea	Valeiras, X., D. Macías, M.J. Gómez,	SCRS

		L. Lema, E. Alot, J.M. Ortiz de Urbina and J.M. de la Serna	
SCRS/2007/142	A common format, among Tuna RFMOS, for the presentation of the state of the stocks	Scott, G.	SCRS
SCRS/2007/143	2007 stock assessment and projections for Western Atlantic bluefin tuna using a BSP and other SRA methodology	McAllister, M., T. Carruthers and N. Taylor	SCRS
SCRS/2007/144	Progress of the ICCAT Enhanced Research Program for Billfish in the western Atlantic ocean during 2006	Prince, E.D. and J. P. Hoolihan	SCRS
SCRS/2007/145	Rapport de l'atelier de formation pour l'amélioration des données statistiques de pêche	Anonymous.	SCRS
SCRS/2007/146	Upon the IRD project to publish an atlas on Atlantic and Indian oceans tuna fisheries	Fonteneau, A.	SCRS
SCRS/2007/147	An attempt to evaluate the recent management regulations of the East Atlantic and Mediterranean bluefin tuna stock through a simple simulation model	Fromentin, J.M.	SCRS
SCRS/2007/148	Datos estadísticos de la pesquería de túnidos de las Islas Canarias durante el periodo 1975 a 2006	Delgado de Molina, A., J. Ariz, R. Delgado de Molina and J.C. Santana	SCRS
SCRS/2007/149	Estadísticas españolas de la pesquería atunera tropical, en el Océano Atlántico, hasta 2006	Ariz, J., J.C. Santana, R. Delgado de Molina, R. Sarralde and A. Delgado de Molina	SCRS
SCRS/2007/150	New data on the ratio between fin and body weights for shark species caught by the Portuguese surface longline fleet	Neves dos Santos, M.	SCRS
SCRS/2007/151	Between the lines: interpolating the potential effectiveness of management actions designed to reduce the catches of juvenile and adult eastern Atlantic and Mediterranean bluefin tuna based on the 2006 assessment outcomes	Scott, G.	SCRS
SCRS/2007/152	A summary of the sport and recreational fishery data available at the ICCAT secretariat	ICCAT Secretariat	SCRS
SCRS/2007/153	Report of observer program for Japanese tuna longline fishery in the Atlantic Ocean between 2005 and 2006	Semba, Y., T. Matsumoto, H. Okamoto and T. Tanabe	SCRS
SCRS/2007/154	Habitat environment integration index of *Thunnus obesus* in the high seas of the central Atlantic ocean based on the quantile regression	SONG Li-ming, GAO Pan-feng, ZHOU Ying-qi, ZHANG Yu	SCRS
SCRS/2007/155	Some comments upon the North Atlantic albacore 2007 assessment	Fonteneau, A.	SCRS
SCRS/2007/156	Informe del proyecto: corrección de la serie historica de datos de esfuerzo y capturas de la flota atunera uruguaya (1981-2004)	Pons, M., A. Domingo, O. Mora, G. Pereyra	SCRS
SCRS/2007/157	Effects of different minimum landing size limitations on the yield levels of swordfish in the Mediterranean	Tserpes, G., G. P. Scott and J. D. Neilson	SCRS
SCRS/2007/158	Standardized CPUE series of swordfish, *Xiphias gladius*, caught by Brazilian longliners in the Southwestern Atlantic Ocean	Hazin, H.G., F. H. V. Hazin and P. Travassos	SCRS
SCRS/2007/159	Standardized CPUE of swordfish (*Xiphias gladius*) caught by São Paulo tuna longliners operating off southern Brazil (1998-2006)	Hazin, H.G., B. L. Mourato; A. F. Amorim; C. A. Arfelli; F. H. V. Hazin	SCRS
SCRS/2007/160	Statistiques de la pêcherie thonière française durant la période 1991-2006	Pianet R. , V. Norström, P. Dewals, R. Gnegoury Dédo, Y. Diatta	SCRS
SCRS/2007/161	Reproductive biology of blue marlin *Makaira nigricans* (Lacépède, 1803) in the equatorial and southwestern Atlantic ocean	Torres-Silva, C.M.; P. Travassos, M. B. Figueredo; F. Hazin,	SCRS

		F. Pessoa; P. Pinheiro	
SCRS/2007/162	Oocytes organization and ovary maturity of the bigeye tuna (*Thunnus obesus*) in the west tropical Atlantic ocean	Figueiredo, M.B.; A.G. Santos ; P. Travassos; C.M. Torres-Silva; F.H.V. Hazin; R. Coeli and B.R. Magalhães	SCRS
SCRS/2007/163	"Associated school": a new tuna fishery in southern Brazil – description and comparison	Schroeder, F.A. and J. P. Castello	SCRS
SCRS/2007/164	GFCM study on small tunas in the Mediterranean including the Black sea	Srour, A. and A. Di Natale	SCRS
SCRS/2007/165	Los túnidos tropicales, su pesca y manejo en el Golfo de México	Jurado Molina, J. and K. Ramírez-López	SCRS
SCRS/2007/166	Dynamic and fishing strategy of Santos tuna longline fleet off southeastern Brazilian coast (1998-2006)	Mourato, B.L.; H. G. Hazin; A. F. Amorim; C. A. Arfelli; F. H. V. Hazin	SCRS
SCRS/2007/167	Standardized CPUE of blue shark caught by São Paulo tuna longliners operating off southern Brazil (1998-2006)	Mourato, B.L.; H. G. Hazin; A. F. Amorim; C. A. Arfelli; F. H. V. Hazin	SCRS
SCRS/2007/168	Interacción de tortugas marinas (*Caretta caretta y Dermochelys coriacea*) con la pesca de palangre pelágico en el Atlántico sudoccidental: una perspectiva regional para la conservación	Giffoni, B.; A. Domingo; G. Sales[3]; F. Niemeyer Fiedler; P. Miller	SCRS
SCRS/2007/169	Eastern Atlantic and Mediterranean Bluefin: Moving in a good direction and how long will it take to get there?	Scott, G.	SCRS
SCRS/2007/170	Wahoo *Acanthocybium solandri* fishery in the vicinity of Saint Peter and Saint Paul archipelago, Brazil, from 1998 to 2006	Viana, D.L.; Hazin, F.H.V.; Nunes, D; Carvalho, F.; Véras, D.; Travassos, P.	SCRS
SCRS/2007/171	Discussion of the alternative explanations for relatively low US catches since 2004	McAllister, Neilson and Porch.	SCRS
SCRS/2007/172	Update on Implementation of the Brazilian National Plan of Action for the Conservation of Albatrosses and Petrels NPOA-Seabird/Brazil	Mancini, P. L., T. Neves and L. Bugoni	SCRS
SCRS/2007/173	Fishery biology on pelagic stingray *Pteroplatytrygon violacea* caught off southern Brazil by longliners settled in São Paulo state (2006-07)	Ribeiro-Prado, C. C. and A. F. Amorim	SCRS

Appendix 4

OPENING ADDRESSES

Opening Address by Mr. Driss Meski, ICCAT Executive Secretary

Mr. Chairman, Distinguished Delegates:

First of all I would like to thank all the scientists of our Contracting Parties and our Cooperating Parties, the representatives of sister organizations and the observers for their presence at this new session of our Scientific Committee.

I hope that in spite of the full agenda you will have some free time to enjoy this beautiful city of Madrid. I would also like to take this opportunity to reiterate my sincere appreciation to the Spanish Authorities and to the Spanish people for all the services rendered to our Commission.

For more than 40 years, the Scientific Committee of ICCAT holds its meetings to review the state of the tuna resources in the Convention area to develop advice to be taken in to consideration by our Commission.

Since more than 15 years ago, the Scientific Committee has held its meetings that have been marked by concern and caution, due essentially to the threats on the tuna resources for which our Commission has a mandate.

In spite of the lack of data, the scientific experts that meet year have shown demonstrated exemplary dedication and good will.

All this work is to succeed in an approach that reflects the real situation is the best manner possible

I would like to affirm, to you the experts, that your work is very much appreciated the world over. Your methods and your research are well known through the presentation that your Chairman Dr. Scott gave at the meeting of the tuna organizations in Kobe, Japan in January, 2007. This presentation has since become a model for all our sister organizations. For this, I would like to congratulate you. Like previous meetings, this year's meeting is being held in a special context, particularly for some species. I wish you a lot of encouragement in preparing the results to present to our Commission. Everyone is eagerly awaiting the results of your work. As usual, the Secretariat has the honor and pleasure to assist you inasmuch as possible so as to facilitate your task. The Secretariat is at the disposal of your Committee.

Finally, I would like to mention that the Secretariat has undertaken the organization of training courses for the collection of data from developing countries. This, thanks to the voluntary financial assistance from some Contracting Parties. I launch an appeal to all the representatives of the developing Contracting Parties to join in this effort to help carry out this mission.

I would like to wish you every success in your work. Thank you.

Appendix 5

WORK PLANS OF THE SPECIES GROUPS FOR 2008

Tropical Tuna Species Work Plan for 2008

The Group is concerned with the yellowfin stock, due to the declining trend of the total catch in the recent years. Although this decline may be in part the result of the large decrease of the purse-seine fleet in recent years, standardized CPUE and average weight trends remain quite low. In the case of skipjack, the last assessment was carried out in 1999, and few studies have been made on this species since then. An assessment of the yellowfin and skipjack tuna stocks is proposed for 2008, to be held simultaneously for both species.

Research:

1. The Group recommends carrying out a synthesis of available studies on the growth of yellowfin tunas aimed at developing an agreed growth model for use in future assessments. The possible use of tagging data or other supplemental sources of information will be considered.
2. It is apparent that the available tagging data provides some additional information useful for estimating bigeye stock status. It is unclear, however, if the assumptions carried out concerning tag reporting rates are accurate. For that reason, it would be advisable to design and implement experiments to estimate tag reporting rates for the fisheries taking bigeye.
3. A national scientist to continue carrying out studies on biological parameters for tropical tuna. Current estimates on reproduction, maturity, sex ratio and the biological parameters are based on studies carried out many years ago. Changes might have occurred in the population during this period that should be considered. Furthermore, new techniques have been developed that might improve the current estimates.
4. To verify the existing conversion factors for bigeye tuna and yellowfin tuna and compare those used by the different longline fleets. Descriptions of the methods used in the calculation of the different conversion factors are also necessary. When weight-length relationships are developed for product conversion, it is recommended that whole and processed weights and fork and pre-dorsal lengths be always recorded as a standard.
5. To increase the size sampling on the longline fleets. Sampling sizes have been decreasing for a number of years, and the importance of these fleets makes data compilation an essential task.
6. Results presented from archival tags on bigeye were considered very interesting, and it is encouraged to continue such tagging in the future.
7. Research concerning the implications of alternative priors used for the intrinsic rate of increase (r) for the Bayesian Surplus Production model is warranted. Further evaluation of the specifications and implications of the VPA F-ratio (assumed ratio of fishing mortality in the plus group to the nearest true age) should be conducted before the next assessments.
8. The need of having a standardized CPUE index for the EC and associated fleet was considered and it is recommended that the EC scientists extend analysis on bigeye tuna, yellowfin tuna and skipjack tuna.
9. Considering that models such as MULTIFAN could be extended to yellowfin and skipjack stocks assessments, the Working Group recommends conducting simulation analyses in order to define the best data sets needed by the models, as well as sensitivity analyses to evaluate the effects of the lack or deficiency of data. Time should be set aside during the planned assessment meeting in 2008 to identify appropriate inputs and options for MULTIFAN (definition of fisheries, etc.) so that efforts to prepare the necessary data for this approach can be initiated.
10. Recognizing the need for all tropical tuna stock assessments, in particular, by the statistical models of the MULTIFAN-CL, to have solid biological parameters on resources (growth, natural mortality and exploitation rates by age, movement between zones, etc.) and fishery independent data. It is recommended that the Tropical Tuna Species Group studies the interest and the possibilities to carry out extensive tagging programme in the future for tropical tunas such as that carried out or planned by the IOTC and WCPFC.

Statistics:

11. Recognising the progress and improvements made, the Group recommends further review of tagging data available at ICCAT databases for yellowfin and skipjack tuna. A procedure should be established with the Secretariat, and in co-ordination with the Tropical Tuna Working Group, the scientist involved in the tagging programs and the *Ad-hoc* Tagging Group, for correction of errors and inconsistencies.
12. In the Recife meeting the Group commended the Secretariat's quality control efforts to improve the size frequency data. However, there are limitations about how much the Secretariat can do in terms of data validation and recommended that National Scientists review all of the size frequency data maintained in the Secretariat databases for validation purposes. This review should be completed before the next assessments in 2008. After this deadline, the Species Groups should decide how to proceed.
13. The estimations of the tuna landings in Abidjan that are directed out of the canning factories (the so-called "*faux poissons*") should include the species and size composition. It is expected that the collaboration of the JDIP will contribute to better information.

Albacore Work Plan

Overview

In July 2007 the assessment of both North and South Atlantic albacore stocks was done, with a data preparatory meeting held in March 2007.

The assessment of the North Atlantic stock indicated that the stock is overfished. This result indicates a need to continue monitoring the catch rates (standardized CPUE´s) for all the major fleets exploiting this stock to corroborate the apparent presence of a "strong" 2003 cohort as seems to be indicated by the surface fisheries relative abundance indices. Also, uncertainty on some biological parameters (growth and reproductive biology) should be studied further.

The improvement of basic input data according to statistical requirements and the need to obtain fishery independent data have been pointed out as a way to discern if the status of the stock is as implied by the analyses performed using only fishery dependent data.

As for the Mediterranean stock, basic information of Task I and Task II data from the fisheries are incomplete and biological information of the stock is poor.

Proposed tasks and on-going research activities for 2008

Task I data, disaggregated by species, gear, area and flag, are required.

Increase the coverage of Task II data for major fleets in the Atlantic and Mediterranean, especially, for the longline fisheries of the North and South stocks. This conclusion was reached as the result of examining size sample data available at the Secretariat.

Develop standardized CPUE series for all the main fleets exploiting the North and South Atlantic albacore stocks.

Continue to investigate the conversion of catch-at-size (CAS) into catch-at-age (CAA) for both North and South Atlantic albacore stocks (i.e. length slicing methods, age-length keys derived from aging methods).

Greater standardization of ageing methodologies across laboratories and readers is needed and the Group proposed the creation of an ageing activities network, like the one created for bluefin tuna.

Studies on fecundity and maturity for both North and South albacore are needed to better estimate the potential spawning stock biomass.

Continue to investigate the modeling of albacore stocks with Multifan-CL (i.e. use of North Atlantic tagging data) and other statistical models (i.e. CASAL).

Tagging electronic programs for Atlantic albacore stocks should be initiated and promoted as a mean to obtain fishery independent data and habitat related information.

Research aimed at finding the causes that could determine to what extent the marked decline in MSY that has been estimated in recent assessments is realistic or not:

- By an in-depth re-analysis of the historical data of the albacore fisheries (including econmic data) and of their potential changes in catchability, for the fisheries that have targeted albacore and those where albacore is a by-catch species.

- By new research trips aimed at better estimating the current exploitation rates of the stock, for example, by tagging, by acoustics, by scientific longliners or other methods.

- By comparison of the data and the stock assessments carried out worldwide on the different albacore stocks, particularly in the Atlantic and Pacific Oceans (North and South).

Bluefin Tuna Work Plan

1. Overview

The next bluefin tuna stock assessment (East and West) has been scheduled by the Commission for 2008. The BFT-SG reiterates the fact that its general advice is unlikely to change significantly within two years time because of bluefin tuna long life span and the necessary delay to detect first effects of most recent regulations. The group thinks that a four-year period would be more appropriate between each comprehensive bluefin tuna stock assessment session. This will allow the Group more time for inter-sessional work, especially to investigate important or novel issues regarding data and models. If the requirement of a stock assessment in 2008 remains, this should be scheduled in late June/early July. Nine days are considered sufficient for the quantitative assessment work and report writing only if much of the data-preparatory work is carried out in advance of the meeting. It is essential, in particular, that catch (being disaggregated by gear/main area[1]/month), catch-at-age and tagging data through 2006 be as final as a few months prior to the meeting to allow preparatory works and analyses.

2. Data submission

National Scientists should submit any missing eastern Atlantic and Mediterranean statistics forthwith. Data for the eastern and western stock through 2006 should be submitted to the Secretariat by the end of March 2008, while data of 2007 should be submitted, at the latest, one week prior to the meeting, so that the Secretariat can incorporate the statistics into the database. ***Action National Scientists***

Estimates of unreported landings for the eastern unit should be investigated prior to the meeting and completed during the assessment meeting. ***Action National Scientists and Secretariat***

All National Scientists should provide catch, catch-at-size, tagging and CPUE data up to and including 2007 where available (East and West). The group recognizes that this may not be possible for all fleets. Assessment software should be adapted to accommodate the possibility of incomplete data for 2007 and earlier. ***Action National Scientists and Secretariat***

The SCRS has also recommended that efforts be made to extend the assessment time series into the past. National Scientists are asked to ensure that any available historical data (especially catch-at-size pre-1970) have been made available to the Secretariat. ***Action National Scientists***

The SCRS also recommended that efforts be made to share novel biological information prior to the meeting, e.g. through a list server maintained by the secretariat. ***Action National Scientists and Secretariat***

3. Catch summaries

The Secretariat should prepare summaries of the available catch data as well as catch-at-size data by the start of the meeting. Late submissions will not be included. ***Action Secretariat***

4. Assessment

The stock assessment work should update the 2006 stock assessments. In the case of the West stock, mainline advice should be based on results from validated and documented software retained in the ICCAT catalog. These catalog entries need to be completed by April 2008. ***Action National Scientists***

In the case of the East stock, it is still recommended that the Bluefin Tuna Species Group should investigate various assessment methods that may be robust to or that can take into account the large uncertainties in the total catch and catch-at-size data. It is also expected that the Group investigates more deeply the effects on stock status of the management measures that were adopted in November 2006 in Dubrovnik. ***Action National Scientists***

[1] Main areas correspond to the 6 areas defined by the ICCAT Bluefin Tuna Mixing Workshop (September 3-7, 2001), Figure 3.

Swordfish Work Plan

Background

The last assessments for North and South Atlantic Swordfish were conducted in 2006. The last assessment conducted for Swordfish in the Mediterranean was in 2007. The next assessments for North and South Atlantic Swordfish are proposed not sooner than 2009, and for the Mediterranean Swordfish stock, an updated assessment is planned not sooner than 2010.

Proposed work

North and South Atlantic

A list of recommended work has been provided in the Report of the 2006 Swordfish Stock Assessment Session (SCRS/2006/015). Among those recommendations, the following were identified as high priority areas where continued efforts are required:

Catch. All countries catching swordfish (directed or by-catch) should report catch, catch-at-size (by sex) and effort statistics by a small an area as possible, and by month. These data must be reported by the ICCAT deadlines, even when no analytical stock assessment is scheduled. Historical data should also be provided.

Assignment of ages. The computer codes used for ageing swordfish in the Atlantic should be updated. The new sex-specific growth curves (SCRS/2002/031) should be incorporated, and its impact in terms of the catch-at-age estimation, as well as its consistency with the tagging data should be evaluated before a new set of growth curves is formally adopted by the Group.

Discards. Information on the number of undersized fish caught, and the numbers discarded dead and released alive should be reported so that the effect of discarding and releasing can be fully included in the stock assessment. Observer sampling should be sufficient to quantify discarding in all months and areas in both the swordfish directed fisheries and the tuna fisheries that take swordfish as by-catch. Studies should be conducted to improve estimation of discards and to identify methods that would reduce discard mortality of swordfish. Studies should also be conducted to estimate the subsequent mortality of swordfish discarded alive; these are particularly important given the level of discarding due to the minimum size regulatory recommendation.

Target species. All fleets should record detailed information on log records to quantify which species or species group is being targeted. Compilation of detailed gear characteristics and fishing strategy information (including time of set) are very strongly recommended in order to improve CPUE standardization. The recommendations made by the 2002 meeting of the Working Group on Methods for looking at diagnostics in this context should be followed. The Group recommended the investigation of alternative forms of analyses in the south that deal with both the by-catch and target patterns, such as age- and spatially-structured models.

Mediterranean

Catch and effort. All countries catching swordfish (directed or by-catch) should report catch, catch-at-size (by sex) and effort statistics by as small an area as possible (5-degree rectangles for longline, and 1-degree rectangles for other gears), and by month. It is recommended that at least the order of magnitude of unreported catches be estimated. The Group noted that it is important to collect size data together with the catch and effort data to provide meaningful CPUEs. Although CPUE by age is the usual input for the age-structured analyses, the Group recognized that this must be based on an increased level of sampling, not merely substitution of the current data. Therefore, it is recommended that increased sampling take place so that CPUEs can be developed by age.

Age determination. The Group noted new research that indicated estimates of age at length from direct ageing studies vary within the Mediterranean on a geographic basis. To avoid the possibility that such variation results from differences in age determination methods, national scientists were encouraged to exchange spine sections and share age determination methodology.

Gear selectivity studies. Further research on gear design and use is encouraged in order to minimize catch of age-0 swordfish and increase yield and spawning biomass per recruit from this fishery.

Management. The Committee recognizes the limitations of the analyses of minimum size and seasonal closure scenarios that have been conducted to date. Hence, the Committee recommends an inter-sessional meeting aimed to conduct additional research into technical measures and time-area closures which could optimize management of the Mediterranean swordfish fisheries.

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. The last assessment conducted for marlin was 2006. 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

Small Tunas Work Plan

Following the management recommendations by the Committee, the highest priority for 2008 will be to participate in small tuna assessment activities currently carried out by other regional organizations (GFCM, Caribbean Regional Fisheries Mechanism) and to encourage these organizations to continue to provide ICCAT with improved knowledge of the state of the stocks of small tuna.

Other activities will include improvement in the catch statistics of these species, as well as increase inter-regional collaboration amongst scientists working on the biology of the main species belonging to this group.

The Committee recommended initiation of a project to design and print water-proof identification sheets for species of interest to ICCAT (including large and small tunas, sharks and billfish) that can be distributed to field officers. These sheets should provide scientific, ICCAT common names and local names.

Sharks Work Plan

Work Plan

The next ICCAT shark stock assessment will be held in Uruguay from July 21 to 25, 2008. As recognized during the Data Preparatory Meeting, held in June 2007, in Punta del Este, Uruguay, a lot of work will be required inter-sessionally to fully prepare the Group for the next assessment. To support this, the Group requested the Secretariat to set up a list server for the Shark Working Group and for other interested parties to work through data issues and assessment methods prior to the assessment meeting.

Assessment methods

The 2008 assessment will focus on blue and shortfin mako sharks because more data are available for these species. The Group, however, expressed great concern with the lack of most of the basic data on pelagic elasmobranch species, other than the blue and the shortfin mako caught by the longline fishery in the ICCAT Convention area which stocks could be in a much more critical condition. Due to their susceptibility and possible vulnerability in Atlantic tuna fleets, the Group decided that during the next stock assessment at least a risk analysis should be conducted on these species, and thus precautionary conservation measures could be eventually developed. For these species, therefore, and to the extent possible, the Group will conduct a rapid assessment of relative vulnerability in overfishing, based on demographic data and risk analyses, and shall evaluate their susceptibility to the fisheries based on available observer data. This rapid assessment method has been recommended by the ICCAT Working Group on Ecosystems. The species to be targeted by such analyses are listed below.

Longfin mako, *Isurus paucus*
Bigeye thresher, *Alopias superciliosus*
Common thresher, *Alopias vulpinus*
Oceanic whitetip, *Carcharhinus longimanus*
Silky shark, *Carcharhinus falciformis*
Porbeagle, *Lamna nasus*
Scalloped hammerhead, *Sphyrna lewini*
Smooth hammerhead, *Sphyrna zygaena*
Crocodile shark, *Pseudocarcharias kamoharai*
Pelagic stingray, *Pteroplatytrygon violacea*

For the assessments of blue and shortfin mako shark, the Group will apply the same models that were used at the 2004 assessment, which are a) a demographic model, b) a Bayesian surplus production (BSP) model, c) an age-structured production model (ASPM) incorporating catch data, and d) a "catch-free" age structured production model. For continuity, all of these models will be applied as they were in the last assessment, but with updated data. All of them will be updated with the new biological information presented up to the meeting. For the BSP, ASPM, and catch-free ASPM, updated CPUE indices of abundance will also be required. For the BSP and ASPM models as currently implemented, information concerning the catch series is also necessary. These models will be applied to multiple catch scenarios, including those based on the Task I data, ratios of shark catches to tuna catches, and estimates based on the shark fin trade data (SCRS/2007/077).

Recognizing that there is a lack of reliable data on the historical catches, and that alternative ways will have to be developed in order to estimate a CPUE index for mako sharks from the Japanese longline data before 1996, the Group will explore additional sources of information from tagging data and from the ICCAT longline effort time series. The BSP and ASPM models will be modified to allow them to be fitted either to the longline effort series or to a series of independently estimated exploitation rates, rather than a catch time series. The BSP model is currently able to estimate catches in the early years of the fishery, but only as a constant value. The code will be modified so that it can estimate an increasing trend in catch.

For blue shark, the Group will attempt to use the available tagging data and the historical longline effort data by 5^{o}x5^{o} squares (CATDIS) to provide an independent estimate of fishing mortality rates (and associated variances) over time, using an updated version of the methods described in Aires-da-Silva *et al.* (2005). These estimates could then be used as priors for the BSP and ASPM models. For the tagging models, however, access to some of the data from the tagging programs in the northeast Atlantic will be essential. A detailed description of the preparation needed for the use of tagging data in the assessment, as well as the data format required for the

tagging modeling, is provided in the report of the Data Preparatory Meeting (*8.2 Preparation of tagging data for use in the Assessment)*.

Recommendations

1. To the Commission/Parties:

- *Data submission*
  The Committee urges Parties that have not yet done so to provide catch and effort data in relation to sharks, including estimates of dead discards, as well as size frequencies of sharks to the Secretariat, in advance of the next assessment, but no later than June 30, 2008.

- *Participation in the upcoming stock assessment*
  The Committee emphasized that the assessments of blue and mako shark stocks, scheduled for 2008, will be severely hampered, or even impeded, if the availability of CPUE series from the main fisheries catching those species is not carried out. In this regard, it is particularly critical that standardized CPUE series from those which have not yet been submitted be provided prior to the meeting. The Committee also emphasized the need for participation in the assessment of scientists with knowledge of these fisheries.

- *Education/capacity building*
  The Committee recommended that the Commission support the development of educational materials (leaflets, folders, etc), focused on the identification of shark species and conservation issues for distribution to fishermen active in the Convention area.

2. To National Scientists

- *Standardized CPUE series*
  It is critical for the upcoming assessment that national scientists of parties with important shark fisheries to provide standardized CPUE series of blue and mako sharks prior to the meeting and no later than June 30, 2008.

- *Review/ revision of catch, effort and size data*
  A review of the Task I and Task II data on sharks, available at the ICCAT Secretariat and carried out during the Data Preparatory Meeting held in Punta del Este, Uruguay, revealed several discrepancies in the ICCAT database. The Committee, therefore, encourages Parties to review their catch and effort data in relation to sharks, including estimates of dead discards, as well as size frequencies of sharks from both by-catch and directed shark fisheries. These data should be reported to the Secretariat, well in advance of the next assessment, but no later than June 30, 2008. Due to the variety of size measurements used by various CPCs, the Committee also recommends that national scientists identify conversion factors for total and fork lengths from the measures provided. The Committee, in particular, recommends that revisions and updates of Task I and Task II data, already identified in scientific documents presented to the Shark Group at the Data Preparatory Meeting, be officially transmitted to the Secretariat by National Statistical Correspondents using the proper electronic forms and be presented and approved by SCRS.

- *Historical catches*
  The Group welcomed the information presented to the Data Preparatory Meeting on historical catch and effort history of blue and mako sharks. Considering the great importance of this kind of data to the upcoming stock assessment, the Committee recommends that Parties conduct data mining research to estimate historical catches (including discarded catch) and catch per unit of effort from the full range of fleets causing impact on shark species. The Group also noted the wide range of estimated catch by different methods applied and recommended that further research be conducted on methods which make use of additional information in reconstructing catch histories. This is particularly important for those fleets which have a long and thus useful history of catch rates however which have only recently begun reporting shark catches by species.

3. To the Shark Group Chair/ ICCAT Secretariat

- *Tagging data*
  Considering the great amount of shark tagging data already available in the ICCAT database, particularly on blue shark, and considering its great importance for the understanding of the life cycle and migrations of shark species, including its potential use in the upcoming stock assessment, the Group welcomed and supported the

recommendation by the Sub-Committee on Statistics for the ICCAT Secretariat to coordinate with scientists from the United States, for a Secretariat database manager to travel to the Miami Laboratory in order to develop an efficient protocol of tag database update and transfer, as soon as possible.

The Group also recognized the value of pooling tag-recapture datasets from tagging programs from different regions in the Convention area, which may increase and help to balance sample sizes of tag releases and recaptures over the Atlantic, hence improving the quality of the tagging modeling. With that aim, it was recommended that the Group coordinate with the ICES Working Group on Elasmobranch Fishes and others in an attempt to pool tagging datasets from both sides of the Atlantic. As part of the coordination effort, the Group recommended that ICES scientists, including the authors of document SCRS/2007/101, presented during the Data Preparatory Meeting, be invited to the upcoming assessment. It was noted that such coordination is also important in order to improve the knowledge on the status of the stocks of pelagic shark species.

Noting that the recent *ad hoc* tagging group has initiated coordination activities on the issue, the Shark Group recommended that shark tagging programs be expanded to areas that have not yet been covered, particularly in the South Atlantic and in the high seas, and that coordination among tagging programs be enhanced.

– *Data harmonization/ coordination*

The Group welcomed the information provided during the Data Preparatory Meeting on the Irish recreational fishery and on the Bay of Biscay longline fishery, and recommended that the ICCAT Secretariat coordinate with the National Statistical Correspondent, in order to allow the incorporation of data from these fisheries, including catch, effort and size of the sharks caught, in the ICCAT database, following the SCRS protocol. The Group also noted that information previously unavailable to ICCAT had been reported to ICES and thus recommended that the ICCAT Secretariat coordinate with the ICES Secretariat to harmonize the available pelagic shark catch (Task I) and catch-effort and size frequency (Task II) databases for elasmobranchs of principal concern to the Group (indicated above). To the extent possible, the Secretariat should also coordinate efforts with EUROSTAT to harmonize the databases on shark catches over time.

Appendix 6

BYP ACTIVITIES 2006 - 2007

Introduction

The Bluefin Tuna Year Program (BYP) Working Group reviewed the progress made under this program during 2006-2007, and was satisfied with the outputs attained by BYP funded research projects. The current financial status is reviewed below and the proposed spending plan for BYP funded research projects for 2007-2008 was considered. The primary areas of research considered important by the Working Group are stock structure, ageing and maturity. While sampling for these analyses remains the highest immediate priority of the BYP, the Committee also recommends support of several additional research activities, which are also itemized below. The Committee has recommended and the Commission has endorsed initiation of a large-scale Bluefin Research Program, which shall incorporate the BYP in the future. This endorsement by the Commission is a welcomed recognition by CPCs of the critical need to increase research funding to address important issues. It is noted that the BYP fund is seed money to start off the research subjects prior to the large-scale Bluefin Research program. It is obvious that future funding levels need to be significantly elevated. In this sense, the Committee welcomed the recent research funds by the EU made available for bluefin research to the various EU members. The biological sampling under the BYP framework has contributed to obtain good results and has allowed initiating and carrying out several research subjects as shown below. Active and efficient coordination is essential in order to best utilize the opportunities and the research fund.

1. Financial report

The financial status of the BYP funds through October 3, 2007 was reviewed. With the expected 2007 Commission contribution of €14,588, the 2007-2008 BYP operating budget should be on the order of €30,931 **(Table 1)**.

2.1 Western Atlantic

2.1.1 Biological sampling

A sampling program for bluefin tuna funded by BYP has been conducted since 2004 in North Lake, Prince Edward Island, Canada. Sampling was continued in 2007 and is ongoing at the time of this report. Fish are sampled for hard parts and DNA material for ageing and stock structure studies. The Gulf of St. Lawrence bluefin tuna fishery provides a unique opportunity to sample large bluefin since the fish are landed in the whole condition and dressed on the wharf.

2.2 Eastern Atlantic and Mediterranean

2.2.1 Biological sampling

The main objective of biological sampling within the BYP is to support research on stock structure by means of genetic analyses (tissue) and microconstituents analyses (otoliths); research on reproduction (gonads) and research on growth (spines, vertebrae and otoliths). Sampling in the eastern Atlantic as well as the whole Mediterranean was accomplished.

For the period 2006-2007, 360 full sets of samples were collected in the Mediterranean Spanish bluefin tuna fisheries (mainly longline and recreational fisheries) and 32 in the Atlantic bluefin tuna fisheries. Full sets consisted of samples for stock structure (genetic & microconstituents), growth (spines &/or otoliths), maturity and fecundity (gonads) and feeding analysis (stomach). In addition 180 sets of incomplete sets of samples were also collected. Special emphasis was applied to collect samples in recreational fisheries: 102 full sets and 100 incomplete sets came from these fisheries.

2.2.2 Research on maturity

In 2005 a study on size and age at sexual maturity of female bluefin tuna from the Spanish Mediterranean, the Mediterranean was completed. Maturity studies on wild bluefin tuna population were carried out under the

PNDB EU project in Spain. Samples collected during 2006 are being analyzed in order to assess maturity and fecundity rates. Results for both studies are underway.

2.2.3 Larval surveys

In July (19-22) 2007 a tuna larval survey (TUNALEV II) in the Cilician Basin was conducted. Bluefin tuna, albacore, Atlantic black skipjack and bullet tuna larvae were caught. The research on tuna larval production in this area will continue in the coming years.

In 2007 the *Instituto Español de Oceanografía* (IEO) carried out a prospective survey on larval ecology in the Balearic Islands area.

2.2.4 Review of ongoing tagging programs and related research activities in Contracting Parties

The majority of BFT tagging activities in the Mediterranean and East Atlantic were carried out within the European Tuna Tagging Program (ETTP) set by EC under the Data Collection program of DG Fish in 2005 and co-funded by EC and national bodies. The ETTP includes both conventional and electronic tagging experiments on BFT and swordfish in the North Atlantic and Mediterranean. The BYP supports the ETTP activities which are important to better understand bluefin tuna spatial dynamics, and distribution. ETTP activities in 2006 were:

1) Tuna tagging activities of Cyprus in 2006 were made in collaboration of tuna farmers with an Italian team, and 10 bluefin tuna (size: 70-250 kg) were tagged using electronic satellite pop-up tags;

2) Tuna tagging activities of Spain in 2006 include:

    a) (IEO) bluefin tuna electronic tagging activities in the Mediterranean (22 adult bluefin, sized 45-230 kg, were tagged in "Viver Atun" farming facilities with electronic satellite pop-up tags in collaboration with an Italian team;
    b) (IEO) conventional tagging campaign in the Bay of Biscay (48 adult bluefin) and Mediterranean Sea (380 juvenile bluefin, 1 year old);
    c) (AZTI) bluefin tuna electronic tagging activities in the Bay of Biscay (1 acoustic tag and 11 internal archival tags were implanted on juvenile bluefin in collaboration with IPIMAR);
    d) (AZTI) opportunistic tagging in the Bay of Biscay (214 bluefin were tagged).

3) Portuguese tagging activities in 2006 were made in collaboration between IPIMAR and local tuna trap (TUNIPEX); 8 adult bluefin (size: 49-153 kg) were tagged with pop-up tags;

4) French tagging activities: deployment of 8 pop-up archival tags were planed in 2006 in cooperation with sport fishing in Corsica, but due to the fact that not a single bluefin was caught, no tag had been deployed;

5) Greek tagging activities targeted mainly swordfish, but also 9 juvenile bluefin were tagged with conventional tags during 2006;

6) Italian tagging activities were made in collaboration with various teams, and in total they deployed 33 pop-up archival satellite tags during 2006.

As one of the BYP funded projects, an enhanced tag recovery project was conducted by Croatian scientists in order to improve recovery of conventional and electronic tags from farmed bluefin tuna in the Adriatic Sea (SCRS/2007/049). It has been noticed that, when fish were directly sent to the processing boats, there is no way to examine fish as transportation of these fish to the boat is very quick and only crews on the boat are allowed to access the fish. There is no information whether tags are properly removed and reported or not if tags are found on board. This is especially true for medium and large sized bluefin.

Results of previous experimental tagging in the grow-out cages have been analyzed with an aim to address issues such as fish weight changes due to farming, as requested by the Commission [Rec. 06-07], and presented to the BFT WG (paper: Tičina *et al.,* 2007; Aquaculture). No new fish have been tagged in the cages during 2006.

2.2.5 BFT ageing coordination

Several European countries (Cyprus, Italy, Greece, Malta, Portugal, Spain) with Canada and Turkey as collaborating countries, have submitted a project proposal to the European Union DG Fish. This is a pilot study

investigating the feasibility of routine sampling of bluefin tuna calcified structures from the European fisheries for routine estimation of age structure of the catch. During next year this project has to be formally presented in next EU DG Fish call for small-scale projects.

An update on bluefin tuna age validation has been carried out (SCRS/2007/135). This study use deposition of bomb radiocarbon as a dated mark to validate inferences of ages of bluefin tuna. Results, based on nearly thirty samples, support the earlier conclusion that the age-length relationship currently in use by the SCRS over-estimates growth rate and underestimates longevity.

Plans for further age and growth research include completing the current validation study using archived bluefin tuna otolith material available in the USA, Canada and Europe; to investigate potential interdecadal differences in bluefin tuna growth rates for both eastern and western Atlantic tuna and to evaluate and document the consequences, of these new growth findings, for the stock assessments and management of the bluefin resources.

3. Research Plan for 2007-2008

As a first priority, the Working Group decided to fund €10,000 to the "World Symposium for the study on the decline of bluefin tuna in historic periods".

The possibility of conducting a comparative maturity study for west and east Atlantic bluefin sampled via standardized methods (by the same gear and for the same size of fish) was discussed. However, given the situation on the availability of matured fish for various fisheries, there is little perspective to get satisfactory sampling. Several other candidates were suggested but there was no concrete research proposal at this time. The Working Group decided to wait a while until some proposals are provided. In the absence of such proposal, it was agreed to leave, for the time-being, the elements of the 2006 spending plan in the 2007 plan until satisfactory proposals for additional research can be prepared.

Table 1. Recommended 2007-2008 BYP contributions to bluefin research (€), balance at October 2, 2007.

Project description 2007-2008	*Research Request*	*BYP Fund Balance*	*Priority*
		16,342	
Anticipated 2007 Commission contribution	14,588	30,931	
Planned expenditures in 2008			
I. Biological sampling			
Bluefin Tuna Symposium	10,000	20,931	1
W. Atlantic sampling (Canada)	6,000	14,000	2
II. Tagging (established by BYPE Coordinator)			
Tagging Coordination	2,000	??	1
Tag recovery and tag-recapture related data collection in tuna farms in Croatia	8,000	6,000	2
Contingency	4,000	0	

Appendix 7

ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH
EXECUTIVE SUMMARY
(Expenditures/Contributions 2007 & Program Plan for 2008)

Summary and Program objectives

The original plan for the ICCAT Enhanced Research Program for Billfish (IERPB, SCRS 1986) included the following specific objectives: (1) to provide more detailed catch and effort statistics, and particularly size frequency data; (2) to initiate the ICCAT tagging program for billfish; and (3) to assist in collecting data for age and growth studies. Efforts to meet this goal have continued through 2006 and are highlighted below. During the 2005 and 2006 Billfish Working Group meetings, the Working Group requested that the IERPBF also focus its objectives to accomplish age and growth estimates for adult marlin, as well as evaluate habitat use of adult marlin using electronic tags. The Working Group believes that these data will facilitate use of more sophisticated models for billfish assessments.

The ICCAT Enhanced Research Program for Billfish, which began in 1987, continued in 2007. The Secretariat coordinates the transfer of funds and the distribution of tags, information, and data. The General Coordinator of the Program is Dr. David Die (USA); the East Atlantic co-Coordinators were Mr. Paul Bannerman (Ghana) and Mr. T. Diouf (Senegal), while the West Atlantic Coordinator is Dr. Eric Prince (USA). The billfish tagging database is maintained at the NMFS Southeast Fisheries Science Center (Miami, Florida) and at the ICCAT Secretariat.

This program has provided continued support to the improvement of fishery and biological data on billfish since its inception in 1986. Over the last few years financial support to the program has been eroding and compromising its ability to reach its objectives. It is imperative that all parties provide financial and in-kind support to the program so that the program continues to deliver the useful data and knowledge it has produced to date. This is especially critical because the largest portion of billfish landings is now coming from Parties that depend on the support of the program to collect fishery data and biological samples.

2007 Activities

The following is a summary of the activities of the program; more details of activities conducted in the western Atlantic can be found in SCRS/2007/144. Four observer trips onboard Venezuelan longline vessels were completed in 2007; although this represents less than half of what had been planned for 2007 this activity provided uninterrupted continuation to the biological sampling program of this fleet that was initiated in 1991 with funds from the IERPB. Sampling of Venezuelan artisanal catches also continued in Margarita Island and in the central coast of Venezuela. Biological samples from both the pelagic longline and artisanal Venezuelan fisheries has provided large numbers of spines and gonads for age, growth and reproductive studies of blue and white marlin. Notably, this program recovered 70 tagged billfish just in the first six months of 2007.

Brazil continued the collaborative program with US institutions that started in 2005 and that during 2007 focused on testing the performance of circle hooks on board commercial vessels, tagging with pop-up satellite tags and collection of age spine samples for age and growth studies. In Bermuda the program continued to support collaborative activities that during 2007 continued to collect biological materials from its billfish tournaments.

A review of billfish statistics in Ghana, Senegal and Côte d'Ivoire initiated in 2006 needs to be completed, but was enhanced by the activities of the ICCAT data fund in West Africa. Improvements on catch records from these Parties are reflected in the Task I tables for billfish and hopefully will continue so that accurate records are available for the upcoming sailfish assessment.

Documents that were produced with the benefit of direct support of the IERPB were SCRS/2007/100, SCRS/2007/114, SCRS/2007/121 and SCRS/2007/144.

2008 Plan and activities

The highest priority for 2008 is to support improvement in the statistics of artisanal fisheries Atlantic wide and estimation of relative abundance indices of sailfish for these fisheries. Other important activities include the support for the continuation of the monitoring of the Venezuelan and Brazilian longline fleet through an observer

program, collection of conventional tags and the collection of biological samples. All these activities depend on successful coordination and the resources required to support them. Details of activities to be carried out in 2008 are provided below and the detailed budget for these is included in **Table 4**.

Shore-based sampling

Sampling of artisanal and small scale fisheries to support the estimation of catch and effort statistics will be focused on fleets that are contributing the largest parts of the catch and/or those that have traditionally provided the higher quality data in the past, to ensure the preservation of uninterrupted time series of catch and relative abundance indices.

West Atlantic

Sample will be conducted on the landings on the following fleets: billfish tournaments from Bermuda, billfish tournaments off southeastern Brazil, in Fernando de Noronha Island and other locations off northeastern Brazil, longline fleets landing in Venezuela, Uruguay and Brazil, and the gillnet fleet operating in central Venezuela.

Eastern Atlantic

Monitoring and sample collection will be supported for the gillnet fisheries of Ghana, Côte d'Ivoire and Senegal as well as the recreational fishery off Senegal. This will complement improvements made with the support of the ICCAT Data Improvement Program.

At-sea sampling

West Atlantic

Continued support will be provided to the sampling made onboard the Venezuelan and Brazilian vessels that have been supported in the past by this program and support will start to sampling of longliners from Uruguay.

Critical habitat of billfish using pop-up satellite archival tags

Several on-going projects are evaluating habitat use and critical habitat needs of blue and white marlin using pop-up satellite archival tag technology. These projects are independently funded but will require the support of the program to facilitate its coordination.

Tagging

The program will need to continue to support the recovery and conventional tagging conducted by program partners.

Age and growth

The collection of biological samples for age and growth studies was, over the last two years, largely supported by an externally funded program, that is due to be completed in 2007, however there is a need to continue collection of samples from fleets not covered by the current program.

Coordination

Training and sample collection

Program coordinators need to travel to locations not directly accessible to them to promote the program and its data needs. These include travel of the coordinators from the east to western African Parties, and travel to the Lesser Antilles and South America by the general coordinator and the coordinator from the west. Strong coordination between activities of the IERPB and the data ICCAT improvement project in West Africa will continue to be required.

Program management

Management of program budget is done by the program coordinators with the support of the Secretariat. Reporting is also the responsibility of the coordinators. Parties that are allocated budget lines for program

activities need to check with the respective program coordinators for the East and West for approval of expenditures before the work is carried our and need to invoice ICCAT to obtain allocated funds. Allocation of funds to the program only happens at the end of the each year.

2007 Budget and Expenditures

This report presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2007. The 2007 budget recommended by the Billfish Working Group for IERPB was €49,950. The only new contribution made to the IERPB during 2007 was an allocation of €20,000.00 from the regular ICCAT budget. Carry over funds left from previous years were €1,343.60, thus total funds available for 2007 were €21,343.60 **(Table 1)**. As a consequence some of the activities of the program were not carried out. To date, expenditures during 2007 were €13,548.42 and are detailed in **Table 2**.

In-kind contributions to the Program continued to be made during 2007. Since 1996, the FONAIAP (Venezuela) and since 1997, the *Instituto Oceanográfico* (University of Oriente) has provided personnel and other resources as in-kind contributions to the at-sea sampling program, thereby reducing the amount of funds needed for this activity from the ICCAT billfish funds. Also, the program coordinator traveled to Venezuela and to Senegal to oversee IERPB funded work. Travel cost for these trips were absorbed by the U.S. National Marine Fisheries Service, the University of Miami and the ICCAT data fund and JDIP project, and as such represented an in-kind contribution to the Billfish Program for 2007. The Department of Environmental Protection of Bermuda also contributed in-kind contributions by providing personnel and other resources used for assessing habitat preferences and reproductive biology of Atlantic blue marlin caught in the recreational fishery. Ghana and Senegal provided in kind contributions by supporting the time spent by Mr. Bannerman and Mr. T. Diouf (Senegal), the co-coordinators for the eastern Atlantic.

2008 Budget and requested contributions

The summary of the 2008 proposed budget, totaling €**47,650** is attached as **Table 3**. The Working Group requests that the Commission maintain its contribution of **€20,000** for 2008 to cover the most critical parts of the 2008 IERPB **(see Table 4)**, including funding for monitoring of catches of longliners in Venezuela, Brazil, Uruguay and the artisanal fleets of the Caribbean and West Africa. The requested contribution from ICCAT and voluntary contributions of **€27,650** from other sources will be necessary to carry out the entire Program Plan in 2008.

The consequence of the Commission failing to make the requested contribution of **€20,000** will be to stop or reduce program activities for 2008 including: (1) eliminating important at sea observer initiatives in Venezuela, Uruguay and Brazil; (2) eliminating coordination travel; (3) Eliminating sampling of artisanal fleets in the western and eastern Atlantic (4) eliminating sampling to obtain hard parts for age and growth analysis; (6) Eliminating conventional tagging activities, including distribution of tag recovery incentive rewards.

Conclusion

The IERBPF has been credited for major improvements in the data supporting the last two ICCAT assessments of billfish. If the IERPBF program were to be terminated due to lack of funds, essential research and monitoring activities that are now supported by the program will suffer and the Working group will be in a difficult position to address the needs of the Commission. Although considerable benefits will accrue from various outputs of the ICCAT data improvement program, the IERPBF is the only program that exclusively focuses on billfish. By having this focus it is in the best position to ensure that the research and monitoring activities not covered by the ICCAT data improvement program are given some minimal resources. The IERPBF is an important mechanism towards completing the goal of having the highest quality information to assess billfish stocks.

Table 1. Summary budget for 2007 for the Billfish Program.

Source	€
Balance at start of Fiscal Year 2007	**1,343.60**
Budget recommended by the Working Group	43.150.00
Income (allocation from ICCAT Regular Budget)	20,000.00
Expenditures (estimate, for details see **Table 2)**	- 21,148.42
BALANCE	**195.18**

Table 2. Detailed 2007 Budget & Expenditures (as of September 28, 2007).

			€
Balance December 31, 2006			**1,343.60**
Income			**20,000.00**
	Contribution from the Commission		21,343.60
Expenditures			**-13,548.42**
	Venezuela	1-3 qtr.	-5575.00
	Brazil	1 semester	-1,875.00
	Côte d'Ivoire		-2,000.00
	Senegal		-2,000.00
	Ghana	1 semester	-2,000.00
	Bank charges		-98.42
Balance as of Sept 28, 2007			**7,795.18**
Funds obligated until end of 2007			
	Venezuela	**4th Qtr.**	**-3,000.00**
	Brazil	**2nd Semester**	**-3,000.00**
	Ghana	**2nd Semester**	**-500.00**
	Tag reward		**-1,000.00**
Bank charges			**-100.00**
Total obligated			**-7,600.00**
Total estimated expenditures			**-21,148.42**
Estimated balance December 31, 2007			**195.18**

Table 3. 2008 Summary budget of the ICCAT Enhanced Research Program for Billfish.

Source	€
Balance at start of Fiscal Year 2008	195.18
Budget recommended by the Working Group	
Income (Allocation from ICCAT Regular Budget)	20,000.00
Other contributions	27.650.00
Expenditures (see **Table 2)**	-47,650.00
BALANCE	**195.18**

Table 4. Detailed 2008 Budget & Expenditures.

	Amount (€)
STATISTICS & SAMPLING	
West Atlantic shore-based sampling:	
Venezuela	5,000 *
Barbados	1,000
St. Maarten, Netherlands Antilles	1,000
Brazil	2,000
Others	2,000
West Atlantic at-sea sampling:	
Venezuela	6,000 *
Uruguay	2,000 *
Brazil	5,000 *
Others	2,000
East Atlantic shore-based sampling:	
Dakar, Senegal	3,000 *
Ghana	3,000 *
Côte d'Ivoire	3,000 *
Others	2,000
TAGGING	
Tag reward	1,500
Lottery rewards	500 *
Outreach	1,000
AGE AND GROWTH	
Collection of hard parts	1,000
Mailing	300
COORDINATION	
Coordination travel	6,000
Mailing & miscellaneous-East Atlantic	100 *
Bank charges	250 *
GRAND TOTAL	**47,650**

* Highest priority to be funded mainly by requested ICCAT contribution.
Authorization of all these expenditures depends, on sufficient funds being available by ICCAT and from other contributions.

Appendix 8

REPORT OF THE 2007 MEETING OF THE SUB-COMMITTEE ON STATISTICS

1. Opening, adoption of Agenda and meeting arrangements

The Sub-Committee on Statistics met on September 24 and 25, 2007 at the offices of the ICCAT Secretariat. The meeting was chaired by Dr. Mauricio Ortiz (United States) and Dr. Guillermo A. Diaz (United States) served as Rapporteur. The Agenda (**Addendum 1 to Appendix 8**) was adopted with the following modification; item 2.7 Rules for revising historical data was removed, as there are no modifications of the current rules.

2. Issues regarding capture data submitted in 2006

2.1 Task I and Task II

The Secretariat presented its Report on Statistics and Coordination of Research that summarized the submission of data since the last SCRS meeting up to September 25, 2007. In response to a Commission request in the ICCAT Resolution to establish a working group on sport and recreational fisheries [Rec.06-17], the Secretariat prepared several tables that summarized data available for Task I and Task II (SCRS/07/152), for sport and recreational fisheries. Further discussion on this request is presented under item 11.

It was noted that by September 9, 2007 (Table 1 in the Secretariat Report on Statistics and Coordination of Research in 2007), only 19 of 43 Contracting Parties have submitted catch information (Task I) Statistical data submission deadlines are still not being meet by several parties, and the Sub-Committee reiterated the importance of data submission in time, but also recognized that data quality control, verification and administrative process may delay data submission. It was recommended by the Sub-Committee that the Secretariat, with the assistance of national scientists present during the SCRS 2007 Working Group meetings, provides and publishes in the web a current list of the Statistical correspondent of each contracting party to facilitate the communication between scientist and responsible designees of official data submission. The Sub-Committee also agrees including a footnote in the above Table indicating those countries that submitted data after the deadline.

Following the discussion of data submission and deadlines time table the sub-committee proposed the following:

- That the Commission should look at incentives to improve data reporting since the present process is evidently not working for some parties, in particular for those that do not report at all, or don't have the infrastructure for data collection.
- Considering that it normally takes a year lag to obtain the best quality final estimates of data and that the latest year of data should be preliminary and subject to changes, the subcommittee should look at practical and realistic deadlines based on scientific goals and quality of data.
- Compliance with reporting of annual fleet statistics (Form 1). This data is in general poorly reported. Given that the commission is trying to manage fleet capacity is necessary to remind the contracting parties of the need of this information. It was recommended that the Secretariat clarifies and request reporting fleet sizes correspond to active and/or license vessels.

The Sub-Committee requested that Statistical Data submission should be done using the electronic forms provided by the Secretariat, and noted that Annual Reports should not be used for data submission.

Following up the 2005 Commission Request in the *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations* [Rec. 05-09], the Species groups were reminded to review and asses the quality of the Task I and II data provided by the Secretariat (as it was agreed during the 2006 meeting of the Subcommittee). In addition, the committee provided a questionnaire/form to the Species groups for which assessments/ data workshops were conducted during the present year to inform and follow up any improvement/changes to the data and their impact on the assessment quality and results. The Sub-Committee will present a summary of the questionnaire responses in the **Addendum 2 to Appendix 8**.

2.2 Tagging data

The *Ad Hoc* Working Group on Tagging Coordination suggested several proposals for tagging activities harmonization. Most of them are under the scope of this Sub-Committee on statistics; particularly the ones referring to revised forms and new forms for tag release and recovery information, as these proposals involve slight modifications of ICCAT data base (see section 4 of the 2007 Ad Hoc Working Group Tagging Coordination meeting report). The Secretariat mentioned that recent updates of tagging data from United States have created a large task within the Secretariat because of the transfer of the whole historic tagging data (above 500 thousand tag records). Given the importance and use of tagging data in recent and upcoming assessments, the Sub-Committee acknowledges the priority of streamline the transfer and updating of tag data process. Therefore, the Sub-Committee recommends that the Secretariat coordinate with scientist from the United Stats, for a Secretariat database manager to travel to the Miami Laboratory and develop an efficient protocol of tag database update and transfer as soon as possible.

2.3 Revisions to historical data

The Secretariat provided an update of the revision of the historical data (see the Secretariat Report on Statistics and Coordination of Research in 2007). The Albacore Species Group Coordinator reported on the efforts between this group and the Secretariat to extend the catch and effort time series of this species back to the 1930's for the assessment of the northern albacore stock conducted during 2007. Historic data was compiled primarily from early SCRS documents and reports of the troll fisheries that started in the 1930s by France and Spain (see Report of the Ad Hoc Meeting to Prepare Multifan-CL Inputs for the 2007 Albacore Stock Assessment). Because the ICCAT Task I database starts in 1950, the subcommittee recommended that the Secretariat develops and modifies the database to include the historic data once the species working group(s) have approved and adopted it. However, the subcommittee recommends that this historic series be only available to ICCAT scientist and working groups, while the web available data series continue to start in 1950 given the restrictions and limitations of quality control and completeness of the historic series (prior to 1950).

2.4 Shark statistics

The coordinator for the Sharks working group presented a summary of the Shark Data Preparatory meeting held in Uruguay in 2007). The Secretariat provided the task I and II data for this meeting and is currently coordinating with the Shark working group and the Tagging Working Group to include shark tagging data from the United States and EC-Ireland.

2.5 BFT, SWO, BET Statistical Documents and other trade information

The Secretariat reported on the comparisons between trade statistics and Task I data for bluefin tuna, swordfish and bigeye tuna (see the Secretariat Report on Statistics and Coordination of Research in 2007).

It was noted that, for swordfish and bigeye they are not conversion factors between trade report units and live weight biomass. The Sub-Committee recommended that the corresponding working groups provide these conversion factors and a protocol to the Secretariat similar to the one already established for bluefin tuna (SCRS/2003/136 and SCRS/2002/010). The Sub-Committee also requested that Table 8b in the Secretariat Report on Statistics and Coordination of Research in 2007 includes a footnote indicating the SCRS reference where the protocol is described (in the case of bluefin tuna) and or the limitations of the calculations presented for swordfish and bigeye tuna trade estimates.

2.6 Other by-catch species

During the last inter-sessional Meeting of the Sub-Committee on Ecosystems (Madrid, February 19 to 23, 2007), the Sub-Committee discussed ways to analyze the spatial overlap between the geographical distribution of seabird by-catch species and ICCAT longline fishing effort. During the meeting, a preliminary procedure to estimate overall fishing effort (total number of hooks) by quarter and $5^{o}x5^{o}$ squares was agreed. This approach is also planned to be used by the Secretariat to estimate overall baitboat and purse seine effort.

In spite of the use given to this database within the Sub-Committee on Ecosystems, the database is probably of interest to many other species groups and scientists of the SCRS, as it is a database of general use (similar to CATDIS but for fishing effort). Because of this, it is important to incorporate the views of different national scientists that were not present in the meeting regarding the assumptions used to create this database, and to test

alternative assumptions for estimating overall effort. In order to have the feedback of the members of the SCRS, the following files were circulated among the SCRS members, while asking to comment on the way the database was generated and on the outcome.

- Appendix 5 of the Report of the inter-sessional meeting (February 19-23, 2007) gives the criteria used by SC-ECO for estimating total longline effort.
- Preliminary estimates of numbers of hooks for major fleets and total is the database thus generated (http://www.iccat.int/Data/Assess/NumberOfHooks.rar)
- Distribution maps of number of hooks for major fleets illustrate effort distribution by 5ºx5º squares over time for some longline fleets (http://www.iccat.int/Data/Assess/MapHooksByFleet.rar)
- Distribution maps of total number of hooks illustrate total longline effort distribution by 5ºx5º squares over time (http://www.iccat.int/Data/Assess/MapTotalHooks.rar).

3. Updated report on a relational database system

The Secretariat reported on the progress and updates to the relational database and web applications for data dissemination and submission. The Sub-Committee acknowledged the effort and quality of the work carried out by the Secretariat during the year despite the heavy workload due to, *inter alia*, numerous stock assessments in 2007. Given the recent increase in workload related to compliance matters by the Secretariat and the continuing demand to support ICCAT scientific efforts, the Sub-Committee reiterated its last year recommendation that the Commission provides additional human resources to the Secretariat in particular for database management and database extractions need to support the requests of species groups during stock assessments. The Secretariat informed that progress on the full documentation of the ICCAT database has been made, but due to the large number of inter-sessional meetings during this year the final product is not yet available.

The Secretariat continued to stress the need to submit data using the available electronic forms in order to facilitate their assimilation into the database. Once again the Sub-Committee recommended moving towards fully electronic submission of data by all Contracting Parties. The Sub-Committee agrees that the inclusion of data into an Annual Report is not considered a formal data submission to the Secretariat. The Sub-Committee praised the Secretariat for its continuous efforts to improve the relational database system. And the Sub-Committee recommends upgrading existing hardware servers to improve network connections to the ICCAT database.

4. Updated report on survey of fishery statistics collection systems

The Secretariat presented a summary of the countries that responded to the survey on fishery statistics in 2007 (SCRS/2007/152). The proposal to the Secretariat is to publish a document summarizing the results of the survey in 2008. The Sub-Committee proposed that the summary document of the fishery survey be included in the web page.

5. National and international statistical activities

5.1 International and inter-agency coordination and planning (FAO, CWP, FIRMS)

The Secretariat continued to work with the CWP (coordinating working party on fishery statistics) and details of this partnership were provided by the Secretariat in its Report on Statistics and Coordination of Research. The Secretariat reported that FAO scientist participated in this year Data Improvement Workshop held in Dakar, Senegal (SCRS/2007/145).

The Secretariat also informed on the work progress with FIRMS (Fishery Resources Monitoring System). FIRMS was officially introduced in May 2006 and contains stock status summary reports for 11 of the main ICCAT species (http://firms.fao.org).

5.2 National data collection systems and improvements

United States

The United States informed that during the year 2007 (April 15-June 15) there was a 100% observer coverage on its pelagic fleet operating in the Gulf of Mexico with the objective of better characterize the fishing effort in that area.

Japan

Japan reported that in the near future it will implement the use of VMS to improve data collection in the Atlantic.

Brazil

Brazil reported that the Government approved legislation making mandatory the use of VMS in all vessels 15 m or greater in length.

Morocco

Morocco reported that is working on a project to recover historical tuna landings of fisheries on their southern coast that primarily target tropical tunas.

Chinese Taipei

Since 2006, the Fisheries Agency mandated all national vessels targeting bigeye tuna in the Atlantic to report their daily catch and effort data through VMS. A mechanism, mainly for sampling compatibility comparison, was also established by cross-referencing VMS data against data collected from dispatched on-board observers. In addition, a pilot program to establish an Automated Imaging System was also launched in 2005 to improve the existing size data collection system. Moreover, collection of size information at the cannery pier side, which commenced in 2006, will be continued with cooperation from designated canneries in Port of Spain, Trinidad and Tobago.

6. Report on data improvement activities

6.1 Japan Data Improvement Project (JDIP)

At the end of 2004, Japan initiated a five-year project to aid several countries meet their data collection and reporting obligations. The Coordinator's report of JDIP activities from December 2007 to November 2008 is attached at Appendix 1 to the Secretariat Report on Statistics and Coordination of Research in 2007.

The Sub-Committee acknowledged the positive impact of the JDIP made evident by the active participation of six scientists from Latin America and Africa during the inter-sessional meeting of bigeye tuna and the Species Groups and SCRS meetings.

6.2 Data Fund from Resolution by ICCAT on Improvements in Data Collection and Quality Assurance [Res. 03- 21]

The 2003 *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* [Res. 03-21] established a Data Fund to be used "for training in data collection and for supporting of scientific participation in SCRS data preparatory and stock assessment sessions by scientists from Parties with insufficient capacity to meet data collection, quality assurance, and reporting obligations". During 2007 six scientists have been funded to participate in the inter-sessional meetings of bigeye tuna and tropical species and in the SCRS meeting.

The Secretariat presented an update on the Data Fund and reported in the coordination between different fund programs supporting common projects (see the Secretariat Report on Statistics and Coordination of Research).

6.3 Data recovery activities

Items were discussed during the meeting and reported in prior sections (2.3 and 5.2). In addition, scientists from Uruguay reported on a project partially funded by the JDIP aimed to the recovery and quality control of catch

and effort data of the Uruguayan longline fleet for the period 1980-2004, with particular emphasis to the bigeye and swordfish catches (SCRS/2007/156).

7. Review of publications and data dissemination

The Secretariat reported that a DVD version of all issues of the *Collective Volume of Scientific Papers* has been finalized and it was distributed to ICCAT scientist. The Subcommittee acknowledged the excellent work that the Secretariat has made in reviewing and publishing these volumes.

In 2007, the last issue of the *Collective Volume of Scientific Papers* (Vol. 60) was published and all *Collective Volume* documents are now available in the ICCAT website as well as the *Statistical Bulletin, No. 36* that is now available in the website and as hard copies.

Due to the considerable amount of spent by the Secretariat in revision and editorial improvements of documents before their publication, the Secretariat and the Sub-Committee reminded scientists of the need to follow the guidelines for document submission to the SCRS, in particular, to check the references mentioned within the documents.

Three volumes of the *Report for Biennial Period, 2006-2007, Part I* were also published in 2007 together with two Newsletter issues.

The Secretariat reported that ICCAT continues its partnership with ASFA providing summaries of *Collective Volume of Scientific Papers* documents to be included in the ASFA database. The Secretariat also reported that in the upcoming years a document-search database will be implemented in the web page to facilitate search by author, keyword, SCRS number, etc.

8. Review of progress made for a revised *ICCAT Manual*

The update of the Chapter 2 of the *ICCAT Manual* species description chapter(s) has been completed and translations have been finalized. The Secretariat reported that calls to complete Chapter 3 (gears descriptions) have been made. However, bits received did not cover all the gears used in the ICCAT fisheries. The Subcommittee recommended finalizing the chapter including only the main gears but keeping the possibility of adding new descriptions in the future.

The Secretariat noted that is some instances different common names are used for the same species between the ICCAT manual and species codes in ICCAT Web and asked for some guidelines or standards. The Sub-Committee recommended that the Species groups review and provide a preferred common name in each of the ICCAT official languages for each species (stock) and report back to the subcommittee on their decisions.

9. Consideration of recommendations from inter-sessional meetings

The Sub-Committee deferred these discussions to the Species Groups and the SCRS Plenary.

10. Evaluation of data deficiencies pursuant to *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations [Rec. 05-09]*

Issues regarding statistical data submission in 2006 were already addressed under Agenda item 2.

11. Review of available information on sport and recreational fisheries [Res. 06-17]

Resolution [06-17] of the Commission calls for a creation of a Working Group on Sport and Recreational Fishing Activities and requests that the SCRS provides this Working Group with relevant information available. The Secretariat prepared a summary of the current available information regarding sport and recreational fisheries in the ICCAT database according to the definitions and criteria stated in the document SCRS/2007/152. In summary, the gear codes SP (sport fishery) and RR (rod and reel) were assumed to represent the sport and recreational fisheries. Summaries of catch and effort trends are presented in Table 1 of SCRS Agenda item 15.3

and in SCRS/2007/152]. In addition, the Secretariat provided a summary table of a survey done in 1997 that identified recreational fisheries by party and species, and linked this information with the summary catch and effort series (Task I and II) available in the ICCAT database.

The Sub-Committee noted several important limitations of these results:

a) It is clear that not all parties have collected and or reported recreational statistics to ICCAT for all years and species. Furthermore, several countries do not have the mechanism or the infrastructure to collect reliable sport/recreational catch and effort data.

b) The gear rod and reel (RR) is not reported exclusively as a recreational gear (as defined a non-commercial removal). There were several instances where the RR classification represented some commercial captures. For example, recent catches of bluefin tuna reported by Canada have a large component of RR, which correspond to commercial operations. There are also examples were RR gear may refer to artisanal operations and not to recreational or sport activities. It was concluded that the discrimination between recreational and non-recreational catches under the RR gear code may not always be feasible.

The Sub-Committee reviewed and updated the summary Table 1 in SCRS Agenda item 15.3 with participation of the national scientists. Comments were added to the table which should be taken into consideration when reviewing the sport and recreational catch and effort series requested by the Commission.

12. Future plans and recommendations

1. Given the recent increase in workload related to compliance matters by the Secretariat and the continuing demand to support ICCAT scientific efforts, the Sub-Committee strongly recommends that the Commission provides additional human resources to the Secretariat in particular for database management and database extractions need to support the requests of species groups during stock assessments (see **Addendum 3 to Appendix 8**).

2. Considering that the electronic system used now to circulate information during the SCRS involves increased computer needs, the Sub-Committee recommended the upgrade of servers and software used to support the requests during intersessional meetings. The Sub-Committee recognized the benefits of this system with regards saving paper and time consuming (see **Addendum 3 to Appendix 8**).

3. The Sub-Committee recommended prioritize the full documentation of the ICCAT database and the advanced training for additional personal that supports the Secretariat's database system task during the next year.

4. The Sub-Committee recommended that the Secretariat coordinate with scientist from the United States, for a Secretariat database manager to travel to the Miami Laboratory and develop an efficient protocol of tag database update and transfer as soon as possible.

5. The Sub-Committee recommended that, when possible, the submission of Task II data from multi-species fisheries should include all species together instead of by individual species in order to avoid duplication of fishing effort.

6. The Sub-Committee recognized the need to speed up the translation of the ICCAT web page to the other official languages of the Commission. Therefore, the Sub-Committee urged the Secretariat to start the process and reiterated the recommendation that the Commission provides additional human resources to the Secretariat for this purposes.

7. The Sub-Committee requested the Secretariat to purchase better commercial software for mapping and spatial analysis, and data presentation (see **Addendum 3 to Appendix 8**).

8. The Sub-Committee recommended that its meetings continued to be scheduled prior to the meetings of the Species Groups and requested the participation of the Chairs of the Species Groups to address specific statistics concerns.

9. The Sub-Committee discussed the need for a protocol on how to estimate the unreported landings from trade statistics and how to include these data into the ICCAT database. It was also recommended to

identify the limitations of the trade data, the process of trade data generation and its accuracy, and how to implement these data for SCRS evaluations.

13. Other matters

No other matters were discussed by the Sub-Committee.

14. Adoption of the report and closure

The report was adopted during the meeting, and the meeting was adjourned.

Addendum 1 to Appendix 8

Agenda

1. Opening, adoption of Agenda and meeting arrangements
2. Issues regarding capture data submitted in 2007
   2.1 Task I and Task II
   2.2 Tagging data
   2.3 Revisions to historical data
   2.4 Shark statistics
   2.5 Bluefin, swordfish, and bigeye tuna Statistical Documents and other trade information
   2.6 Other by-catch species
   2.7 Rules for revising historical data
3. Updated report on relational database system
4. Updated report on survey of fishery statistics collection systems
5. National and international statistical activities
   5.1 International and inter-agency coordination and planning (FAO, CWP, FIRMS)
   5.2 National data collection systems and improvements
6. Report on data improvement activities
   6.1 Japan Data-Improvement Project
   6.2 Data Fund from [Res. 03-21]
   6.3 Data recovery activities
7. Review of publications and data dissemination
8. Review of progress made for a revised Field Manual
9. Consideration of recommendations from inter-sessional meetings
10. Evaluation of data deficiencies pursuant to [Rec. 05-09]
11. Review of available information on sport and recreational fisheries [Res. 06-17]
12. Future plans and recommendations
13. Other matters
14. Adoption of the report and closure

Addendum 2 to Appendix 8

**Questionnaire and Example Response (Swordfish Working Group Mediterranean Stock)
Intended to Monitor the Impacts and Improvements of Data Availability
and Quality for Assessment Purposes**

This questionnaire was distributed to the Chairmen of working groups that had a data workshop and or assessment during 2007.

Questionnaire data deficiencies, impacts, solutions and priorities for stock assessment of ICCAT species. (Responses given in italics).

1. Species and stocks covered under the data review and preparation work.
2007 SWO-MED Assessment WG (September 2007)

2. Please identify a recent data workshop or data preparation task for an assessment evaluation. (location, work time schedule, number of scientific participants)

No workshop prior to assessment, much of the data assembly occurred during the assessment

3. Please detail the task performed during the data workshop with regard to catch and effort data
   a) Update and verification of landings, dead discards by? Flag, fishery, area, quarter, semester, etc.
   Completed during the WG.
   b) Update and verification of fishing effort
   Completed during the WG.
   c) Update and verification of gear/fleets distribution of catches.
   Completed during the WG.
   d) Revision of historical gaps or update of historical series
   Completed during the WG
   e) Others (describe).
   Inclusion of a longer time series of CPUE information.

4. Other tasks done during the workshop
   a) CPUE series update
   Yes.
   b) Size, age conversions of catch data
   Yes.
   c) Review and update of biological information.
   Yes.
   d) Others (describe).

5. What were the main problems/difficulties associated with the catch and effort data. Please provide a brief summary if applicable.
   a) Incomplete series.
   Landings incomplete in 2006, necessitating analyses only to 2005. Some assumptions still necessary, even for 2005.
   b) Lack of information from main flags/fleets for recent years
   Reports generally received, but not by the required time, resulting in some time spent during assessment WG on tasks that could have been accomplished before the meeting.
   c) Under-reporting
   Not known, perhaps not a major issue since this stock is not managed by TAC.
   d) Others.

6. What other limitations of data were identified. Please provide a brief summary and their consequences.
   a) No size data available for important flags/fleets
   Incomplete CAS for some important fishing nations, substitutions were required.
   b) No area/ time of year of capture information
   c) Others

7. What were the conclusions/recommendations from the scientific group with regards to the data available and likely assessment analysis to be performed?
   The data were considered sufficient for both age-aggregated (production) analyses and age-disaggregated (VPA).

8. For each stock, please chose and describe the recommendations of the scientific group for the assessment analyses
   a) Incomplete data, the group doesn't recommend any further analysis with it.
   b) Highly deficient data of catch and effort need to restrict analyses to simple aggregated models.
   c) Sufficient data to carry out age/or group aggregated analysis
   d) Sufficient data to perform size base evaluations (see above)

9. What were the priorities identified by the scientific working group in order to improve data input for future assessment analysis (one per stock, in priority order)
   1) (From Detailed Report) *Data submission. Data must be reported by the ICCAT deadlines, even when no analytical stock assessment is scheduled. Historical catch, effort and CPUE data, if revised or when requested by the Secretariat, should also be provided, if possible. If the catch and size data are provided to the Secretariat by the specified deadlines, then the Secretariat will provide the catch-at-size and the adopted substitution table to the relevant scientists for review in advance of the meeting. This will then allow the stock assessment session to proceed immediately with analyses, without the delay associated with recalculating the catch-at-size during the meeting due the late submission of new data on the first day of the meeting. This continuing problem caused difficulty for the current assessment, requiring the Group to make assumptions such as the carry-forward of catch from one year to the next or substitutions for Task II data for those countries who did not report as required.*

10. Other recommendations to the data collection programs (i.e. individual ICCAT members) or the Secretariat data management group.
    (The following were extracted from the Detailed Report of 2007)

    a) Sampling schemes. The Group noted that the COPEMED Program, which has greatly improved the collection of data on statistics and biology, has ended and new national and international initiatives are needed. However, the Group noted the improvements in the data obtained in several countries, due to the new EC data collection regulations. There remain several areas for improvement in provision of basic catch and effort data, as identified above.

    b) Catch. All countries catching swordfish (directed or by-catch) should report catch, catch-at-size (by sex) and effort statistics by as small an area as possible (5-degree rectangles for longline, and 1-degree rectangles for other gears), and by month. It is recommended that at least the order of magnitude of unreported catches be estimated.

    c) Dead Discards. Participating countries improve their estimates of dead discards of juvenile swordfish, and submit such information to the ICCAT Secretariat.

    d) Size sampling. All countries and fishing entities should carry out an adequate level of size sampling, and when possible sampling by sex, preferably by month and on as fine a scale as possible. If standard units of measure are not reported to ICCAT, then National Scientists should also provide appropriate conversion factors. In the absence of research to define adequate sampling levels, the Group recommended at least a large sampling fraction as proposed for the Atlantic, perhaps as much as 20%. The Group noted that it is important to collect size data together with the catch and effort data to provide meaningful CPUEs.

    e) CPUE. CPUE series should be developed to take into account the geographic stratification of the catch by gear and month using standard measures of effort for each gear (e.g., number of hooks for longline, length of nets for gillnet), on as fine a scale as possible (5-degree rectangles for longline, and 1-degree rectangles for other gears). Although CPUE by age is the usual input for the age-structured analyses, the Group recognized that this must be based on an increased level of sampling, not merely substitution of the current data. Therefore, it is recommended that increased sampling take place so that CPUEs can be developed by age. To achieve this goal, the Group noted that it is important to collect size data together with the catch and effort data to provide meaningful CPUEs.

Addendum 3 to Appendix 8

Details and Specifications of the Hardware and Software Requested for the ICCAT Secretariat

Hardware

Network and access network support for SCRS meetings, and ICCAT web support require the following upgrade/new hardware:

2 SERVERS

1 File server for ICCAT meetings support, with portable characteristics (no rack) (If ICCAT moves to the new office, maybe the portable characteristics will not be needed): Specifications:
- HP ProLiant ML370 G5 series ---------- €5,500 (excl. VAT)

1 One server with multiple functions (This computer will be dedicated mainly to run programs that require higher computational capacity (i.e.. Multifan-CL) File Server, Calculus center and backup), Rack based specific and able to support Windows and Linux. Specifications:
- HP ProLiant DL580 G5 series (rack 4U) ---------- €7,500 (excl. VAT)

Upgrade network (WiFi/ and line-based connections) 4 access points (scientific meetings/wireless access)
---------- €1,000 (excl.VAT)

TOTAL estimated hardware cost ---------- €14,000

Software

Database software, office software upgrades, and mapping - GIS software: For mapping, geo-reference and graphical display of ICCAT data, with publishing quality output and analysis capability. The new version of office (2007) is now running around the participants to ICCAT meeting and to the Secretariat staff should have capability to read all files submitting with the new format. According to the new Microsoft procedure the sharing of software is became very difficult and not recommended.

Name	*Quantity*	*Unit price (€)*	*Total price €)*
Windows 2003 Server std.	3	725	2,175
Client Access Licenses connection to W. 2003 Server (cals)	30	-package-	672
SQL Server 2005 std. (with 5 cals)	2	906	1,812
Office 2007 Pro.	25	310	7,750
S-PLUS 8.	1	1,500	1,500
ArcGIS ArcView 9.2 Desktop	1	1,500	1,500
ArcGIS 9.2 Data Interoperability package	1	2,500	2,500
Acrobat Pro.	5	634	3,170
Creative Suite 3.0 Web Premium (upgrade)	1	926	926
Dreamweaver CS (upgrade)	1	230	230
TOTAL			21,563

VIDEO Projection Hardware

The subcommittee recommends the quote/purchase of flat screen projectors for multiple video output to be used during, and SCRS meetings and inter-sessional working group. The equipment will support wireless transfer of presentation style files and documents, with capability for multiple output video and or multiple size screens

(split image among screens). The hardware/software video equipment will need to be portable to the new Secretariat office and SCRS plenary meetings (in the case that SCRS meeting is held outside the headquarters). Estimated cost €12,500.

Item 1
The following recommendation was drafted last year and submitted to the Commission at the 2006 meeting. During recent years, the demands on the ICCAT Secretariat in terms of data management have increased dramatically. In order to maintain quality, responsiveness and control of multiple databases, the Sub-Committee recommends that additional human resources be provided to the Secretariat Statistics Department. The qualifications and capabilities required for this position are summarized below.

Profile:

Primary skills
- Expertise in MS-SQL Server 2000/2005, in particular:
  - Transact SQL programming (medium/advanced)
  - Database development (medium)
  - Database administration (medium)
  - Data normalization (medium)

- Programming skills
  - Dot.net framework (1.1, 2.0)
    - Visual basic (medium)
    - C# (medium)

  - Skills in MS-Office 2003/2007 platform
    - MS-Access
      - Visual basic for applications (VBA)
    - MS-Excel
      - Visual basic for applications (VBA)

Complementary
- Knowledge of MySQL Server y SQLyte
- Knowledge of Open-Office

Salary level GS2-GS3

Appendix 9

2007 REPORT OF THE SUB-COMMITTEE ON ECOSYSTEMS

1. Opening, adoption of Agenda and meeting arrangements

The Meeting of the Sub-Committee on Ecosystems was held at the ICCAT Secretariat in Madrid on September 29, 2007. Dr. H. Arrizabalaga (EC-Spain), meeting Chairperson, welcomed meeting participants and proceeded to review the Agenda which was adopted with minor changes (attached as **Addendum 1 to Appendix 9**).

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

Section	*Rapporteurs*
1, 4-8	H. Arrizabalaga
2	C. Small
3	G. Díaz

2. Review of progress made towards a seabird assessment

SCRS/2007/126 presents information on the incidental catch of albatrosses of the genus *Diomedea*, by the Uruguayan surface longline fishery (2004-2007). Several difficulties for the identification of the species are analyzed, and a comparison with morphometric and meristic data available in the scientific literature is carried out in relation to those obtained in laboratory. Information on the recovery of tags, CPUE by sex and area was provided for four species (*Diomedea exulans, Diomedea sanfordi, Diomedea epomophora* and *Diomedea dabbenena*).

SCRS/2007/172 presented an update on the implementation of the *Brazilian National Plan of Action for the Conservation of Albatrosses and Petrels* (NPOA- Seabird). Brazilian NPOA- Seabirds was launched by IBAMA (*Brazilian Institute of Environment and Natural Renewable Resources*), during the second meeting of the ACAP Advisory Committee, held in Brasilia, in June 2006, and it is now being implemented. The Brazilian NPOA aims to assure the viability of *Procellariiforms* breeding colonies within Brazilian territorial boundaries and to reduce seabird by-catch. The document described the actions already being developed to achieve these goals, through several partnerships, with the participation of the Government, NGOs and the private sector. Actions include research on seabird by-catch, the development of new technologies to reduce incidental seabird capture, as well as educational efforts to promote awareness in the fishing sector of the importance of the conservation of albatross and petrel species, of methods already available to reduce by-catch, and encouraging the introduction of mitigation measures in the Brazilian longline fleet.

Update on ICCAT seabird assessment

The *Inter-sessional Meeting of the Sub-Committee on Ecosystems* in February discussed the methodology for the ICCAT seabird assessment and adopted a six stage framework:

1) Identify seabird species most at risk;
2) Collate available data on at-sea distribution of these species;
3) Analyze the time area overlap between species distribution and ICCAT longline fishing effort;
4) Review existing by-catch rate estimates for ICCAT longline fisheries;
5) Estimate total annual seabird by-catch (number of birds) in the ICCAT Convention area;
6) Assess the likely impact of this by-catch on seabird populations.

A preliminary risk assessment exercise was undertaken at the meeting in February, representing the first stage of the assessment. The results of this exercise were circulated widely to seabird experts for comments, and 17 responses were received. Papers have been updated to reflect these comments.

Document SCRS/2007/029 gives an inventory of available data on seabird by-catch rates in ICCAT fisheries. It also gives a bibliography of studies of remote-tracking, population status and demography for seabird species recorded as by-catch in ICCAT fisheries, and lists relevant studies of the impact of fisheries on seabird populations. These data sources will be of use in the seabird assessment. Thirty-six seabird species have been

recorded as by-catch in ICCAT longline fisheries and five additional species are considered potential by-catch species. The document notes data gaps, including few seabird by-catch data available from longline fisheries in the Mediterranean, with the exception of the Spanish fleet. The group noted that additional seabird by-catch data may exist, including in the Mediterranean area (e.g. SCRS/2006/163), and encouraged CPCs to contact authors with such data, or, where observer data have not yet been compiled and published, to prepare these data for presentation at the next meeting of Sub-Committee on Ecosystems.

Document SCRS/2007/129 was presented on the update seabird risk prioritization exercise (Stage 1 of the seabird assessment). Data have been updated for five of the 41 seabird species, and the methodology for the productivity-susceptibility risk score has been refined. The updated results **(Table 1)** are similar to those of the February meeting. Species with highest risk scores are the six species of albatrosses from South Georgia and the Tristan da Cunha Islands, black-browed albatross from the Falkland Islands (Islas Malvinas), and six shearwater species. It was noted that in the cases of grey petrel, Cape Verde shearwater and great shearwater, high risk score is partly a result of lack of data and the use of a precautionary approach. It was noted that albatrosses are distributed in the South Atlantic, mostly south of 20ºS, while the shearwater species are distributed more widely across the ICCAT area.

An update was given on progress of Stages two and three of the seabird assessment to analyze seabird distribution and overlap with ICCAT longline fishing effort. Priority species for detailed analysis of distribution are the albatrosses from South Georgia, Tristan da Cunha Islands and Falkland Islands (Islas Malvinas), and Cory's and Balearic shearwater. Scientists are in the process of contributing new remote tracking data for a number of high priority albatross and shearwater species, which will greatly assist the ICCAT analysis. These data will be ready for analysis in early 2008. It was noted that the analysis will involve some assumptions such as proportion of population not breeding, and distribution of juvenile birds.

The meeting also noted there may be seabird species identified as high priority for which very few by-catch or distribution data currently exist. The Commission should consider that in these cases, precautionary management actions, such as the introduction of mitigation measures in advance of complete knowledge of the impact of ICCAT fisheries on seabirds.

Document SCRS/2007/130 summarizes the method that will be used for Stage 5 of the seabird assessment to calculate total seabird by-catch in the ICCAT area. Appropriate area/time/fishery strata will be defined, and both effort and by-catch estimates will be applied to each stratum.

The group noted that since there is a lack of seabird by-catch data for some fisheries or years, estimates and approximations will be necessary. For example, seabird by-catch rates from Brazil, South Africa and Uruguay are likely to be applied to other fleets operating in similar areas for which no seabird by-catch data currently exist. Beyond that, the group recognized that accurate measures of seabird and turtle by-catch, which are relatively rare and highly variable events, require high levels of observer coverage.

It was also noted that the SCRS/2007/130 lists seabird by-catch rates in non-ICCAT fisheries, and that this is important since the impact of ICCAT fisheries on seabird populations must be considered in the context of seabird by-catch also occurring on non-ICCAT fisheries.

The group discussed the longline fishing effort data developed at the February meeting, which is stratified into the main fisheries and agreed it is the best available effort data at this time. This data may be revised in the future to incorporate comments from CPCs.

Table 2 provides a summary of the longline effort in the ICCAT Convention area by flag for the period 2000-2005 and an indication of the available estimates of bird by-catch from those fleets and if an observer program is believed to be active. From this table, it is apparent that more than 70% of the total longline fishing effort for the period has no associated information about bird by-catch levels available for the ICCAT. This might overstate the difficulties anticipated since bird by-catch varies with the area of fishing, but nonetheless, it is quite apparent that information is not yet available for a large proportion of the overall fishing effort. Some information might be forthcoming if data from the operating observer programs were analyzed for seabird by-catch and provided to SCRS. The Sub-Committee recommends that such analyses be undertaken and provided by the next meeting in order to advance the work of the Sub-Committee. On the other hand, it may be that scientific observer data will not be forthcoming from a wide range of the longline fleets, in which case, the Commission should consider the merits of instituting an ICCAT scientific observer program similar to those operated by other tuna RFMOs to collect and provide the necessary data.

It was noted that the United States is conducting research to refine design of tori lines for pelagic longline fisheries.

3. Review of progress made on circle hook impact studies

In the meeting held in February, the group made a comprehensive review of different studies conducted in the three oceans, in order to see if there was any general pattern regarding the effect of hook types on catch rates of by-catch and target species. This table was distributed to scientists from other tuna commissions, who incorporated information from three studies not previously identified. Another document was presented in the meeting with relevant information on this subject.

Document SCRS/2007/113 presented a study of the effect on catch rates on fish, turtles and seabirds using different hook type and bait used by the Spanish longline fishery operating in the Atlantic Ocean. Three hook types and two bait types (mackerel and squid) were tested. Experiments were conducted in five areas of the Atlantic Ocean where interactions with sea turtles are known to occur. On average, results indicated that for some commercial species, such as swordfish, the use of circle hooks reduced their catch rate, however the opposite was observed for by-catch species (billfish and sea turtles). Bait type appeared to have a more significant effect than hook type. These results do not agree with the results of similar studies conducted in other areas, therefore, confirming the complexity of this issue.

The Sub-Committee reviewed the work conducted in February in the light of the new information provided, and agreed that, although in general the results of some experiments are encouraging, the effect of circle hooks on catch rates of target and by-catch species is far from being settled and much research is needed. Issues to take into consideration are the shape and degree of offset of the circle hooks and bait type used, which complicate the comparison of the results of different experiments and the draft of general conclusions.

4. Review of new information concerning ecosystems

Five documents were presented in this section.

SCRS/2007/025 presented information on interactions and depredation rates between Spanish longliners targeting swordfish and false killer whales in the Atlantic, Indian and Pacific. Areas of highest interaction were identified based on logbook and observer data. Depredation was detected only on 2% of the sets, and estimated total depredation for the Atlantic was about 1.1-1.8% of the annual catch. The group encouraged this type of analysis for other fleets to be conducted and reported to the SCRS, estimating thus the magnitude of the importance of the depredation issue in the Atlantic.

Document SCRS/2007/128 showed information on sightings and incidental catches of marine mammals registered by observers on-board the Uruguayan tuna fleet. Six dolphin species and two whale species were sighted and two pinniped species and at least three cetaceans were caught incidentally.

Document SCRS/2007/168 presented information of interactions of sea turtles, *Caretta caretta* and *Dermochelys coriacea*, with Brazilian and Uruguayan pelagic longline vessels collected by observers during the period 2005-2007 operating south of 19º latitude. A total of 2,267 sea turtle interactions were recorded and the majority corresponded to *Caretta caretta* (1,965 individuals). Estimated CPUE in the area of the study were relatively high compared to other studies. In the case of *Caretta caretta*, most individuals caught corresponded to juveniles. Document SCRS/2007/124 presented results of a research on mitochondrial DNA of the sea turtle *Caretta caretta* in the southwestern Atlantic. Genetic results indicated the presence of specimens from nesting colonies in Brazil, Greece, Mexico, the Pacific Ocean, Turkey and United States, which points to the existence of a feeding area common to juveniles from different populations.

SCRS/2007/154 presented a logistic regression analysis using longline and oceanographic data to estimate bigeye tuna habitat index.

A proposal to build a meta database of observer programs was presented and discussed, as observer data were identified as one of the primary data sources that would allow developing many of the Terms of Reference (TOR) of the Sub-Committee, however availability in the Secretariat is very limited. The proposal suggested some data fields for the metadatabase, divided into four sections: (i) information on observer program extent, (ii)

information on the type of data the program records, (iii) sampling strategies, and (.iv) summary data from the programs.

In the discussion, it was agreed that the metadatabase may be of interest to other groups within the SCRS, therefore it was agreed to interact with the SCRS community to find the best way to build the metadatabase. It was agreed that an easy-to fill questionnaire should be prepared and distributed to national scientists. The exact content of the questionnaire needs to be agreed with the Secretariat and Chairs of the different Species Groups, as well as the Sub-Committee on Statistics.

The data fields that could be included in the database are shown in **Table 3**.

5. Work Plan for 2008

An inter-sessional meeting is suggested in 2008 around March.

The objectives of the meeting would be as follows:

- Review the progress made towards a seabird assessment, with special emphasis on the assessment of the degree of overlap between fishing effort and bird area distribution (stage 3 in the assessment framework), review of catch rate estimates (stage 4), estimation of total number of birds caught in ICCAT fisheries (stage 5) and effect of the bird by-catch mortality on seabird populations (stage 6);
- Review the new information concerning ecosystems;
- Review the observer data availability and progress towards building the observer metadatabase.

6. Recommendations

The Sub-Committee continues to recommend that, if they have not yet done so, Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities (CPCs) institute data collection procedures which permit quantifying the total catch (including by-catch) composition and disposition by the tuna-fleets and report those data to ICCAT. The Sub-Committee recommends scientific observer and logbook programs in combination, to be used for this purpose and further recommends that CPCs adequately fund such programs in order to meet data reporting obligations. Further, the Commission should consider the merits of instituting an ICCAT scientific observer program similar to those operated by other tuna RFMOs to collect and provide the necessary scientific data.

Given that improvements in the database can only be achieved if CPCs increase infrastructure investment into monitoring the overall catch composition and disposition of the overall catch, should the Commission wish improved advice on the tuna fishery impacts on the ecosystem, larger research investment should be carried out.

Although a number of observer programs have been instituted by ICCAT CPCs, the data from these programs are not generally available at the ICCAT Secretariat for use in monitoring and advising the Commission on the tuna fishery impacts on the ecosystem. While there are data gaps which need to be filled to enable this work, the Sub-Committee recommended that as a first step in identifying a complete list, a meta database describing the different National Observer programs be constructed making use of the information held in the ICCAT Survey of Fisheries and other information as available in SCRS documents and Annual Reports and posted on the ICCAT Web site.

As a further step, the Sub-Committee recommends that the available observer data be evaluated for consistency in information content in order to gain assurance that these and future data can meet the needs of the Commission. Future observer data collection should be based on the ICCAT best practice procedure for collecting data on by-catch, including seabirds, sea turtles, marine mammals and other species of concern.

The Commission should authorize hiring a By-catch Coordinator at the Secretariat and to encourage CPCs to enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics. In the absence of receiving sufficient funds for such a position through the Commission's ordinary budget, the Commission should consider receipt of external funds for this purpose. This type of funding mechanism has been used in the past for several special research projects coordinated by the Secretariat and is currently being utilized

to support the seabird assessment framework. It is anticipated that funding for the seabird assessment framework might need to continue into the future.

The Sub-Committee noted there may be seabird species identified as high priority for which very few by-catch or distribution data currently exist. The Commission should consider that in these cases, precautionary management actions should be taken, such as the introduction of mitigation measures in advance of complete knowledge of the impact of ICCAT fisheries on seabirds. To this end, the Commission should develop educational materials for distribution to fisherman active in the Convention area. These materials should identify conservation issues related to seabirds, marine turtles, sharks and other species of concern and also identify easily implemented mitigation measures that have been demonstrated to reduce their unintentional catch and/or decrease incidental mortality.

7. Adoption of the report and closure

The Report was adopted by the Group. The Chairperson thanked the participants and the Secretariat for their work and the meeting was closed.

Table 1. Results of the preliminary seabird risk assessment scoring. For definition of scores see SCRS/2007/129.

Species	*Breeding island group*	*Breeds in Atlantic /Migrant*	*IUCN status*	*Population Status*	*Overlap with ICCAT*	*Behavioral susceptibility to capture*	*Life-history strategy*	*Median age at first breeding*	*Risk score 1*	*Risk score 2*	*Risk score 3*
Sooty albatross *Phoebetria fusca*	Tristan da Cunha	B	3	3	3	?	3	10	3.0	3	4.24
Tristan albatross *Diomedea dabbenena*	Tristan da Cunha	B	3	3	3	3	3	9.7	3.0	3	4.24
Wandering albatross *Diomedea exulans*	South Georgia	B	2	3	3	3	3	9	3.0	3	4.24
Grey-headed albatross *Thalassarche chrysostoma*	South Georgia	B	2	3	3	3	3	10	2.8	3	4.24
Black-browed albatross *Thalassarche melanophrys*	South Georgia	B	3	3	3	3	2	9	2.8	2.75	3.91
Atlantic yellow-nosed albatross *Thalassarche chlororhynchos*	Tristan da Cunha	B	3	3	3	3	2	9	2.8	2.75	3.91
Black-browed albatross *Thalassarche melanophrys*	Falklands (Islas Malvinas)	B	3	2	3	3	2	9	2.6	2.5	3.91
Balearic shearwater *Puffinus mauritanicus*	Balearics	B	3	3	3	3	2	6	2.8	2.75	3.61
White-chinned petrel *Procellaria aequinoctialis*	South Georgia	B	2	3	3	3	2	6.5	2.6	2.75	3.61
Southern giant petrel *Macronectes giganteus*	Chile	B	1	?	3?	3	2	7	2.4	2.75	3.61
Grey petrel[1] *Procellaria cinerea*	Prince Edward	M?	1	?	?	3	2	7	2.4	2.75	3.61
Grey petrel[1] *Procellaria cinerea*	Crozet	M?	1	?	?	3	2	7	2.4	2.75	3.61
Grey petrel[1] *Procellaria cinerea*	Kerguelen	M?	1	?	?	3	2	7	2.4	2.75	3.61
Grey petrel[1] *Procellaria cinerea*	Tristan da Cunha	B	1	?	3	3	2	7	2.4	2.75	3.61
Cory's shearwater *Calonectris diomedea*	Mediterranean	B	0	3	3	3	2	6.5	2.2	2.75	3.61
Cape Verde Shearwater[1]	Cape Verde	B	1	1?	3	?	2	6.5	2.4	2.75	3.61

Species	*Breeding island group*	*Breeds in Atlantic /Migrant*	*IUCN status*	*Population Status*	*Overlap with ICCAT*	*Behavioral susceptibility to capture*	*Life-history strategy*	*Median age at first breeding*	*Risk score 1*	*Risk score 2*	*Risk score 3*
Calonectris edwardsii											
Great shearwater[1] *Puffinus gravis*	Tristan da Cunha	B	0	?	3	3	2	6	2.2	2.75	3.61
Grey-headed albatross *Thalassarche chrysostoma*	Indian Ocean	*M?*	2	3	1	3	3	10	2.4	2.5	3.61
Wandering albatross *Diomedea exulans*	Crozet	M	2	2	1	3	3	9	2.2	2.25	3.61
Sooty albatross *Phoebetria fusca*	Indian Ocean	M	3	3	1	?	3	10	2.6	2.5	3.61
Grey-headed albatross *Thalassarche chrysostoma*	Chile	M	2	?	1	3	3	10	2.4	2.5	3.61
Sooty shearwater *Puffinus griseus*	Falklands (Islas Malvinas)	B	1	2	3	?	2	6	2.2	2.5	3.61
Yelkouan shearwater *Puffinus yelkoan*	Mediterranean	B	0	2	3	3?	2	6	2	2.5	3.61
Spectacled petrel *Procellaria conspicillata*	Tristan da Cunha	B	2	0	3	3	2	6.5	2	2	3.61
Wandering albatross *Diomedea exulans*	Prince Edward	M	2	1	1	3	3	9	2	2	3.61
Southern royal albatross *Macronectes giganteus*	Campbell	M	2	1	1	3	3	9	2	2	3.61
Grey-headed albatross *Thalassarche chrystostoma*	Prince Edward	M	2	1	1	3	3	10	2	2	3.61
Northern royal albatross *Diomedea sanfordi*	Chatham	M	3	0	1	3	3	8	2	1.75	3.61
Black-browed albatross *Thalassarche melanophrys*	Crozet	M?	3	3	1	3	2	9	2.4	2.25	3.20
Black-browed albatross *Thalassarche melanophrys*	Kerguelen	M	3	3	1	3	2	9	2.4	2.25	3.20
Atlantic petrel *Pterodroma incerta*	Tristan da Cunha	B	2	?	3	1	2	5.75	2.2	2.25	2.83
Southern giant petrel *Macronectes giganteus*	South Sandwich	B	1	?	1?	3	2	7	2	2.25	2.83
Cape gannet *Morus capensis*	Namibia/South Africa	B	2	3	3	1	2	3.5	2.2	2.25	2.50

Species	*Breeding island group*	*Breeds in Atlantic /Migrant*	*IUCN status*	*Population Status*	*Overlap with ICCAT*	*Behavioral susceptibility to capture*	*Life-history strategy*	*Median age at first breeding*	*Risk score 1*	*Risk score 2*	*Risk score 3*
Southern giant petrel *Macronectes giganteus*	Tristan da Cunha	B	1	0	3	3	2	7	1.8	2	3.61
Southern giant petrel *Macronectes giganteus*	Falklands (Islas Malvinas)	B	1	0	3?	3	2	7	1.8	2	3.61
Southern giant petrel *Macronectes giganteus*	Argentina	B	1	0	3?	3	2	7	1.8	2	3.61
Northern fulmar *Fulmarus glacialis*	Many colonies	B	0	1	2	3	2	8.5	1.6	2	3.54
Audubon's shearwater *Puffinus lherminieri*	Caribbean	B	0	?	3	1	2	8	1.8	2.25	3.20
Indian yellow-nosed albatross *Thalassarche carteri*	Indian Ocean	M	3	2	1	3	2	9	2.2	2	3.20
Great-winged petrel[1] *Pterodroma macroptera*	Tristan da Cunha	B	0	?	3	1	2	6.5	1.8	2.25	2.83
Cape petrel *Daption capense*	Many colonies	B	0	?	3	1	2	5	1.8	2.25	2.83
White-chinned petrel *Procellaria aequinoctialis*	Prince Edward	M	2	2	1	3	2	6.5	2	2	2.83
White-chinned petrel *Procellaria aequinoctialis*	Crozet	M	2	2	1	3	2	6.5	2	2	2.83
White-chinned petrel *Procellaria aequinoctialis*	Kerguelen	M	2	2	1	3	2	6.5	2	2	2.83
Black-capped petrel *Pterodroma hasitata*	Caribbean	B	2	2	3	1	2	5.75	2	2	2.83
White-capped albatross *Thalassarche steadi*	Auckland	M	1	1	2	3	2	7	1.8	2	3.20
Little shearwater *Puffinus assimilis*	North Atlantic	B	0	1	3	1	2	8	1.4	1.75	3.20
Black-browed albatross *Thalassarche melanophrys*	Chile	M	3	0	1	3	2	9	1.8	1.5	3.20
Southern fulmar *Fulmarus glacialoides*	Many colonies	B	0	?	2	1	2	10	1.6	2	2.92
Southern giant petrel *Macronectes giganteus*	Indian Ocean	M	1	1	1	3	2	7	1.6	1.75	2.83
Southern giant petrel *Macronectes giganteus*	South Georgia	B	1	0	1	3	2	7	1.4	1.5	2.83

Species	*Breeding island group*	*Breeds in Atlantic /Migrant*	*IUCN status*	*Population Status*	*Overlap with ICCAT*	*Behavioral susceptibility to capture*	*Life-history strategy*	*Median age at first breeding*	*Risk score 1*	*Risk score 2*	*Risk score 3*
Southern giant petrel *Macronectes giganteus*	South Orkneys	B	1	0	1?	3	2	7	1.4	1.5	2.83
Southern giant petrel *Macronectes giganteus*	South Shetlands	B	1	0?	1?	3	2	7	1.4	1.5	2.83
Cory's shearwater *Calonectris diomedea*	Macaronesia	B	0	0	3	1	2	6.5	1.2	1.5	2.83
Manx shearwater *Puffinus puffinus*	Many colonies	B	0	1	3	1	2	6	1.4	1.75	2.83
Bermuda petrel *Pterodroma cahow*	Bermuda	B	3	0	3	1	2	5.75	1.8	1.5	2.83
Shy albatross *Thalassarche cauta*	Tasmania	M	1	0	1	3	2	7	1.4	1.5	2.83
Light-mantled albatross *Phoebetria palpebrata*	South Georgia	B	1	?	1	1	3	7	1.8	2	2.69
Light-mantled albatross *Phoebetria palpebrata*	Indian Ocean	M?	1	0	1	1	3	7	1.2	1.25	2.69
Northern gannet *Morus bassanus*	N Atlantic	B	0	0	3	1	2	4	1.2	1.5	2.50
Northern giant petrel *Macronectes halli*	Indian Ocean	M	1	1	2	1	2	7	1.4	1.5	2.50
Great skua *Catharacta skua*	North Atlantic	B	0	0	3	1	1	6.8	1	1.25	2.50
Audouin's gull *Larus audouinni*	Mediterranean	B	1	0	3	1	1	4.5	1.2	1.25	2.24
Yellow-legged gull *Larus cachinnans*	Mediterranean	B	0	0	3	1	1	4.5	1	1.25	2.24
Northern giant petrel *Macronectes halli*	South Georgia	B	1	0	1	1	2	7	1	1	2.24
Laughing gull *Larus atricilla*	Caribbean	B	0	?	2	1	1	3.5	1.4	1.75	1.80
Herring gull *Larus argentatus*	Widespread	B	0	0	2	1	1	4.5	0.8	1	1.80
Great black-backed gull *Larus marinus*l	North Atlantic	B	0	0	2	1	1	4.5	0.8	1	1.80

Table 2. Relative nominal longline effort in the ICCAT Convention area by flag for the period 2000-2005 and an indication of the available estimates of bird by-catch from those fleets* and if an observer program is believed to be active.

Flag	*2000-2005 Average*	*Bird by-catch Estimates*	*Observer Program*
Chinese Taipei	34.9%	No	Yes
Japan	20.0%	No	Yes
EC.España	11.3%	Yes	Yes
Brasil	5.6%	Yes	Yes
China P.R.	3.5%	No	Yes
EC.Greece	3.1%	Yes	Yes
EC.Portugal	3.1%	No	Sporadic
EC.Italy	2.7%	Yes	Yes
NEI	2.4%	No	No
United States	2.3%	Yes	Yes
St. Vincent and Grenadines	2.1%	No	No
Mexico	1.5%	No	Yes
Namibia	1.3%	No	?
Canada	0.7%	Yes	Yes
Uruguay	0.7%	Yes	Yes
Venezuela	0.7%	No	Yes
Maroc	0.6%	No	No
Korea	0.5%	No	Yes
Philippines	0.5%	No	No
Libya	0.4%	No	Yes
South Africa	0.4%	Yes	Yes
Grenada	0.2%	No	No
Tunisie	0.2%	No	No
Vanuatu	0.2%	No	No
EC.Malta	0.2%	No	Yes
Algerie	0.2%	No	No
Trinidad and Tobago	0.1%	No	No
Cuba	0.1%	No	No
EC.Cyprus	0.1%	No	No
Barbados	0.1%	No	No
Norway	0.1%	No	No
Others[1]	0.2%	No	Maybe

[1]Others include: Panama, Turkey, EC.France, Sierra Leone, Seychelles, Belize, EC.Ireland, FR.St Pierre et Miquelon, Faroe Islands, EC.United Kingdom, UK.Bermuda, Angola, UK.Sta Helena, Argentina, Croatia, UK.British Virgin Islands, Seychelles, Russian Federation, Iceland and the Falkland Islands.

*CPCs that have indicated they have bird by-catch estimates but have not documented these estimates, should document them by the 2008 inter-sessional meeting of the Sub-Committee.

Table 3. Suggestions for data fields for ICCAT metadatabase on observer programs.

(i) Observer program data	
Year	Minimum by year (preferably divide by month or year quarter)
Flag of vessels	
Gear type	(longline, trawl, pole and line, etc.)
Target species	
Range of vessel size?	*Some observer programs may stratify their programs e.g. by vessel size, so may need an option to record additional factors. Suggestions by which fleets may be stratified are in FAO Technical paper 414. (Purse seine observer programs may be stratified e.g. by use of FADs)*
Source of observer data	(i.e. name of observer program)
Years of operation of observer program	*How long has the observer program been running?*
Bibliographic reference	*(if any)*
Coverage (vessel/trips with observers onboard)	• *Target coverage* • *Number of vessels/trips with observer onboard* • *Number of vessels/trips in fishery* • *% coverage*
Coverage (amount of effort observed)	• *Fishing effort observed (e.g. # hooks for LL, # sets for PS)* • *Total fishing effort in fishery* • *% coverage*
Area covered	FAO area/sub-areas, or min/max latitude and longitude
(ii) **What data are recorded by program?** May be easiest to include these as tick boxes for what the program records	
Oceanographic/meteorological	• *SST, wind, swell, cloud*
Vessel data	• *Tonnage, horsepower, gear mensuration devices that are used, data describing the electronics used by the vessel (types of depth sounders etc.), skipper name*
Gear and Effort data	• *Time of set, Time of retrieval, Setting speed, Main line length and materials, branchline length and materials, number of hooks, hook spacing, number of hooks between buoys, hook type, hook size, gear depth (how is depth calculated?), bottom depth, bait type, bait condition (e.g. live/frozen/thawed), line weights, use of light sticks, use of wire trace*
Catch data	• *Number of each species, weight of each species, fate, condition*
Discard data	• *% total catch (% landings+ discards), number of tones, how discards are calculated, main discard species, reason for discarding*

Non-target species data	• *Number of each species, fate, type of interaction, size, sex, photo ID for some species, retain carcasses, collect tag/band data, abundance data e.g. number of seabirds during set* • *It may be most useful to give responses separately for each group of by-catch species (turtles, seabirds, non-target fish, sharks/rays, marine mammals).*
Fish data	• *Length of fish, length code (if used) (how length is measured, what length codes are used?), otoliths, scales, statoliths, sex, maturity, stomach contents.*
Depredation	
Use of by-catch mitigation measures	
Other (define)	
(iii) Sampling strategy	• Sampling strategy for vessels/trips • Sampling strategy for effort to observe within each trip • Method for estimating total and observed effort • Sampling strategy for catch composition • Sampling strategy for discards • Sampling strategy for fish size
(iv) Summary data	*(if available)*
Target fish CPUE	*(Will metadatabase will be used more generally within ICCAT, not just for the Sub-Committee on Ecosystems? If so, would want to include summary data on target species as well as by-catch).*
Discard rate	
Shark CPUE	
Turtle CPUE	
Seabird CPUE	
Others?	

Addendum 1 to Appendix 9

Agenda of the Sub-Committee on Ecosystems

1. Opening, adoption of Agenda and meeting arrangements
2. Review of progress made towards a sea-bird assessment
3. Review of progress made on circle hook impact studies
4. Review of new information concerning ecosystems
5. Work Plan for 2008
6. Recommendations
7. Other matters
8. Adoption of the report and closure

Appendix 10

A COMMON FORMAT, AMONG TUNA RFMOs, FOR THE PRESENTATION OF THE STATE OF THE STOCKS

Background

Stock status evaluations are often based on highly technical analytical methods and presentation of their results, by nature, is usually directed toward technical readers versed in the intricacies of the methods applied. Unfortunately, the implications of these results are often difficult for those less versed in the technical methods to fully comprehend. A method of graphical presentation that assists in transmitting to a non-technical audience, the implications of stock status evaluations in terms of the overall goals and objectives of, for instance, the ICCAT Convention, has been previously applied in formulating SCRS advice, and this approach was reemphasized at the 2006 Commission meeting and again at the TRMFO meeting in Kobe. The general scheme used in characterizing stock status is shown in **Figure 1** which identifies the level stock biomass, expressed relative to that which would support MSY (the Convention Objective) on the x-axis and fishing mortality rate relative to the level that would permit the Convention Objective to be achieved on the y-axis. An element of the presentation format that assisted in transmitting advice to Commissioners regarding stock status relative to the Convention objective was the addition of stop-light coloration and symbols indicating the relative concern regarding stock status in the context of the Convention objective.

Based on the 2006 (and earlier) SCRS stock status evaluation results, a summary of the quantitative and qualitative indicators of stock status was presented to the Commission. This summary is shown in **Table 1**, which attempts to characterize the uncertain aspects of our evaluations in both quantitative and qualitative ways. Further characterization of stock status uncertainty, when such measures are available, can be transmitted using a spread of results overlaid on the 4-quadrant display. **Figure 2** demonstrates such a graphical presentation for the most recent year of the 2006 north Atlantic swordfish assessment. The time-trend of stock status evaluations (*a.k.a*. 'cobra track) from this same assessment also provides a view of how the stock condition has varied over time **(Figure 3)**.

Feedback received from the Commission meeting indicated that the combination of colors and smiley symbols helped in transmitting the mainline advice the Commissioners wished to receive. Of course, more detailed information remained available in the Executive Summaries. These same graphics were presented at the 2007 Kobe meeting of the TRFMO[1] as part of the ICCAT presentation to the joint meeting and subsequent presentations made by the other TRFMO adopted the coloration scheme ICCAT used for characterizing stock status. As a result, the TRMFO report (http://www.tuna-org.org/Documents/other/Kobe%20Report%20English-Appendices.pdf) called for standardization of the presentation form of stock assessment results. Subsequent to the Kobe meeting, the scientific chairs from the respective TRMFO met through correspondence and agreed upon common graphical presentation formats for advising their respective Commissions on stock status results.

A common format

A result of the consultation held between the scientific chairs of the 5 TRFMO was to adopt a 4 quadrant display of stock status results, and to the degree possible, provide a method to characterize the uncertainty in the results. Both the status in the most recent year of the stock status evaluation (*e.g*. **Figure 2**) and the time-trend (or "cobra-track" **Figure 3**) displays were proposed as informative and convenient ways to show the results of stock status evaluations. This is not to say that other graphical displays should not be used, as the points needing illustration often differ between stocks and assessment levels. None-the-less, the SCRS should strive to standardize (at least over the near-term) for presenting stock status evaluations using the forms shown in **Figures 2** and **3**.

[1] The five Tuna Regional Fishery Management Organizations are: International Commission for the Conservation of Atlantic Tunas, Indian Ocean Tuna Commission, Inter-American Tropical Tuna Commission, Western and Central Pacific Fisheries Commission, and Commission for the Conservation of Southern Bluefin Tuna.

Table 1. Summary of SCRS stock status evaluations using both quantitative and qualitative indicators. Uncertainty is expressed in terms of ranges or multiple symbols. These classifications are also contrasted with the draft FAO FIRMS Stock Status Descriptors.

ICCAT Stock Status Summary

	Reference Levels		Draft FIRMS Descriptors (2006)	
STOCK	F/Fmsy	B/Bmsy	Exploitation Rate	Stock abundance
BFT-W	1.7	0.41(0.29-0.54)	High F	Depleted
BFT-E	3.1	~>.25	High F	Depleted/Low
BUM	>1	<<1	High F	Depleted/Low
WHM	Possibly ~>1	<<1	Moderate F	Depleted/Low
ALB-N	1.10 (0.99-1.30)	0.68(0.52-0.86)	Moderate F	Low
YFT	1.13 (0.94-1.38)	0.73-1.10	Moderate F	Intermediate
BET	0.73-1.01	0.85-1.07	Moderate F	Intermediate
SWO-N	0.86(0.65-1.04)	0.99(0.87-1.27)	Moderate F	Intermediate
SWO-S	Likely <1	Likely >1	Moderate F	Intermediate
ALB-S	0.62(0.46-1.48)	1.66(0.74-1.81)	Moderate F	Intermediate
SAI	?	?	Uncertain	Uncertain
SKJ	?	?	Uncertain	Uncertain
SWO-M	?	?	Uncertain	Uncertain
ALB-M	?	?	Uncertain	Uncertain

Fishery **R**esources **M**onitoring **S**ystem – An FAO/RFMO Partnership

Stock Status Classifications

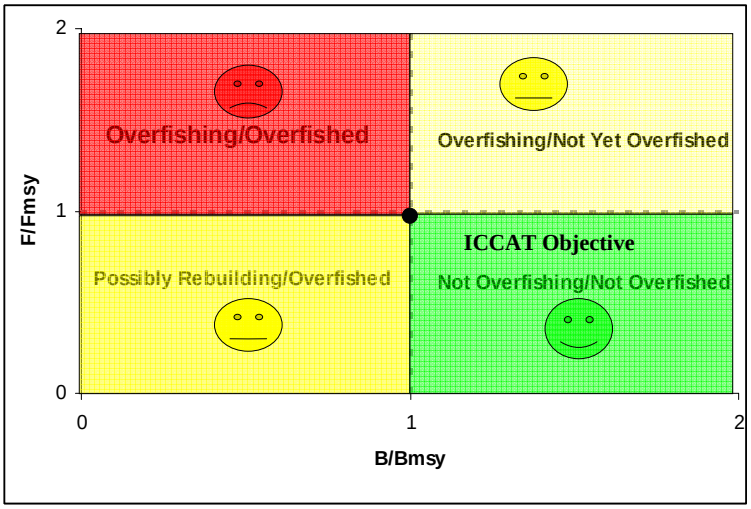

Figure 1. Stock status quadrants used for characterizing stock status relative to the ICCAT Convention objective. Paired values of $F/F_{MSY}>1$ and $B/B_{MSY}<1$ (or their proxies) imply the stock is in the 'red' or danger zone and is considered both overfished and undergoing overfishing. Cases where B/BMSY<1 and $F/F_{MSY}\leq 1$ indicate the stock is overfished but possibly rebuilding and is in a 'yellow' or caution zone. Likewise, if $F/F_{MSY}>1$ and $B/B_{MSY}\geq 1$ the stock is considered undergoing overfishing but is not yet overfished and is in a 'yellow' or caution zone. Cases where $B\geq B_{MSY}$ and $F\leq F_{MSY}$ indicate the stock is in a condition which meets the ICCAT Convention objective. The smiley symbols aid in transmitting these implications.

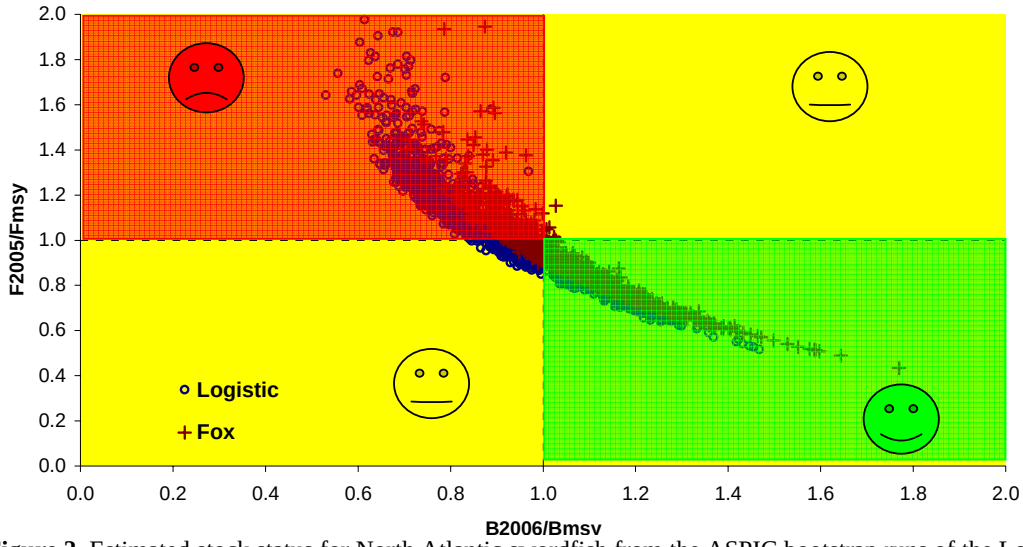

Figure 2. Estimated stock status for North Atlantic swordfish from the ASPIC bootstrap runs of the Logistic and Fox models. The spread of outcomes is a measure of our uncertainty in the current status of this stock. The weight of the evidence places the current (2006) biomass at B_{MSY} and F_{2005} 14% below F_{MSY}.

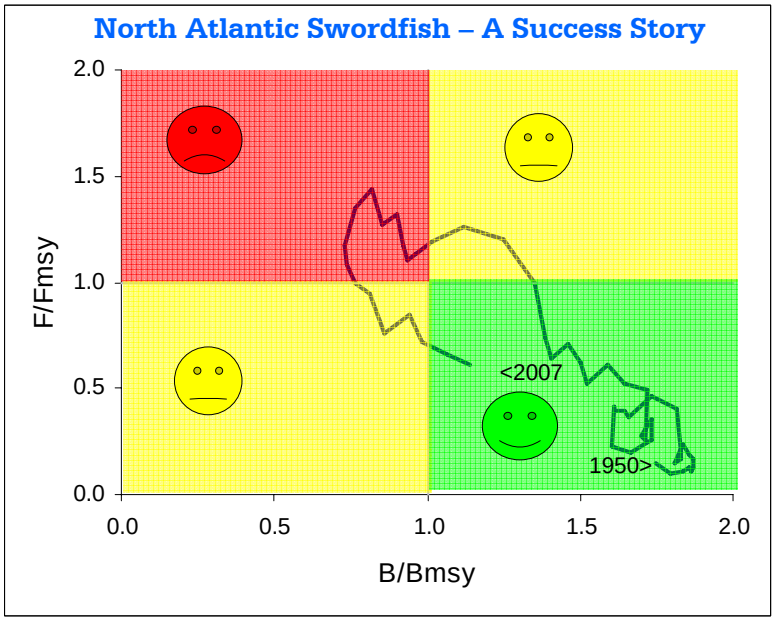

Figure 3. Estimated time-trend of stock status for North Atlantic swordfish demonstrating the stock's rebuilding from an overfished condition until the beginning of 2007, when the stock was projected to re-enter the safely sustainable zone, a status which is consistent with the ICCAT Convention objective.

Appendix 11

DESCRIPTION OF POPULATION DYNAMICS POSITION

Duties and Responsibilities

Under the overall guidance of the ICCAT Executive Secretary and the general supervision of the Assistant Executive Secretary, to be responsible for the development and maintenance of procedures for quality assurance of the scientific advice to the Commission.

Specific duties include:

- to establish review mechanisms to benefit both the individual scientists working within the ICCAT Species Groups and to foster consistency in approach and assumptions made for various assessments as well as in the scientific advice provided to the Commission in the Executive Summary Reports.

- to guide and conduct performance evaluations of the available assessment models, clarify the implicit assumptions, establish rules and guidelines on their appropriate use and normalize the methods, and maintain at the Secretariat, the software accepted for use by the various Species Groups. This guidance would, in turn, be available to all scientists interested in the assessment work carried out at Species Group meetings and would give more transparency to the results of assessment analyses.

- Active participation in the Secretariat scientific work in the following areas:

    - The maintenance and dissemination of appropriate and approved software for analyses of ICCAT fish stocks and maintenance and archives of previous assessment data and analytical methodology.

    - Participation in multi-disciplinary teams and committees to develop quality control procedures for ICCAT assessment methodologies and data bases.

    - The review of fishery data collection proposals and advice on their technical feasibility and the soundness of proposed institutional arrangements.

    - The organization and improvement of the data management system of the ICCAT data base and preparation of data for stock assessments, including the development of specific software to facilitate such work.

    - The review of the limitation of the quality of data and their variability.

    - Provide advice on the selection of consultants, draft terms of reference for such consultants and participate in the supervision of their work;

    - Assistance to scientific groups in drafting and/or finalizing their reports.

    - Perform other related duties as described.

Qualifications and Experience - Essential

Under- graduate and Post-graduate degree in Fisheries, or a closely related field.

Various years of progressively responsible experience in quantitative analysis of fisheries stock assessments and the development of management advice based upon scientific studies, including the planning and implementation of review processes, substantial experience in the development of procedures for fisheries assessment, and the generation of management advice.

Familiarity with fisheries biology, environmental and assessment science methodologies including statistical/mathematical modeling methods in which population models are statistically matched to fisheries/biological/environmental observational data.

Demonstrated ability to make judicious choices as to the appropriateness of models based upon available data experience in utilizing fishery data bases for use in assessments.

Experience in leading and participating in multi-disciplinary teams for fisheries biology and assessment.

Demonstrated experience in computer modeling technology as it pertains to fisheries assessment and environmental data bases.

Demonstrated capacity to conceptualize and quantify scientific problems associated with fisheries assessment and management and to communicate these orally and in writing.

Ability to work well under pressure and to work effectively and harmoniously with people of different national and cultural backgrounds.

Excellent working knowledge of one of ICCAT's three official languages (English, French and Spanish).

Applicants should be in good health. Willingness to travel frequently to countries, entities and fishing entities, including remote areas.

Qualifications and Experience - Desirable

A PhD degree in Fisheries or a related field.

Experience in developing new mathematical modeling techniques for fisheries stock assessment.

Practical experience in a range of technical areas in planning and implementing fisheries surveys and statistical collection procedures. Experience in designing and developing fishery databases for multiple users.

Knowledge of the one or both of the other official languages of the Commission.

Salary and remunerations

The position will be classified according to the United Nations Scheme at the Professional Level (P-4), between Step1 and Step 9, depending on the qualifications of the candidate. The annual salary for P-4 (Step 1) is currently ------. The annual salary for P-4 (Step 9) is currently ------. The difference between the gross and net salaries is the employer/employee contribution to the pension plan. These salary amounts, which also include a "Post Adjustment" based on the cost of living in Madrid, are exempt from Spanish income taxes.

Other remuneration, in addition to the annual salary, includes: medical insurance for the employee, a private pension plan, family allowance for dependent children up to age 21, educational allowance for dependent children from age 5 to 21, home leave, and other benefits. There is a one year probationary period.

The current "ICCAT Staff Regulations and Rules" will apply for all aspects and conditions of employment which are not included in this notice.

Application for the position

Candidates should submit a *Curriculum Vitae*, to be received at the Secretariat by ------. The CV should include documented educational background, professional experience, a list of relative published works, as well as three references (2 professional and one character reference are preferred). A Recruitment Committee, led by the Chairman of ICCAT's Standing Committee on Research and Statistics (SCRS), will review all the applications and report to the Executive Secretary. Final appointment will be made by the ICCAT Executive Secretary.

A personal interview may be required as well as a comprehensive medical examination.

The successful candidate will receive a notice of appointment from the Executive Secretary in ------. The starting date of employment will be mutually agreed upon between the successful candidate and the Executive Secretary.

Appendix 12

TERMS OF REFERENCE
FOR A WORLD SYMPOSIUM FOR THE STUDY INTO THE DECLINE OF BLUEFIN TUNA (*THUNNUS THYNNUS*) IN HISTORIC PERIODS

Dates: 22-24 April, 2008
Place: Santander, Spain

The symposium comes in response to a recommendation of the SCRS in 2006. Previous studies have stressed within the framework of ICCAT the disappearance of some past fisheries or the drastic fall in the yields of others that generate changes in the spatial distribution of the catches.

The events occurred in past decades, but marked the future of the fisheries. In the Atlantic these came mostly in the sixties, whereas in the Pacific during the late 1800s and early 1900s, several fisheries that occurred in the northern Japan suddenly disappeared, while more recently several new fisheries has started in the Sea of Japan and coastal areas of northern Japan.

The aim of the symposium is to provide a deeper investigation of events that took place decades ago and to improve our understanding of these intriguing past events. This information should further help in improving current management and conservation measures. Participants will be invited to present communications that make reference to the issue in the period in which the events took place.

On these days the remaining communications will be made on the following themes:

ATLANTIC OCEAN

- What has led to the disappearance of the Norwegian and German fisheries as well as the decline of the other traditional East Atlantic and Mediterranean fisheries (i.e. trap, baitboat) in the early 1960s?
- What has led to the disappearance of the West Atlantic trap fisheries and to the sudden appearance/disappearance of the Japanese/Brazilian fisheries offshore Brazil during the 1960s?
- What effect did the considerable development of fisheries at the end of the forties have in Eastern Atlantic as well as in the Western Atlantic during sixties?
- What influence did juvenile fishing in the 1950s have on mature fish? Can the old landing statistics be recovered in order to be able to estimate fishing mortality rates following intense years of juvenile fishing in Atlantic fisheries?
- What factors influence the continuous increase in the mean weight of catches of spawners (traps and North Sea and Norwegian coast fisheries)? How can the progressive decline in the yield of mature fish be halted?
- How has the great development of purse seine fishing in the Western Atlantic during the 1960s affected the Atlantic spawning stock?
- How can the progressive decline of the yield from the Atlantic spawning stock be halted? Is environmental variability related to it?

PACIFIC OCEAN

- What was the reason of collapse of fisheries in the northern Japan during the late 1800s and early 1900s?
- What was the reason of newly developed fisheries especially in the Sea of Japan, any relation to global warming?
- What kind of environmental or biological factors determine the large scale movements such as trans-Pacific movements and journeys to the southern hemisphere?
- What is the mechanism of producing strong year-classes?
- How can we better manage the stock that indicates very large fluctuation in recruitment?