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

(Madrid, Spain, October 2 to 6, 2006)

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

(Madrid, Spain – October 2 to 6, 2006)

1. Opening of the meeting

The 2006 Meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, October 2, 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. Mr. Meski recalled that this year ICCAT celebrates its 40th anniversary and referred to the work carried out during these years by the Commission for the conservation of Atlantic tuna and tuna-like resources. The Executive Secretary guaranteed his support and that of the entire Secretariat 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 revised and adopted, with minor changes **(Appendix 1)**.

The Executive Secretary informed the Committee that a special session commemorating the ICCAT´s 40th anniversary would be held, in which the majority of the past Chairmen of the Committee, who had been invited for the occasion, would participate.

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

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	J. Powers (W), J.M. Fromentin (E)
BIL - Billfishes	D. Die
SWO- Swordfish	J. Neilson, P. Travassos (Atl.), G. Tserpes (Med.)
SBF - Southern Bluefin	
SMT - Small tunas	J. Ortiz de Urbina

Dr. Pilar Pallarés served as rapporteur for all other Agenda items.

3. Introduction of Contracting Party delegations

There were 24 Contracting Parties present at the 2006 meeting: Angola, Brazil, Canada, Cape Verde, China (People´s Republic), Croatia, Equatorial Guinea, European Community, Ghana, Guinea (Rep.) Japan, Korea, Mexico, Morocco, Norway, Russian Federation, United Kingdom (Overseas Territories), South Africa, Tunisia, Trinidad and Tobago, Turkey, 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 FAO, GFCM, COMHAFAT, ACAP, OCEANA,WWF, the Ocean Conservancy, SEO-Birdlife and scientists from Chinese Taipei were admitted as observers (see **Appendix 2)**.

5. Admission of scientific documents

The Secretariat informed the Committee that 160 documents had been submitted during the year, many of them prepared for the inter-sessional meetings.

Besides the scientific documents, there are seven reports of inter-sessional meetings and Species Groups, 27 Annual Reports from the Contracting Parties, Entities and Fishing Entities, a report from CARICOM and 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 the major point of the Secretariat Report on Statistics and Coordination of Research in 2005-2006, which had been presented at the meeting of the Sub-Committee on Statistics where it was discussed in depth.

The Secretariat informed the Committee on the general state of the statistics, including tagging data and trade data, with regard to the degree of transmittal and compliance with the formats for presentation of data. Information was also provided on the publications issued and the work done by the Secretariat for the projects, such as FIRMS, in which ICCAT participates. The new *Statistical Bulletin*, (Vol. 35), presented by the Secretariat, includes new chapters with tagging information and tables and figures, ranking the major fleets by species. The objective of this publication will be to develop the ICCAT atlas as recommended by the SCRS in 2002.

The Committee congratulated the Secretariat for the improvements made and expressed its satisfaction for the progress made. The Committee also recognized the good performance of the web page and urged the Secretariat to start its translation the three official ICCAT languages.

The SCRS Chairman thanked the Secretariat for the work carried out and called attention to the detailed information on Task I and Task II data, by flag and fleet, provided by the Secretariat according to Recommendation 05-09, which served as a base for the Species Groups to identify the existing gaps in data and assess the importance of these.

7. Review of national fisheries and research programs

In accordance with the new format established in 2005, only 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 try to clearly define the contents under the various sessions (scientific or on compliance). In spite of the Committee´s having proposed a summary table format in 2005, with basic information on sampling coverage which should be attached to the Annual Reports, the reports presented do not include such a table.

Angola

The tuna fishery off the Angolan coast is comprised small tunas and large tunas. The small tuna species targeted are Atlantic bonito (*Sarda sarda*), chub mackerel (*Scomber japonicus*) and Atlantic black skipjack (*Euthynnus alletteratus*). The large tuna species caught are bigeye tuna (*Thunnus obesus*), yellowfin tuna (*Thunnus albacares*) and albacore (*Thunnus alalunga*). Small tunas are mostly caught in Angolan waters during the months from October to January and large tunas are caught during the period from June to December.

In 2005, the total catch was about 2,640 t for small tunas and large tunas with a catch of 75 t of bigeye and 111 t of yellowfin. These catches are from the artisanal, semi-industrial and industrial fisheries.

Catches are also taken by purse seiners, pelagic trawlers (in the case of the fishery for small pelagics), hand line, small driftnets, and longlines.

Brazil

In 2005, the Brazilian tuna longline fleet consisted of 99 vessels, representing an increase of about 10% from 2004. The number of baitboats operating in 2005 was 41, the same as for 2004. A new purse seine fishing activity began recently in Brazil, based in the south coast, to target skipjack tuna. In 2005, the Brazilian tuna purse seine fleet consisted of 19 vessels.

In 2005, the Brazilian catch of tunas and tuna-like fishes, including billfishes, sharks, and other species, was close to 50,000 t, representing an increase of about 10% from 2004. The majority of the catch again was taken by baitboats, about 60%, with skipjack tuna being the most abundant species, accounting for 90% of the baitboat catches. The total catch of the tuna longline fishery was about 80% greater than 2004, with yellowfin tuna being the most abundant species, accounting for one quarter of the longline catches. Swordfish and blue shark, were, respectively, the second and third most caught species, whereas dolphin fish ranked fourth. These dolphin fish catches, as well as a great part of the increase of the Brazilian longline yield, resulted from the fishing activities of a small-scale fishing fleet based mainly in Itaipava-ES, in the Brazilian southeast coast, which grew significantly from 2004 to 2005. Although comprised of relatively small boats, this fleet is highly mobile, operating throughout most of the Brazilian coast and targeting a variety of species. Most of the year, however, it targets dolphin fish, using surface longline, in the vicinity of Vitoria-Trindade Seamount Chain. The total catch of white marlin and blue marlin, in 2005, was about 240 t and 610 t, respectively, representing a threefold increase for both species from 2004. This increase was mainly the result of fishing operations of a foreign chartered fleet, composed by 19 vessels, flagged to Panama and based in Recife, which operated all year round during 2005, differently from 2004, when its fishing operations began only around May-June. In 2006, the fishing operations of this fleet were suspended. It is important to note that the release of white marlin and blue marlin that are alive by the time of boarding is mandatory in Brazil, and their sale is prohibited.

Besides the catch and effort data regularly collected from Brazilian tuna fisheries, in 2005, a total of 36,758 fish were measured at landing. Additional size data obtained at sea by observers onboard were aggregated to this database, resulting in a total of over 50,000 fish measured. Data on tuna catches have also been collected from several recreational fisheries based off southeast and northeast Brazil, mainly in Rio de Janeiro, Vitória, Recife, and Fernando de Noronha, where sport tournaments are conducted by local yacht clubs.

Data from the National Observer Program were also used to estimate the impact of the tuna fisheries on seabird populations along the Brazilian coast. During 2005, 68 incidental catches of seabirds were recorded during fishing cruises made by the Brazilian tuna fleet based in ports located on the northeast coast. The most common species caught were the black-browed and yellow-nosed albatrosses, white-chinned and spectacled petrels, and the great shearwater. Research on the incidental catches of seabirds continued, aiming mainly at testing and implementing mitigation measures to reduce the incidental catch of seabirds by the longline fishery. These works have been supported by the Special Secretariat of Fisheries and Aquaculture (SEAP), seabird conservation institutions, such as “Projecto Albatroz”, and several universities.

Finally, in 2005, an important billfish research effort in cooperation with U.S. scientists was begun, including collection of spines and gonads, for age, 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. Part of these results were presented during the 2006 ICCAT Marlin Stock Assessment Session, which took place in May, as well as during the SCRS Species Groups last week.

Canada

The Canadian nominal landings of Atlantic bluefin tuna in 2005 were 600 t, taken by tended line, rod & reel, trap, electric harpoon and longline from July through December. All traditional bluefin tuna fishing areas produced catches of tuna in 2005. 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 2005 were 1558 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 2005, however, the other tunas accounted for slightly greater than 15% of commercial large pelagic species landed.

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 2005 were 202 t of porbeagle, 11 t of blue shark and 91 t of shortfin mako.

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

Cape Verde

The major scombrid species caught in Cape Verde are: yellowfin tuna *(Thunnus albacares)*, skipjack tuna *(Katsuwonus pelamis)*, bigeye tuna *(Thunnus obesus)* and small tunas (Atlantic black skipjack-*Euthynnus alletteratus*, frigate tuna-*Auxis* spp., wahoo-*Acanthocybium solandri*).

These resources are caught by the artisanal fleet and by the industrial or semi-industrial fleet. In 2004, the industrial as well as the artisanal fleet produced 8,482 t, of which about 40% of the catches correspond to tunas and tuna-like species.

Billfish and swordfish are caught in Cape Verde waters, mostly by EC vessels and by sport fishing.

In the two fisheries, (artisanal and industrial) sharks are taken as by-catch or accompanying catches. It is considered that these are over-exploited.

Catches in the artisanal fishery are relatively stable. However, the annual industrial catch shows fluctuation with a decreasing trend.

In 2005, the Cape Verde fishing fleet was comprised of 735 small vessels with outboard motors, 297 small boats without motors, with an average of three fishers per small boat, and about 70 larger vessels with internal engines.

The resources are exploited by the artisanal fleet, i.e., small boats, and by the industrial or semi-industrial fleet, which are larger boats. Hand line and baitboat are the most used gears.

The foreign fleet that operates in the Cape Verde EEZ is comprised essentially of tuna vessels (baitboats and purse seiners) and surface longliners, the majority of which are from EC countries. The most caught species in the catches are sharks, followed by scombrids and swordfish.

Size sampling is conducted on all the species of scombrids and similar species caught in Cape Verde.

A Statistical Bulletin is published every year, but for numerous reasons there has been some delay in its publication in recent years.

With the objective of creating a National Corps of On-board Observers, the General Directorate of Fishing will soon carry out a training course for on-board observers.

Cape Verde has always provided information aimed at updating ICCAT statistics and stock assessments.

With regard to the ICCAT recommendations, the Government of Cape Verde, through the Management Plan for Fisheries, has implemented the following measures:

- For the national tuna fishery, maintain la prohibition on catches of yellowfin and bigeye tunas less than 3.2 kg, and reserve an exclusive area for fishing activities within the limit of three nautical miles.
- For the foreign fleet, maintain the prohibition on the catch of yellowfin and bigeye tunas less than 3.2 kg and prohibit the foreign fleet from carrying out any fishing activity inside the 12 nautical mile limit.
- For sharks, in the entire Cape Verde EEZ shark fin fishing is prohibited (Resolution 3/2005 of 21 February).

China

Longline is the only fishing gear for tunas by Chinese fishing fleet in the Atlantic Ocean, in which 26 tuna longliners in total operated in 2005. Their total catch, tuna and tuna-like species, including sharks (in round weight), amounted to 8,969 t, more than that of 2004 (8,622 t). Bigeye tuna and bluefin tuna are the targeted species, and their catches amounted to 6,200.2 t and 23.7 t, respectively in 2005. Bigeye tuna is the major target species in the Chinese catch, accounting for 69.1% of the total. However, the bigeye catch is 355.1 t (5.4%) lower than that of 2004. Yellowfin tuna, swordfish and albacore are taken as by-catch. The catch of yellowfin tuna decreased from 1,305.2 t in 2004 to 1,185.5 t in 2005. The catch of swordfish was 199.2 t, a 40.3% decrease from the previous year. The catch of albacore amounted to 206.5 t, a 43.1% increase from the previous year. In 2005, some of deep freezer longliners seasonally accessed fish in the EEZs of some coastal nations, i.e. Liberia (6 vessels, from July to August) and Côte d'Ivoire (2 vessels, from September to October) due to having the fishing license.

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 began carrying out an observer program for the tuna fishery in ICCAT waters in 2001. In 2006, one observer was dispatched on board the Chinese Atlantic tuna longline fishing fleet from January to April in 2006. The area covered by this observer 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) fish/1000 hooks for the duration of his investigation.

In terms of implementation of the relevant ICCAT conservation and management measures, the fishery administration authority of China required all the fishing companies operating in the Atlantic Ocean to report their catch monthly to the Branch of Distant Water Fisheries of China Fisheries Association and the Tuna 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 Chinese fishing vessels on the high seas of world oceans, and will implement a VMS program starting October 1, 2006.

Côte d'Ivoire

Although Côte d'Ivoire has not had any industrial tuna fishing fleets since 1985, the monitoring of the fleets that visit the fishing port of Abidjan was carried out. Thus, in 2005, the following was reported:

- 26 tuna vessels (15 Spanish and associated vessels, 9 French, 2 Ghanaian, 2 Guinean);
- 102,459 t of tunas processed (landings, transshipments, canneries);
- 21,500 t of « false tuna » or « false fish » (tunas rejected by the canneries because they are damaged or small size, small tunas (frigate tuna, mackerels) and all other species landed by the purse seiners.))

High seas artisanal driftnet fishing is carried out by Ivorian and Ghanaian vessels. Overall, they carried out slightly more than 17,000 trips and also landed large tunas (albacore, skipjack), small tunas (frigate tuna and mackerel), billfish (marlins, sailfish and swordfish) and sharks. The breakdown of these catches is as follows:

- 1,434 t of large pelagics, as follows :
  - 175 t yellowfin tuna *(Thunnus albacares)*
  - 1,259 t skipjack tuna *(Katsuwonus pelamis)*

- 274 t of small tunas, as follows:
  - 270 t Atlantic black skipjack *(Euthynnus alletteratus)*
  - 4 t frigate tuna *(Auxis thazard)*

- 232 t of billfish, as follows:
  - 107 t blue marlin *(Makaira nigricans)*
  - 1 t white marlin *(Tetrapturus albidus)*
  - 93 t sailfish *(Istiophorus albicans)*
  - 31 t swordfish *(Xiphias gladius)*

- 73 t of sharks, as follows:
  - 14 t mako *(Isurus oxyrinchus)*
  - 32 t smooth hammerhead (*Sphyrna zygaena* and *S. lewini*)
  - 27 t silky *(Carcharhinus falciformis)*

Croatia

The total Croatian catch of tuna and tuna-like fishes in 2005 was 1,017 metric tons (t). Of this amount, 100% of the catch is comprised of bluefin tuna. The total catch was caught by purse seine and transferred into floating cages for growing purposes. Additionally, 1,930 t of large bluefin tuna have been imported in Croatia in 2005 from France and Libya for growing purposes. The number of licensed vessels actively fishing for tuna and tuna-like species in 2005 was 32, while 16 of these vessels have been reported as licensed large-scale vessels (> 24 m).

During 2005, a study continued on bluefin tuna farming based on the tagging of live specimens in captivity, within framework of BYP, and all tagged specimens were harvested at the beginning of 2006.

A Pilot Sampling Program has been established in accordance with Rec. 05-04. The collection of Task II data of bluefin tuna caught by Croatian fishing vessels (for farming purpose) and eventually harvested from farms has been done.

All conservation and management measures regarding the bluefin tuna fisheries and farming are incorporated in national legislation.

Equatorial Guinea

Equatorial Guinea has a 31,400 Km^2 Exclusive Economic Zone (EEZ). An assessment of the country's fishing resources is being negotiated with FAO and in the framework of multi-lateral and bi-lateral cooperation.

Three types of fisheries are carried out. Equatorial Guinea does not own any fishing vessels.

At the industrial and semi-industrial level, fishing activities require the prior issuance of fishing licenses. The artisanal sport fishery and research fishing is carried out by fishing authorizations. Up to now no license has been issued for tuna fishing.

Equatorial Guinea does not yet conduct any research activities. However negotiations are underway with institutions such as FAO and, in the framework of multi-lateral and bi-lateral cooperation, to evaluate the fishing resources. There is no statistical scheme currently in place to meet the ICCAT requirements. There is a Commission recommendation to the effect that the Secretariat should support the Government of Equatorial Guinea in establishing a statistical scheme.

In the absence of a control and monitoring scheme of its EEZ, it is possible that vessels of other countries illegally exploit the resources in the Equatorial Guinea EEZ.

European Community

The tuna fisheries of the European Community countries are characterized by their long history, their importance and their diversity. These fisheries, which have often been active for centuries and even thousands of years, are currently active throughout the Atlantic and Mediterranean, where they exploit to some extent all the species under ICCAT mandate. They use a wide variety of fishing gears, including purse seine, baitboat, troll, pelagic trawl, traps, and sport and recreational gear.

The total annual catches of the EC countries are given in the following table:

Year	*YFT*	*SKJ*	*BET*	*ALB*	*SWO*	*BFT*	*OTH*	*TOTAL*
1990	114468	68920	21611	34945	21801	15031	17845	276775
1991	90094	122830	26004	24914	21396	13318	12664	298556
1992	85375	83806	27340	31967	22955	18654	10973	270098
1993	77584	103443	35117	33464	25091	21430	10556	296129
1994	76213	90845	37458	29934	27761	27074	10429	289287
1995	68080	81778	35874	35670	29563	27900	11954	278865
1996	69022	69942	30374	27518	25194	30259	12825	252309
1997	54726	59936	23930	27311	23393	28841	10587	218138
1998	62389	58934	19073	23892	20721	18707	8387	203716
1999	51401	66675	22581	33857	20111	16651	10616	211276
2000	54834	56715	18697	32094	23446	19009	12435	204796
2001	63323	49715	16696	24285	20866	18180	12398	193065
2002	64229	45065	17407	23189	18035	18490	14597	186415
2003	57316	69185	16564	26226	20821	16952	8532	207065
2004	45368	69283	14381	23542	22032	14989	9751	189595
2005	34639	47090	14502	34567	20743	17315	8193	177049

Total EC catches in 2005 are currently estimated at 177,000 t, and are the lowest for the current EC countries since 1976. This decrease is mainly due to the continuous decline in fishing effort of the tropical purse seiners and their catches. The EC assures continuous statistical monitoring of the activities of the majority of its tuna fleets, and in complying with the ICCAT requirements for Task I and Task II data (catch, fishing effort, size data). Unfortunately, this statistical monitoring is still insufficient for some fleets and these statistics should therefore be improved as soon as possible. As in previous years, the national institutes of fishery research of the EC countries have carried out a very wide range of research on all the species of tunas and billfish under ICCAT mandate. This work centered on, for example, biological studies, observer trips, tagging cruises carried out (with traditional, sonic and electronic tags), studies on the environment and tunas, and population dynamics analyses aimed at better assessment of the state of the resources. Some technological research aimed at reducing the by-catches of longliners were also carried out in 2005. All the results of these studies have been presented to the SCRS and to the various specialized ICCAT working groups, in which scientists of EC countries have actively participated in 2006.

Ghana

Baitboats and Purse-seiners fishing off the EEZ of Ghana exploited tuna species in the year 2005. The total number of vessels registered to fish for tuna resources within the EEZ of Ghanaian waters are is comprised of 37 vessels: 25 baitboats, 8 purse seiners and 4 longliners.

Catches in 2005 was approximately 82,000 t with purse seiners contributing over 52% of the overall catch. Skipjack landings were 66%, yellowfin 24%, bigeye 3% and other minor tunas 7%. Purse seiners collaborate with baitboats in harvesting the resources often sharing the catch.

A new program aimed at improving tuna statistics with the introduction of the AVDTH software for analyzing catch, effort and sampling data was introduced. This is being funded by the JDIP/ICCAT Data Fund. It is envisaged that a homogenous catch reporting system for the fishery in the eastern and western Gulf of the Atlantic would then be comparable and meaningful for any stock assessment programs in the future.

Beach sampling of the billfishes continued off the western coast of Ghana.

Guinea (Rep.)

Tuna fishing in the Republic of Guinea is carried out exclusively by industrial and foreign fleets. This fishing is dominated by the European Community fleets, in particular, the Spanish and French fleets that land their catches at Dakar, Abidjan or Las Palmas.

In 2005, about 30 tuna fishing licenses were issued, while only six Spanish flag tuna vessels fished in Guinean waters. The reported catches of these purse seiners amounted to 108 t, comprised mainly of yellowfin tuna (*Thunnus albacares*).

No national scientific research program or data collection scheme for tunas have been implemented. There is, however, a data collection system on the artisanal shark fishery and the provisions are being implemented, aimed at improving the collection of data on tunas in Guinean waters.

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 2004 was estimated to be 222, and the number of fishing days was 31,600 days, which was 90% compared to the average value in the last decade. The 2004 catch of tunas and tuna-like fishes (excluding sharks) in the Atlantic Ocean and the Mediterranean Sea by the Japanese fishery is estimated to be 29,819 t. Although the total amount of fishing effort in 2004 was 90% of the average effort in last ten years, the total catch in 2004, excluding discards and sharks, was only 81% of the average catch for the same years. The most important species was still bigeye tuna, representing nearly 60% of the total tuna and tuna-like fish catch in 2004. The next dominant species was yellowfin tuna which occupied 20% in weight; the third species was bluefin tuna (10.5%). The remaining species in the catch were mainly were comprised of albacore, blue marlin and swordfish. The decline of catch in recent years was almost due to a decrease of bigeye catch. In 2004, the bigeye catch was 72% of the average catch amount.

Korea

In 2005, bigeye and yellowfin tuna accounted for most of the catch by Korean longliners in the Atlantic Ocean. To catch the two species, Korean longliners operated in the northwest and southwest (10°~60°W and 5°N~10°S). The total catches in 2005 included 1,146 t of bluefin tuna that were caught by chartered Turkish purse seiners in the Mediterranean Sea, which was reported by Korean observers on board.

In 2005, two observers were placed on chartered Turkish purse seiners to monitor bluefin tuna fishing in the Mediterranean Sea. In 2006, two observers were dispatched for bluefin tuna fisheries. One observer was on a Korean tuna longline vessel catching bluefin tuna in the EEZ of Algeria, and the other observer was on the chartered Turkish purse seiner to monitor bluefin tuna fishing in the Mediterranean Sea.

Mexico

Mexican tuna fishing in the Atlantic is carried out in the Exclusive Economic Zone, including the region south of the Gulf of Mexico. Fishing effort is directed at the catch of yellowfin tuna (*Thunnus albacares*). In 2005, there were 30 vessels reported with fishing activities that reported a yellowfin tuna catch of 1,050 t, which represented 72% of the reported catch for 2005.

Mexico carries out extensive research work on this fishery. For this reason, an on-board scientific observer program was implemented, which is continuing, with 100% coverage of the commercial fishing trips. The objective of the national program is to collect information on catch statistics (target species and by-catch species), size data, fishing effort, gear characteristics, etc. In 2005, Mexico participated regularly in scientific meetings related to longline tuna fishery in the Gulf of Mexico. In the month of March preliminary work was carried out on the standardizing of fishing effort applied to tuna fishing with longline in the Gulf of Mexico by the Mexican and U.S. fleet. The "MexUs-Golfo" meeting was held, where issues related to the yellowfin tuna fishery and its by-catches were discussed. The major studies conducted in 2005 in the framework of priority research work of the *Instituto Nacional de la Pesca,* INP (National Fishing Institute) were as follows:

1. Improvement of the database on tuna longline fishing in the Gulf of Mexico, by time/area strata.
2. Research for the Fisheries Management, through:
   - Spatial analysis of fishing effort of the tuna fleet.
   - Analysis of yellowfin size structure.
   - Time and area analysis of the incidental catch.
   - Conduct clinics to free turtles caught incidentally.
3. Participation in training courses for scientific observers on-board longline vessels.

Morocco

In Morocco, tuna fisheries continue to occupy an important place in the fishing sector, in particular, at the socio-economic level, due to the important volume of investments made, the large number of direct and indirect employment generated, and the diversity of the fishing methods, including artisanal fisheries, small boats, and industrial activities.

Moroccan waters, characterized for their being part of a very dynamic marine ecosystem, constitute a privileged passage zone for a large number of large pelagic species, particularly swordfish, bluefin tuna, small tunas (skipjack, Atlantic bonito, frigate tuna, plain bonito), bigeye tuna and yellowfin tuna. The major fishing methods of these resources are trap, hand line, purse seine and driftnet. The seasons and the duration differs according to the species targeted.

The data collection system in place several years ago is more and more functional. It covers all the landing ports, in the Atlantic as well as in the Mediterranean, and all the species of tunas and small tunas, and sharks. All the data relative to the landings are regularly transmitted for the requirements of Task I data. This system is reinforced by the collection of trade data on exports. The overall catch in 2005 reported a decrease of 9.48% as compared to that of 2004.

As concerns the implementation of the conservation and management measures adopted by ICCAT, the report gives the state of the actions taken at the national level concerning minimum size limits, fishing effort limit, monitoring of fishing activities, at sea and on land.

In order to contribute to the fight against illegal, unregulated and unreported fishing (IUU), Morocco has taken measures within the framework of the National Plan of Action to prevent and halt these practices in the ICCAT Convention area. The vessel location system and satellite monitoring of fishing vessels (DRS/GPS) constitute one of the measures.

With regard to the fishery research plan, in 2005 the *Institut National de Recherche Halieutique* (INRH), through its two Regional Centers in Tanger and Nador, continued its research programs on tunas and tuna-like species. These programs mainly concern two aspects.

The first aspect of these research and monitoring programs consists of the study on the biology of swordfish and bluefin tuna, in particular, the analysis of stock structure of the landings, the estimation of biological parameters, such as the size-weight relation through a routine biological sampling program established and carried out at the same time at the major landing ports in the North Atlantic, the Strait of Gibraltar and in the Mediterranean. The stock structure of the landings of these two species is regularly transmitted for the requirements of Task II data. They are also the subject of scientific documents submitted to the SCRS stock assessment sessions.

The objective of the second aspect of these programs aimed at collecting and analyzing information on fishing fleet activities and the traps targeting tunas, to estimate and study the catch indicators of these fisheries, particularly in terms of fishing effort and abundance index (CPUE). This work is carried out through surveys with professionals and the administrations involved in the management of these fisheries. Document SCRS/2005/111 presents some results of these research programs.

A biological study has started, based on morphometric measurements of bluefin tuna individuals caught by the traps as well as their leftovers after capture. This study aims at reconstructing the stock structure of the component of this species caught by this fishing method and, in this way, to remedy their unavailability.

Russia

The fishery: No specialized purse tuna fishery was carried out in 2005 and the first half of 2006 due to repairs of the purse seiners and modernization.

In the central-eastern Atlantic the trawling fishing vessels caught 202 t of tunas (139 t of bullet tuna, 63 t of frigate tuna) as by-catch; Atlantic bonito catches amounted to 79 t in 2005.
In the equatorial Atlantic Ocean two experimental cruises were carried out in 2005 from the longline vessel *Askele* and, according to the observer data, the tuna catches were as follows: 4.1 t tunas, 18.4 t sharks, and 3.0 t of other fish species. The catch per unit effort attained 38 kg per 100 hooks for all species.

Research and statistics: In 2005 and the first half of 2006, observers collected data on the occurrence of tunas and tuna-like species in the trawl catches in the EEZs of Mauritania and Morocco, as well as by longline vessel *Askele*. The species and length composition of tunas and their proportion in the total catches of all species were determined.

Research on Atlantic black skipjack was carried out in the eastern Atlantic Ocean using material collected during 1959-1998. Sampling was carried out off western Africa, from 30º N to 20º S. The preliminary data, from 16,000 fish measurements and 7,000 t biological samples were processed.

The morphological differences in black skipjack from the central-eastern and southeastern Atlantic Ocean were revealed. The reproduction period of black skipjack from these areas is extended in time and is characterized by a pronounced seasonal pattern. Spawning occurs in different periods and is associated with the warm season. Taking in account the existing differences, it is reasonable to assume that black skipjack in the central-eastern and southeastern Atlantic belong to different populations.

The recent AtlantNIRO studies on the functional structure of pelagic oceanic and semi-oceanic shark distribution areas continued (Litvinov, 2006).

Implementation of ICCAT conservation and management measure: To improve the quality of statistics, observers on trawl vessels operating in the Convention area collect data on by-catch of tunas and tuna-like species on the annual basis. The 2005-2006 ICCAT Resolutions and Recommendations have been transmitted to the fishing companies.

South Africa

Fishery activities

The first long-term (10 year) commercial fishing rights were allocated in South Africa's tuna/swordfish longline fishery in 2005, with 26 of 30 tuna rights allocated and 17 of 20 swordfish rights allocated.

Although the annual longline catch was the highest on record, with over 3 500 t of tuna and tuna-like species landed, most of this catch was made in the Indian Ocean.

Nominal swordfish CPUE continued to decline in the Atlantic from 1009 kg.1000hooks-1 in 1998 to 205 kg.1000hooks-1 in 2005.

In contrast, yellowfin tuna catch and CPUE have continued to increase over recent years and is evident for all gear types, particularly the rod and reel sector, which continued to expand. Total yellowfin catch in the Atlantic Ocean increased from 400 t in 2004 to 1150 t in 2005. The high abundance of large yellowfin in the boundary region of the Atlantic and Indian Oceans is likely of Indian Ocean origin as high abundances of this species has been reported from the entire western Indian Ocean since 2003.

The baitboat fleet recorded its lowest catch of albacore on record with < 3 000 t landed. The poor catch is a combination of albacore unavailability in near-shore waters, unfavorable foreign currency exchange and an increased targeting of yellowfin.

Research activities

Collection and processing of swordfish biological material is now complete, with > 3000 biological samples (spines, gonads, stomachs) and > 1 500 tissue samples collected. These samples will be used to elucidate the life history and stock structure of swordfish in Southern African waters.

Marine and Coastal Management (MCM) collected over 500 albacore spines for an age and growth study. Unfortunately, due to technical difficulties no results were available at the time of the Species Working Group meetings.

MCM, in collaboration with WWF and BirdlifeSA, continued its research on the impacts of longlining on sharks, turtles and seabirds and are investigating various mitigation measures.

Observers were deployed on 15% of domestic longline trips and 80% of foreign charter trips in order to obtain size frequencies, catch composition and level of discards.

Trinidad and Tobago

An estimated 5,597 t of tuna and tuna-like species and sharks are reported for the year 2005. The catch is estimated from the landings of commercial vessels and three of five major game fishing tournaments held. Serra Spanish mackerel (*Scomberomorus brasiliensis*) accounted for almost 50% of the catch and there were notable catches of king mackerel (*S. cavalla*) and mixed species of shark and tuna. The fishing effort comes mainly from just over 1,400 artisanal vessels. There are also 14 semi-industrial longline and approximately 36 semi-industrial multi-gear vessels. The number of recreational vessels is unavailable at this time. Attempts have been made to improve the quality of catch and effort data including a preliminary reconstruction of catches for the period 1908-2002 and re-estimation of recent artisanal fishery statistics for the period 1995-2005. This information will be presented to ICCAT upon reconciliation of the data. In addition, Trinidad and Tobago will present information to ICCAT to facilitate the application of a more appropriate breakdown of its reported billfish catches in order to update the Task I and the compliance tables. In 2006 Trinidad and Tobago participated in the 2nd Annual Scientific Meeting of the Caribbean Regional Fisheries Mechanism (CRFM) and the second meeting of the CRFM Ad Hoc Working Group on Methods.

Tunisia

The fishing of large pelagics in Tunisian waters continues to be monitored within the framework of a research project contract between the National Institute of Sciences and Technologies of the Sea (INSTM) and the Ministry of Scientific Research of Technology and of Development of Skills.

In Tunisia, bluefin tuna is caught mainly by purse seiners, in particular, in the area bordering on the Libyan border. This area is currently under the control of the Libyan authorities and recently the Libyan Government has decreed the area of Hakl El bouri a protected fishing area (72 miles of the Libyan coast). As concerns swordfish, this species is generally fished all along the Tunisian coast. Small tunas, which are a secondary target of the purse seiners, are also caught all along the Tunisian coast.

Since 2003, a form of bluefin tuna aquaculture in farms, strictly dependent on fishing, has been well installed. This activity is strongly dependent on the availability of the natural resource of bluefin tuna (purse seine catches) and on the level of consumer demand of the country(ies) that consume(s) this species.

During the course of 2005, nearly 53 tuna vessels measuring between 15 and 38 m draft all carry out fishing for tunas along the Tunisian coast. Furthermore, 90 longliners of various sizes continue to fish in Tunisian waters targeting swordfish.

The catches of tunas and tuna-like species (swordfish) amounted to 6,535 t. In terms of proportion, bluefin tuna this year constituted the major part of the catches with 49.7% of the total catches of 3,249 t, while the catches of small tunas are estimated at 2,221 t, representing 33.8%. Swordfish catches have almost reached the 2002 level, from 738 t en 2004 to 1,074 t, representing 16.1% of the national landings.

Purse seine landings of bluefin tuna comprised 99.9% of national catches.

In 2005, four farms for fattening of bluefin tuna were active targeting a total capacity of 2,400 t. The quantities from Tunisian purse seiners amounted to only 1,452 t, for which the different companies had to import more bluefin tuna. Thus, 938 t of live bluefin tuna were placed in the Tunisian cages. From the reports of the companies involved in this activity, the production was close to 2,390 t.

As concerns research activities, Tunisia continued, through the INTPM, to carry out research work on large pelagics. Studies centered mainly on key biological parameters (growth, reproduction, state of the stock, etc.), the monitoring of bluefin tuna fattening activities and defining the spawning areas of these species.

Turkey

The total catch of bluefin tuna in 2005 was 990 t, a decrease compared to the previous year (1,075 t in 2004). Almost all of the catch was caught by purse seiners. There were 62 vessels licensed to fish bluefin tuna. There are six bluefin tuna farms in Turkey. Almost all of the total purse seine catch was transferred into floating cages for fattening. The catch quantity of albacore, bullet tuna and Atlantic black skipjack have not been recorded for a long time. The catch quantities of these species have been specifically recorded since 2004. The total catch of these species in 2004 amounted to 27, 284 and 568 t, respectively.

In 2005, for the analyses of reproduction and age and growth of the bluefin tuna, biological samples (gonads, liver, dorsal spines and otoliths) were obtained from the fishery. The otolith samples of bluefin tuna collected by Turkish scientists in 2001-2005 in Turkish waters are being studied jointly by Turkish, Greek and U.S. scientists. In 2006, for the tagging of bluefin tunas, there was a cooperative effort between Istanbul University and the University of Bari (Italy). For this tagging research, supported by the Association of Bluefin Tuna Farmers and Exporters (OYID), 15 fish were tagged in the first stage, obtained from fishing carried out in the Levantine Sea. In the second stage, fish obtained from the farms will be tagged.

United Kingdom (Overseas Territory)

The total catch of tuna and tuna-like species in 2005 was 162 t which represents a decrease in landings of 24 t over the previous year. This was due primarily to declines in the landings of the two principal species, wahoo and yellowfin tuna.

Bermuda remained active in the ICCAT Enhanced Program for Billfish Research. A study on post-release survival and movement patterns of blue marlin caught on recreational fishing vessels in the western Atlantic, utilizing pop-up satellite tags, is ongoing. Tournament sampling of blue marlin has continued to provide important data on reproductive seasonality with peak spawning occurring in July. Conventional tagging of blue marlin, white marlin, yellowfin tuna and blackfin tuna, principally by charter fishing vessels, has continued during the past year.

Uruguay

The Uruguayan tuna fleet was comprised of 12 vessels in 2005, the same as for the previous year, and is directed mainly directed at swordfish. As is customary, the major part of the longline fishing effort is in Uruguayan territorial waters and adjacent international waters. In 2005 the fleet landed a total of 2,438 t, of which 36% corresponded to swordfish, 32% to sharks, and 30% to tunas (mainly yellowfin tuna).

The Pelagic Resources Division of the National Directorate of Aquatic Resources continues to carry out the National On-board Observer Program, in whose framework 15 campaigns were conducted in 2005. This year the Project to Correct the Historical Series of Catch and Effort Data was initiated, with assistance from Japan through the JDIP. The Shark Action Plan also started and is expected to finalize in the first half of 2007. In October of this year, the National Action Plan for the Conservation of Sea Birds will finalize. The first stage of the project on skipjack biology and fishing has started. Further, a project is being developed on sea turtles which includes the application of electronic tags.

United States

Annual fisheries information

The total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2005 was 19,295 t, a decrease of about 24% from 25,336 t in 2004. Estimated swordfish catch (including estimated dead discards) decreased 171 t to 2,423 t, and provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico decreased in 2005 to 1,403 t from 2,087 t in 2004. The estimated 2005 Gulf of Mexico landings of yellowfin tuna accounted for about 24% of the estimated total U.S. yellowfin landings in 2005. U.S. vessels fishing in the northwest Atlantic landed in 2005 an estimated 848 t of bluefin, a decrease of 123 t compared to 2004. Provisional skipjack landings decreased by 74 t to 28.8 t from 2004 to 2005, estimated bigeye landings increased by 67 t compared to 2004 to an estimated 483 t in 2005, and estimated albacore landings decreased from 2004 to 2005 by 159 t to 487 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 2004 and 2005 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 3,333 billfishes (including swordfish) and 329 tunas in 2005. This represents a decrease of 12.3% for billfish and a decrease of 81.5% 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 2005. 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.

Venezuela

Venezuela has industrial baitboat, purse seine and longline fisheries as well other artisanal fisheries that target billfish. These are located in the eastern and central area of the country and they use artisanal surface longline and driftnets.

Statistics on catch, effort and size have been collected satisfactorily from all the fisheries in 2005. Statistical coverage reached an average of 80% of the trips monitored by logbooks, inspections at landing ports and multi-species sampling of tunas and tuna-like species.

In 2005 various research programs were carried out, which included the following: Monitoring and control of the tuna fishery in the eastern Atlantic, the enhanced research program for billfish which contemplates an observer program on-board longline vessels, and an assessment of the artisanal fisheries and those that catch small tunas.

A National Action Plan was developed on sharks, processing was started on data from the artisanal fishery that catches small pelagic species, and the registry of industrial and artisanal vessels was updated.

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

Chinese Taipei

Fishing effort of Chinese Taipei declined significantly in 2005 which has resulted in a substantial reduction in catches of the three major species (albacore, bigeye and yellowfin) by about 13,000 t. The total 2005 catch was estimated as about 33,000 t. Chinese Taipei has developed several data improvement programs (SCRS/2006/168) which are aimed at expanding fishery-independent size data sources through expansion of the at-sea observer program and the port sampling program in canneries and at unloading ports (first trip was made in 2005 in Cape Town); to improve Task II catch/effort data quality through comparisons with some independent information such as 100% recovered VMS data; and to increase the collection of operation-related information and biological sampling for studies on fish stocks in more detail. Besides, due to the refinement of the logbook format, detailed shark statistics split into three major species for 2003-05, including Task I, Task II CE and size data, were provided to the ICCAT for the first time.

8. Executive Summaries on species

The texts and tables of these Summaries generally reflect the information available at ICCAT immediately prior to the SCRS Plenary Sessions, since they have been prepared at the Meetings of the Species Groups. Therefore, the data used not coincide with the data used in the assessments, if the assessment was carried out before. Likewise, the catches reported to ICCAT during the SCRS Meeting or after the Meeting may not be included in these Summaries.

The 2007 Work Plans of the various Species Groups are included in **Appendix 5**.

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:

- Section 15.1 contains recommendations in relevant to yellowfin tuna.
- The Tropical Tunas Work Plan **(Appendix 5)** includes plans to address research and assessment needs for yellowfin tuna.
- Report of the 2006 ICCAT Inter-sessional Meeting of the Tropical Species Working Group (SCRS/2006/017).

The Report of the Tropical species Working Group Meeting (Madrid, September 28-29, 2006) is found in **SCRS/2006/017**.

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.

Two documents presented to the 2006 SCRS addressed important biological questions for the assessment of yellowfin tuna. The first document developed a new growth curve using daily growth increment counts from otoliths that were collected from both the western and eastern Atlantic, across a broad size range, which included very small fish (5 cm). 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 yellowfin tuna stock assessments. This discrepancy in growth models should be resolved prior to, or accounted for during, future stock assessments. The estimated ages and hatch months in this document supported the current ICCAT working hypotheses of a single stock for the Atlantic with an oceanic migration pattern, and suggest that the contributions from the western spawning areas may be larger than has previously been assumed.

The second document tested the feasibility of using otolith microchemistry to distinguish juvenile yellowfin from several distinct spawning areas, with the goal of assessing the potential of these markers to retroactively identify nursery origin and oceanic movements in adults. The results were promising. The potential of the approach to differentiate between spawning areas may be improved if those areas are regularly sampled to track differences in chemistry as well as inter-annual changes.

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 since 2001. Atlantic surface fishery catches have shown a declining trend from 2001

to 2005, whereas longline catches have generally increased in the eastern Atlantic while remaining about the same in the western Atlantic. In the eastern Atlantic, purse seine catches declined from 89,569 t in 2001 to 57,451 t in 2005, a 37% reduction **(YFT-Table 1; YFT-Figure 1)**. Baitboat catches declined by 28%, from 19,886 t to 14,366 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 declined from 13,072 t to 2,634 t, an 80% reduction. Baitboat catches declined by 28%, from 7,027 t to 5,065 t. In the eastern Atlantic, longline catches increased from 5,479 t to 8,155 t, a 49% increase. In the western Atlantic, longline catches decreased only slightly from 12,740 t to 12,700 t. The increase in South African catches in the eastern Atlantic, from 402 t in 2004 to 1156 t in 2005, appears to 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 27 vessels in 2005, with an average age of about 25 years. On the other hand, the European and associated baitboat fleet increased from 15 to 21vessels during the same period.

Several relevant scientific documents were presented to the 2006 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 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. One document described new standardized catch rate information from the Japanese longline fishery. This index is compared with a partially standardized Chinese Taipei longline index in **YFT-Figure 4**, along with nominal catch rate trends from Brazilian and U.S. longline fleets. 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, which should be regarded as preliminary pending a planned evaluation of updated catch-at-size data, are shown in **YFT-Figure 5.** The average weight in European purse seine catches, which represent the majority of the landings, has been declining since 1994. 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, but is not clear in other fleets which have not undergone such a dramatic shift in selectivity and which target larger fish.

Recent signals in the fishery data could result in a different evaluation of stock status than that which is summarized below. It is important that the next assessment take these and other indicators into account.

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 160,000 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 (160,000 t), catches have declined each year to a level of 108,000 t, a reduction of 33% and the lowest level of catch since 1974. A potential explanation for this decline is the reduction in eastern Atlantic purse seine effort, but that alone does not explain the reduction of catches of

baitboat and of purse seine in the western 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 nominal catch rates could suggest decreases in abundance or availability, and a clear picture does not emerge from the available fishery indicators.

YFT-4. Effects of current regulations

The 1972 *Recommendation by ICCAT on a Yellowfin Size Limit* [Rec. 72-01] established a 3.2 kg minimum size with a 15% tolerance in numbers of fish landed. Yearly catches of undersized yellowfin tuna in number were about 60-75% of purse seine catches and about 40-80% of baitboat catches since 2000, occurring primarily in the equatorial fisheries. Compliance with this measure was never effectively achieved, largely due to difficulties related to the multi-species nature of the fishery, as described in detail in "Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, July 4-8, 2005)". Although the minimum size limit for yellowfin tuna has been eliminated [Rec. 05-01, effective in 2006] for this reason, the protection of juvenile tunas may be important and alternative approaches to accomplish this should be studied.

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.

ATLANTIC YELLOWFIN TUNA SUMMARY

Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2001)	159,000 t (since revised to 160,000 t)
(2005)	108,143 t
Replacement Yield (2001)	May be somewhat below the 2001 yield
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:

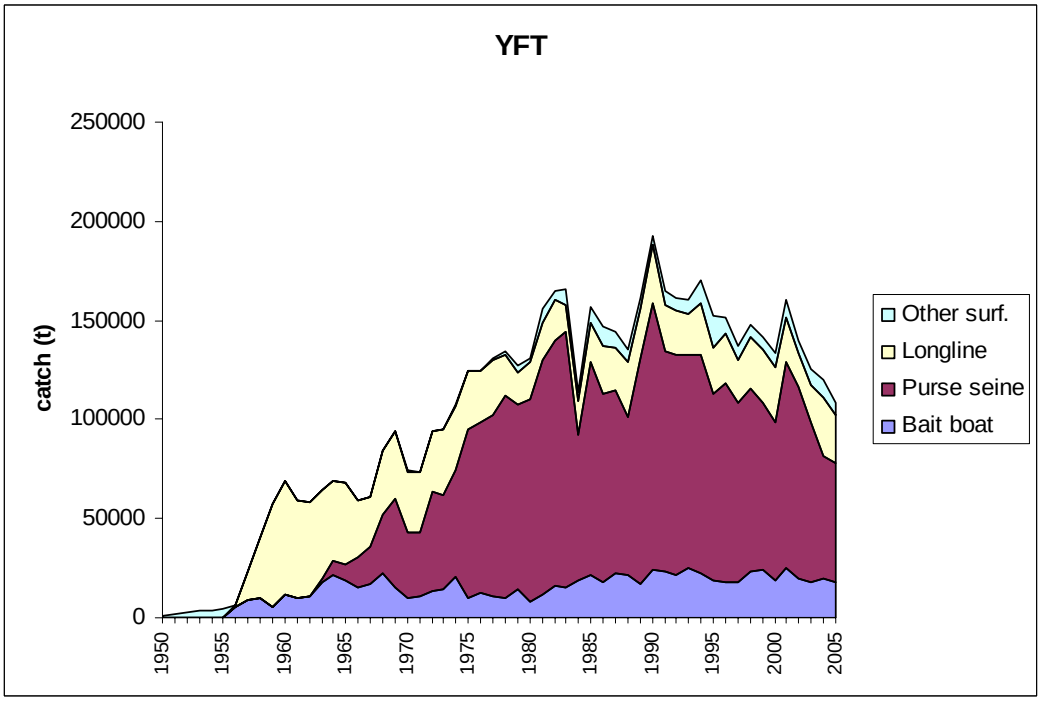
- 3.2 kg minimum size [Rec. 72-01]. Note: This measure has been repealed [Rec. 05-01, effective 2006].
- Effective fishing effort not to exceed 1992 level [Rec. 93-04].
- Closed area/season for fishing on FADs [Rec. 99-01]. Note: This measure has been replaced [Rec. 04- 01, effective 2005].

[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 2005 should be considered provisional.
[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.

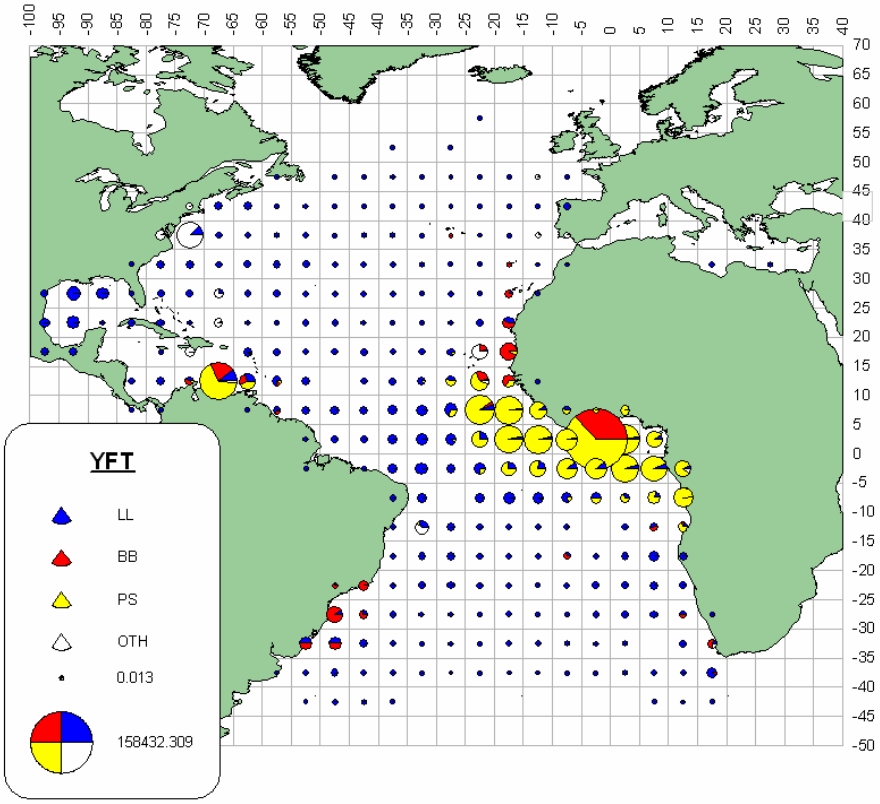
YFT-Table 1. Estimated catches (t) of yellowfin tuna *(Thunnus albacares)* by major area, gear and glag.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			155818	165001	165373	113940	156547	146535	144428	135219	161322	192456	164716	161364	159963	170527	151939	151754	137192	147470	141946	133572	160196	139382	125015	120194	108143
	AT.E		138114	138711	124953	76053	113656	106606	110304	99180	123239	157112	124239	121039	116788	116211	110902	113032	100327	110729	105172	95990	117818	109433	99556	86922	81235
	AT.W		17704	26290	39666	37481	42365	31751	27680	30284	32807	27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30357	38154	29343	24807	29482	24266
	UNCL area		0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4224	607	651	3790	2642
Landings	AT.E	Bait boat	9788	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18471	15652	13496	13804	13974	17480	19056	13009	19886	13906	14435	14640	14366
		Longline	7986	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8047	7497	8292	5479	5580	8534	12073	8155
		Other surf.	5347	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	2305	1951	1624	1084	1577	1262
		Purse seine	114993	111820	103502	50860	86576	85325	86141	73117	102200	127673	97182	99532	92130	90151	87597	88715	78358	83647	77151	72384	90502	88323	75504	58632	57451
	AT.W	Bait boat	1917	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315	6009	3764	4868	3867
		Longline	11323	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11638	12740	11604	10024	14292	12700
		Other surf.	1642	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4581	5345	5200	7027	3763	6413	7104	5065
		Purse seine	2822	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13072	7966	4607	3217	2634
	UNCL area	Longline	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4224	528	651	3790	2642
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	0	
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	
Landings	AT.E	Angola	959	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	100	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1	0	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	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	5281	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1802	1896	1896	5027
		Cayman Islands	1460	100	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	84	71	1535	1652	586	262	1033	1030	1112
		Chinese Taipei	432	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4946	4874	3009
		Congo	50	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	0	0	0	0	0	0	0	0	
		Cuba	2945	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	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	2	0	0	673	213	99	302	565	175
		EC.España	51428	54164	51946	40049	66874	61878	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	31105	31469	24884	21414	11777
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949	22672
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	
		EC.Latvia	0	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	0	332	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	208	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	178	194	3	6	4	5	16
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Gabon	0	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	0	2	16	15	0	0	0	0	0	0	0	0	0	0	0	0	
		Georgia	0	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	5510	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	16504	17807	28328	17010	30642	23499	19030	15137	19833
		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	2906
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
		Japan	2863	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1534	1999	4982	3231
		Korea, Republic of	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	209	984	95
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	0	0	
		Maroc	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	95	2035
		NEI-1	0	3121	5388	1104	0	0	2077	3140	5436	12513	4856	10921	9875	8544	8970	9567	6706	7225	5418	5448	10205	8209	5396	4294	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165	89	139	85	135
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3183	6082	6110	3962	5441	4793	4035	6185	4161	24
		Norway	0	0	0	0	0	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	341	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7839	8644	10854	5759	3137	1753	930	1103	574	1022	0	1887	6170
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9	68	69
		Russian Federation	0	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	737	0	0	0	0	4
		S. Tomé e Príncipe	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279	681	1301
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	
		Seychelles (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	
		South Africa	178	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	240	320	191	342	152	298	402	1156
		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	1	0	0	
		U.S.A.	1472	636	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.	541	1004	1282	2168	3768	1851	1275	3207	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	59	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	0	0	
		Ukraine	0	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	8	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	30	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142	115	116	116	116

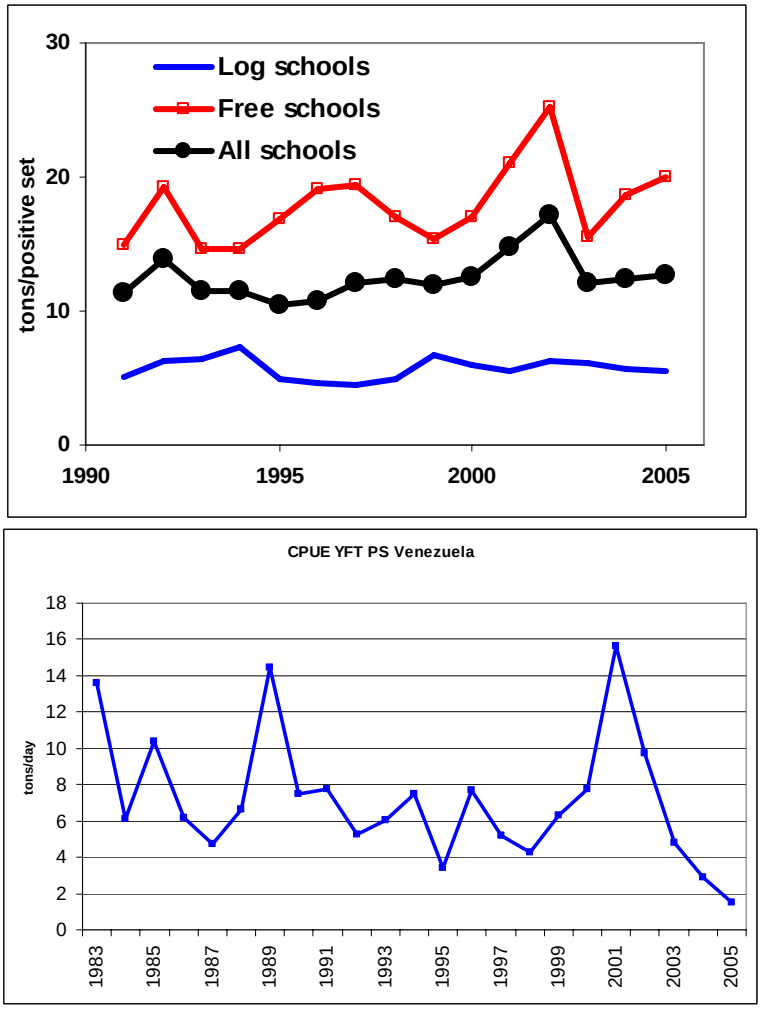
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		Brasil	2084	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985	7223
		Canada	0	0	0	0	0	2	40	30	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304	240
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275	74
		Chinese Taipei	435	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	950	587
		Colombia	0	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	1997	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	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81	119
		Dominican Republic	0	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	0	1957	3976	1000	0	0	1	3	2	1462	1314	989	7	4	36	34	46	30	171	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	1	0	0	0	151
		Grenada	64	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460	492
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	0	0	0	0	
		Japan	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	571	755	943	836
		Korea, Republic of	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	0	0	580
		Mexico	42	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208	1050
		Netherlands Antilles	173	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0	0	0	0	
		Panama	262	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145	299	299
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	1	40	48	22	65	16	43	37	35	48	38	33	24	884	568	4251	
		Sta. Lucia	25	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	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.	1688	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6516	5566
		UK.Bermuda	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47	82	61
		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	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204	644
		Venezuela	4500	14426	26576	21879	20535	11755	11137	10949	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	18651	11421	7411	5774	5097
	UNCL area	China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	139	156	200	124	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	0	18
		Libya	0	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	0	79	0	0	
		NEI (Flag related)	0	0	754	406	526	956	1297	2324	2780	4100	4318	3836	2671	4404	4202	5962	6100	8339	7409	5269	2883	175	578	0	
		Panama	0	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	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	1956	1341	280	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	3717	2551
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	0	



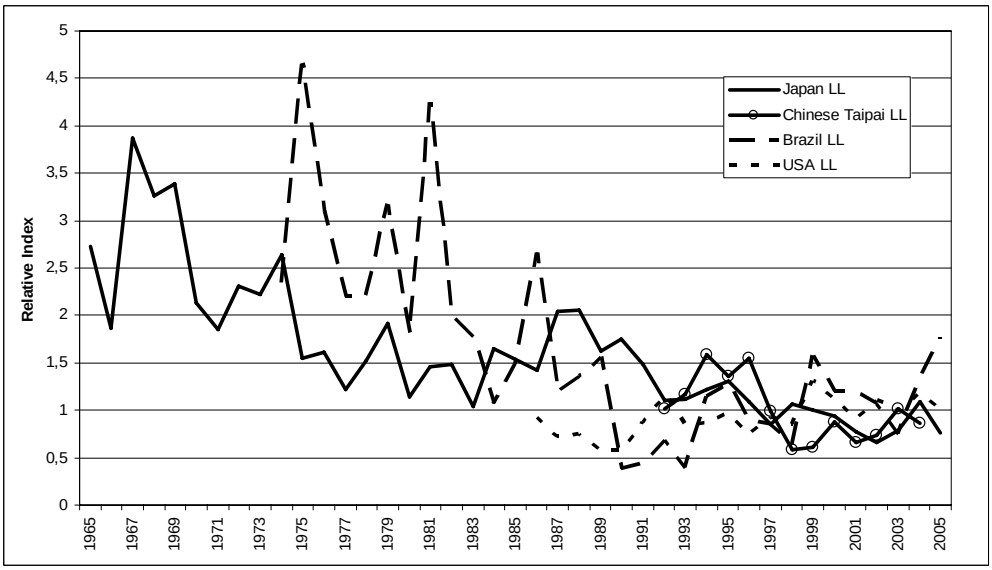
YFT-Figure 1. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2005.



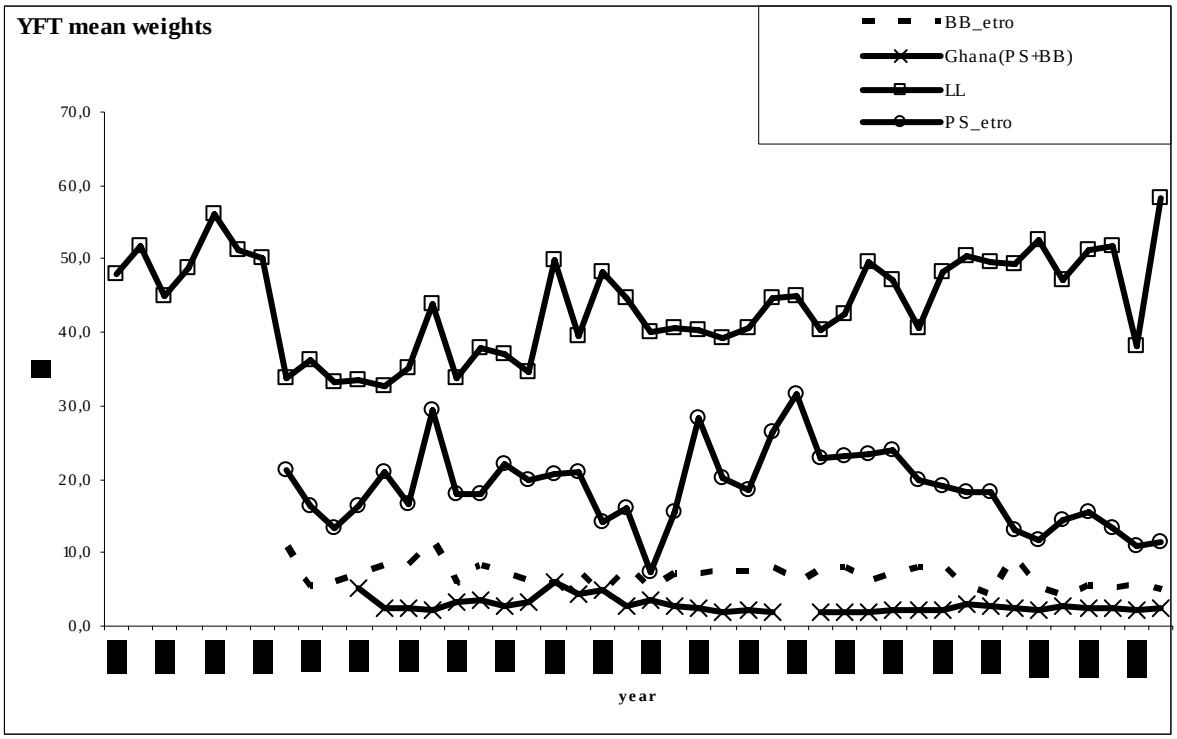
YFT-Figure 2. Geographic distribution of yellowfin tuna catches for most recent years (2000-2004) by major tuna fishery.



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. Atlantic yellowfin tuna catch per unit effort trends for longline fleets. The Japan (numbers) trend is standardized, and is typically used in stock assessments. 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. The Brazil (weight) and USA (numbers) trends are nominal.



YFT-Figure 5. Trend in yellowfin tuna average weight for Atlantic fleets (not all countries included). Purse seine averages are calculated across all set types (floating object and free school). These trends should be regarded as preliminary pending a planned evaluation of updated catch at size data.

8.2 BET - BIGEYE TUNA

The last stock assessment for bigeye tuna was conducted in July 2004. Due to the early date of that meeting, the most recent catch information covered in the assessment was 2002. This document highlights on changes in fisheries and fishery related events as well as scientific studies that have been conducted during 2005; readers interested in a more complete summary of biology, fisheries and state of stock on Atlantic bigeye tuna should consult the report of the 2004 SCRS meeting.

Other information relevant to Atlantic bigeye tuna is available in this SCRS Report and other publications:

- Section 15.1 contains response to the Commissioner's request [Rec.05-09].
- Report of the 2006 ICCAT Inter-sessional Meeting of the Tropical Species Working Group (SCRS/2006/011)
- Report of 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Section 9.4. *In* ICCAT, 2006, Report for Biennial Period, 2004-2005, Part II).
- 2004 ICCAT Bigeye Tuna Year Program Symposium (Anon. 2005).
- Report of the Second World Meeting on Bigeye Tuna (Anon. 2005a).

BET-1. Biology

The geographical distribution of bigeye tuna is very wide and covers almost the entire Atlantic Ocean between 50oN and 45oS. This species is able to dive deeper than other 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 being much deeper in the daytime than at night. Spawning takes place in tropical waters when the environment is favorable. From the nursery areas in tropical waters, juvenile fish tend to diffuse into temperate waters as they grow larger. Catch information from the surface gears indicate that the Gulf of Guinea is a major nursery ground for this species.

Dietary habits of bigeye are varied such that various prey organisms like fish, mollusks, and crustaceans are found in stomach contents. A growth study based on otolith and tagging data resulted in the adoption by the Committee of a new growth curve. According to it, bigeye exhibit relatively fast growth: about 105 cm in fork length at age 3, 140 cm at age of 5 and 163 cm at age 7. Bigeye tuna become mature at about age 3 and a half. Young fish form schools mostly mixed with other tunas such as yellowfin and skipjack. These schools are often associated with drifting objects, whale shark and sea mounts. This association appears to weaken as bigeye grow larger.

Various pieces of evidence such as a genetic study, 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.

Information on vertical and horizontal movements was provided this year from the archival tagging conducted near the Canary Islands. Young fish tagged indicated both associated (in association with boats used as FADs) and unassociated behavioral patterns that was judged from the swimming depth. When associated, tagged fish swam shallower depth between 10 and 100 m deep while it moved extensively between the surface and 400 m deep when it was unassociated. Tagged fishes did not move very much during the time at liberty of one year.

There is no other document presented this year that directly dealt with the biology of this species.

BET-2. Fisheries indicators

The most noteworthy trend in fisheries observed is the general declining trend in total catch of this species after a high peak (121,000 t) in 1999. Total annual catch went down to less than 85,000 t since 2002. Provisional 2005

total catch is about 60,000 t, though this is considered to be provisional and incomplete estimate as some countries did report their Task I data while others did not **(BET-Figure 1)**. The decline of longline catch is nearly 50% between 1999 and 2005, and this 2005 low longline catch (35,000 t) was not recorded since 1983.

Among the longline countries/entities, Chinese Taipei reduced its catch in 2005 by the largest amount followed by Japan. It was reported that the number of Chinese Taipei boats decreased during the latter half of 2005. However, the Japanese fleet indicated less declined trend so far.

Purse seine and baitboat catches also decreased by similar percentage. The number of boats for purse seine and baitboat operating in the equatorial waters also indicated a large decline. In addition, most of the purse seiners operating in the Atlantic consisted of aged boats over 25 years old. Among the surface fishing countries, Spain, Ghana and France also reduced their catch while Portugal recovered its catch since 1998. The area of fishing has not shifted during the recent years, as the geographical catch distribution is shown in **BET-Figure 2**.

BET-Figure 3 shows bigeye tuna mean weight by the main fleets, which should be regarded as preliminary pending a planned evaluation of updated catch-at-size data. Longline is the largest at about 40-60 kg followed by baitboat in the northeast Atlantic followed by baitboat in eastern tropical waters, purse seine in eastern tropical waters and Ghanaian fisheries. All mean sizes indicated some fluctuation and decreased slightly except for longline fishery.

BET-3. State of the stock

The Committee again noted that the current estimate of MSY of bigeye (about 100,000 t) is considerably higher than that estimated by the SCRS up to the mid-1990s (close to 70,000 t). This increase is chronologically linked, on the one hand to the increased catches of small bigeye associated with FADs (which has logically decreased the MSY), and on the other hand to the increase in longline effort targeting adult bigeye. This increase in the CPUE was totally unforeseen by the SCRS ten years ago. It is essential that the assessments that will be carried out by the SCRS in 2007 attempt to explain the causes of this unforeseen increase in the estimated MSY and, in particular, whether or not it is due to the increased productivity of the stock or artificial causes in data and methodologies applied by the SCRS in the early 1990s.

The 2004 assessment indicated that the stock has declined due to the large catches made since around the mid-1990s to around or below the MSY level, and that fishing mortality exceeded F_{MSY} for several years during that time period. Projections indicate that catches of more than 100,000 t will result in continued stock decline. Given the high uncertainties in the catches, abundance indices and other parameters used in the assessment, catch levels of around 90,000 t or even lower values would facilitate the recovery of the stock **(BET-Figure 4)**. However, updated relative abundance on bigeye suggests that the stock has continued to decline in recent years in contradiction to the projection result **(BET-Figure 5)**. Thus, a full stock assessment for this stock in 2007 is warranted.

BET-4. Effects of current regulations

BET Recommendation 04-01 sets a number of regulations for 2005-2008. First, TAC is set at 90,000 t. Second, CPCs/Entities, whose 1999 catch reported in 2000 was larger than 2100 t, should limit the number of fishing boats whose size is larger than 24m length overall, to less than the average number in 1991 and 1992. Third, there is also a specific limit for the number of longline vessels for China (45), Chinese Taipei (98) and Philippines (8). Panama is allowed to operate up to 3 purse seiners. Fourth, 2005-2008 catch limits are also set for China (6,900-7,400 t), Japan (25,000-27,000 t), EC (24,000-25,000 t), Panama (3,500 t), Ghana (4,000-5,000 t) and Chinese Taipei (16,500 t). The limits for the number of fishing vessels are difficult to know as there are no data available to the Committee. However, the 2005 catch for specific CPCs/Entities is less than the respective limit.

The last regulation stated in 04-01 was the closure for the surface fishing in the area 0°-5°N, 10°W-20°W during November in the Gulf of Guinea. Since 2005 is a transitional year from a old closure of surface fishing to new one, the evaluation of effectiveness of this closure is too early to make it.

The attachment of Recommendation [Rec. 05-02] requests Chinese Taipei to ensure data reporting consistent with ICCAT rules as well as the evaluation of its historical data submitted to ICCAT. The Committee acknowledged the intensive efforts being undertaken by Chinese Taipei. The Committee believes that the resulted outcomes will meet the requirements of the above Recommendation and will certainly benefit the upcoming bigeye stock assessment.

ATLANTIC BIGEYE TUNA SUMMARY

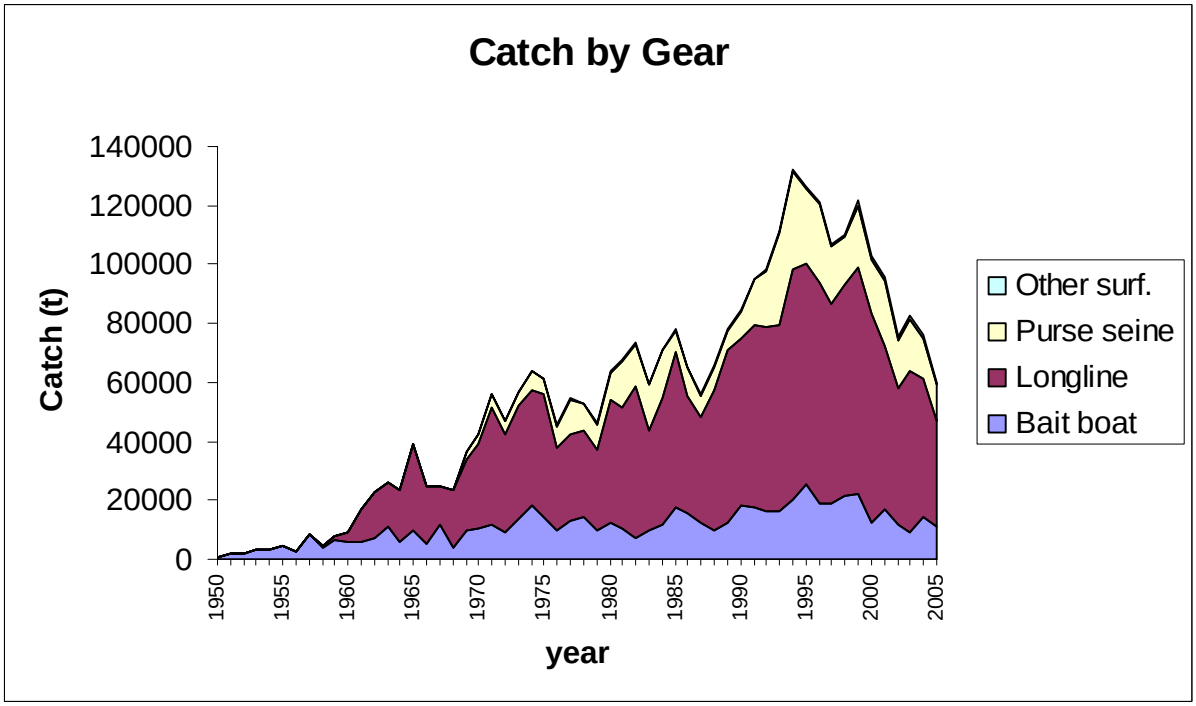
Maximum Sustainable Yield (likely range[1])	93,000 t - 114,000 t
Current (2005) Yield[2]	60,000 t
Replacement Yield (2003)[1]	89,000 - 103,000 t
Relative Biomass (B_{2003}/B_{MSY}) [1]	0.85 - 1.07
Relative Fishing Mortality: (F_{2002}/F_{MSY}) [1]	0.73 - 1.01
Conservation & management measures in effect:	[Rec. 04-01] replaced [Rec. 79-01 and Rec. 99-01] after June, 2005. − Total allowable catch is set at 90,000 t − Catch limits for those who reported 1999 catch in 2000 was larger than 2,100 t. − 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 0°-5°N and 10°W-20°W.

[1]Range based on point estimates from various production models and including a delay-difference model. Other models applied during the assessment resulted in estimates outside this range.
[2]Provisional figure, subject to change in the future.

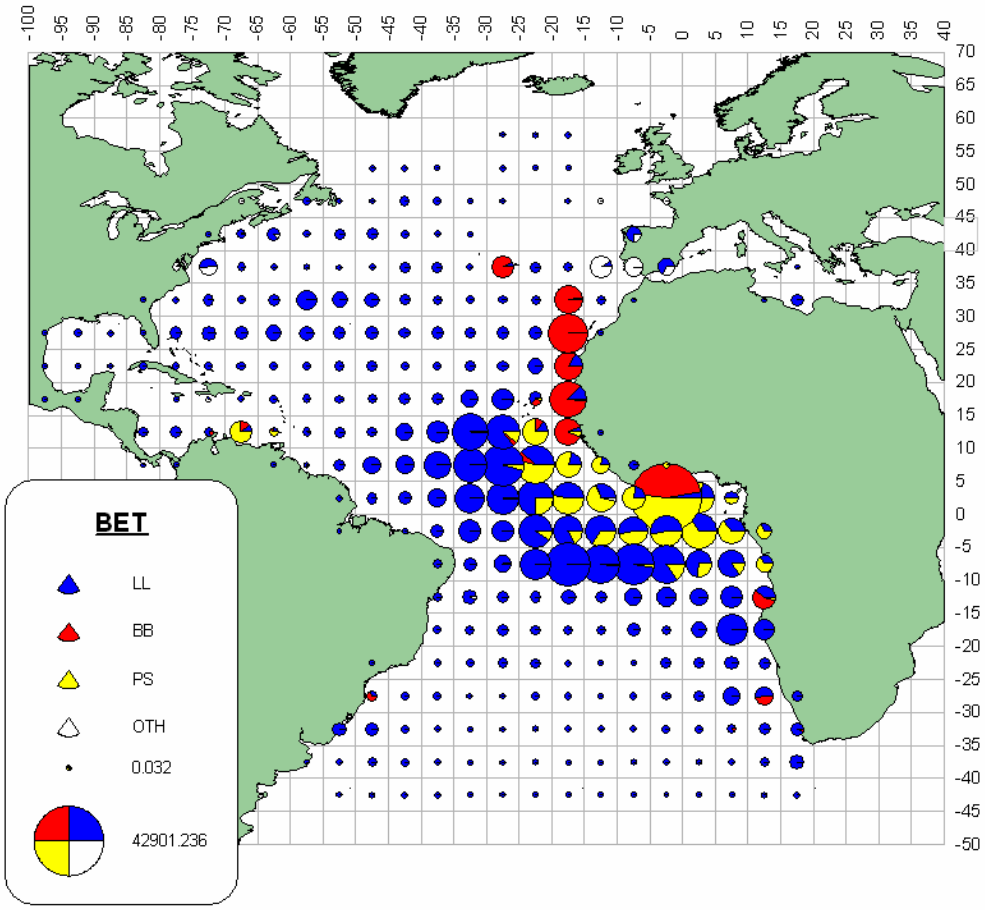
BET-Table 1. Estimated catches (t) of bigeye tuna *(Thunnus obesus)* by major area, gear and flag.

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL		67753	73493	59370	71052	78215	65396	55976	65796	78068	84337	95264	98434	111568	132225	126284	121131	106476	109890	121498	102635	95821	75743	82804	76093	59818
	Bait boat	10124	6922	9796	11439	17651	15618	12631	9710	12672	18106	17750	16248	16467	20290	25552	18959	18640	21263	22360	12312	16870	11639	9086	14035	11030
	Longline	41608	51805	33757	43303	52595	39942	35570	47758	58389	56537	61556	62359	62871	78296	74816	74900	68251	71836	76527	71194	55265	46417	54463	47436	35724
	Other surf.	365	290	163	247	415	550	626	469	636	287	434	604	648	974	561	353	536	429	1373	1221	1623	1496	1342	1234	534
	Purse seine	15656	14476	15654	16063	7554	9286	7148	7859	6371	9407	15524	19223	31582	32665	25355	26919	19049	16362	21239	17908	22062	16191	17913	13388	12530
	Angola	0	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	0	100	41	72	50	17	78	22	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	0	24	17	18	18	6	11	11	0	
	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	40	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	0	0	0	
	Brasil	505	776	521	656	419	873	756	946	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455	1496	1081
	Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	
	Canada	0	0	0	0	0	11	144	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143	187
	Cape Verde	72	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	1	1	1	1077
	China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555	6200
	Chinese Taipei	1887	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	21563	17717	11984
	Congo	0	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	0	0	0	0	0	0	0	0	
	Cuba	711	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	5	0	0	0	
	EC.España	10010	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524	10969	8251	7618
	EC.France	8020	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926	2816
	EC.Ireland	0	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	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	3086	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3313	1498	1605	2590	1655	3204	4053
	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	0	21	28	0	
	Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	0	0	0	
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	1	87	10	0	0	0	184	150	121	0	0	0	
	Ghana	780	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	7431	13252	11460	5586	14095	5893	4816	6944	2333
	Grenada	0	0	0	0	0	0	0	0	0	0	65	25	20	10	10	0	1	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	998
	Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	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	0	1	0	0	0	0	0	
	Japan	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15306	19572	17064	11338
	Korea, Republic of	12274	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629	770
	Liberia	0	0	0	0	0	0	0	0	206	16	13	42	65	53	57	57	57	57	57	57	57	57	57	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	508	1085	500	400	400	400	400	400	400	31	593	593	0	
	Maroc	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889	929	786
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7	4	5	4
	NEI (ETRO)	0	338	1141	157	0	0	85	20	93	785	1221	2138	4594	5034	5137	5839	2746	1685	4011	2285	3027	2248	2504	1387	
	NEI (Flag related)	0	0	46	369	354	758	1406	2155	4650	5856	8982	6151	4378	8964	10697	11862	16569	24896	24060	15092	8470	531	0	0	
	NEI (UK.OT)	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274	215	177	307
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879	2758	1822	1849
	Norway	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	2500	2844	2732	3165	4461	5173	5616	3847	3157	5258	7446	9991	10138	13234	9927	4777	2098	1252	580	952	89	63	0	1521	2310
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854	1855
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	38	4	8	91	0	0	0	0	1
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	
	Senegal	0	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	407	548	721
	Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162	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	0	6	2	0	0	0	
	South Africa	381	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	53	55	249	239	341	113	270	221
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103	18	
	Sta. Lucia	0	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	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	0	0	0	
	Trinidad and Tobago	0	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.	158	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	482	416	483

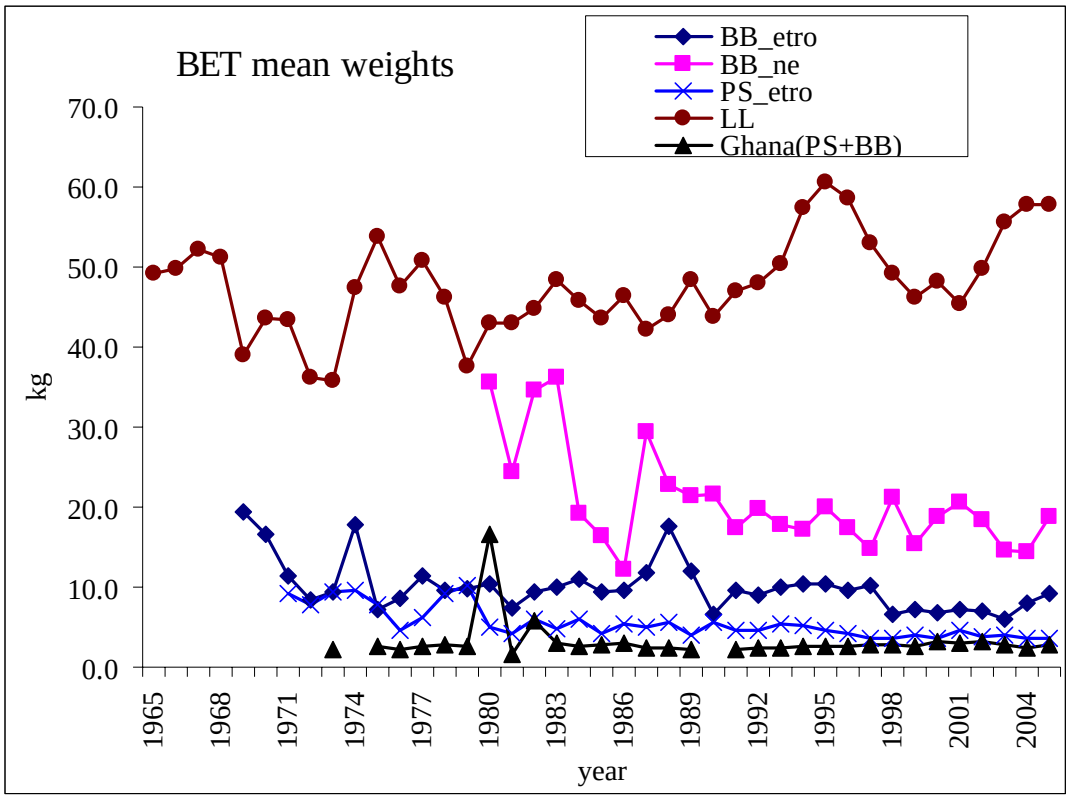
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
U.S.S.R.	2832	635	352	1233	870	1071	1887	1077	424	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
UK.Sta Helena	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5	0	0	
Uruguay	86	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40	62
Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	635	403
Venezuela	1684	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457	189	274	222	140	226	708	629	516	1060	243



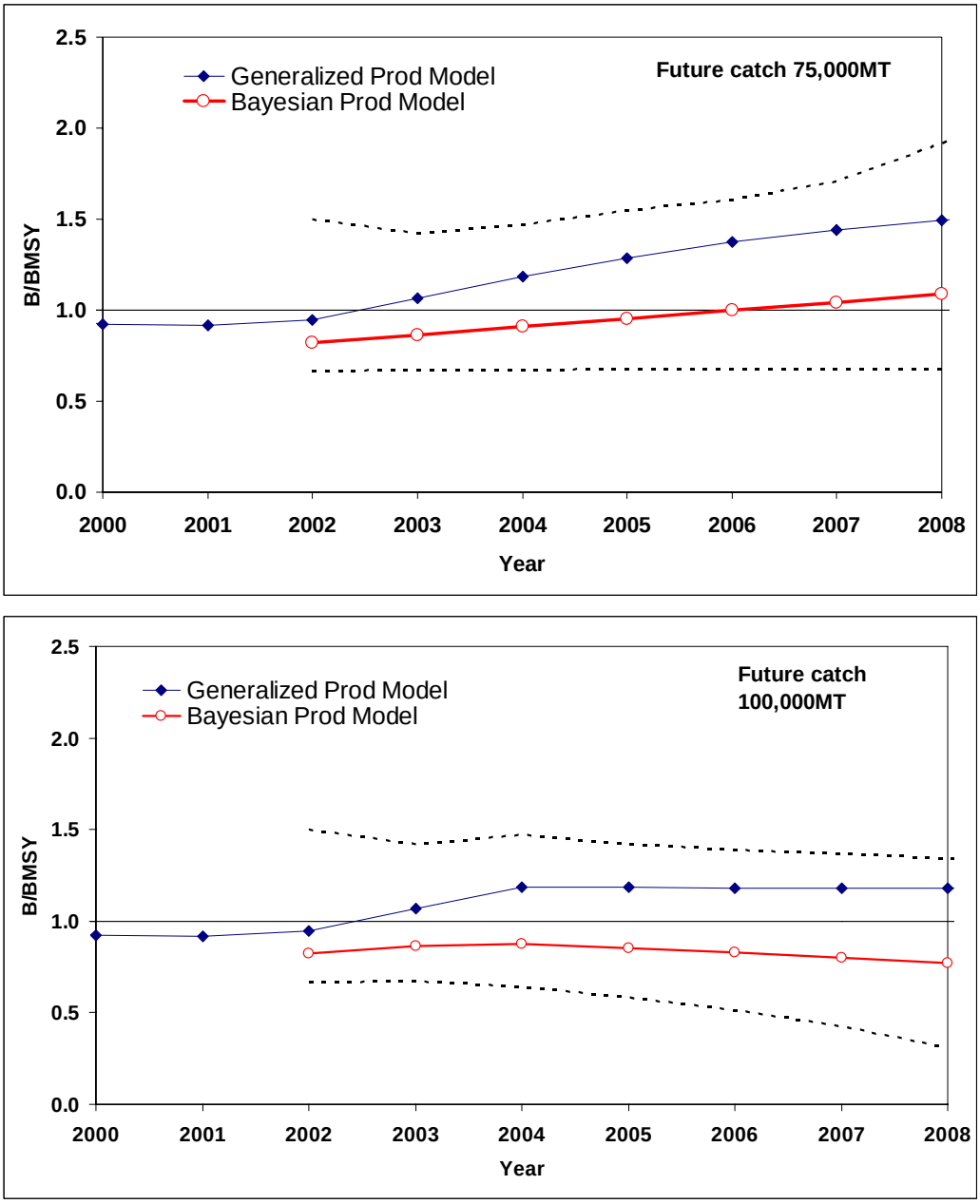
BET-Figure 1. Trend of bigeye catches (1950-2005) by major tuna fishery.



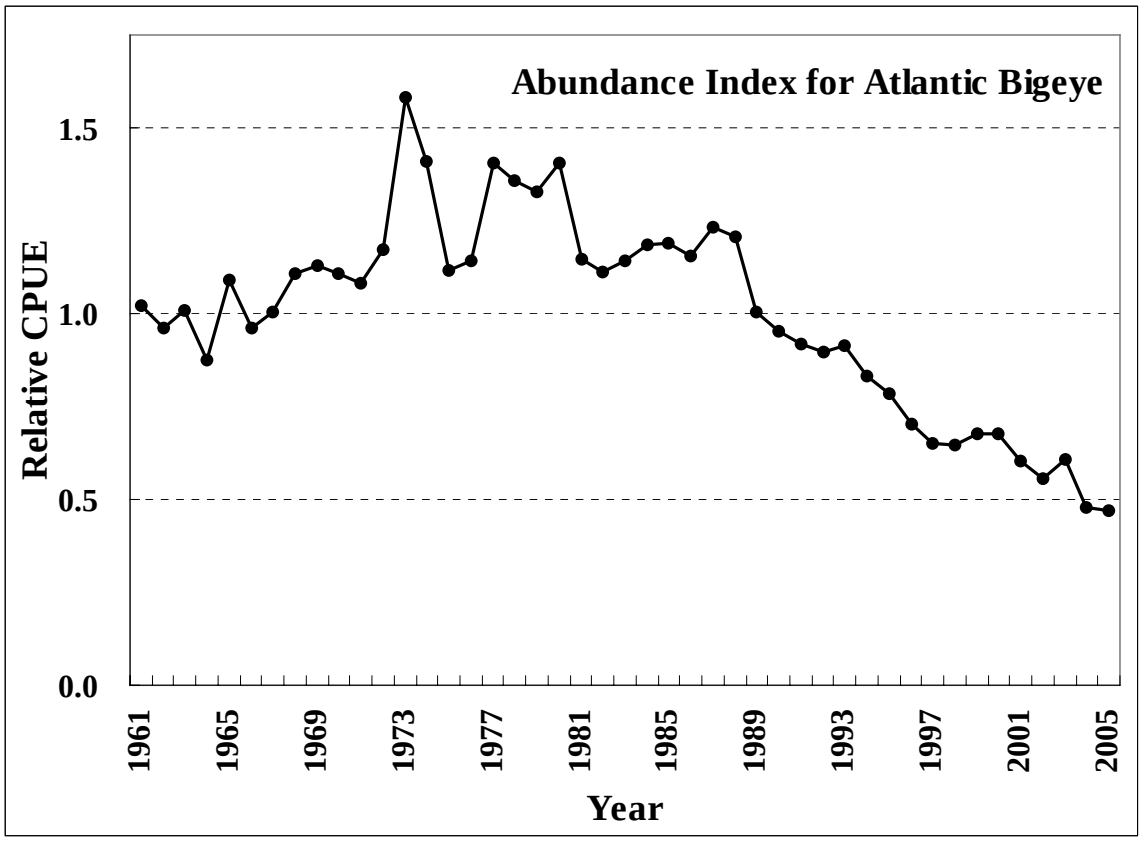
BET-Figure 2. Geographic distribution of bigeye catches for most recent years (2002-2004) by major tuna fishery.



BET-Figure 3. Average weight of bigeye tuna caught by various fisheries. BB_etro: baitboat in the eastern tropical waters, BB_ne: baitboat in the northeast Atlantic, PS_etro: purse seine in the eastern tropical waters, LL: all longline combined in the eastern tropical water, Ghana (PS+BB): Ghana combined for purse seine and baitboat. These data should be regarded as preliminary pending a planned evaluation of updated catch-at-size data.



BET-Figure 4. Future projections from production model results. Constant catches of 75,000 t (top) and 100,000 t (bottom) are assumed after 2003. Dashed lines are 80% confidence intervals from generalized surplus production models (ASPIC).



BET-Figure 5. Relative abundance information (in number of fish) for bigeye tuna in the total Atlantic standardized from the Japanese longline 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 it spawns opportunistically throughout the year and in vast sectors of the ocean and its growth varies according to the latitude. However, a re-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 (see the "Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas", July 2005)

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

SKJ-2. Fisheries indicators

The total catches obtained in 2005 in the entire Atlantic Ocean were close to 166,200 t **(SKJ-Table 1**, **SKJ-Figure 2)** which represents an increase on the order of 17% 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, Guatemala and Ghana, followed by the baitboat fisheries of Ghana, EC-Spain and EC-France. The catches made in 2005 in the East Atlantic amounted to 138,218 t, representing an increase of 19% as compared to the average of 2000-2004 **(SKJ-Figure 3)**. The Committee 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 catches for the purse seiners (as well in the historical catches).

In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. Catches in 2005 in the West Atlantic amounted to 28,028 t, a level close to the average of the historical period in 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. An estimate of the increase by a factor of 3 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.

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 and fishery characteristics. For this reason, 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. The fact that a reduction in abundance for a local segment of the stock would have little repercussion on the abundance of the stock 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 6 to 9)**. Generally, it is noted that the average weight observed in the east Atlantic (close to 2 kg; **SKJ-Figure 8**) is much lower than the estimates given in the other oceans (closer to 3 kg).

The presence of negative values in the development of the Grainger and García index over time could be interpreted as a sign that catches are too high. Therefore, the state of potential over-exploitation would have occurred in 1994-1995, i.e., after the massive use of FADs in fishing operations **(SKJ-Figure 10)**. The group, however, expressed doubts 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, showing a possible decline in the yield of the stock following the introduction of FADs. The 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.

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

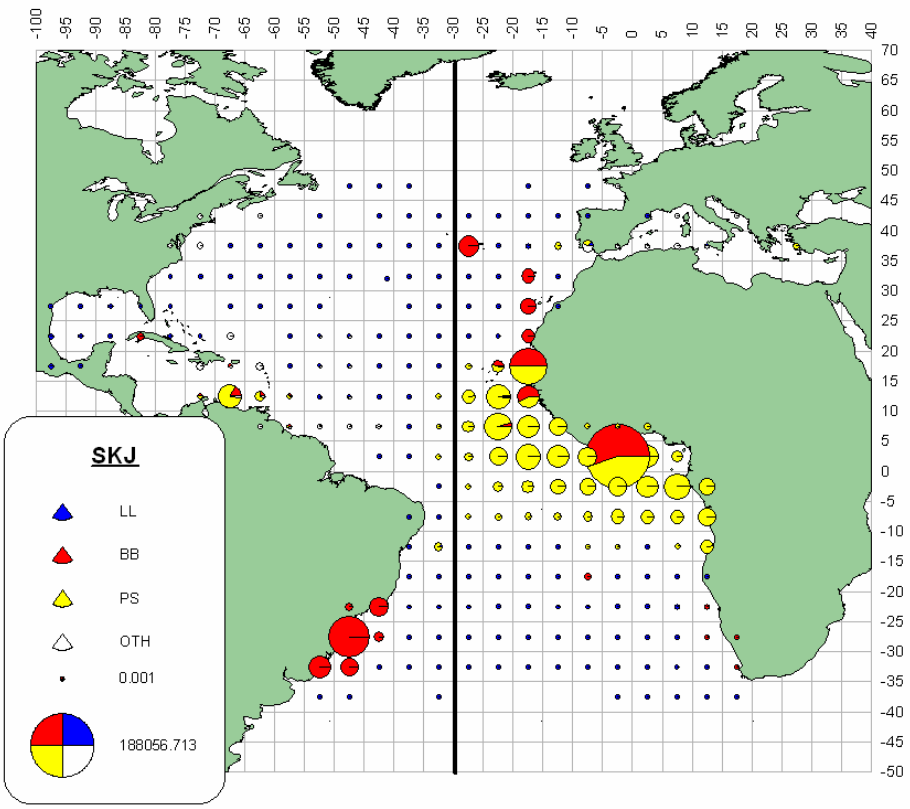
No management recommendations were proposed for this species.

ATLANTIC SKIPJACK TUNA SUMMARY		
	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2005) Yield	138,218 t	28,028 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	None	None

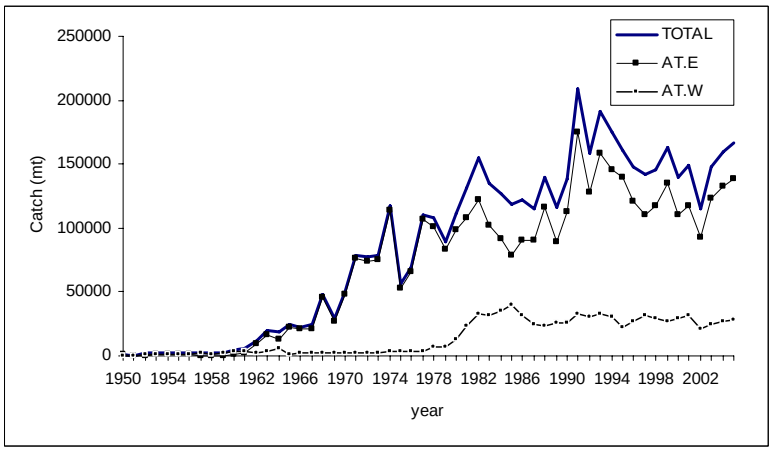
SKJ-Table 1. Estimated catches (t) of skipjack tuna *(Katsuwonus pelamis)* by major area, gear and flag

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			131061	154909	135038	126826	118713	122172	114566	139962	116120	138659	208455	158283	191738	175332	161339	148110	142338	145876	162705	139935	149302	114988	147728	159869	166261
	AT.E		107941	122368	102669	91230	78441	90021	90402	116226	89738	112549	175052	128128	158517	145382	139480	120548	110626	116789	135349	110628	117851	93388	123604	132938	138218
	AT.W		23073	32520	31839	35596	40272	32151	24164	23736	26382	26110	33404	30155	33221	29949	21859	27562	31712	29087	27356	29307	31451	21507	24125	26930	28028
	UNCL area		47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	0	15
Landings	AT.E	Bait boat	38918	44488	34873	28085	29868	30009	38803	48015	41000	36569	41611	35660	31656	37817	33691	32047	38624	42012	41403	30547	44438	23838	32466	45021	45310
		Longline	22	2	62	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	58	83	323	428
		Other surf.	2528	3054	2242	1328	219	1640	1040	1332	1469	1178	1890	1449	1028	311	308	323	138	930	288	2335	662	535	580	1046	2212
		Purse seine	66473	74824	65492	61795	48348	58353	50553	66875	47260	74802	131545	91016	125831	107244	105478	88171	71818	73762	93616	77698	72698	68958	90474	86548	90269
	AT.W	Bait boat	17999	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737	21366	23537	25514
		Longline	9	23	8	25	24	8	6	9	25	23	33	29	20	16	33	19	12	21	58	23	60	143	95	220	233
		Other surf.	410	390	653	842	567	1657	518	355	600	600	872	764	710	1577	2023	452	556	516	481	466	951	511	367	404	314
		Purse seine	4654	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769	1967
	UNCL area	Longline	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	0	
	AT.E	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0	0	0	
		Angola	2532	2257	318	46	131	56	80	30	85	69	66	41	13	7	3	15	52	2	32	14	14	14	14	10	
		Benin	60	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	0	0	0	
		Bulgaria	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	398	371	371	7231
		Cayman Islands	1800	30	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	4	0	0	0	0	0	0	
		Chinese Taipei	0	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	23	26	29	26
		Congo	200	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	0	0	0	0	0	0	0	0	
		Cuba	198	189	135	310	246	569	81	206	331	86	0	0	7	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	0	1173	259	292	143	559	1259
		EC.España	35458	38016	28934	46659	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25466	44837	38751	28124
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	26926	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637	19899	21879	14850
		EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	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	102	99	99
		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	14	14
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34	17
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	2825	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8477	4692
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	1	11	51	26	0	59	76	21	101	0	0	0	
		Ghana	7858	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	27667	34150	43460	29950	43340	31887	32766	33600	54322
		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	6389
		Japan	12935	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0	0	
		Korea, Republic of	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	3017	3956	2532	885	1015	1222	1041	428	295	1197	254	559	312	248	5024	684	4513	2486	858	1199	268	281	524	809	4666
		NEI-1	0	1560	3383	927	590	540	791	2994	2263	10516	11335	12409	20291	17418	16235	16211	6161	6748	8893	7127	8122	8550	9688	11137	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0	0	
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	10092	8708	101
		Norway	0	0	0	0	0	0	581	738	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	144	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1559	281	342	0	7126	11490
		Rumania	0	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0	0	0	
		S. Tomé e Príncipe	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1046	733	1271	4874
		South Africa	110	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0	2	2	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	0	1	0	0	
		U.S.A.	2800	79	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.	1750	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta Helena	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63	63	63
		Venezuela	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	1	137	243	505	101	138	90	7	111	106	272	123	50	1	0	1	0	2	0	1	0	0	0	30	
		Barbados	78	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0	0	0	
		Brasil	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416	23037	26388
		Canada	180	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	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	1	2	1	0	1	16	14	14	12

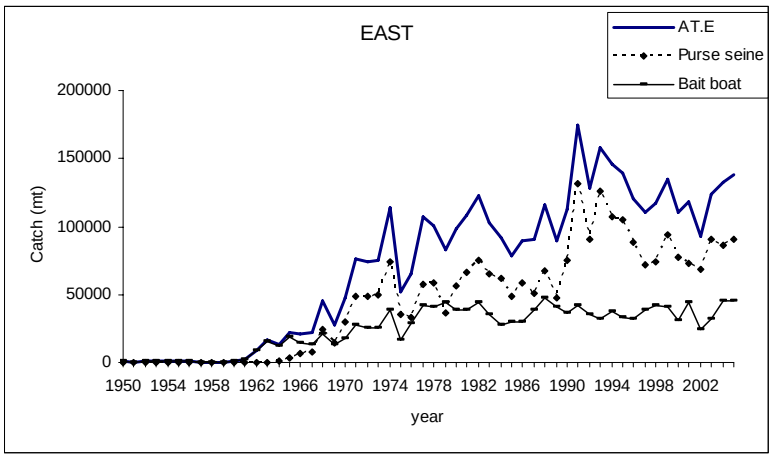
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Colombia	0	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	0	
	Cuba	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	0	0	
	Dominica	0	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30	20
	Dominican Republic	71	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	0	0	0	
	EC.España	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	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	4	1	0	3	29	47
	Grenada	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16	21	22
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	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	
	Korea, Republic of	0	0	0	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mexico	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	6	51	13	54	71	75	9	7
	Netherlands Antilles	40	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	17	28	29	27	20	66	56	53	37	42	57	37	68	97	264	92	251	251
	Sta. Lucia	37	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	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	
	U.S.A.	2753	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	88	79	103	29
	UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Venezuela	4900	12645	12778	16526	10712	5690	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6870	2554	3247	3270	1093
UNCL area	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	0	15
	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	
	Korea, Republic of	47	21	530	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	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	93	0	0	



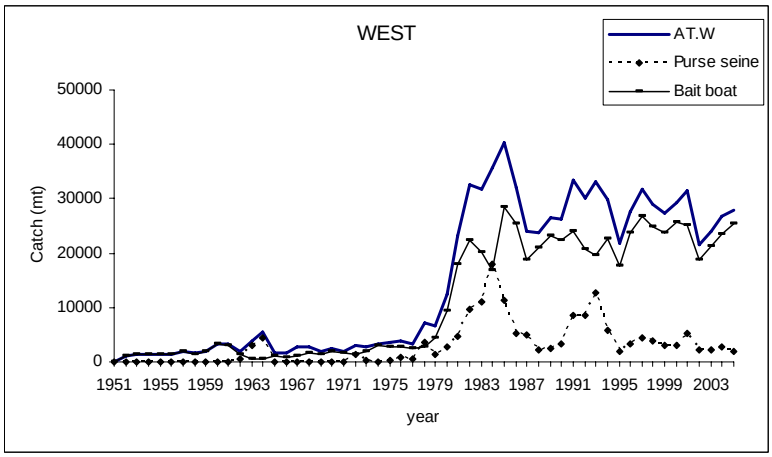
SKJ-Figure 1. Geographic distribution of skipjack catches by gear for the period 2000-2004.



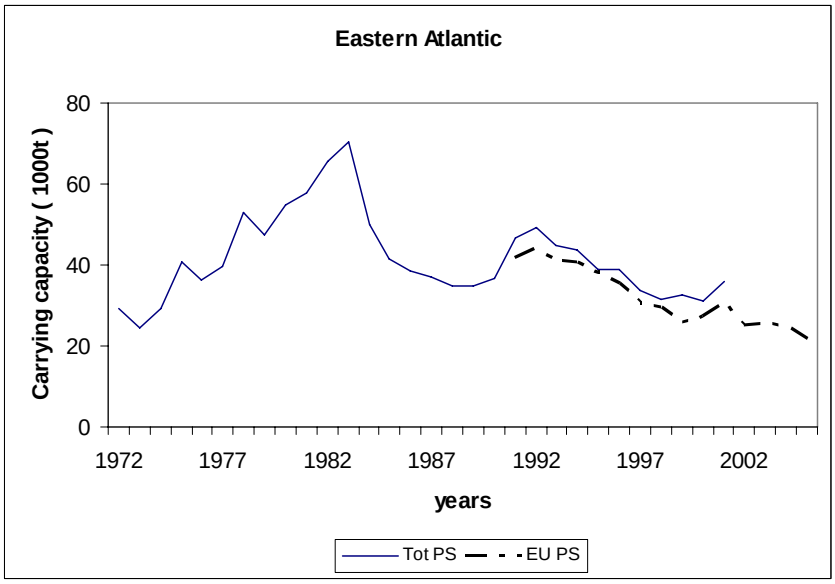
SKJ-Figure 2. Total eastern and western Atlantic skipjack landings (1950-2005).



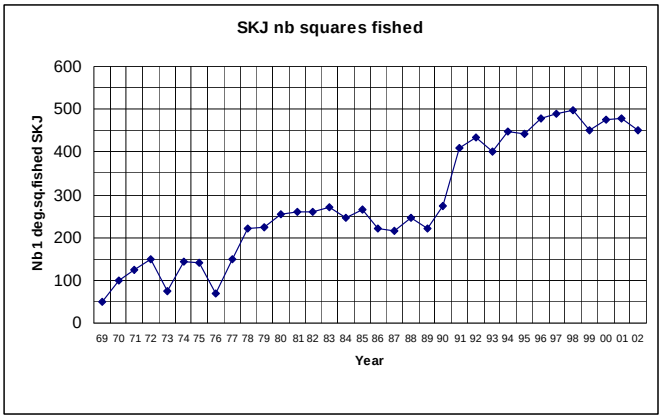
SKJ-Figure 3. Reported landings of skipjack in the eastern Atlantic, by major gear (1950-2005).



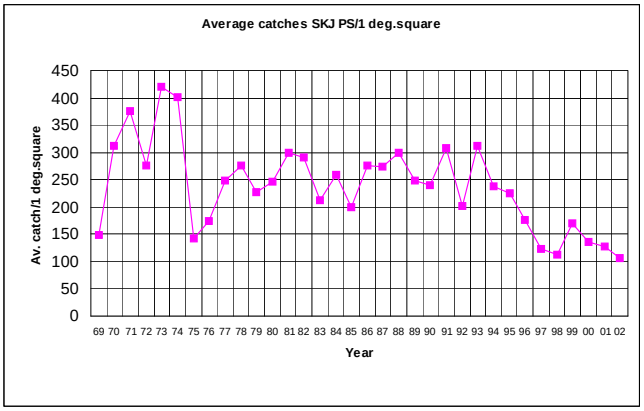
SKJ-Figure 4. Reported landings of skipjack in the western Atlantic, by major gear (1950-2005).



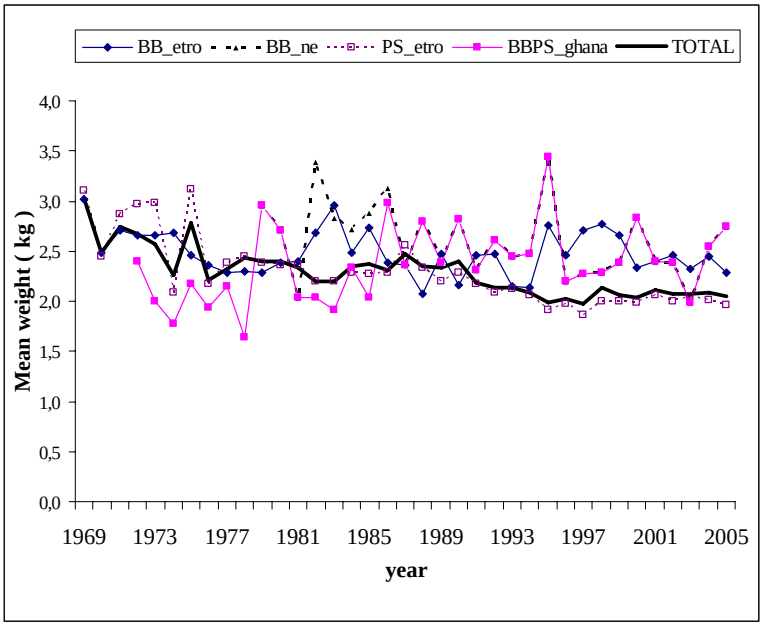
SKJ-Figure 5. Carrying capacity (in 1000 t) of the overall purse seine fleet in the eastern Atlantic (1972-2001) and updated from 1991 to 2005 for EU purse seiners.



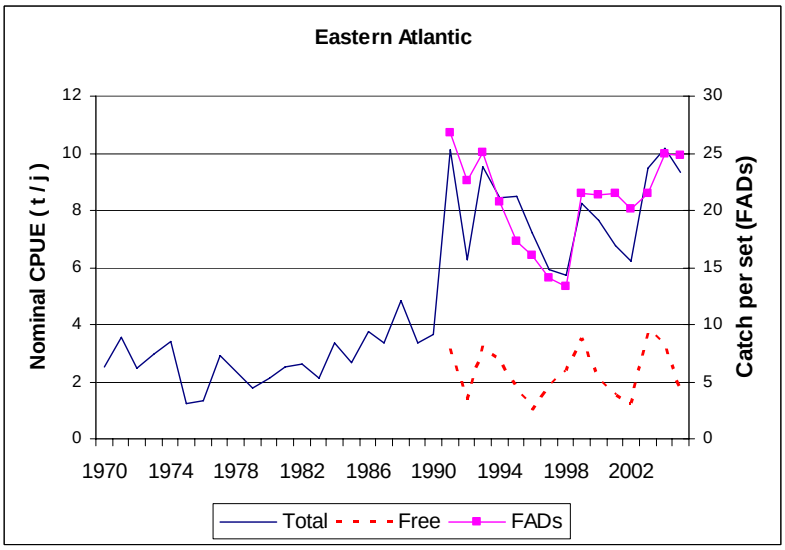
SKJ-Figure 6. Number of 1x1 degree areas (where skipjack catches were reported) for purse seiners fishing in the eastern Atlantic purse seine fisheries (1969-2002).



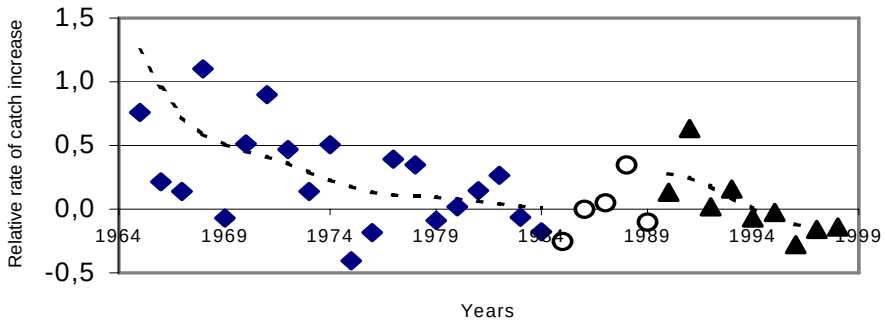
SKJ-Figure 7. Average skipjack catch per 1x1 degree area (where skipjack catches were reported) for purse seiners fishing in the eastern Atlantic (1969-2002).



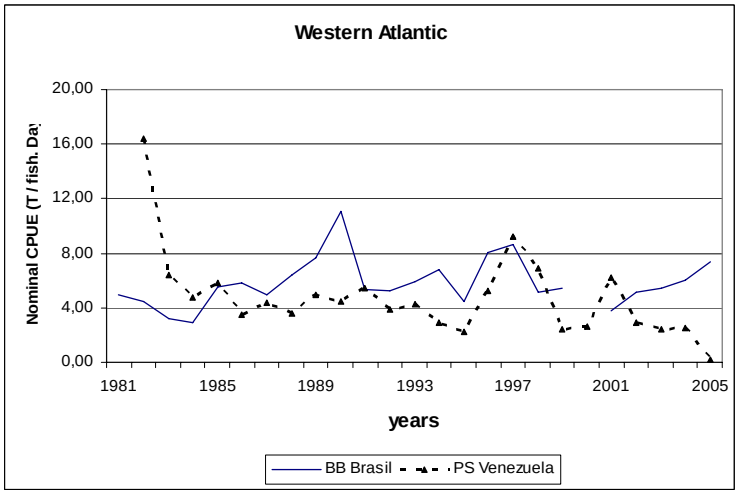
SKJ-Figure 8. Development of the mean weight of skipjack landed in the eastern Atlantic (1968-2005); given the fishing mode in which baitboats and Ghanaian purse seiners collaborate with each other, the mean weight of skipjack caught by this country is shown for the two gears combined.



SKJ-Figure 9. Development of nominal CPUE of SKJ of European purse seiners in the eastern Atlantic. (1970-2005). 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). Before 1990, there was little or no distinction between these two fishing methods (free school vs FAD) in logbooks..



SKJ-Figure 10. Changes over time in 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 the 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 and Venezuelan purse seiners in the western Atlantic (1981-2005).

8.4 ALB – ALBACORE

The last assessment of the North stock was conducted in 2000 (1975-1999) and that of the Southern stock in 2003; no assessment of the Mediterranean stock has ever been carried out. This report updates the latest information and catch data available for 2005.

Complete information for North stock assessment can be found in Report of the ICCAT SCRS Albacore stock assessment session (Anon., 2001) and for South stock in 2003 ICCAT albacore stock assessment session (Anon., 2004)

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: north and southern Atlantic stocks (separated at 5ºN) and a Mediterranean stock (**ALB-Figure 1**). Nevertheless, there is likely intermingling of Indian Ocean and South Atlantic immature albacore which needs further research.

Three scientific documents related to albacore growth were presented to the Data Preparatory Meeting in July 2006. The new growth information provided for the North Atlantic stock, supported previous estimates on albacore growth. A new growth Bertalanffy model was estimated for South stock accordingly to a validation study done on hard parts (otoliths and spines). Present available knowledge about habitat distribution according to size, spawning areas and maturity estimates remained the same for the three albacore stocks considered.

EC Ireland commenced an archival tagging programme onboard a trolling vessel using “dummy” tags, with 2 tag recoveries from 199 releases to date. EC Ireland also initiated a major biological study examining age estimation and stock structure.

ALB-2. Description of fisheries or fisheries indicators

North Atlantic

The northern stock is exploited by surface fisheries targeting mainly immature fish (50cm to 90 cm FL) and longline fisheries targeting immature and adult albacore (60-120 cm FL). The main surface fisheries are carried out by EC fleets (Spain, France, Portugal and Ireland) 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 autumn. The main longline fleet is of Chinese Taipei and operates in the central and western North Atlantic all year round. The geographical distribution of the Japanese longline fishing effort in 2005 showed a tendency of a higher concentration of fishing effort in the temperate central north Atlantic between 25°N and 35°N. The seasonal distribution clearly indicated a high concentration of fishing effort in areas such as the south of Iceland, off the east coast of North America and in the inter-subtropical areas mainly between 20ºN and 20ºS, with fishing taking place in the 1st and 4th quarters of year,

Total reported landings for the North Atlantic generally declined since 1983, largely due to a reduction of fishing effort by traditional surface (trolling and baitboats) and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). Some stabilization followed in the 1990s, mainly due to the increased effort and catch by new surface fisheries (driftnets and mid-water pair pelagic trawl) with a peak in 1993 at 38,063 t.

Catches decreased to the lowest on record in 2002 caused by a decrease in catches in the surface fishery. The declared catch in 2005 was 34,624 t, higher than the reported catch of 25,159 t in 2004. It was observed that reported landings in 2005 were incomplete **(ALB-Table 1)**. Two documents presented to SCRS 2006 provided catch statistics as well as fishery information monitored for Spanish bait boat and troll fisheries. The surface fisheries accounted for the bulk of the total catch (90%) observed in 2005. The baitboat and troll fleets catches increased by approximately 28% and 36%, respectively, in comparison to 2004 catch. The surface fishery for EC-France was almost 3 times higher than the reported catch in 2004. On the other hand, reported longline catches of Chinese Taipei showed a decrease of almost 50% as compared to 2004 catch due to decline of fishing effort.

Scientific documents were provided during the meeting dealing with revision of Task I and Task II Spanish bait boat and troll fisheries. Also a revision of Japanese longline albacore Task I data from 2002 to 2005 was provided. Chinese-Taipei provided Task I and Task II up to 2005 based on improved analyses of logbooks. The Committee also acknowledges the improvement in independent size data collection by Chinese Taipei through a port sampling program in a major Atlantic cannery; the quantity of size data is expected to be increased.

Standardized CPUE series for the U.S. longline fishery and standardized fishing effort for the Spanish troll fishery were updated to 2005 and presented during the meeting.

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 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 2005 was 17,928 t and decreased by about 4,590 t compared to 2004. Furthermore, the total reported landings for 2005 continued to decline since 2001 and was the lowest on record since 1984. The decline in catch is likely due to a reduction in fleet size as is the case for Chinese-Taipei and Brazil. Concerning the Brazilian fleet, 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 2005 the catch of Brazilian longline fleet was 359 t. The decreased availability of albacore in the inshore waters of South Africa and unfavorable foreign currency exchange rates in the last three years has caused a general reduction in the number of active baitboat vessels. In addition, there has been an increasing shift in yellowfin targeting by a component of the South African baitboat fleet due to the high abundance of this species since 2003 in South African waters.. Japanese longline fishing effort in 2005 was exerted in central tropical waters between Africa and South America as well as in the waters along the African coast in the south Atlantic. The seasonal distribution clearly indicated a high concentration of fishing effort in areas such the inter-subtropical areas between 20ºN and 20ºS throughout the year.

A revision of Japanese longline albacore Task I data from 2002 to 2005 was provided. Chinese Taipei provided Task I and Task II up to 2005 based on improved analyses of logbooks. The Committee also acknowledges the improvement in independent size data collection by Chinese Taipei through port sampling program in a major cannery of the Atlantic and the quantity of size data is expected to be increased.

Mediterranean

Reported landings in 2005 accounted for 3,310 t, which represents a decrease with respect to 2004 catches and a decrease of nearly 60% from 2003 catches, which are the largest catch reported in the time series for the Mediterranean Sea albacore stock (**ALB-Table 1** and **ALB-Figure 2**).

ALB-3. State of stocks

The following text reflects results from assessments carried out in 2000 (North stock) and 2003 (South stock). An updated assessment will be undertaken in 2007. For that evaluation the Committee expects to evaluate the hypothesis that recent productivity potentials for the northern have changed compared to historical levels (see **Appendix 5**, Albacore Work Plan 2007).

North Atlantic

In 2003 the Committee concluded that it was inappropriate to proceed with a VPA assessment based on the catch-at-age until the catch-at-size to catch-at-age transformation is reviewed and validated. In 2006 ICCAT Albacore data review meeting was held. Thorough revision of North Atlantic Task I and Task II data was done

and a more robust method for catch-at-size analyses was tested in preparation for the 2007 assessment session (see SCRS/2006/014).

Consequently the current state of the north albacore stock is based primarily on the last assessment conducted in 2000 together with observations of CPUE and catch data provided to the Committee in 2003.

The Committee noted that CPUE trends have varied since the last (2000) assessment, and in particular differed between those representative of the surface fleets (Spain Troll age 2 and Spain Troll age 3) and those of the longline fleets of Japan, Chinese Taipei and the United States (**ALB-Figure 3**). The Spanish age 2 troll series, while displaying an upward trend since the last assessment, nonetheless declines over the last 10 years. For the Spanish age 3 troll series the trend in the years since the last assessment is down, however, the trend for the remainder of the last decade is generally unchanged. For the longline fleets, the trend in CPUE indices is either upwards (Chinese Taipei and US) or unchanged (Japan) in the period since the last assessment. However, variability associated with all of these catch rate estimates prevented definitive conclusions about recent trends of albacore catch rates.

Equilibrium yield analyses, carried out in 2000 and made on the basis of an estimated relationship between stock size and recruitment, indicate that spawning stock biomass was about 30% below that associated with MSY (**ALB-Figure 4**). However, there were considerable uncertainties in these estimates of current biomass relative to the biomass associated with MSY (B_{MSY}), owing to the difficulty of estimating how recruitment might decline below historical levels of stock biomass. Thus, the Committee concluded that the northern stock is probably below B_{MSY}, but the possibility that it is above it should not be dismissed. However, equilibrium yield- per-recruit analyses made by the Committee in 2000 indicate that the northern stock is not being growth-over fished ($F < F_{max}$; **ALB-Figure 5**). In addition, the Committee notes that the current estimate of MSY is below the level of catch realized for several decades in the past (**ALB-Figure 2**). There are several hypotheses that could explain this (e.g. environmental vs fishery changes) which could be addressed by including a more extensive historical time series of data in the next assessment.

South Atlantic

In 2003 the Committee assessed the status of the Southern Atlantic albacore stock with an age-structured production model (ASPM), using the same specifications as in 2000, to provide a Base Case assessment for South Atlantic albacore. Results were similar to those obtained in 2000, but the confidence intervals were substantially narrower in 2003 than in 2000. In part this may be a consequence of additional data now available, but the underlying causes need to be investigated further. The estimated MSY and replacement yield from the 2003 Base Case (30,915 t and 29,256 t, respectively) were similar to those estimated in 2000 (30,274 t and 29,165 t). In both 2003 and 2000 the fishing mortality rate was estimated to be about 60% of F_{MSY}. Spawning stock biomass has declined substantially relative to the late 1980s, but the decline appears to have leveled off in recent years (**ALB-Figure 6**) and the estimate for 2002 remains well above the spawning stock biomass corresponding to MSY. A statistical (Bayesian) age-structured production model was used for the first time in 2003. The results from this model were qualitatively similar to those from the ASPM. Projections were carried out using this alternate model.

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. 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 2006. A 1998 Recommendation that limits fishing capacity to the average of 1993-1995 also remains in force. The Committee noted that reported 2001-2005 catches had been below the TAC **(ALB-Table 1)** and is unable to assess whether or not these recommendations have had a direct effect on the stock.

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. Also the total catch by Chinese Taipei, South Africa, Brazil and Namibia were well below the 27,500 t catch limit of parties actively fishing for southern albacore [Res. 02-06]. Japan adhered to its by-catch limit of 4% of the total catch of bigeye tuna in the Atlantic Ocean [Rec. 03-06]. However, the Committee is unable to assess whether or not these catch limits have had a direct effect on the stock.

Mediterranean

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

ALB-5. Management recommendations

North Atlantic

The Committee reiterates the advice that in order to maintain a stable Spawning Stock Biomass in the near future, the catch should not exceed 34,500 t (the 1999 catch level) and extends it until the 2007 scheduled assessment.

South Atlantic

The Committee continues to recommend that in order to maintain SSB in the near future the catch should not exceed 31,000 t until the next scheduled assessment in 2007.

Mediterranean

There were no management recommendations for the Mediterranean stock.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY

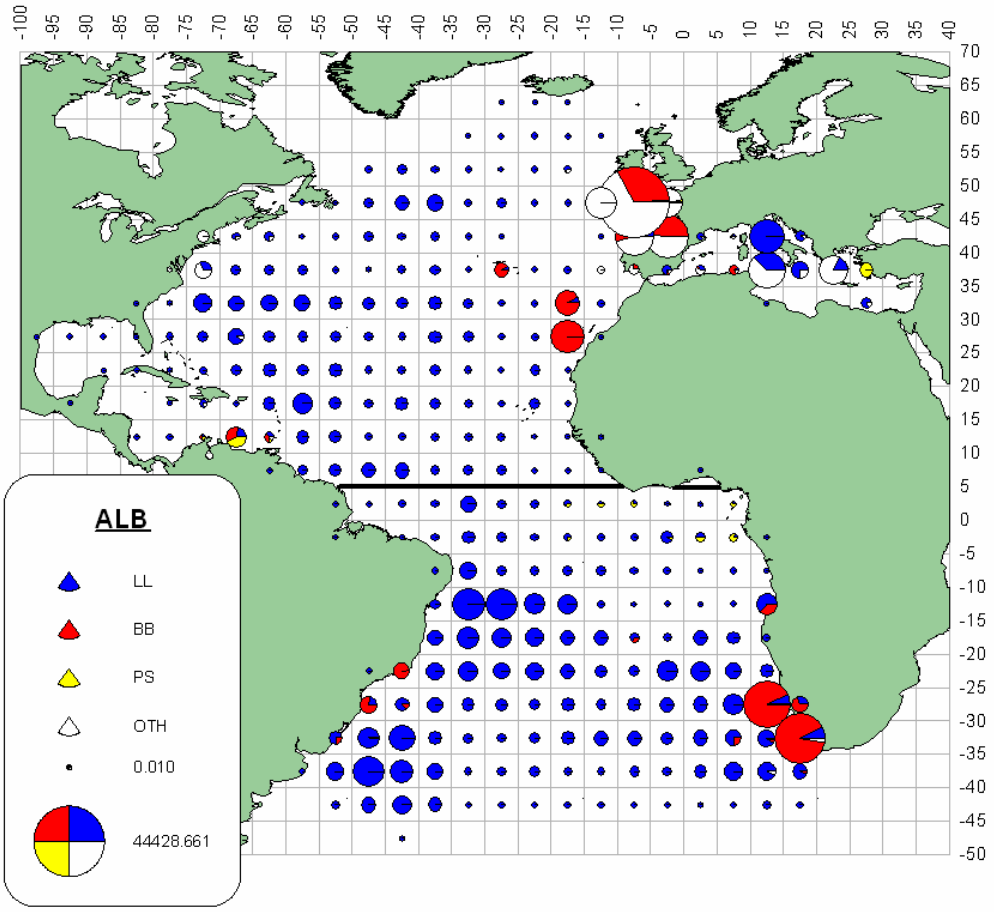
	North Atlantic[1]	**South Atlantic**[2]	**Mediterranean**
Current (2005) Yield	34,624 t[5, 6]	17,928 t[5,6]	3,310 t[5,6]
Maximum Sustainable Yield	32,600 t (32,400-33,100)	30,915 t (26,333-30,915)	Unknown
Replacement Yield (2004)	Not estimated	29,256 t (24,530-32,277)	Not estimated
Relative Biomass[3]			
$B_{current}/B_{MSY}$	0.68 (0.52-0.86)	1.66 (0.74-1.81)	Not estimated
Relative Fishing Mortality[3,4]			
$F_{current}/F_{MSY}$	1.10 (0.99 - 1.30)	0.62 (0.46-1.48)	Not estimated
$F_{current}/F_{MAX}$	0.71 (0.66 - 0.78)	--	Not estimated
$F_{current}/F_{0.1}$	1.25 (1.14 - 1.39)	--	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] VPA results based on catch data (1975-1999). 80% confidence intervals from bootstrap.
[2] ASPM results based on catch data (1956-2002). 80% confidence intervals from bootstrap.
[3] F_{1999} = North Atlantic, Geometric Mean 1996-1998.
[4] North "current" is from 2000 assessment (F_{1999}); South "current" is from 2003 assessment (F_{2002}).
[5] This figure includes reported catch, provisional catch reported to the Committee.
[6] Unclassified area albacore catch of 4130 t was reported to ICCAT in 2005.

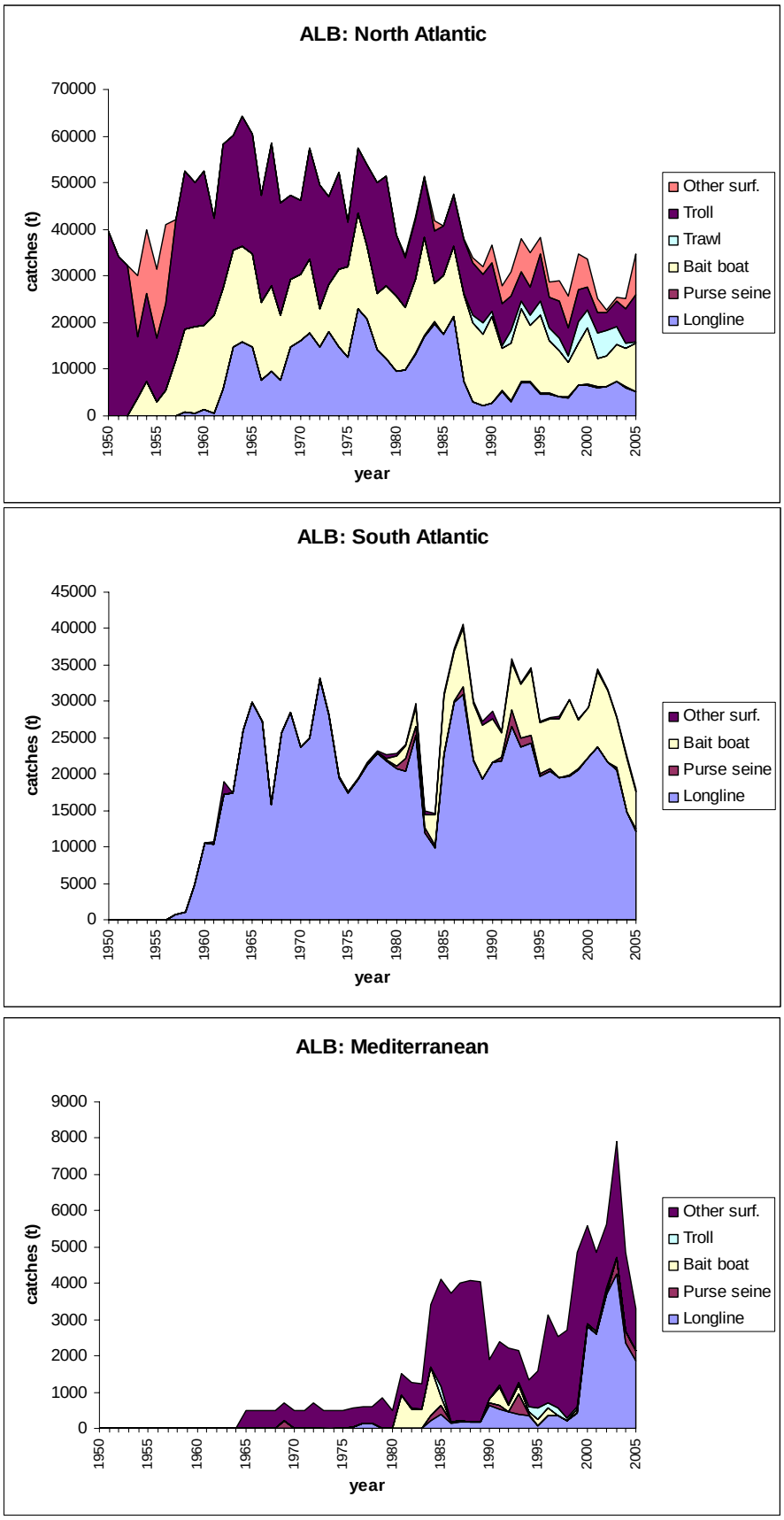
ALB-Table 1. Estimated catches (t) of albacore *(Thunnus alalunga)* by major area, gear and flag

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			60071	73617	67643	59842	76052	88554	82738	68048	63342	67167	56343	69599	73078	71613	67512	60352	59559	58888	67346	71425	70259	60039	61402	58181	59992
	AT.N		34531	42673	51490	41829	40826	47554	38115	33878	32070	36557	27938	30815	38063	35036	38295	28780	28988	25587	34840	33762	25222	22630	25514	25159	34624
	AT.S		24040	29672	14918	14599	31097	37288	40630	30107	27212	28714	25858	35797	32448	34677	27168	27857	27908	30276	27605	29262	34498	31714	27943	22518	17928
	MEDI		1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	2130	1349	1587	3125	2541	2698	4851	5577	4866	5608	7893	4847	3310
	UNCL area		0	0	0	0	0	0	0	0	0	0	168	785	437	551	462	590	121	327	50	2824	5672	87	53	5657	4130
Landings	AT.N	Bait boat	13410	15857	21108	8305	12589	15202	18756	16752	15374	18625	8985	12449	15646	11967	16411	11337	9820	7562	8781	12113	6099	6639	7918	8128	10447
		Longline	9819	13206	16863	19709	17413	21232	7296	3013	2228	2683	5304	3103	7020	7196	4776	4620	4044	3875	6621	6614	5975	6160	7288	5945	5074
		Other surf.	523	694	367	2231	108	213	343	994	1662	3865	3999	5173	7279	7506	3555	3337	4378	6846	7646	6119	3089	376	1013	2163	8567
		Purse seine	0	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	118	211	348	63
		Trawl	1	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331	3836	1089	260
		Troll	10778	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5249	7487	10214
	AT.S	Bait boat	1721	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712	6973	7475	5084
		Longline	20426	25255	11941	9834	22672	29815	30964	21828	19407	21590	21859	26519	23650	24224	19718	20472	19447	19699	20588	22282	23747	21654	20619	14726	12055
		Other surf.	89	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	247	9	125	58	377	323	94	316	288
		Purse seine	1804	1349	699	365	182	244	948	185	0	4	408	2395	1380	1023	349	216	104	215	183	49	15	25	256	0	502
	MEDI	Bait boat	900	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0	0	
		Longline	0	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	3706	4248	2345	1864
		Other surf.	600	700	700	1716	2973	3552	3782	3879	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4265	2689	2193	1755	3166	2176	1160
		Purse seine	0	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	0	1	478	326	287
		Troll	0	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0	0	
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	18	0	5657	4098
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	
		Purse seine	0	0	0	0	0	0	0	0	0	0	8	122	68	55	63	41	13	219	0	5	10	14	53	0	32
Discards	AT.N	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.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5	5	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	
		Canada	0	0	0	0	0	1	21	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27	52
		Cape Verde	0	0	10	10	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	14	8	20	0	0	21	16	57	196	155	32	112
		Chinese Taipei	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278	2540
		Cuba	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	0	0	0	
		EC.España	20819	25478	29557	15685	20672	24387	28206	27557	25424	25792	17233	18176	18380	16998	20197	16323	17294	13285	15364	15965	9177	8952	12530	15379	20221
		EC.France	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4289	3641	2537	8170
		EC.Ireland	0	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175	306
		EC.Portugal	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513	556
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0	0	6
		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	0	4	7	0	
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25	29
		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	1740	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	688	1126	711	682	868	1723
		Korea, Republic of	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0	0	0	59
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	120	178
		Mexico	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	177	494	357	2551	601	525	44	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	0	4	0	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	300	1555	89	
		Sta. Lucia	0	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	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.	472	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	480	444	646	487
		U.S.S.R.	51	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	0	1	0	2	2	2	0	0	1	1
		Venezuela	331	137	823	1076	467	172	26	137	41	95	319	205	246	282	279	315	49	107	91	1374	349	162	424	457	175
	AT.S	Argentina	2	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 (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0	0	0	
		Brasil	276	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522	556
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	39	89	26	30	26	112	95
		Chinese Taipei	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288	10730
		Cuba	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0	0	0	

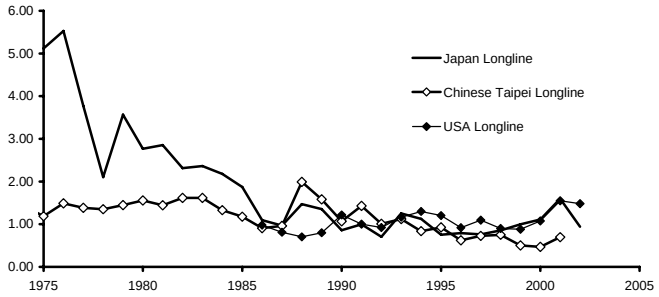
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		EC.España	889	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	573	836	376	81	24
		EC.France	912	947	372	7	18	35	100	0	0	0	50	449	564	129	82	190	38	40	13	23	16	18	63	0	478
		EC.Portugal	0	0	0	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9	43
		Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0	0	0	
		Japan	558	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	554	341	231	315	500	387
		Korea, Republic of	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0	5	37	42
		Maroc	0	113	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	4	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	915	950	982	1199	1429	1162	2418	3419	2962	3152	3328	2344
		Panama	129	210	0	0	0	280	924	0	0	0	240	130	168	212	12	22	0	2	14	0	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	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	2320	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502	3198
		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	27	0	0	
		U.S.A.	2	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2	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.Sta Helena	7	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2	0	0	
		Uruguay	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120	32
	MEDI	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30	255	425
		EC.España	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	475	404	380	126	284	152	200	209	1	138	
		EC.France	0	0	0	141	250	20	60	31	31	121	140	11	64	23	3	0	5	5	0	0	0	1	0	0	
		EC.Greece	0	0	0	0	0	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	950	773	623
		EC.Italy	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912	3671	2248
		EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	2	0	10	15
		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	
		NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0	0	
		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	
	UNCL area	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	8
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	8	122	68	55	63	41	5	27	0	2	10	14	53	0	7
		NEI (Flag related)	0	0	0	0	0	0	0	0	0	0	160	281	159	133	110	180	50	50	50	0	0	0	0	0	
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	192	0	2	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	382	210	363	289	369	58	58	0	0	0	0	0	0	17
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2819	5662	18	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	5657	4098
Discards	AT.N	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	

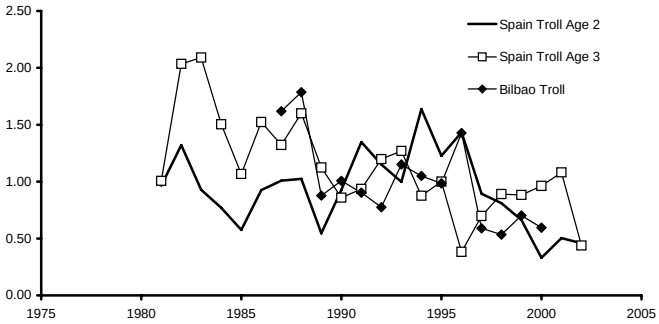


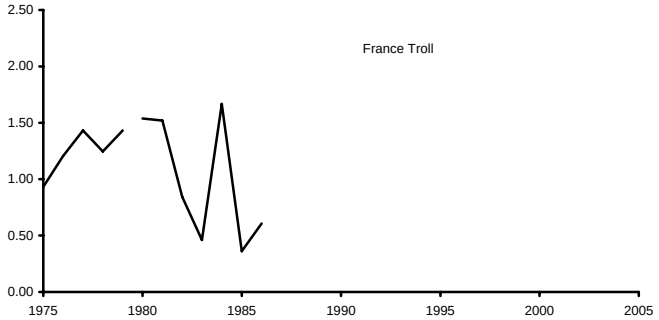
ALB-Figure 1. Geographic distribution of albacore catches for the recent period (2000-2004), by major tuna fishery.

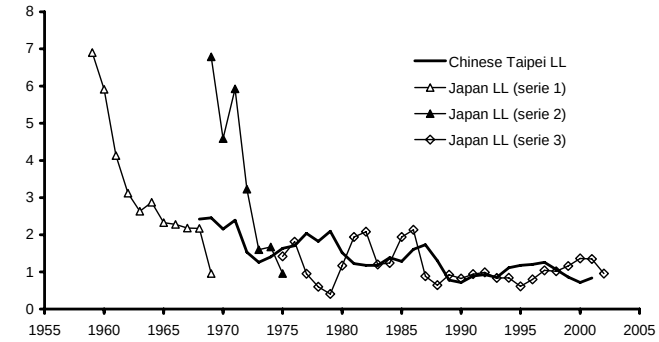


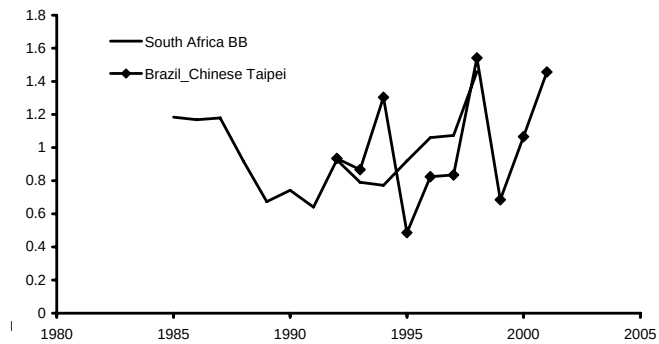
ALB-Figure 2. Albacore landings (t) by stock and major gear types, 1950-2005. Data from the Mediterranean Sea are highly uncertain and provisional in recent years.



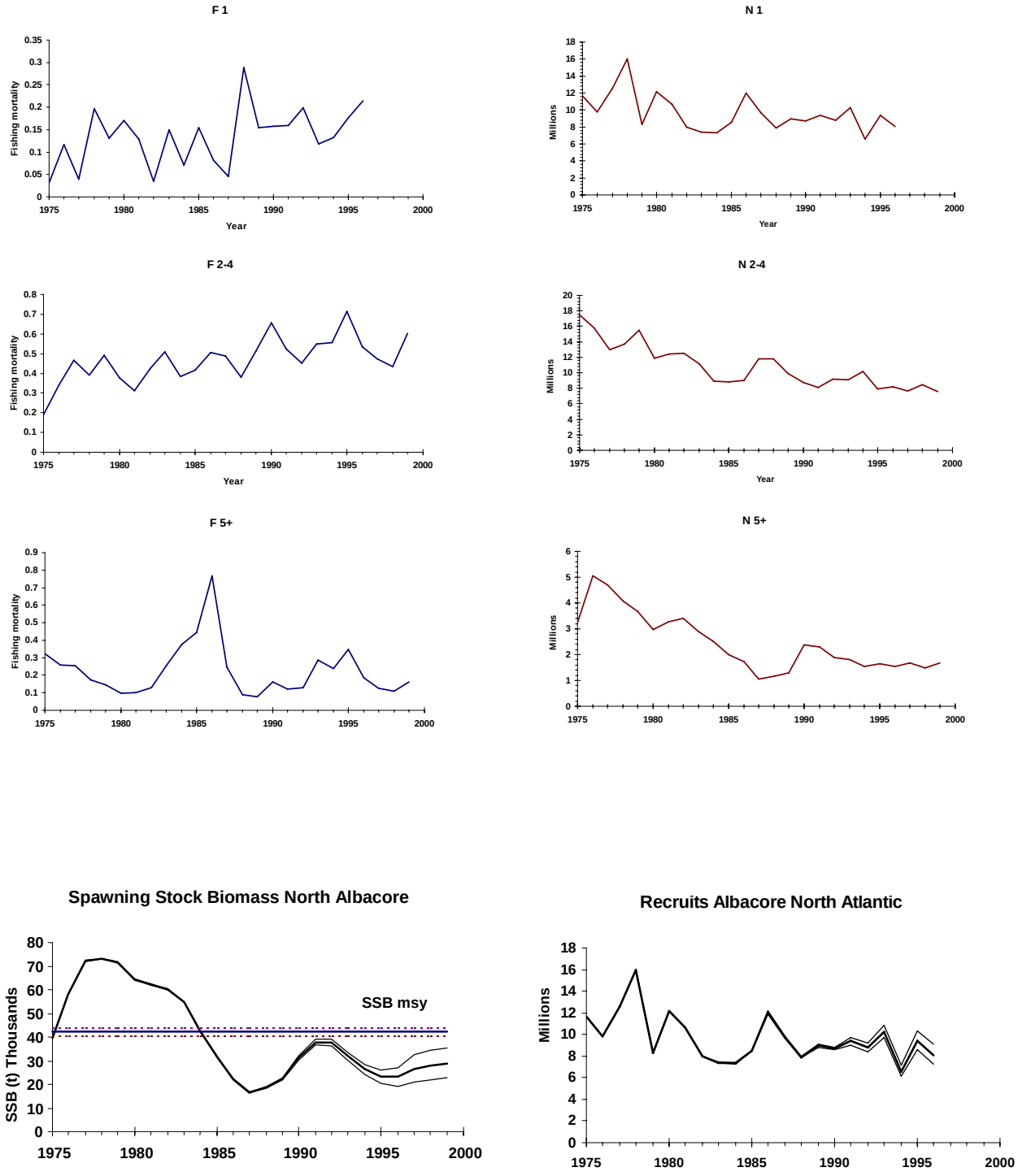




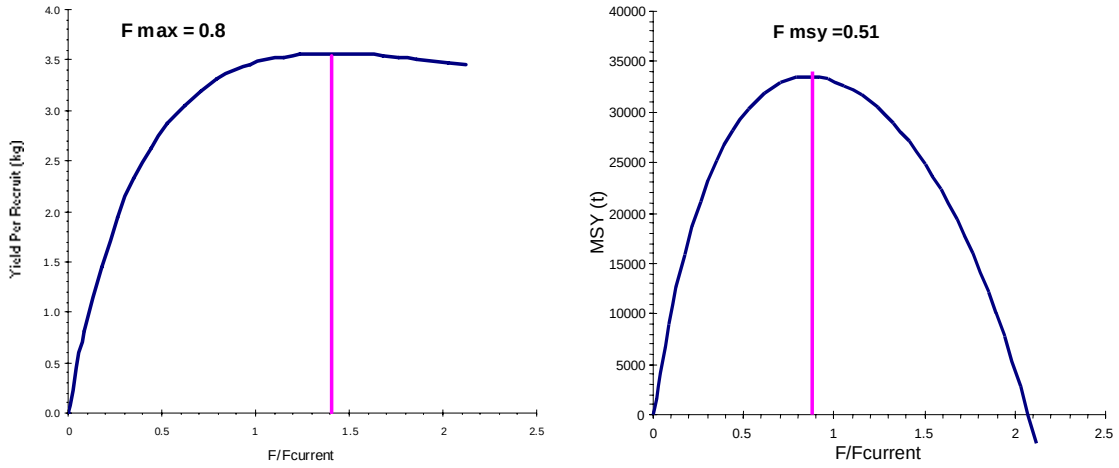




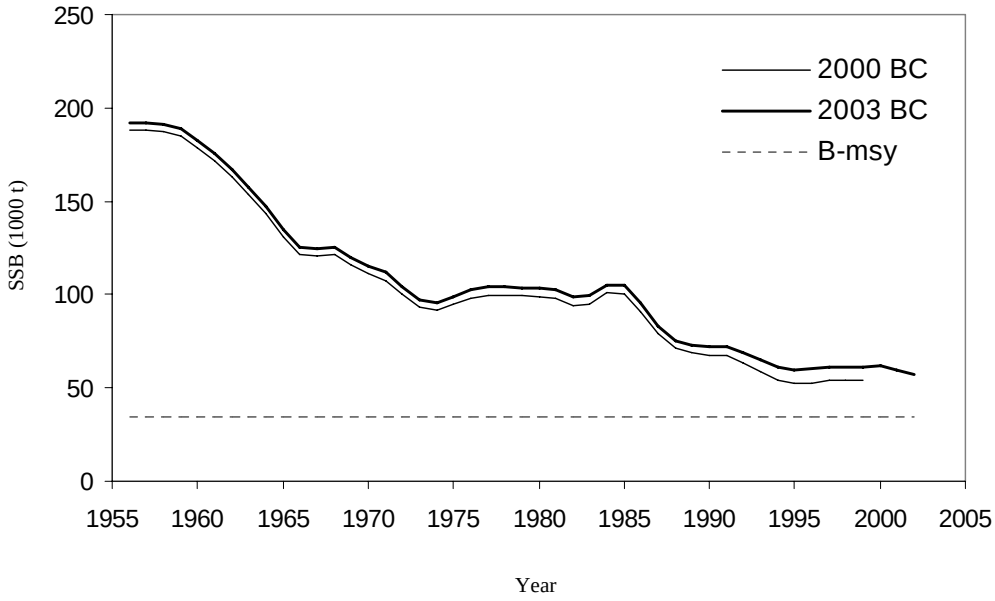
ALB-Figure 3. CPUE series for North (top 3 panels) and South Atlantic (bottom 2 panels) albacore (scaled to the means).



ALB-Figure 4. North Atlantic albacore Base Case VPA estimates (2000 assessment) of fishing mortality rates (F) and numbers of fish by age-groups (top 6 panels), and spawning stock biomass and recruits with 80% confidence limits (bottom panels).



ALB-Figure 5. Yield-per-recruit (left) and equilibrium yield (right) estimated by the 2000 VPA for the northern albacore stock. Fishing mortality (x-axis) is relative to current fishing mortality (F_{1999} = 0.57).



ALB-Figure 6. Spawner biomass for South Atlantic albacore estimated from ASPM fits for the 2003 Base Case (heavy line) and 2000 Base Case (thin line), for comparison.

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 known to mature at 8 years of age (196 cm) in the Gulf of Mexico. However, evidence indicates that the average age of first spawning in the Gulf of Mexico may be older than 10 years.

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 advances in otolith microconstituent analyses, archival tagging and genetics into the 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 catch was stable at 500-600 t as were Japanese catches in 2002 and 2004 (2003 was low for regulatory reasons). However, the United States did not catch its quota in 2004 and 2005 with catches of 899 t and 717 t, respectively. It was noted that these 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 present assessment is consistent with previous analyses in that spawning stock biomass (SSB) declined rapidly in the early 1970's followed by a more gradual decline in SSB through the early 1990's (**BFTW-Figure 2**) to about 21% of the 1975 level. During the period 1994-1998 it appears that SSB recovered somewhat to about 28% of the 1975 level in 1998. However, our 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 1970's. The Group remains uncertain as to the causes of the relatively poor recruitment since 1976 and, therefore, we are less certain about the outlook for recruitment in the future.

Also, note that the assessment incorporates 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 in 2005 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 probably Japan did not have abnormally low catches in 2005 supports the first explanation. On the other hand, other fishery indicators in 2005 (some abundance indices, declining size composition in some areas) support the second explanation.

The SCRS has no strong evidence to favor either explanation over the other, but it noted that the failure of a fishery to take about a third of its TAC, particularly for a valuable species like bluefin tuna, is a reason for concern. 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 this 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. 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 (SCRS 2002), 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.

BFTW-5. Effects of current regulations

No new analyses of the effect of current ICCAT regulations in the western Atlantic were conducted.

BFTW-6. Management recommendations

The Committee has the following advice for consideration by the Commission:

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 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. 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 Agenda Item 15.6.

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

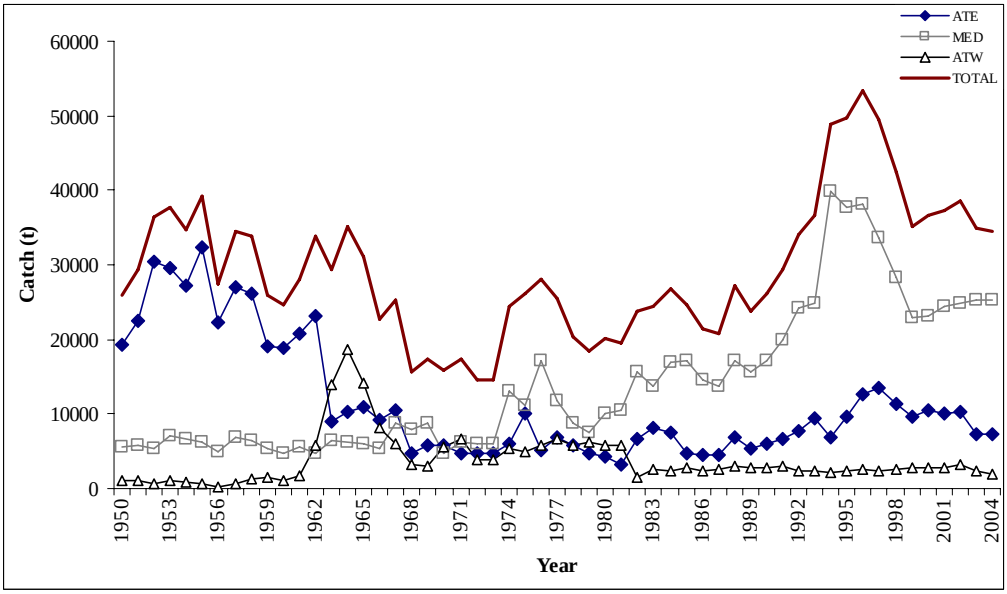
Current (2005) Catch (including discards)	~1,800 t [4]
Short-term Sustainable Yield	~2,300 t
Maximum Sustainable Yield (MSY|R[1,2])	3,200 (3,000-3,400)[2]
Relative Stock Biomass	
SSB_{2004}/SSB_{1975}	0.18
$SSB_{2004}/SSB_{MSY\|R}$	0.41 (0.29-0.54)[2]
Relative Fishing Mortality[3]	
$F_{2004}/F_{MSY\|R}$	1.7
$F_{2004}/F_{0.1}$	3.1
F_{2004}/F_{max}	1.7
Management Measures:	TAC of 2,700 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 The estimate of 1,800 t was made by SCRS and includes a preliminary estimate of Japanese catches of 302 t. Note that **BFT-Table 1**, does not add up to 1,800 t, since official reports were not received at the time of the assessment.

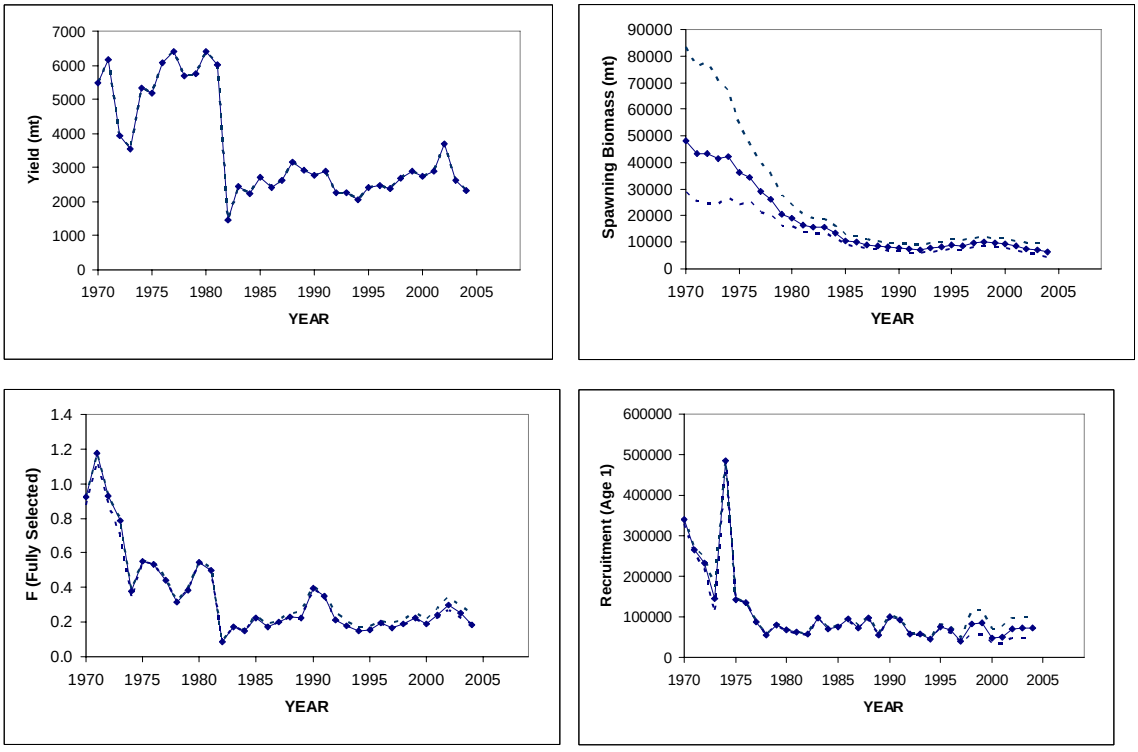
BFT-Table 1. Estimated catches (t) of northern bluefin tuna *(Thunnus thynnus)* by major area, gear and flag.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			19547	23853	24344	26717	24645	21374	20792	27128	23819	26045	29420	34131	36636	48853	49714	53302	49485	42375	35228	36541	37390	38506	34936	34590	22596
	AT.E		3261	6702	8152	7393	4757	4492	4436	6950	5324	6040	6556	7619	9367	6930	9650	12663	13539	11376	9628	10528	10086	10347	7232	7377	3299
	MED		10515	15706	13650	17032	17203	14560	13764	17167	15628	17207	19872	24230	24901	39810	37640	38144	33612	28342	22828	23238	24519	24841	25347	25190	17773
	AT.W		5771	1445	2542	2292	2685	2322	2592	3011	2867	2798	2992	2282	2368	2113	2423	2495	2334	2657	2772	2775	2785	3319	2357	2023	1523
Landings	AT.E	Bait boat	1121	831	1882	2262	2004	1414	1821	1936	1971	1693	1445	1141	3447	1980	2601	4985	3521	2550	1492	1822	2275	2567	1241	1790	41
		Longline	575	2705	2626	1538	535	770	904	1169	853	1496	3197	3817	2717	2176	4392	4788	4534	4300	4020	3736	3303	2896	2750	2041	41
		Other surf.	368	190	1425	949	501	973	668	1220	1020	562	347	834	1548	932	1047	646	511	621	498	703	712	701	560	402	819
		Purse seine	266	655	262	373	86	276	0	0	0	54	46	462	24	213	458	323	828	692	726	1147	150	884	490	1078	871
		Sport (HL+RR)	71	13	0	0	1	1	3	1	2	1	0	0	0	0	0	0	162	28	33	126	61	63	109	87	
		Traps	859	2309	1956	2271	1630	1057	1040	2624	1478	2234	1522	1365	1631	1630	1152	1921	3982	3185	2859	2996	3585	3235	2082	1978	1527
	MED	Bait boat	100	53	0	1699	278	0	0	0	0	25	148	158	48	0	206	5	4	11	4	0	0	1	139	17	
		Longline	342	1550	980	1196	1228	678	799	1227	1121	1026	2869	2599	2342	7048	8475	8171	5672	2749	2463	3317	3750	3670	3212	2564	1351
		Other surf.	935	521	674	1738	3211	3544	2762	2870	3289	1212	1401	1894	1607	3218	1043	1197	1033	1880	2976	1067	1096	990	2536	3776	3311
		Purse seine	8529	12131	10484	9888	11219	9333	8857	11198	9450	11250	13245	17807	19297	26083	23588	26021	24178	21291	14910	16195	17174	18052	17848	17335	12431
		Sport (HL+RR)	22	87	194	275	507	322	433	838	457	1552	738	951	1237	2257	3556	2149	2340	1336	1622	1921	1321	1647	1392	1339	607
		Traps	587	1364	1318	2236	760	683	913	1034	1311	2142	1471	821	370	1204	772	601	385	1074	852	739	1177	481	221	159	72
	AT.W	Longline	3879	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	727	228	542	190
		Other surf.	133	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	110	149	97	91
		Purse seine	910	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32	178
		Sport (HL+RR)	808	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2035	1398	1139	924
		Traps	41	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32	8
Discards	AT.W	Longline	0	0	0	0	0	514	192	215	248	133	199	211	88	83	138	167	155	123	160	222	105	211	232	181	131
		Other surf.	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	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	14	3	0	0	0	0	0	0	
Landings	AT.E	Cape Verde	0	0	10	1	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	85	103	80	68	39	19	41	24
		Chinese Taipei	6	16	2	0	0	0	0	0	0	0	0	0	6	20	8	61	226	350	222	144	304	158	0	0	
		EC.Denmark	3	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0	0	0	
		EC.España	2177	2857	4587	4804	3628	2876	2479	4567	3565	3557	2272	2319	5078	3137	3819	6174	6201	3800	3360	3474	3633	4089	2138	2801	35
		EC.France	153	150	400	602	490	348	533	724	460	510	565	894	1099	336	725	563	269	613	588	542	629	755	518	561	818
		EC.Germany	2	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	0	5	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	14	21	52	22	8	15	3	1	1
		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	17	41	174	34	29	193	163	48	3	27	117	38	25	240	35	199	712	323	411	441	404	186	61	26	17
		EC.Sweden	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	12	0	0	0	0	0	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	104	118	0	0	0	0	
		Guinée Conakry	0	0	0	0	0	0	0	0	0	0	0	0	0	330	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	0	2	27	0	0	1	0	0	
		Japan	515	2573	2609	1514	420	739	900	1169	838	1464	2981	3350	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	2695	1986	
		Korea, Republic of	0	0	3	0	77	0	0	0	0	0	0	0	0	4	205	92	203	0	0	6	1	0	0	0	
		Libya	0	0	0	0	0	0	0	0	0	0	0	312	0	0	0	576	477	511	450	487	0	0	0	0	
		Maroc	177	993	365	171	86	288	356	437	451	408	531	562	415	720	678	1035	2068	2341	1591	2228	2497	2565	1797	1961	2405
		NEI-1	0	0	0	6	3	4	0	5	6	74	4	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	85	144	223	68	189	71	208	66	0	0	0	0	0	0	
		Norway	161	50	1	243	0	31	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	
		Panama	48	12	0	17	22	11	4	0	0	0	0	0	0	1	19	550	255	0	13	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	2	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	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	
		U.S.A.	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	MED	Algerie	220	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	1586	1208	950
		China P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	97	137	93	49	0	0	0	0	0	0	0	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	328	709	494	411	278	106	27	169	329	508	445	51	277
		Croatia	0	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139	827	1017

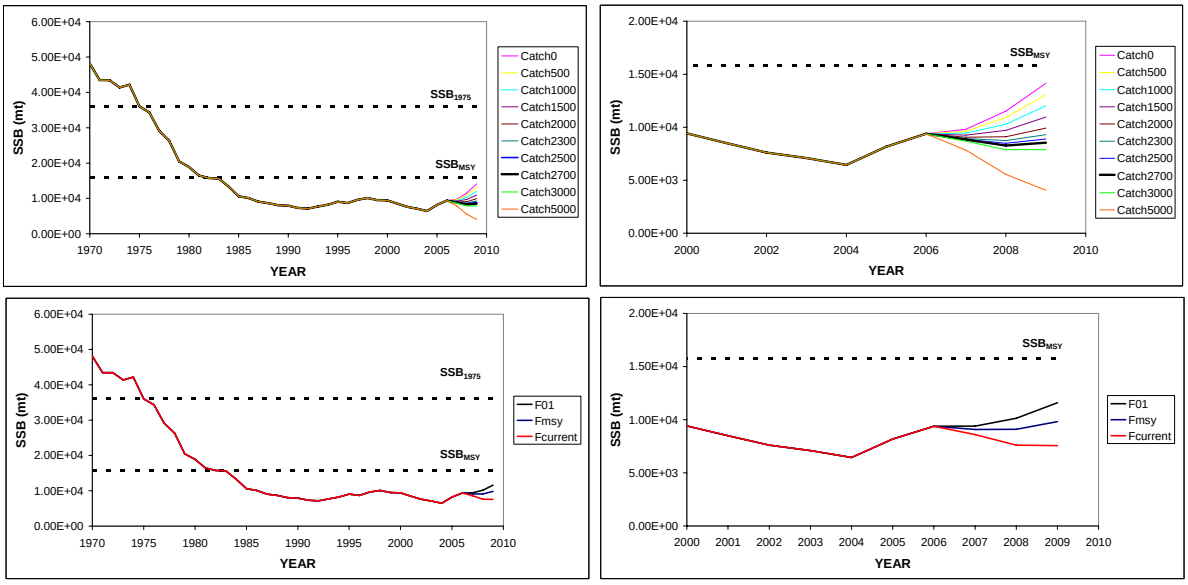
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		EC.Cyprus	10	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79	105	149
		EC.España	354	989	812	2743	1460	701	1178	1428	1645	1822	1392	2165	2018	2741	4607	2588	2205	2000	2003	2772	2234	2215	2512	2353	
		EC.France	2350	4878	3660	3600	5430	3490	4330	5780	4434	4713	4620	7376	6995	11843	9604	9171	8235	7122	6156	6794	6167	5832	5989	6471	8638
		EC.Greece	0	0	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422	389	318
		EC.Italy	6017	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973	4686	4841
		EC.Malta	32	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255	264	346
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	278	320	183	428	446	274	37	54	76	61	64	0	2	0	
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	
		Japan	100	961	677	1036	1006	341	280	258	127	172	85	123	793	536	813	765	185	361	381	136	152	390	316	638	
		Korea, Republic of	0	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	271	310	270	274	300	300	300	300	84	328	370	425	635	1422	1540	812	552	820	745	1063	1941	2055	2168	2519	
		Maroc	2	0	1	4	12	56	116	140	295	1149	925	205	79	1092	1035	586	535	687	636	695	511	421	760	819	92
		NEI (combined)	0	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	610	709	
		NEI-1	0	1	0	19	0	168	183	633	757	341	1750	1349	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	427	639	171	1066	825	140	17	0	0	0	0	
		NEI-2	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	72	67	0	74	287	484	467	1499	1498	2850	236	0	0	0	0	0	0	0	
		Serbia & Montenegro	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0	0	0	
		Tunisie	218	298	293	307	369	315	456	624	661	406	1366	1195	2132	2773	1897	2393	2200	1745	2352	2184	2493	2528	791	2376	
		Turkey	565	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	3300	1075	
		Yugoslavia Fed.	376	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	0	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	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0	0	
		Canada	425	291	433	264	142	73	83	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557	537	600
		Chinese Taipei	7	11	2	3	3	3	0	0	0	0	0	0	0	0	0	0	2	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	0	74	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	0	1	62
		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	0	1	0	0	3	11	0	
		Japan	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575	57	396	
		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	0	1
		Mexico	20	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12	22	9	10
		NEI-1	0	14	1	0	0	0	0	0	30	24	23	17	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	0	2	0	0	429	270	49	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	14	12	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	1	3	2	14	14	14	2	43	9	3	0	0	0	0	0	0	0	0	2
		Trinidad and Tobago	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.A.	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1840	1478	899	717
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0	0	
		Uruguay	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	0	0	
Discards	AT.W	Canada	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14	15	
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	514	192	215	248	133	199	211	88	83	138	171	155	110	149	176	92	174	218	167	131



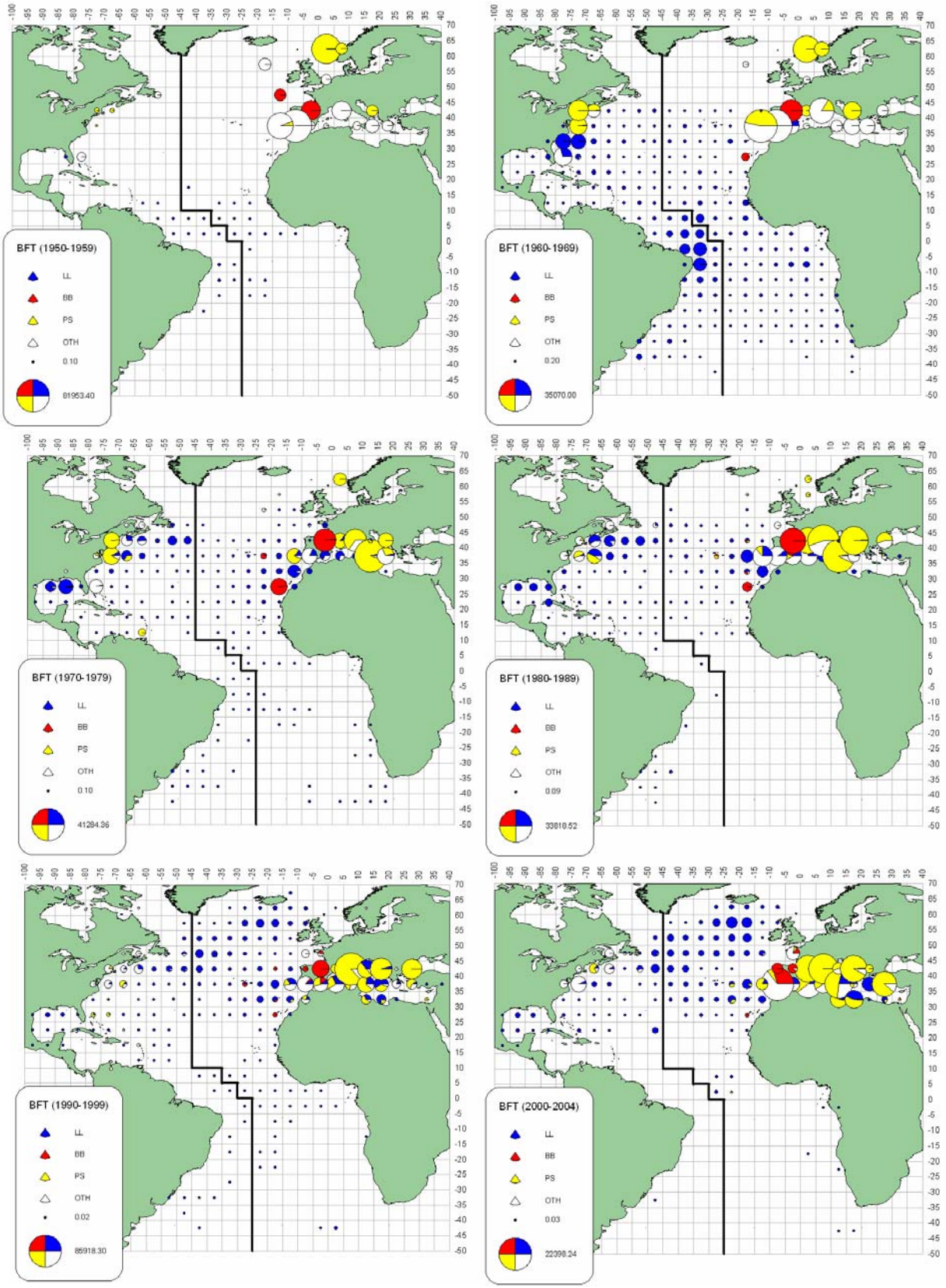
BFT-Figure 1. Atlantic bluefin catches (in t., including discards) by region.



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.



BFT-Figure 4. Geographical distribution of BFT 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 2004, declared catch was about 32,500 t for the East Atlantic and Mediterranean, of which about 25,000 t were declared for the Mediterranean. Information available reinforces our belief that catches of bluefin tuna from the eastern Atlantic and Mediterranean have been seriously under-reported in recent years. An estimate made by the Working Group, 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 tonnes in the Mediterranean and thus about 50,000 tonnes in the east Atlantic and Mediterranean **(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). 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 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 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 are allowing under-reporting of overall catches, and incomplete compliance with size limit regulations may be affecting 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 estimation of the SCRS of the fishing capacity of all fleets combined and current fishing mortality rates, unless adequate management measures are implemented **(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 during the spawning season 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 landings for 2003 and 2004 (32 579 and 32 567 t, respectively) are at about that level, but the Committee strongly believes, based on the knowledge of the fisheries and farming practices, that substantial under-reporting is occurring and that actual catches are well above TAC. The SCRS estimates for the recent years is close to the levels reported in the mid-1990s, *i.e.* about 43 000 tonnes in the Mediterranean and thus about 50 000 tonnes in the East Atlantic and Mediterranean. Based on our analysis, it is apparent that the TAC is not respected and is largely ineffective in controlling overall catch.

The Committee's evaluation of the current regulatory scheme is that, unless it is adjusted to impose greater control over the fisheries by improving compliance and to reduce fishing mortality rates, it will lead to further reduction in spawning stock biomass with high risk of fisheries and stock collapse.

BFTE-6. Management recommendations

The available information indicates that the current fishing mortality rate (under the current overall fishing pattern) may be more than three times the level which would permit the stock to stabilize at the MSY level. Current 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. Therefore, management actions are also needed to mitigate the impacts of overcapacity as well as to eliminate illegal fishing.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY

Current (2004) Yield	Reported: 32,567 t	SCRS Estimate: **50,000 t**
Short-term Sustainable Yield[1]	On the order of 15,000 t	
Long-term potential yield[2]	~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)	32,000 t	

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

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

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; multispecies vessels are vessels targeting other species during at least part of the fishing season). 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.
Below table: Estimations of total yearly catch (in tonnes) 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 multispecies	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 multispecies	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 & Recreative	10663	0.01 t/yr	**0.03 t/yr**	0.06 t/yr
Total commercial vessels	**1707**			
Total commercial & recreational vessels	**12370**			

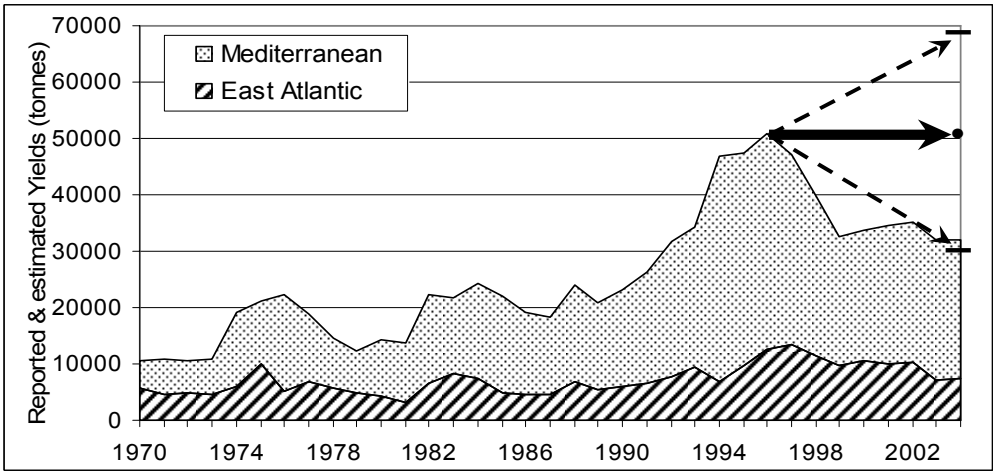
Estimated Yield from Commercial vessels	22,228 t	**43,107 t**	60,630 t
Estimated Yield from commercial & recreational vessels	22,376 t	**43,417 t**	61,316 t

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

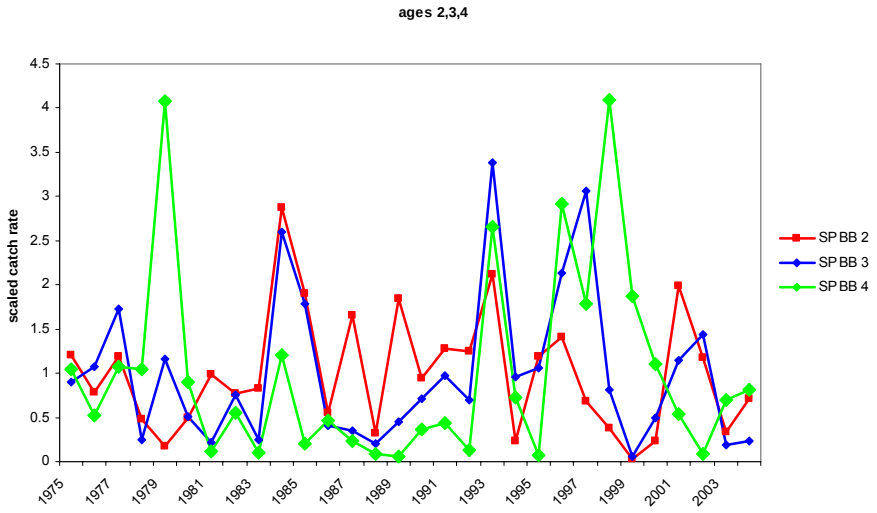
		Closure			Benchmarks		Further %Reduction in F needed to Reach F_{max}	Expected Catch (t) in Outyears Indicated under F Level Modeled					Long-term[1] Potential Yield
case	Min Size	Area	Months	Gears	Fmax/F	%SPR		Projected year 1	Projected year 2	Projected year 3	Projected year 4	Projected year 5	
1	SQ	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

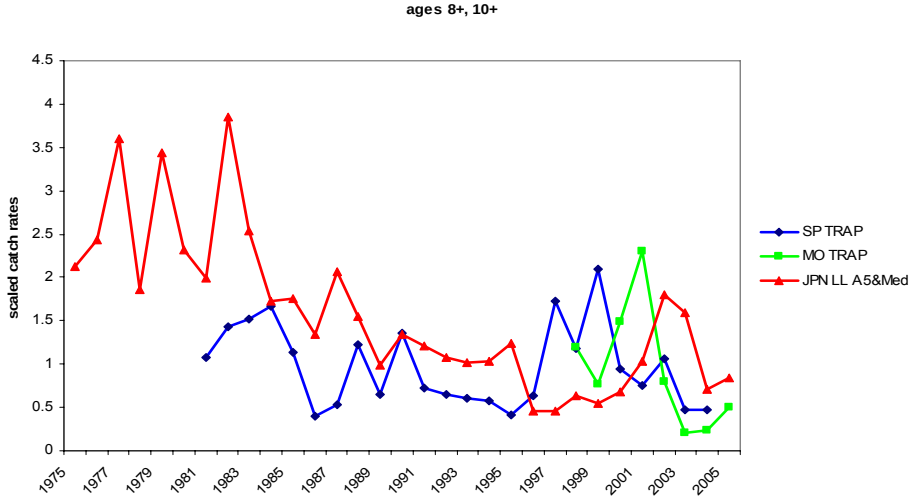
Notes: Case numbers are shown in the associated figures.
Min Size modeled: SQ (status quo) represents the currkg minimum, 25kg is a 25kg stock-wide minimum, and 30Kg is a 30kg stock-wide minimum
Areas modeled for additional closures: SQ, present time/area/gear closures as measured in 2003-2004, MED is 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

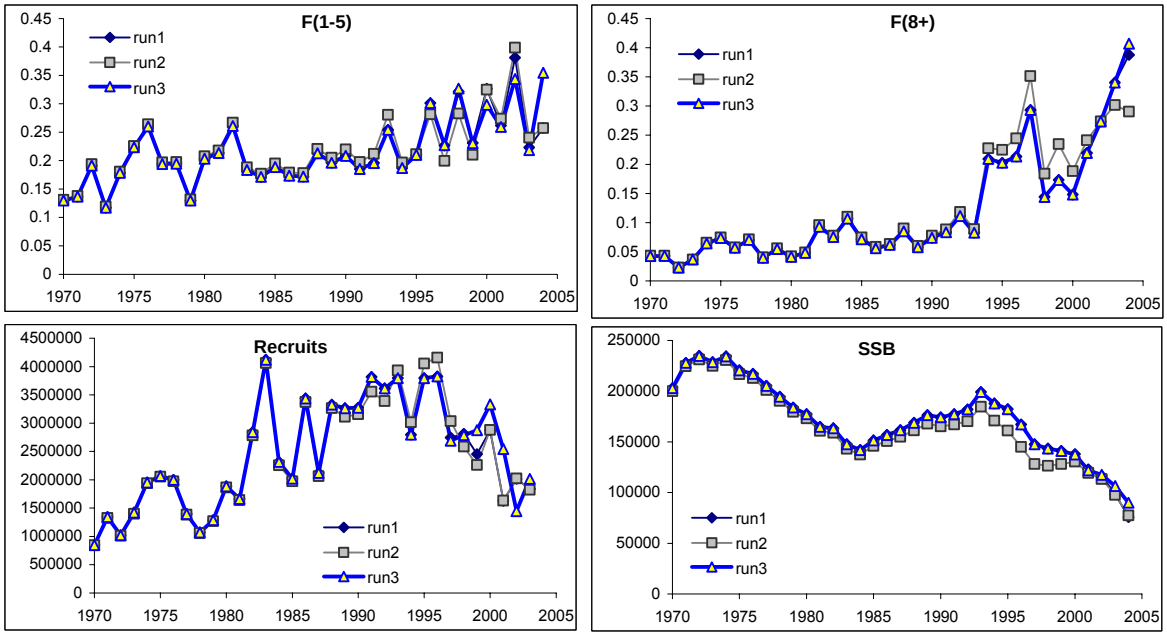


BFTE-Figure 1. Total bluefin tuna Task I for the Mediterranean Sea and east Atlantic. SCRS 'best' estimate (with a high and low range) of actual Mediterranean catch is about 43,000 tonnes and is superimposed with the east Atlantic reported catch for 2004, resulting in a total for the East stock of about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

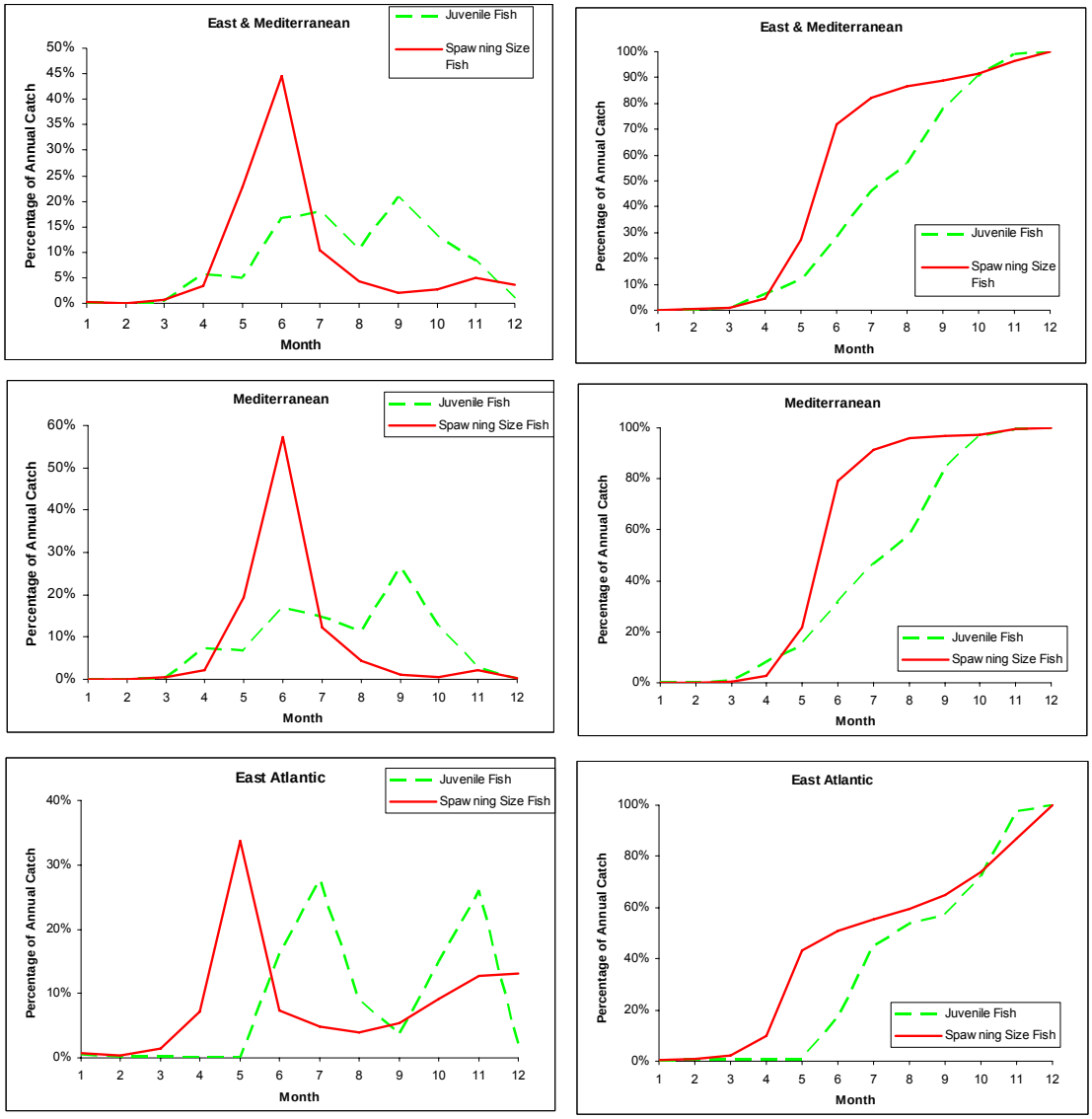




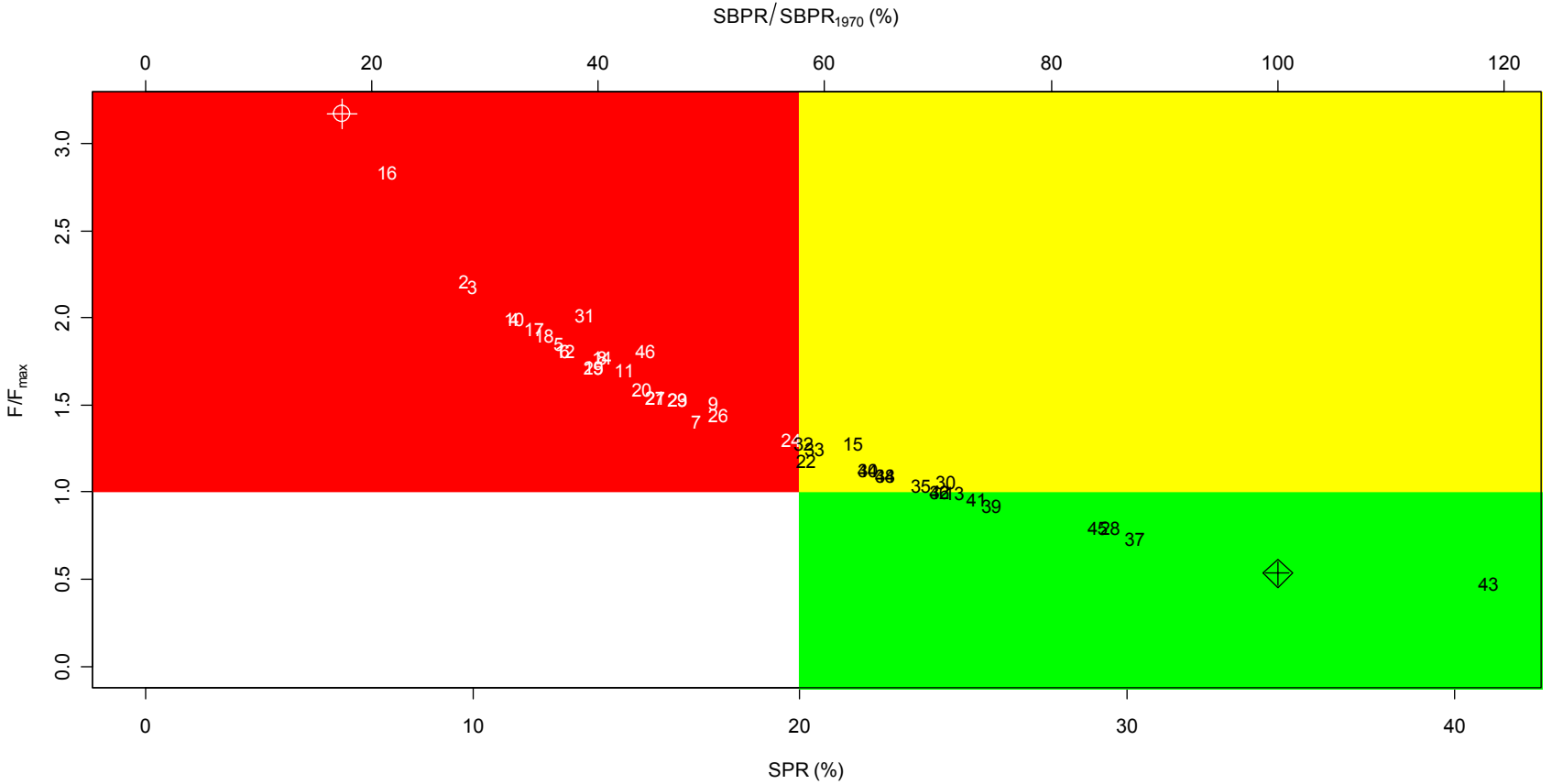
BFTE-Figure 2. Standardized Catch rate indicators from fisheries harvesting small (left hand panel) and large (right hand panel) bluefin in the east Atlantic and Mediterranean.



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 Mediterranen alone (center panels) and 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 and cross overlaid on diamond represents stock status in 1970. 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. 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. Estimates of survival rates of marlins remain elusive but a few tagging studies that use PSAT tags have estimated post-release survival of marlins caught on recreational and longline gear. These studies show that some modifications of gear (longline and sport) can increase the survival of live releases.

A recent paper used three lines of evidence (scale and anus position morphometrics and DNA sequences) to validate the existence of round scaled spearfish (*Tetrapturus georgei*) in the eastern and western Atlantic. The paper concludes that obvious similarities of morphometrics between roundscale spearfish and white marlin may have resulted in misidentification of roundscale spearfish as white marlin in the areas where these two species overlap. The significance of this misidentification is still to be evaluated.

BUM/WHM-2. Catch

The Working Group 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 (SCRS/2005/010). Total removals for the period 1990-2004 were obtained by modifying Task I values with the addition of blue marlin and white marlin that the Working Group estimated from catches reported as billfish unclassified. Additionally the reporting gaps were filled with estimated values for some fleets. The resulting estimates of total removals are presented in detail in SCRS/2006/012 and together with Task I catches on **BUM/WHM-Table 1.**

Catches of blue marlin and white marlin continued to decline through 2004 **(BUM/WHM-Figure 1)**. The estimated catch of blue marlin for 2004 was 2,916 t and that of white marlin 610 t. Task I reported catches of BUM in 2005 were 2,897, however, this estimate is preliminary and is likely to be substantially larger when all 2005 catches are reported. Although historically more than half of catches came from longline gear, other fleets have increased their removals, or perhaps have increased their reporting **(BUM/WHM-Figure 2)**. In recent times new fleets have harvested large catches of blue marlin, including the artisanal FAD fisheries in the eastern Caribbean islands and a new artisanal fleet of small longliners operating off Brazil between 20 degrees S and 26 degrees S.

BUM/WHM-3. Fishery indices

A number of new relative abundance indices have been estimated over the last two years including some for fleets for which previously no estimates were available. Still, 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.

Trends in abundance inferred from the available indices differ between individual fleets for the period 1990-2005. For the period 2001-2005, two out of seven individual fleet indices for white marline increased, the others were flat. Three of seven individual fleet indices for blue marlin decreased, the others were flat **(BUM/WHM-Figure 3)**.

The working group employed three different standardization models to develop additional indices for the period 1990-2004 that combined data from the Brazilian, Japanese, Chinese Taipei and US longline fleets **(BUM/WHM-Figure 4)**. These indices produce estimates for blue marlin and white marlin over a larger geographical area than that for any individual index. The combined indices for both species 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.

BUM/WHM-4. State of the stocks

Blue marlin

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

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. Recovery/Outlook

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 **(BUM/WHM-Figure 5)**.

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".
There is not enough information on the proportion of fish being released alive for all fleets, to evaluate the effectiveness of this particular regulation. Average catch of pelagic longline and purse seine vessels during the period 2001-2004 was 49 % (blue marlin) and 59% (white marlin) of the maximum catch for those same fleets in the years 1996 or 1999.

[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 circle hooks 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

	White marlin	**Blue marlin**
$B_{2004} < {}^{1}B_{MSY}$	Yes	Yes
Recent abundance trend (2001-2004)	slightly upward	possibly stabilizing
$F_{2004} < F_{replacement}$	Yes	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	2916 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 Working Group. The preliminary catch reported for 2005 is 2,897 t for blue marlin and 475 t for white marlin. Final estimates for 2005 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. From Task I data and total estimate made by Working Group.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Estimated totals[1] (From SCI-038 Tables)			**2032**	**2708**	**2131**	**2811**	**3348**	**2028**	**2104**	**2774**	**4264**	**4533**	**4143**	**2978**	**3032**	**4042**	**3873**	**4671**	**5159**	**4567**	**4273**	**4281**	**3444**	**3178**	**3177**	**2916**	
TOTAL			2032	2708	2130	2748	3311	1993	2053	2736	4215	4524	4134	2964	3019	3975	3802	4607	5087	4034	3849	3757	3037	2626	2713	2145	2897
	AT.N		1296	1650	1214	1378	1566	1069	836	909	1540	1946	1411	1080	1057	1510	1447	1745	1712	1519	1260	1101	551	516	641	659	1215
	AT.S		567	884	749	1252	1623	789	1085	1690	2530	2378	2586	1768	1817	2331	2229	2652	3119	2376	2431	2335	2276	1975	1752	1476	1675
	UNCL area		169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	211	134	320	10	7
Landings	AT.N	Longline	792	1162	809	920	1223	695	327	415	1009	1601	981	628	600	1065	926	1269	1228	980	764	664	331	391	451	453	259
		Other surf.	204	189	206	252	174	160	190	184	197	137	225	223	217	212	292	214	331	432	377	341	176	60	151	145	906
		Sport (HL+RR)	300	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17	19	27	0
	AT.S	Longline	430	822	533	975	1362	661	964	1530	2017	1958	2286	1490	1434	1671	1565	2036	2296	1594	1525	1485	1284	899	1220	890	808
		Other surf.	135	60	216	276	260	127	121	159	512	418	299	277	382	658	662	605	753	780	904	850	991	1076	531	586	1645
		Sport (HL+RR)	2	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	0	0	0	2
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	10	7
		Other surf.	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	210	130	320	0	
Discards	AT.N	Longline	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37	19	34	34
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1	1
		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	16
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	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	1	0	0	0	
Landings	AT.N	Barbados	117	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	
		Canada	0	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	0	41	48	41	51	79	133	9	31	15	17	10	49
		Chinese Taipei	98	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	48	66	51	24
		Cuba	178	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34	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	75	69	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	0	0	0	
		EC.España	0	0	0	3	4	1	0	8	7	5	1	6	7	6	2	25	5	36	15	25	8	1	6	27	
		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	776
		EC.Portugal	0	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1	31	27	24
		Grenada	1	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72	45	42
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	
		Japan	332	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	442	155	125	158	168	
		Korea, Republic of	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90	86
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	0	0	0	
		Netherlands Antilles	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	38	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	1	1	5	0	0	5	5	5	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	0	1	0	0	0	0	15	0	0	
		Sta. Lucia	0	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	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.	342	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19	26	
		U.S.S.R.	0	0	0	0	0	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	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	
		Ukraine	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	106	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	108	72	76	84	83	138
	AT.S	Benin	6	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	0	0	0	
		Brasil	28	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577	195	612
		China P.R.	0	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	104	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	253	264	127
		Cuba	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109	115	107
		EC.España	0	0	0	0	0	0	0	0	15	0	12	40	37	49	38	133	117	159	110	115	86	27	6	24	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	1	0	24
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	0	0	0	0	0	0	0	0	
		Ghana	129	52	216	166	150	16	5	7	430	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470	759

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		Japan	136	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	180	155	311	359	
		Korea, Republic of	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	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	38	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	7	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	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	1	0	0	
		U.S.S.R.	1	0	0	0	7	16	22	32	5	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	0	23	0	0	0	0	0	0	
	UNCL area	Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	38	55	56	0	3	0	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	207	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	0	114	122	59	37	187	131	130	110	0	
		Mixed flags (FR+ES)	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	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	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	0	4	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	10	6
Discards	AT.N	U.S.A.	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49	19	35	50
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	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	0	1	0	0	0	

[1] Estimated totals by Working Group (SCI-038/2006) include estimates from unclassified billfish and NEI.

Les estimations totales realisées par le Groupe de Travail (SCI-038/2006) incluent les estimations des istiophoridés non-classifiés et NEI.

Las estimaciones totales realizadas por el Grupo de Trabajo (SCI-038/2006) incluyen las estimaciones de istiofóridos sin clasificar y NEI.

WHM-Table 1. Estimated catches (t) of Atlantic white marlin *(Tetrapturus albidus)* by major area, gear and flag. From Task I data and total estimate made by Working Group.

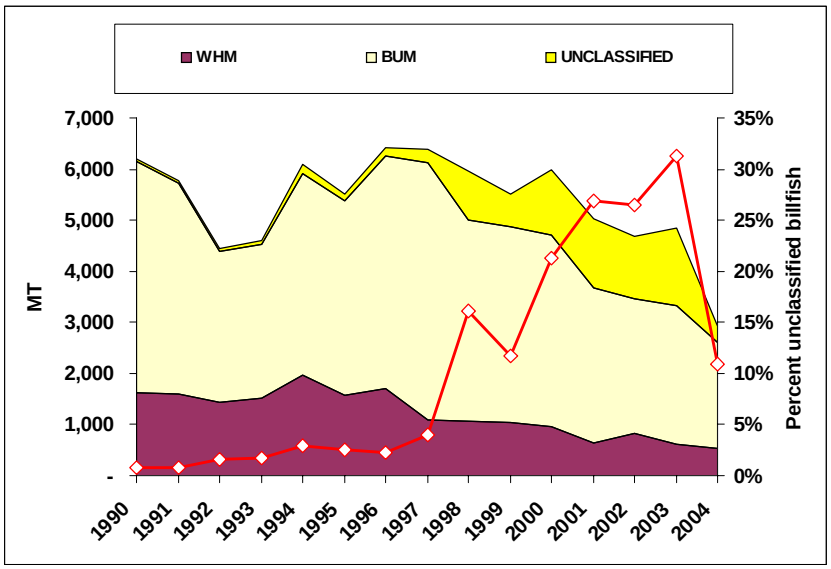
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Estimated totals[1] (From SCI-038 Tables)			**1241**	**1100**	**1773**	**1203**	**1727**	**1617**	**1504**	**1359**	**1806**	**1635**	**1599**	**1439**	**1526**	**1966**	**1584**	**1354**	**1113**	**1109**	**1026**	**1242**	**941**	**867**	**646**	**610**	
TOTAL			1241	1100	1772	1200	1727	1611	1491	1352	1805	1634	1598	1439	1526	1966	1584	1752	1113	1101	1013	961	642	822	615	565	475
	AT.N		750	605	1280	653	860	905	587	406	368	401	236	610	565	657	624	651	425	411	368	362	291	264	205	211	170
	AT.S		460	463	461	525	844	680	879	921	1410	1196	1351	819	949	1298	952	1095	678	681	634	579	350	557	395	354	306
	UNCL area		31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	11	21	1	1	15	0	
Landings	AT.N	Longline	671	548	1196	570	788	812	433	167	234	259	106	466	436	528	458	536	334	360	287	282	248	208	177	163	132
		Other surf.	7	12	5	17	29	61	54	150	11	40	21	35	34	57	48	30	49	13	18	38	22	17	10	20	14
		Sport (HL+RR)	72	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6	1	1	0
	AT.S	Longline	340	442	308	471	825	654	870	832	1333	1152	1328	805	927	1297	946	681	590	557	622	570	327	488	388	351	304
		Other surf.	120	21	153	54	19	26	9	89	76	40	23	14	22	1	2	3	50	123	11	9	23	69	7	2	2
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	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	3	0	0	0	0	0	0	0	
		Other surf.	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	11	21	0	1	15	0	
Discards	AT.N	Longline	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29	17	27	22
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	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	1
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	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	1	0	0	0	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	117	11	39	17	24	29	26	43	15	41	33	25	25	0	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Canada	0	0	0	0	0	0	1	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1	2	5
		China P.R.	0	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	174	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	61	15	10	3
		Cuba	189	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7	0	0	
		EC.España	0	0	0	9	14	0	0	61	12	12	9	18	15	25	17	97	89	91	74	118	43	4	19	19	
		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	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	5	11	30
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	8	0	33	10
		Japan	118	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	15	10	22	17	
		Korea, Republic of	49	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	0	2	8	8	0	5	6	11	18	44	15	15	28	25
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	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	0	4	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	44	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	5	9	6	5
		U.S.A.	78	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6	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	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	
		Venezuela	142	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	25	72	110	55	55	60
	AT.S	Argentina	0	0	0	0	4	4	0	0	8	9	6	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	0	1	0	1	0	0	0	0	0	
		Brasil	100	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266	80	244
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
		China P.R.	0	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	136	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	89	162	53
		Cuba	116	45	112	153	216	192	62	24	22	6	10	10	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	1	2	1	5	1	2	2	3	1	1
		EC.España	0	0	0	0	0	0	0	1	1	0	17	6	12	2	19	54	4	10	45	68	18	2	3	45	
		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	8	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	0	0	0	
		Ghana	45	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1	1
		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	25	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	41	6	13	11	
		Korea, Republic of	36	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-1	0	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	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	

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	3	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
		U.S.S.R.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	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	0	3	14	0	0	1	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	1	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	14	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	0	3	0	0	0	0	0	0	0	
		Mixed flags (FR+ES)	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	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	U.S.A.	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33	17	27	23
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	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	0	1	0	0	0	

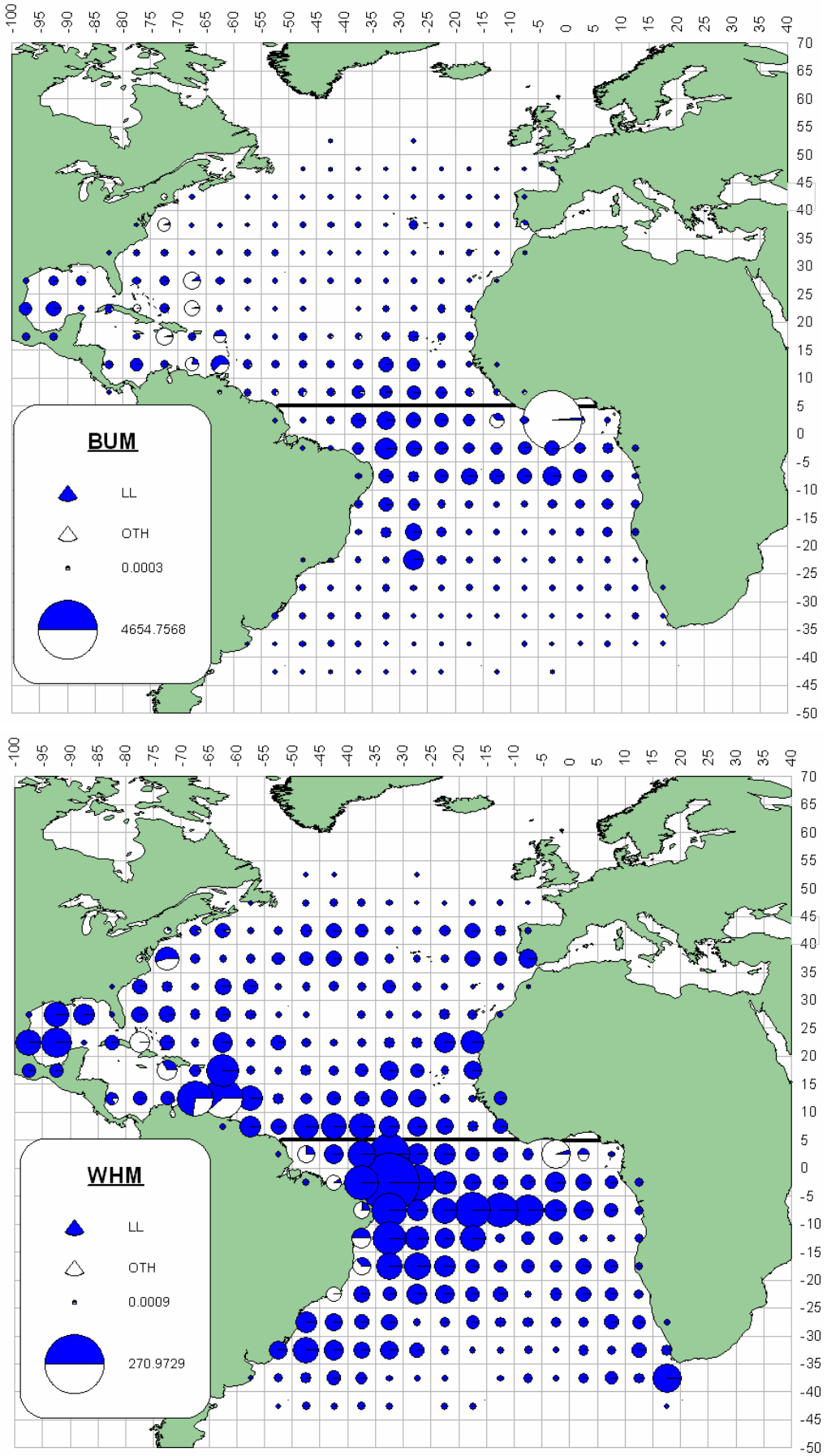
[1] Estimated totals by Working Group (SCI-038/2006) include estimates from unclassified billfish and NEI.

Les estimations totales realisées par le Groupe de Travail (SCI-038/2006) incluent les estimations des istiophoridés non-classifiés et NEI.

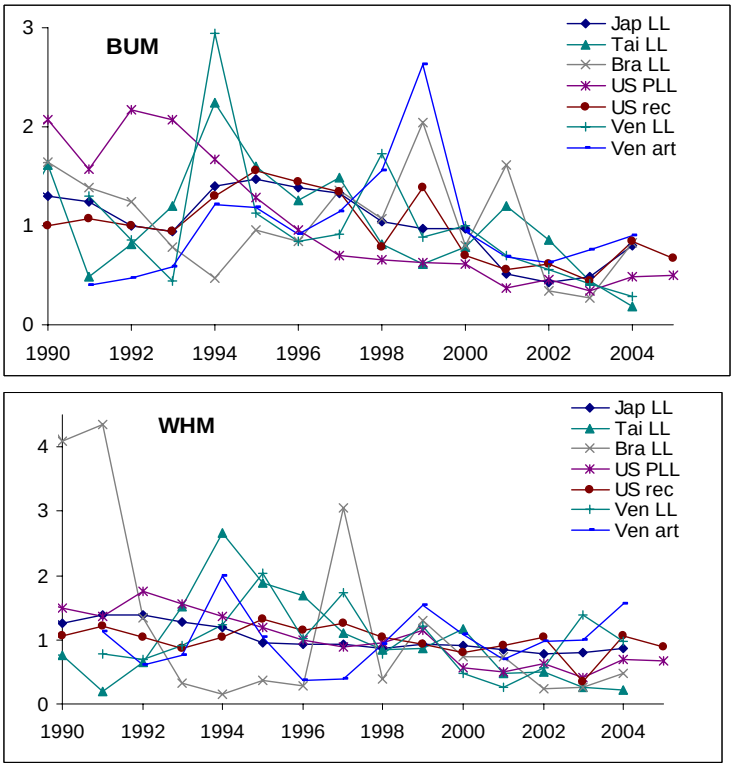
Las estimaciones totales realizadas por el Grupo de Trabajo (SCI-038/2006) incluyen las estimaciones de istiofóridos sin clasificar y NEI.



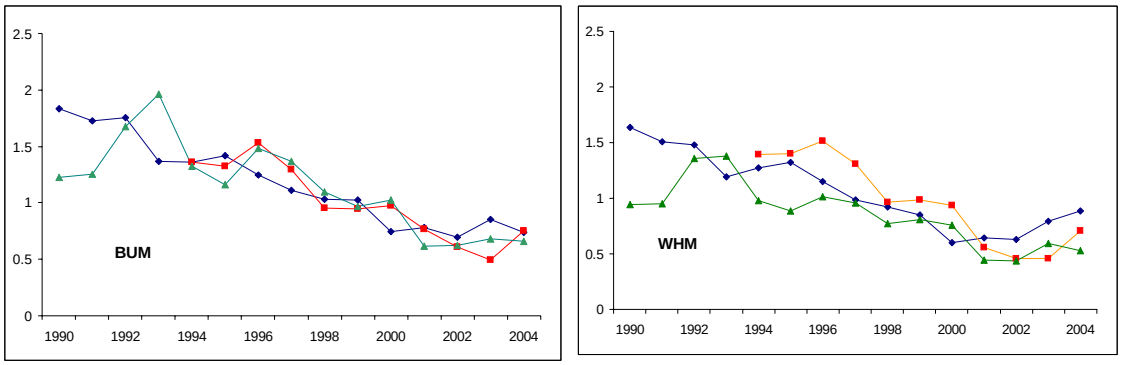
BUM-WHM Figure 1. Total catch of blue marlin, white marlin, and billfish for 1990-2004, and percentage of the ratio of unclassified billfish (line with symbols) with respect to the total blue marlin and white marlin catch.



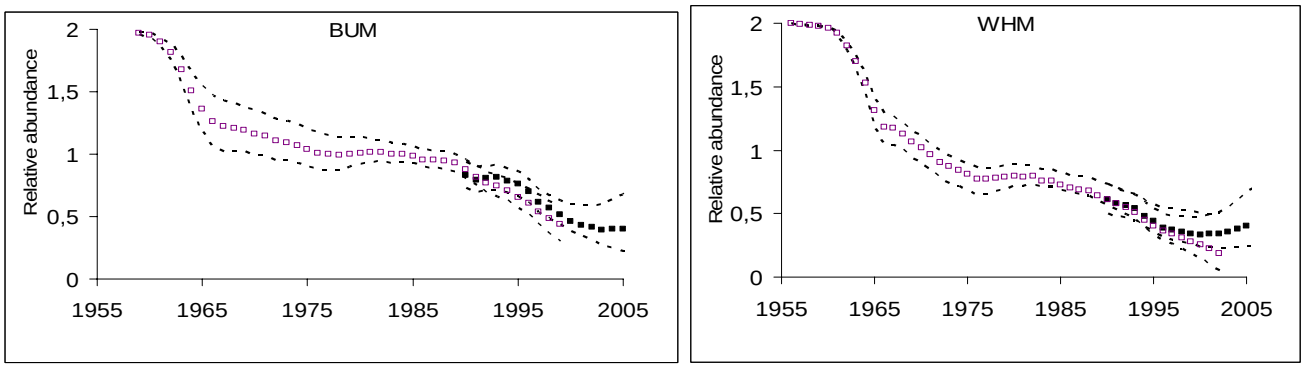
BUM-WHM Figure 2. Geographic distribution of blue marlin (upper panel) and white marlin (lower panel) catches for the period 2000-2004 by major tuna fisheries.



BUM-WHM Figure 3. Available individual fleets indices for blue marlin (upper panel) and white marlin (lower panel). Each series was scaled to its mean.



BUM-WHM Figure 4. Relative abundance indices for blue marlin (left) and white marlin (right) estimated by combining data for four longline fleets; three different statistical models shown for comparison.



BUM-WHM Figure 5. Production model fits to recent CPUE data (solid squares) compared to fit trend estimated in the 2000 assessment (empty squares) for blue marlin (left) and the 2002 assessment for white marlin (right). Outer dotted lines represent 80% confidence limits.

8.7 SAI - SAILFISH

No new sailfish assessments were conducted in 2006.

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 (Figure 1).

A few studies have recently reported on various aspects of the biology of sailfish. New reports on the geographical and seasonal distribution of spawning sailfish were provided for Southern Brazil (between 20 and 26 degrees S), the Straits of Florida and the Florida east coast. Additional a new study has estimated growth of adult sailfish based on tag recapture data. Estimates of post release survival have been obtained for pelagic longline gear in the Gulf of Mexico.

Considerable amount of research has been done on the vertical distribution of sailfish. A study onboard a research cruise in the tropical Atlantic has showed that the vertical distribution of catch per unit of fishing effort of sailfish has a similar pattern to that of marlins and spearfish. This indicates that all these species are mainly distributed near the surface layers. Furthermore another study has showed that large areas of cold hypoxic water (low in dissolved oxygen) occur as distinct strata in the eastern tropical Pacific and Atlantic oceans as a result of high productivity initiated by intense nutrient upwelling. In these areas, the shallow band of acceptable habitat (as shallow as 25 m in the ETP) restricts tropical pelagic fishes (including marlin and sailfish) to a very narrow surface layer and makes them more vulnerable to exploitation by surface gears.

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)**.

A new report has described the expansion and increase in the number of small artisanal longliners off Brazil. This fleet targets dolphin fish *(Coryphaena* spp.) but makes substantial catches of sailfish and other billfish. New research conducted by observers onboard Spanish longliners targeting swordfish, reports that sailfish and spearfish are the most common billfish caught by this fleet. Less than 10% of these billfish were tagged or released alive. Sailfish is also the most commonly caught billfish in the Spanish purse seine fishery operating in the tropical Atlantic and targeting free schools of tuna.

Catches of Sailfish continue to be 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)**. Combined catches of spearfish and sailfish in 2004 were 1,119 t for the east and 1,258 t in the west. Preliminary and incomplete reports to ICCAT suggest that the 2005 catch was 722 t and 970 t, respectively, for the east and west region **(SAI-Figure 2)**.

Large catches of unclassified billfish continue to be reported to the Committee. From 2001 to2004 reported catch of unclassified billfish ranged from 12% to 30% of the reported catch of all billfish. For some fisheries this percentage is much greater. This continues to make the estimation of sailfish catch difficult.

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 2005. 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, including separation of spearfish out of those catch reports where both species were reported as combined. This should be done in an inter-session meeting in 2008 leading to a sailfish assessment in 2009.

ATLANTIC SAILFISH SUMMARY[1]

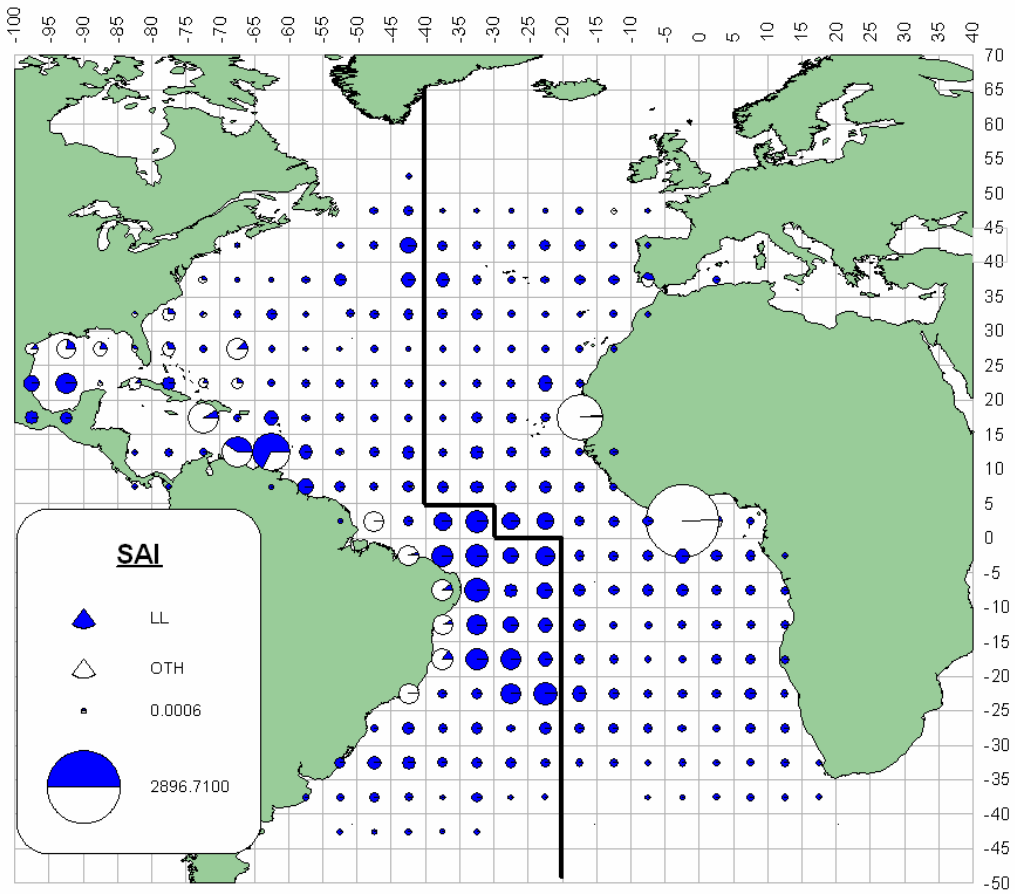
	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	Not estimated	Not estimated
Recent Yield (2000)	506 t	969 t
2000 Replacement Yield	~ 600 t	Not estimated
Management Measures in Effect	None	None

[1]As estimated in 2001.

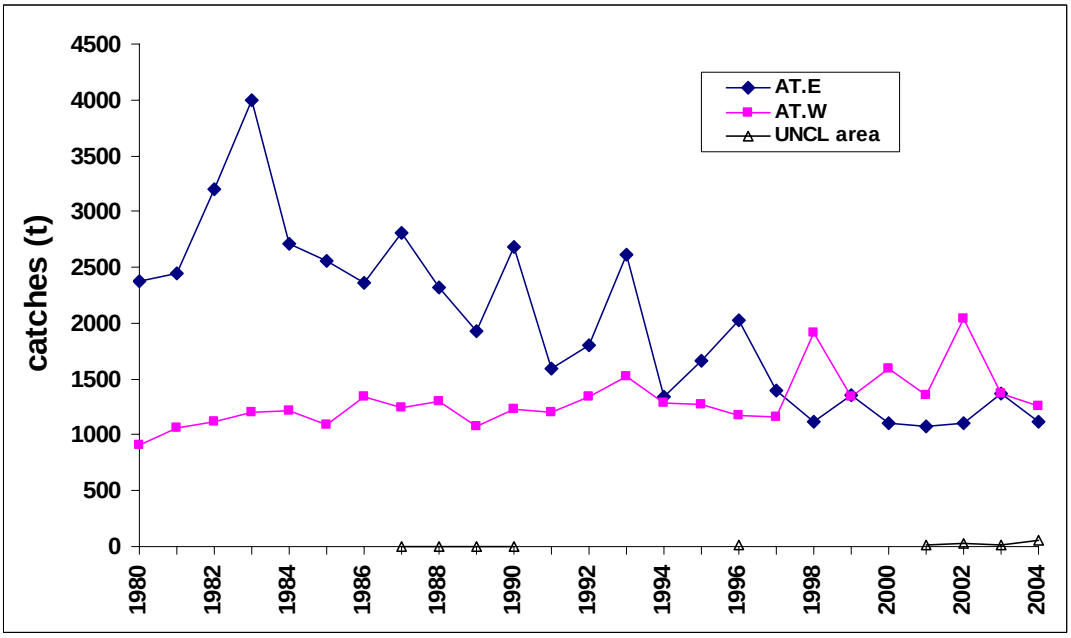
SAI-Table 1. Estimated catches (t) of Atlantic sailfish and spearfish by major area, gear and flag.

		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	TOTAL	**3276**	**3503**	**4321**	**5195**	**3935**	**3649**	**3692**	**4059**	**3625**	**3006**	**3914**	**2792**	**3144**	**4135**	**2625**	**2935**	**3211**	**2566**	**3031**	**2699**	**2699**	**2442**	**3176**	**2748**	**2439**	**1692**
	AT.E	2369	2447	3202	3999	2714	2556	2357	2813	2320	1934	2687	1593	1799	2609	1341	1669	2029	1403	1111	1352	1107	1071	1109	1364	1119	722
	AT.W	907	1056	1119	1196	1221	1093	1335	1246	1304	1072	1226	1199	1345	1526	1283	1266	1172	1164	1919	1347	1592	1357	2035	1376	1258	970
	UNCL area								0	0	0	0						10					14	32	7	62	
AT.E	Longline	151	202	309	270	224	148	140	112	126	152	153	61	52	547	215	271	207	256	228	327	208	187	371	305	272	87
	Other surf.	1893	1748	2325	3223	2329	2168	1646	2117	1657	1337	1516	1025	1009	1229	899	810	1291	592	621	618	493	884	738	1059	847	635
	Sport (HL+RR)	325	497	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407					
AT.W	Longline	360	408	471	320	512	506	543	568	625	481	445	307	413	795	599	425	423	300	1089	559	904	898	1329	936	809	838
	Other surf.	179	87	173	141	173	274	295	187	208	238	514	521	599	498	468	484	509	503	553	615	602	401	603	441	449	132
	Sport (HL+RR)	368	561	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103	0	0	0
UNCL area	Longline								0	0	0	0											2	30	5	57	
	Other surf.																	10					12	2	2	5	
AT.E	Belize (foreign obs.)																				0						
	Benin		36	48		53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5					
	Cape Verde			3																							
	China P.R.															3	3	3	3	7	9	4	5	11	4	4	8
	Chinese Taipei	5	12	67	20	8	9	1			7	13			420	101	155	65	150	117	178	120		124	74	38	69
	Côte D'Ivoire					40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73	93
	Cuba	79	79	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533									
	EC.España			10		4	7	9		28	14	0	13	3	54	8	18	43	39	24	49	22	156	196	183	148	
	EC.Portugal													1	2	1					53	11	4	8	7	13	11
	EC.United Kingdom																									1	
	Gabon																0	109	7				1				
	Ghana	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529	551	503	542
	Honduras (foreign obs.)																			0	0						
	Japan	33	50	38	47	63	84	71	37	57	57	63	16	42	58	81	78	72	49	80	49	55	26	31	39	77	
	Korea, Republic of	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5			0					
	Mixed flags (FR+ES)	702	820	847	811	576	592	655	641	664	702	968	281	242	294	258	206	156	178	224	212	158					
	NEI (ETRO)														11	15	10	10	10								
	S. Tomé e Príncipe																		139						23		
	Senegal	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	266	138	361	263	
	St. Vincent and Grenadines																							7			
	U.S.A.												2	4	1	1	3	1									
	U.S.S.R.		37					2	5	4	4																
AT.W	Aruba	30	30	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10					
	Barbados										69	45	29	42	50	46	74	25	71	58	44	44					
	Belize																										5
	Brasil	231	64	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	625	468	586	588	534	416
	China P.R.															3	3	3	3	3	9	4	3	1	0	1	0
	Chinese Taipei	36	81	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22		70	25	11	22
	Cuba	119	134	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18		
	Dominica																						2			1	
	Dominican Republic			22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	81	260	91		
	EC.España										0	0	8	13	18	19	37	5	30	42	31	64	299	476	222	125	
	EC.Portugal																					7	0	2	12	12	110
	Grenada	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112	147
	Japan	22	44	135	22	34	38	28	6	22	22	25	73	1	2	10	5	8	18	11	21	23	6	17	52	64	
	Korea, Republic of	51	41	19		52	72	14	1		17	25		3		8	8	22	8								
	Mexico														2	19	19		9	646	40	118	36	34	45	51	55
	NEI (ETRO)														31	30	30	30	30								
	Netherlands Antilles	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15					
	Seychelles																					3					
	St. Vincent and Grenadines											2	1	4	4	4	2	1	3		1			131	3	168	

		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Sta. Lucia																								0		
	Trinidad and Tobago				64	58	14	79	110	34	18	10	4	4	118	101	101	104	10		4	3	7	6	8	10	9
	U.S.A.	308	533	452	734	495	282	462	496	508	381	304	407	330	265	207	380	303	406	294	235	121	68	110	5	7	12
	Venezuela	58	72	57	119	81	81	77	80	22	24	24	65	71	207	162	103	166	185	259	179	93	131	160	136	161	195
UNCL area	Benin																						12	2	2		
	EC.España																									57	
	EC.Portugal																								5	5	
	Mexico																	10									
	St. Vincent and Grenadines																						2	30			
	U.S.A.								0	0	0	0											0				



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 1980 to 2004 for the east and west stocks.

8.8 SWO-ATL-ATLANTIC SWORDFISH

A new assessment for Atlantic swordfish was conducted in 2006. Other information relevant to Atlantic swordfish is presented elsewhere in this SCRS Report: Advice relevant to *Resolution by ICCAT for the evaluation of small-swordfish mortality* [Res. 02-04] is provided in Section 16 and Recommendations pertinent to Atlantic swordfish are presented in Section 15.

SWO-ATL-1. Biology

A Workshop on swordfish stock structure took place in Crete in early 2006, in response to *Resolution by ICCAT on the clarification of the stock structure and boundaries between the swordfish stocks in the Atlantic* [Res. 99-03], at which 13 scientific documents on swordfish biology were presented. The results of the research presented gave general support to the stock structure currently assumed for Atlantic Swordfish (Mediterranean and North and South Atlantic stocks). The Workshop agreed that the precise delimitation between these three stocks cannot be improved upon without intensified collaborative and multi-disciplinary research. Similarly, the classification of swordfish caught near the boundaries to their stock of origin is subject to uncertainty and cannot be made accurately without intensified collaborative and multi-disciplinary research taking into account fine-scale (e.g., 1º squares) and quarterly sampling strata. The Workshop also noted that while there was some mixing between Atlantic and Mediterranean stocks near the Straits of Gibraltar, there was strong evidence that the Mediterranean is genetically distinct from the Atlantic, Pacific and Indian Ocean stocks.

Three scientific documents related to SWO biology were presented during the stock assessment meeting. These contributions provided new insight into the potential usefulness of hard parts of swordfish for age determinations in combination with genetic analyses, sex-ratio at size data for the south-west Atlantic (Uruguay) and length composition information off western Africa (Côte d'Ivoire). A further scientific document was presented to the Swordfish Species Group meeting. That contribution explored the impact of exclusion of JLL indices for 2004 and 2005 in the North Atlantic VPA, and concluded that the view of stock status and projections obtained excluding the JLL indices was generally consistent with the results of age-aggregated production analyses presented in the Detailed Report of the swordfish assessment working group.

SWO-ATL-2. Fishery indicators

Because of the broad geographical distribution of the Atlantic swordfish **(SWO-Figure 1)**, in coastal and offshore areas, mostly ranging from 45ºN to 45ºS, this species is available to a large number of fishing countries. 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 are made using surface drifting longline. However, many additional gears are used, including traditional gillnets off the coast of western Africa.

As a result of ICCAT and domestic regulatory recommendations, there are recent developments in the fisheries of some nations. (1) Starting in February 2000 and finishing in December 2003, Japanese vessels fishing in the North Atlantic were domestically required during this period to discard or release all swordfish caught as the Japanese block quota had been reached. However, the domestic recommendation for live release of swordfish was extended to the present. (2) In 2001, U.S. pelagic longline fishing was prohibited or restricted in five areas-times to reduce incidental catches including juvenile swordfish and by-catch species. (3) The Canadian directed swordfish fishery has reduced effort in recent years as a result of a combination of factors, including reduced quota, increased opportunities for fishing other species, relatively low market value, and the introduction of an Individual Transferable Quota (ITQ) management system in 2002. (4) A further change in the fishery has resulted from changes in technology of several fleets, i.e. there has been a change in the type or style of longline gear used by many EU vessels that have gone from the traditional multifilament to monofilament gear, changes in targeting operation in several fleets, etc. The Committee notes these recent developments and their potential effect on the available data, its continuity and complexity and therefore its interpretation. Specific research actions about these issues are needed in the near future.

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 2**). The 2005 estimated catch (reported and carried over) was 24,830 t (reported catch was 24,462 t). A substantial number of countries have not yet reported their 2005 catches so values should be considered provisional and subject to revision. Japan provided a preliminary estimate of catch in the north and south Atlantic assessments (302 and 175 t, respectively).

North Atlantic. For the past decade, the North Atlantic estimated catch (landings plus discards) has averaged about 11,900 t **(SWO-ATL-Table 1** and **SWO-ATL-Figure 2)**, and the 2005 landings (including carry-overs) plus discards were 12,143 t (reported catch was 11,775 t). In 2005, there has been a 40% 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 1990's 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 3)**.

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 2004, the 12,902 t reported catches were about 40% lower than the 1995 reported level. The reported 2005 catch is 12,687 t, and should be considered provisional and is probably an underestimate.

For the 2006 assessment there was some improvement in the information level available from fisheries harvesting southern Atlantic stock swordfish. Catch rate fishery indicators 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 1990's (**SWO-ATL-Figure 4**) and without additional research it will not be possible to resolve if either pattern best reflects the total biomass trend. It is possible that the by-catch and targeted fisheries CPUE trends could track different elements. This view was supported to some degree by the limited size-frequency information for southern stock swordfish catch, but much additional research and data collection would also be required to test this hypothesis.

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 1139 t. The most recent (2005) reported level of discards is 348 t, a reduction of 67% 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 2)**. 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, most of the bootstrap outcomes show that current F is less than F_{MSY}, while about half of the current biomass estimates are less than B_{MSY} (**SWO-ATL Figure 4**). 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

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 Group 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 Group 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 Group has 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 6**). The estimated MSY (about 17,000 t) is 33% higher than current reported landings.

SWO-ATL-4. Outlook

North Atlantic

The Committee believes that it is likely that the northern swordfish stock is nearly rebuilt to B_{MSY}. Although there is some uncertainty associated with this conclusion (**SWO-ATL Figure 4**), almost half of the bootstrap estimates of current biomass were greater than or equal to B_{MSY}. If the current TAC management strategy is maintained, the stock is likely to remain near the level that would produce MSY.

South Atlantic

While the Committee believes 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

This report only takes into account catch data transmitted to the SCRS by the different countries and which were available during the meeting. Total catch is considered provisional and subject to revision for 2005 **(SWO-ATL Table 1)**.

Canada, Chinese Taipei, EC-Spain, Japan, Morocco, South Africa, and the United States provide catch-at-size data based on national sampling. Other nations are either partially (e.g., Brazil, EC-Portugal) or completely substituted from these data. The SCRS considers that it is not appropriate to apply these scientific estimates for purposes of evaluating compliance, and therefore only summary data are provided.

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 9,000 t and the estimated discards were about 535 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 10,800 t and the estimated discards were about 460 t. The total allowable catch in the North Atlantic in 2004 was 14,000 t. The reported landings and discards in 2004 were about 12,300 t. Reports for 2004 are considered provisional and subject to change.

The total allowable catch in the South Atlantic for the years 2002, 2003, 2004, and 2005 were respectively, 14,620 t, 15,631 t, 15,776 t, and 15,956. The reported landings and discards for the same years were respectively 14,000 t, 12,300 t, 12,800 t, and 12,687. Reports for 2005 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.

In 2000, the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 21% (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 about 25%. The Committee noted that this proportion of small fish did not increase very much even though recruitment in the North may have been at a high level in recent years.

Other implications

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

SWO-ATL-6. Management recommendations

North Atlantic

In order to maintain the northern Atlantic swordfish stock close to a level that would produce MSY, the Committee recommends continuing the present TAC (14,000 t). Given the current estimate of 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[5]
Current (2005) Yield[2]	12,143 t	12,687 t
Current (2006) Replacement Yield[3]	14,438 t	Not estimated
Relative Biomass (B_{2006}/B_{MSY})	0.99 (0.87 - 1.27)[4]	Likely >1
Relative Fishing Mortality		
F_{2005}/F_{MSY}[1]	0.86 (0.65 - 1.04)[4]	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].

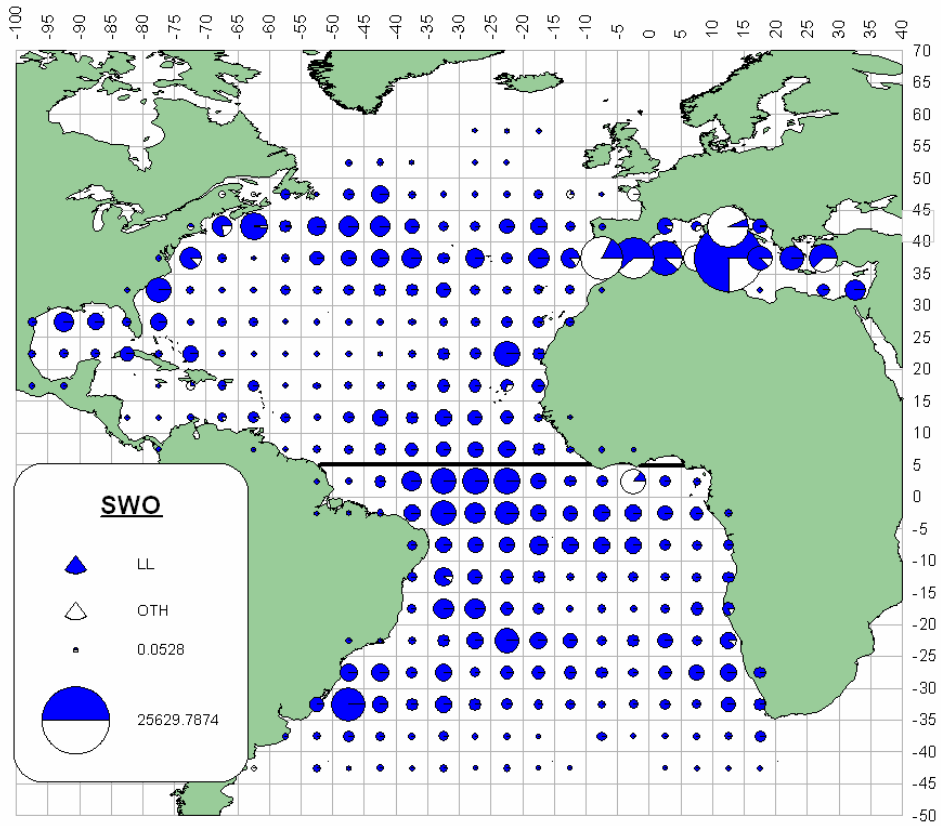
[1] Base Case production model (Logistic) results based on catch data 1950-2005.
[2] Provisional and subject to revision.
[3] For next fishing year.
[4] 80% confidence intervals are shown.
[5] Provisional and preliminary, based on production model (Exponential) results based on catch data 1970-2005.

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

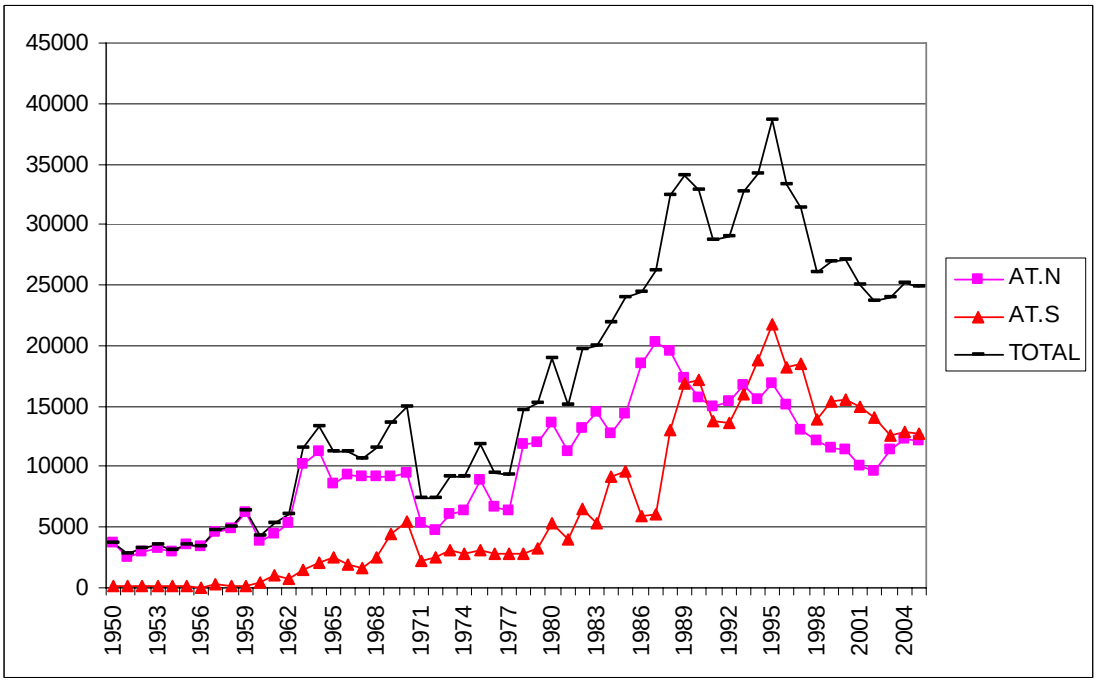
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			18881	15155	19662	19929	21930	23969	24380	26266	32469	34098	32796	28647	29027	32659	34247	38624	33324	31432	26101	27001	27047	25019	23703	23990	25167	24830
	AT.N		13558	11180	13215	14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16717	15475	16844	15172	12997	12195	11590	11439	10011	9654	11464	12265	12143
	AT.S		5323	3975	6447	5402	9139	9586	5894	6030	12956	16848	17124	13713	13633	15942	18772	21780	18152	18435	13906	15410	15608	15008	14049	12526	12902	12687
Landings	AT.N	Longline	12831	10549	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8423	8654	9986	11498	11163
		Other surf.	727	631	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	687	385	855	447	612
	AT.S	Longline	5179	3938	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13720	14819	15448	14302	13641	11725	12445	12596
		Other surf.	144	37	103	95	219	723	943	584	552	450	419	426	460	395	1407	974	352	175	176	586	159	706	408	801	456	91
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	1137	896	607	618	313	358
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7	10
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	
		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	
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10	10	10	10
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	
		Canada	1885	561	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203	1558
		China P.R.	0	0	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	134	182	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30	140
		Cuba	278	227	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	0	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	0	
		EC.España	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586	5376	5521
		EC.France	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102	178
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12	1	1
		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	0	
		EC.Poland	1	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	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320	900
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	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	0	0	10	39	0	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	0	
		Grenada	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73	56
		Iceland	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	
		Japan	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	554	302
		Korea, Republic of	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	0	51
		Liberia	5	38	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	136	124	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335	334
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32	44	41
		NEI-1	0	0	0	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	12	0	0	0	0	14	3	131	190	185	43	35	111	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	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	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	0	0	1	4	44	5	5
		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	0	
		Senegal	0	0	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	0	0	10	0	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	
		St. Vincent and Grenadines	0	0	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	0	0	1	0	0	0	0	0	0	0	0	0	2	3
		Trinidad and Tobago	0	0	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.	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2380	2162
		U.S.S.R.	21	0	69	0	16	13	18	4	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	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	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	0	0	200	141
		Venezuela	192	24	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45	53	55
	AT.S	Angola	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Argentina	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	38	0	5	10	8	0	
		Belize (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	0	
		Benin	0	18	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	0	
		Brasil	1582	655	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998	3785

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		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	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	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	29	534	344	200	423	353	278	91
		Chinese Taipei	702	528	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745	744
		Cuba	316	147	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29	31
		EC.España	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483	5402
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345	493
		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	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	
		Ghana	110	5	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343	55
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	
		Honduras (foreign obs.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	0	0	
		Japan	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	790	685	897	937	646	175*
		Korea, Republic of	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	24	70	36
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	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	0	0	4	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	856	439	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	0	0	730	469	751	504	191	549	832
		Nigeria	0	0	0	83	69	0	0	0	0	0	0	0	3	0	0	0	9	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	105	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	0	0	6	1	8	1	1
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	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	6	0	0	
		South Africa	31	9	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295	199
		Togo	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	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	171	396	160	179	142	43	200	21	15	
		U.S.S.R.	154	40	26	46	158	60	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	0	0	20	4	0	0	
		Uruguay	0	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105	843
Discards	AT.N	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45	106
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	598	567	319	263	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	308	263	282	275	262
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1	

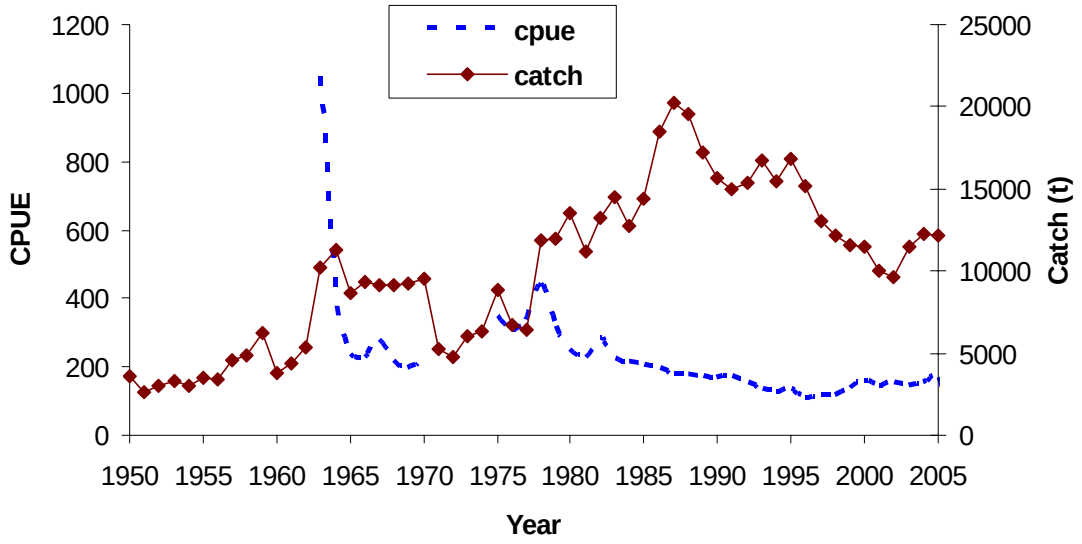
* Japanese longline catches in 2005 were revised during the SCRS resulting 778t and 269 t. for the north and south stocks respectively.



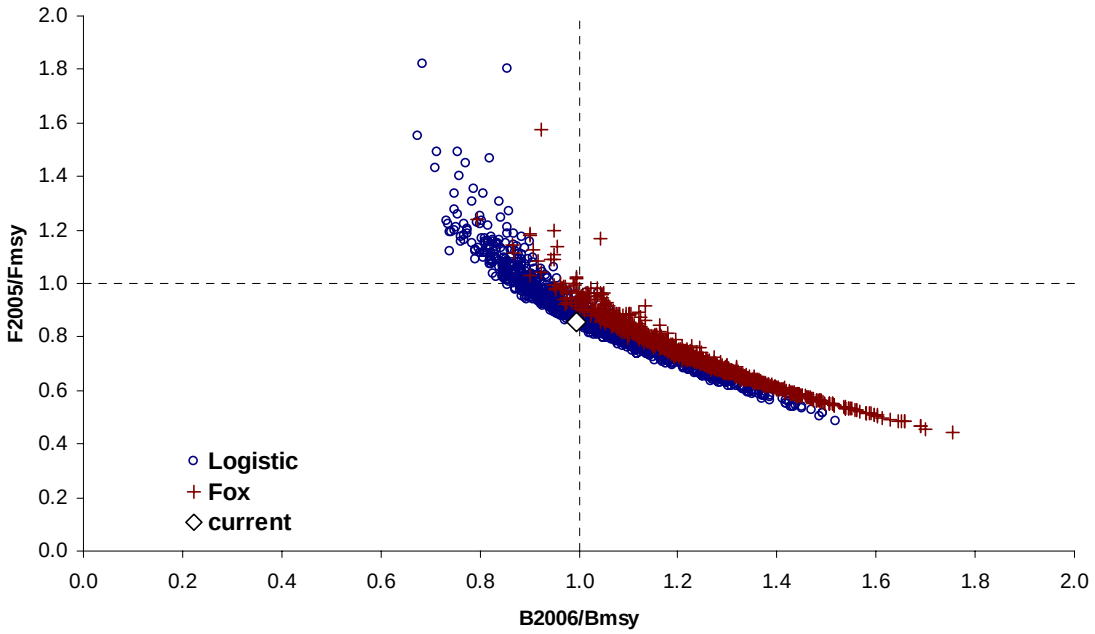
SWO Figure 1. Geographical distribution of SWO cumulative catch (t) by longline, for the period 2000-2004 in the Convention Area.



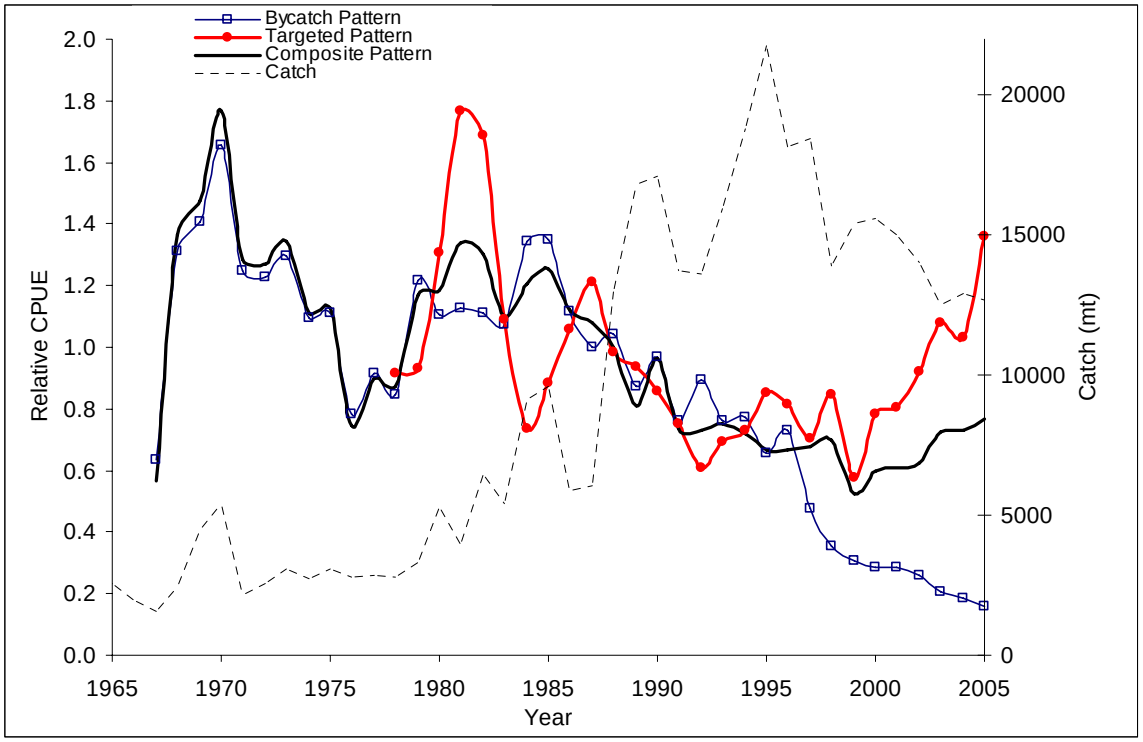
SWO-ATL Figure 2. SWO catches for North, South and total Atlantic, in tons, for the period 1950-2005



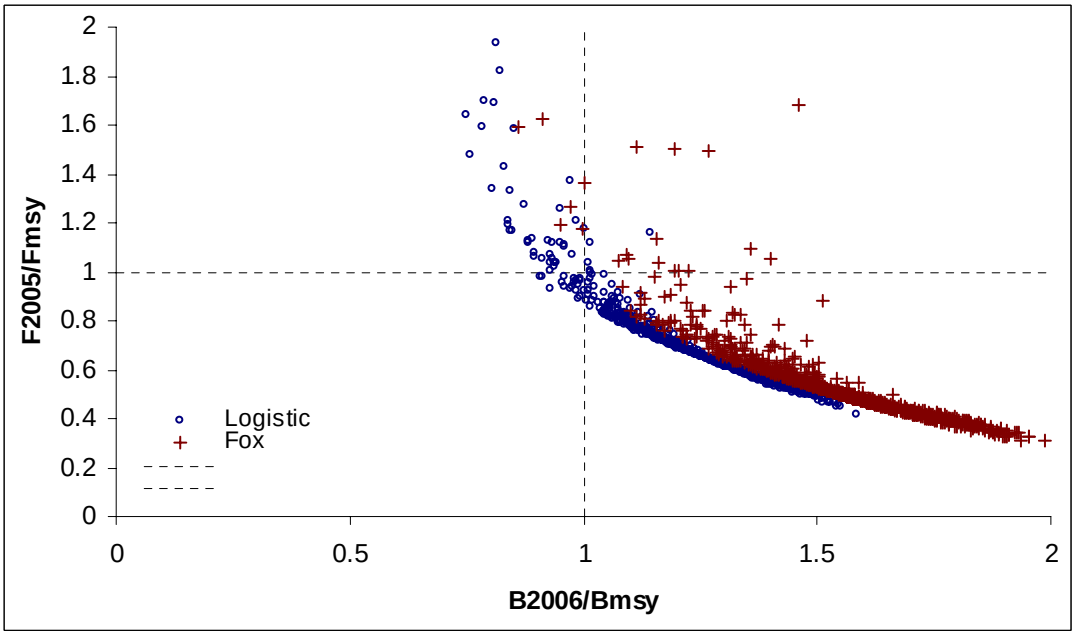
SWO-ATL Figure 3. Estimated catches of north Atlantic swordfish (in MT, including discards) for 1950-2005, and the combined biomass index.



SWO. Figure 4. Estimated stock status for north Atlantic swordfish from the ASPIC bootstrap runs of the Logistic and Fox models. The solid diamond is the current best estimate of stock status.



SWO-ATL Figure 5. Relative CPUE patterns from bycatch (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. Scatterplot of the estimated pairs of current biomass and fishing mortality ratios for southern Atlantic swordfish. The results were obtained from a production model fit to the Composite CPUE data, assuming two different models.

8.9 SWO-MED-MEDITERRANEAN SWORDFISH

The most recent assessment was conducted in 2003, making use of catch and effort information through 2001. The present report focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Mediterranean swordfish should consult the report of the 2004 SCRS meeting.

SWO-MED-1. Biology

A Workshop on swordfish stock structure took place in Crete in early 2006, in response to Resolution [Res. 99-03], at which 13 scientific documents on swordfish biology were presented. The results of the research presented demonstrated that Mediterranean swordfish compose a unique stock separated from the Atlantic ones but further research is needed to clearly define stock boundaries.

A document presented during the SCRS meeting suggested that yearly differences in the growth pattern of 0-age fish were related to SST variations.

SWO-MED-2. Fishery indicators

Catch levels are rather stable in the last decade fluctuating between 12,000-16,000 t. Those levels are relatively high 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) 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 2004 catch is estimated to exceed 13,000 t but a final figure 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 the recent years are EC-Italy, EC-Greece, EC-Spain and Morocco. Also, Algeria, EC-Cyprus, EC-Malta, EC-Portugal, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental 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.

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 mostly employed in Italy, Morocco and Turkey. There are also other 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 size of the gillnet fleet has a clear decreasing trend.

Preliminary results of a study presented during the 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 gear, while a significant reduction of swordfish catches was found when using circle hooks.

Mediterranean total 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 since 1990, they have fluctuated between about 12,000 to 16,000 t.

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

SWO-MED-3. State of the stocks

The 2003 assessment indicated the presence of a stable situation in terms of recruitment, and total and spawning biomass (**SWO-MED-Figures 2 and 3**). These findings suggest that the current exploitation level is sustainable, in the short-term. However, the lack of sufficient historical data did not allow the determination of stock status

relative to MSY benchmarks. The VPA analysis has also suggested that recent F estimates were higher than the calculated Y/R and SPR benchmarks.

The Committee 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 (**SWO-MED-Figure 4**). Fish less than three years old represent 50-70% of the total yearly catches. A reduction of the volume of juvenile catches would improve yield per recruit and spawning biomass per recruit levels.

SWO-MED-4. 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]. The recently adopted [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.

Assuming low variation (10%) on the annual recruitment levels, a document presented in the SCRS meeting indicated that a four-month fishery closure during the recruitment period would, in the medium term, result in an increase of the total annual catch of about 6% in terms of weight, and in a reduction of the number of juvenile fish in the catch by 18-23%.

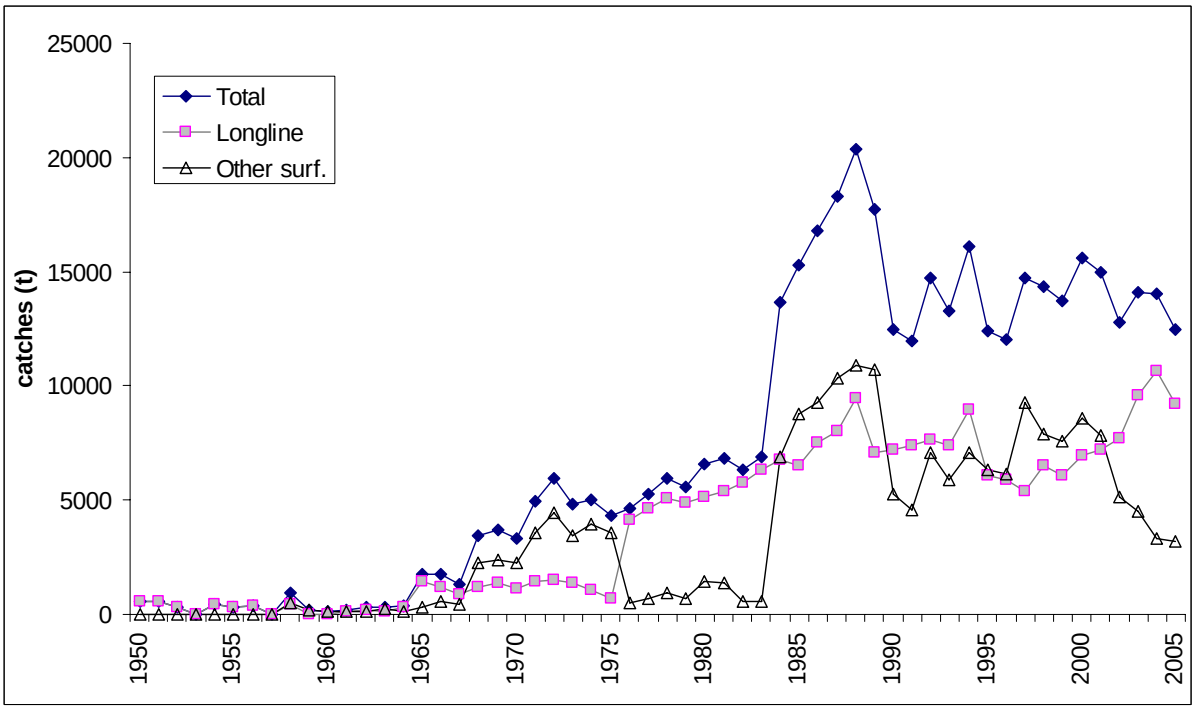
MEDITERRANEAN SWORDFISH SUMMARY

Maximum Sustainable Yield	Not estimated
Current (2004) Yield[1]	14,016 t
Current (2002) Replacement Yield	~15,000 t
Relative Biomass (B_{2002}/B_{MSY})	Not estimated
Relative Fishing Mortality	
F_{2001}/F_{MSY}	Not estimated
F_{2001}/F_{max}	2.7
$F_{2001}/F_{0.1}$	4.7
$F_{2001}/F_{30\%SPR}$	3.3
Management measures in effect	No ICCAT regulations; national closed areas, minimum size and effort controls.

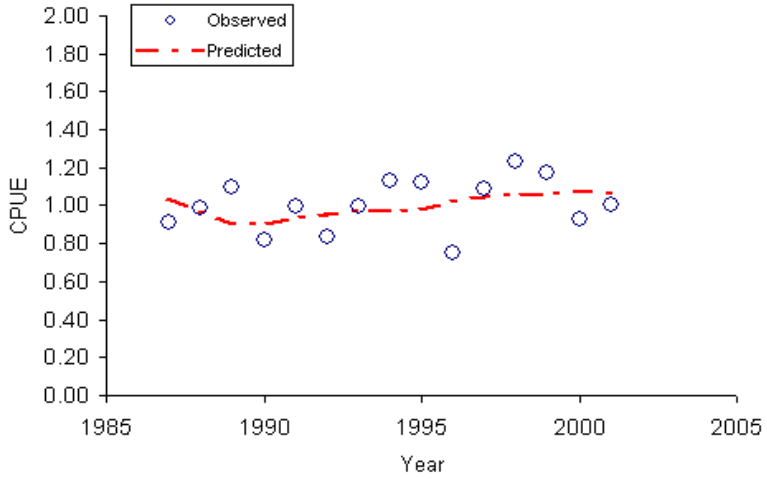
[1] The 2005 reported catch is considered incomplete and too provisional to use in this table.

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

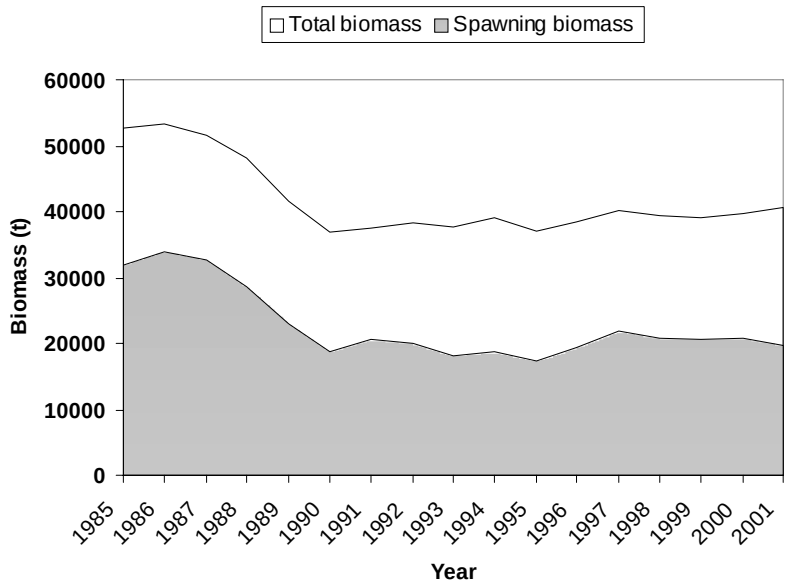
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL		6813	6343	6896	13666	15292	16765	18320	20365	17762	12441	11997	14709	13265	16082	12430	12053	14693	14369	13699	15572	15006	12803	14089	14016	12471
Landings	Longline	5418	5770	6313	6749	6493	7505	8007	9476	7065	7184	7393	7631	7377	8985	6084	5884	5389	6496	6097	6963	7180	7696	9556	10665	9193
	Other surf.	1395	573	583	6917	8799	9260	10313	10889	10697	5257	4604	7078	5888	7097	6346	6169	9304	7873	7602	8609	7826	5107	4534	3341	3164
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	9	113
Landings	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	0	0	0	
	Algerie	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	0	564	635
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	0	0	0	
	Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0	0	
	EC.Cyprus	78	103	28	63	71	154	84	121	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49	53
	EC.España	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	306	950	
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	0	19	
	EC.Greece	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120	1311
	EC.Italy	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	6725	5286	6104	6104	6312	7515	6388	3539	8395	6942	7460
	EC.Malta	192	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195	362
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120	14
	Japan	0	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	4	2	1	0	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	0	10	2	
	Maroc	0	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253	2523
	NEI-2	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	0	
	Tunisie	7	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	791	
	Turkey	70	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	373	360	360	350	0	
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	0	9	113



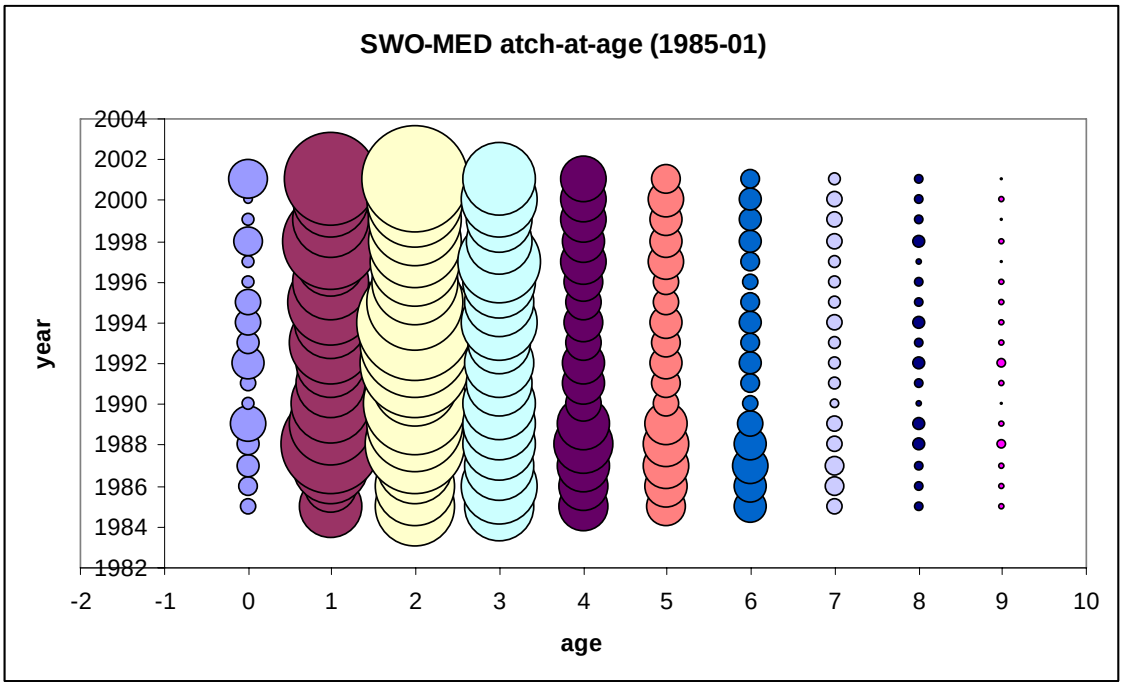
SWO-MED-Figure 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2005.



SWO-MED-Figure 2. Fit of the non-equilibrium production model to catch and effort since 1987. The predicted CPUE indicates a relatively stable population biomass over the time-period from 1987-2001.



SWO-MED-Figure 3. Total and spawning biomass estimates by year.



SWO-MED-Figure 4. Age distribution of swordfish catches in the Mediterranean by year (1985-2001).

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 2006, CCSBT will not be issuing a stock status report until after its annual meeting (October 10-13, 2006) which will take place after SCRS. For this reason, no Executive Summary for SBF is included in this Report. The Committee requests that the Secretariat transmit to the Commission the Executive Summary that will be issued by CCSBT after the SCRS meeting.

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.

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.

At present no new information submitted during the meeting is available for the species that comprise this group.

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. Various species are also caught by the sport fisheries.

SMT-Table 1 shows historical landings of small tunas for the 1980 to 2005 period although data for last year are preliminar. 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 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 2001 is observed, when the catch was 84,093 t. From that year on catches continued to decrease reaching 43,879 t in 2005. This decrease seems 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 2005 is 43,879 t. The Committee pointed out the relative importance of small tuna fisheries in the Mediterranean Sea, which account for 26% of the total reported catch in the 1980-2005.

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.

SMT-4. Outlook

The results of an ICCAT questionnaire circulated in 1996 indicate that the small tunas 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 working group. The Committee reiterates it 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.

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

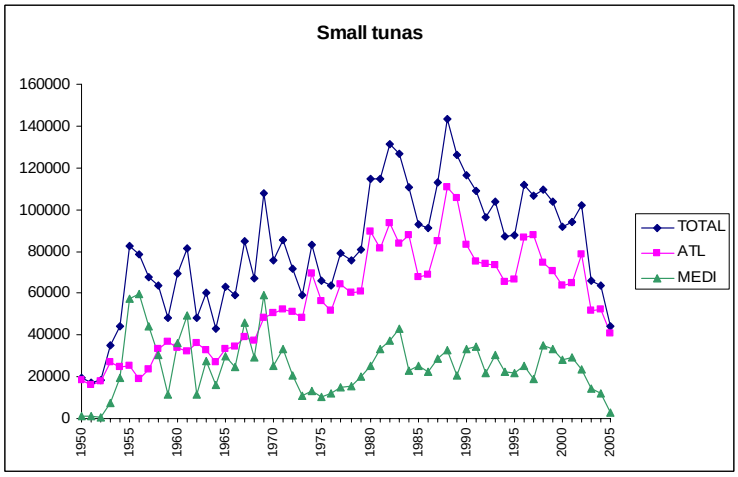
			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
BLF TOTAL			1973	1941	1738	1908	1403	2822	3462	3322	2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2358	4034	4756	1303	1931	985
Thunnus atlanticus		Brasil	85	89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1	118	91
		Cuba	721	622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0	
		Dominica	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42	25	
		Dominican Republic	124	144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0	0	0	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	761	842	809	821	755	729	669	816	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0	
		Grenada	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268	306
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0	
		Liberia	0	0	0	0	0	0	0	229	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	0	12	0	10	9	10
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		Netherlands Antilles	55	55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0	
		Sta. Lucia	0	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	0	5	5	5
		U.S.A.	139	41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	334	414	675	222
		UK.Bermuda	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9	4	
		Venezuela	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1902	1210	319	732	225
BLT TOTAL			0	0	0	0	0	2	0	357	723	3634	2206	814	394	177	100	0	0	28	579	1230	1577	950	1348	402	930
Auxis rochei		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231	300	791
		Russian Federation	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468	128	102	139
		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	0	989	0	
		Turkey	0	0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316	0	0	
		U.S.A.	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		U.S.S.R.	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BON TOTAL			38927	41106	42386	21907	24905	21320	29712	46382	29721	28941	33561	22025	30584	21505	20841	24692	24641	39937	36196	28306	28533	25400	14228	8521	4553
Sarda sarda	ATL TOTAL		10760	12169	6840	6849	6946	5892	7395	22354	17766	6844	8306	6914	4587	5823	5652	7497	10563	10207	8026	6334	6297	9684	3112	2975	2547
		Angola	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118	0	0	
		Argentina	846	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	0	1	2	2	0	
		Benin	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	0	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0	0	90
		Bulgaria	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cuba	0	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0	0	0	
		EC.España	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23	9	0
		EC.Estonia	0	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	502	587	547	569	492	431	331	395	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0	0	
		EC.Germany	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0	0	
		EC.Greece	1	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	0	48	
		EC.Latvia	0	0	0	0	0	0	0	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	793	0	0	
		EC.Poland	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0	
		EC.Portugal	31	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40	50	38
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0	
		Georgia	0	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Germany Democratic Rep.	440	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Ghana	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Grenada	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	14	16	7	10	10	0	0	
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	
		Maroc	477	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928	989	1411
		Mexico	408	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	1632	1861	1293	1113	1032	1238	1066	654
		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	0	2	0	0	0	0	
		Rumania	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0	0	0	
		Russian Federation	0	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441	461	16	79
		Senegal	1327	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441	0	159	
		Sierra Leone	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	11	245	44	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	0	15	18	
		Sta. Lucia	0	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0	1	
		Togo	0	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	452	188	280	81

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		U.S.A.	333	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44	70	68
		U.S.S.R.	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	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	0	1385	985	0	0	25	0	0	0	342	2786	1918	1114	399	231	1312	30	0	
		Uruguay	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	833	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13	0	16
	MEDI TOTAL		28167	28937	35546	15058	17959	15428	22317	24028	11955	22097	25255	15111	25997	15682	15189	17195	14078	29730	28170	21972	22236	15716	11117	5546	2007
		Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	
		Algerie	740	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	0	609	575
		Bulgaria	191	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35	0	0	
		Croatia	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	0	0	0	0	0	
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	10	6	4
		EC.España	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544	272	
		EC.France	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27	0	0	
		EC.Greece	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	1538	1321	1390
		EC.Italy	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091	2009	
		EC.Malta	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0	0	0	
		Egypt	2	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	0	0	
		Libya	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	309	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	274	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	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	0	45	0	3	2	6	10	12	12	14	17	17	0	0	0	
		Tunisie	381	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	848	1251	
		Turkey	23174	23397	29034	7220	12281	10756	16793	17613	4667	14737	19151	8863	19548	10093	8944	10284	7810	24000	17900	12000	13460	6286	6000	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	
		Yugoslavia Fed.	39	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BOP TOTAL			1448	584	38	49	133	87	564	1482	1116	457	588	600	601	775	640	2136	476	159	844	1193	984	917	729	513	139
Orcynopsis unicolor	ATL TOTAL		1448	584	38	49	124	86	538	1474	1109	420	487	424	349	599	525	2004	249	29	627	1048	830	780	706	506	137
		Benin	2	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0	
		EC.Portugal	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
		Maroc	968	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	478	99	37	40	40	50	50	50	50	50	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	0	3	
	MEDI TOTAL		0	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	0	87	135	198	153	92	119	224	128	216	135	145	128	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	1
		Libya	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	0	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	0	3	1	
BRS TOTAL			5841	6019	6632	8129	3501	6549	6212	9510	10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	5136	3410	3714
Scomberomorus brasiliensis		Brasil	3466	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881	814	471
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	388	494	523
		Trinidad and Tobago	0	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	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	0	0	
CER TOTAL			628	687	677	680	574	500	392	219	234	225	375	390	450	490	429	279	250	250	0	3	5	1	2	1	1
Scomberomorus regalis		Dominican Republic	106	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0	0	
		EC.France	522	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	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	0	0	0	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	1	2	0	1
FRI TOTAL			15913	25240	21690	25903	22876	20306	23407	25151	21416	23333	15424	8026	11209	10477	9870	17809	16519	14446	12615	12307	14465	15475	4871	8394	2805
Auxis thazard	ATL TOTAL		12235	19197	15870	19566	17636	15249	19667	19025	15029	14973	8853	3125	8182	5354	5569	11900	13449	12160	10548	9613	10223	10375	2421	2863	2028
		Angola	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38	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	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860	414	532
		Bulgaria	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	0	0	0	0	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	206	0	0	
		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	4
		EC.España	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635	34	0
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	0	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	0	168	47
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4	6	0
		Germany Democratic Rep.	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

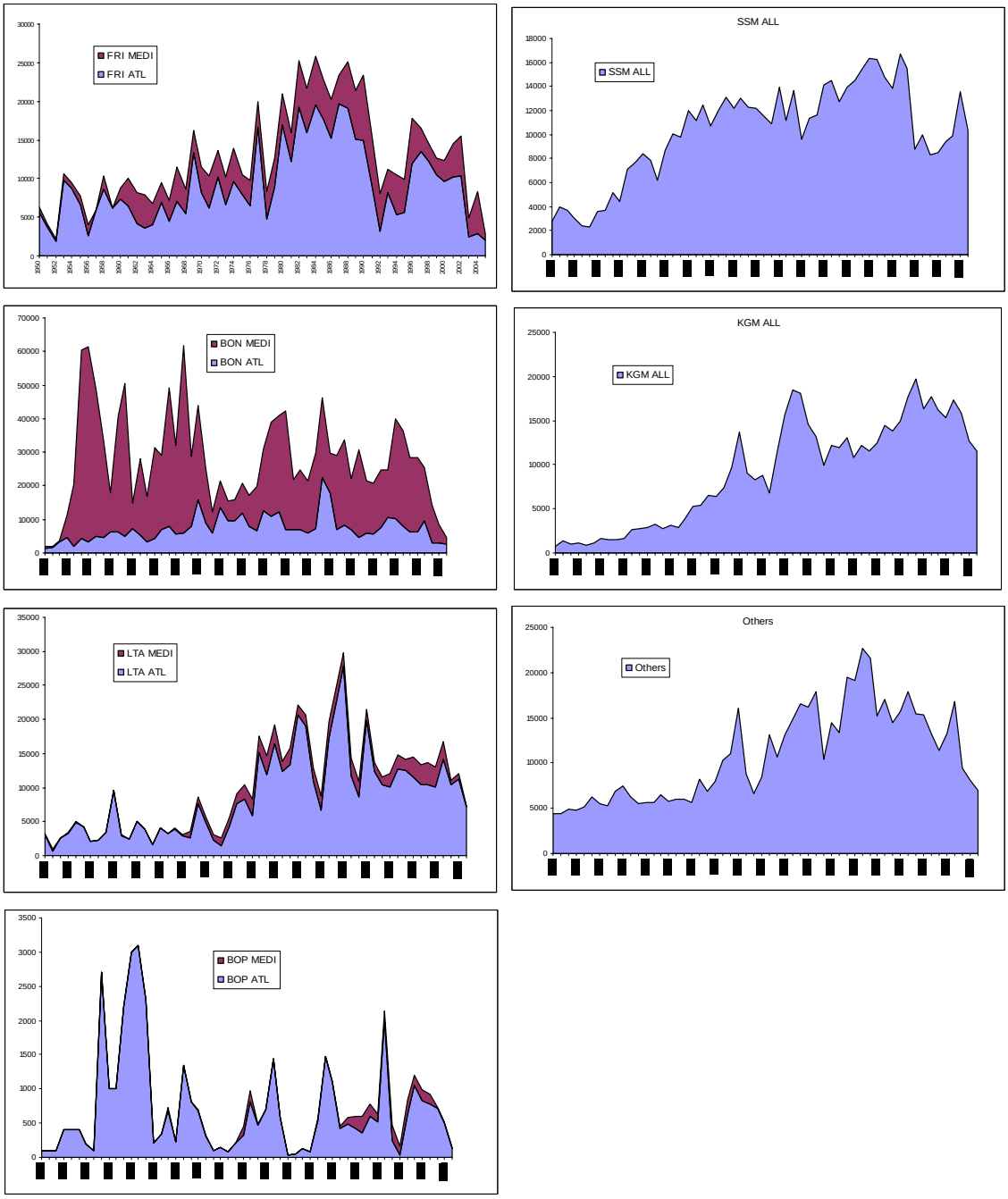
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Ghana	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Maroc	1267	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184	542	61
	Mixed flags (FIS)	1856	1984	2800	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	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768	0	0	
	NEI-1	0	0	333	46	0	0	17	381	155	237	1	4	32	68	70	180	120	309	491	291	420	186	71	180	304
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	505	474	
	Panama	0	0	0	0	0	0	0	0	0	0	243	57	118	341	328	240	91	0	0	0	0	0	0	394	975
	Rumania	0	0	0	0	0	51	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	0	0	0	0	0	0	0	0	0	0	3249	1441	220	505	456	46	500	761	477	0	0	300	50	56	63
	S. Tomé e Príncipe	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0	0	0	
	Senegal	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0	0	0	
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	245	0	0	0	414	
	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.	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	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	0	36	48	0	43	0	0	
	Venezuela	944	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	444	32	113	182	42
MEDI TOTAL		3678	6043	5820	6337	5240	5057	3740	6126	6387	8360	6571	4901	3027	5123	4301	5909	3070	2286	2067	2694	4242	5099	2450	5531	777
	Algerie	0	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391	547
	Croatia	0	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0	0	
	EC.España	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009	
	EC.France	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0	
	EC.Greece	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226	180
	EC.Italy	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819	
	EC.Malta	4	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0	0	0	
	Maroc	14	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	0	13	1	0	0	2	6	6	6	7	8	8	0	0	0	
	Tunisie	237	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	32	93	45	15	2300	932	0	1760	
	Yugoslavia Fed.	14	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
KGM TOTAL		18513	18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12439	14462	13868	14916	17775	19712	16392	17678	16161	15349	17277	15855	12667	11609
Scomberomorus cavalla	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	1	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	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311	247	202
	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	0	36	35	2	0	0	0	
	Dominican Republic	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226	0	0	
	Grenada	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5	0	0	
	Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390	312	245
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	
	Mexico	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	3583	4121	3688	4200	4453	4369	4564	3447
	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	
	Sta. Lucia	0	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	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.	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	6081	6983	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	0	1	
	Venezuela	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	0	0	
KGX TOTAL		339	283	20	485	22	149	261	491	105	131	225	266	301	508	512	824	156	251	1	229	48	0	15	0	1
Scomberomorus spp	Barbados	0	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	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	160	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	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	236	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	0	1
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	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	0	155	0	0	44	48	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	0	53	84	86	134	106	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	14	0	0	0	0	15	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0	0	0	
	Sta. Lucia	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0	0	
	Trinidad and Tobago	179	203	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	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0	
LTA TOTAL		13847	15839	22214	20625	12896	8809	19741	25135	29855	14359	10910	21554	13681	11607	12026	14786	14147	14510	13341	13737	12994	16840	11060	12112	7396
Euthynnus alletteratus	ATL TOTAL	12401	13359	20653	18975	10856	6643	17317	22730	27820	11742	8587	19798	12415	10402	10124	12667	12543	11596	10465	10443	10131	14198	10377	11242	7159
	Angola	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	0	0	
	Argentina	0	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Benin	40	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0	
	Brasil	45	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	0	320	280
	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	
	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	236	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	108	0	0	
	Cuba	53	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0	
	Côte D'Ivoire	0	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	0	0	270
	EC.España	7	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1	489	
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.France	1098	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	696	631	610	613	0	10	27
	EC.Germany	0	0	0	0	0	0	0	0	0	38	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	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Poland	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16	19	21
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173	0	
	Germany Democratic Rep.	0	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ghana	3287	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541	7060	5738
	Israel	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Maroc	19	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	86	77	54	60	60	50	50	50	50	50	4	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	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681	0	0	
	NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33	2	0	26
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	
	Panama	36	0	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	0	0	0	0	0	
	Rumania	12	291	216	266	126	81	7	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	0	0	0	0	0	0	0	0	0	0	617	306	265	189	96	49	0	88	0	0	0	74	13	0	
	S. Tomé e Príncipe	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0	0	0	
	Senegal	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1097	1094	1094	0	1865	
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	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	2	2	2	0	1	10	1	1	0
	U.S.A.	97	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1492	1382	765
	U.S.S.R.	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Bermuda	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4	5	
	Venezuela	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50	0	
MEDI TOTAL		1446	2480	1561	1650	2040	2166	2424	2405	2035	2617	2323	1756	1266	1205	1902	2119	1604	2914	2875	3294	2863	2642	682	870	237
	Algerie	0	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158	116
	Croatia	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0	
	EC.Cyprus	22	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0	
	EC.España	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41	
	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	0	0	112
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	24	38	
	EC.Malta	0	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0	0	0	
	Israel	35	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0	
	Maroc	61	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	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0	
	Palestinian Territory, Occupied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0	
	Serbia & Montenegro	0	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0	
	Syrian Arab Republic	73	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0	
	Tunisie	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	633	
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750	0	0	
	Yugoslavia Fed.	0	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAW TOTAL		3156	5312	4716	4498	3989	3292	1799	3915	2934	5610	4025	1527	1775	1270	1264	1316	871	1108	727	748	727	1067	12	375	
Scomberomorus tritor	Angola	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Benin	60	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205	0	0	
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Latvia	0	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	298	0	0	
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0	
	Germany Democratic Rep.	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Ghana	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	0	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	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	8	0	0	0	0	0	0	0	0	
	Senegal	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522	0	375	
	U.S.S.R.	0	602	1170	223	206	219	28	143	195	1240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Ukraine	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	21	0	42	12	0	
SSM TOTAL		11164	13633	9574	11362	11590	14117	14531	12712	13946	14500	15546	16346	16231	14777	13857	16725	15501	8723	9973	8336	8492	9461	9853	13582	10334
Scomberomorus maculatus	Colombia	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0	0	0	
	Cuba	657	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0	0	0	
	Dominican Republic	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	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	0	265	0	0	
	Grenada	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0	0	
	Mexico	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	5483	6431	4168	3701	4350	5242	3641	5723
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5330	
	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	0
	Trinidad and Tobago	939	1218	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.	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	4660	4611	4611	4611
WAH TOTAL		2920	2280	2366	2159	920	1151	1235	1612	1507	1470	1687	1807	2571	2104	2362	2515	3085	2483	2943	2020	2296	2253	1658	1977	1411
Acanthocybium solandri	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
	Aruba	115	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0	
	Barbados	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0	43	0	
	Benin	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Brasil	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405	519	449
	Cape Verde	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	552	0	0	
	Dominica	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6	
	Dominican Republic	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0	
	EC.España	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48	305	214
	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	0
	Grenada	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44	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	35	
	Netherlands Antilles	215	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230	0	0	
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52	0	0	
	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	0	7	6	
	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	0	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40	60	
	Sta. Lucia	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169	232	169
	Trinidad and Tobago	0	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	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	846	789	712	558
	UK.Bermuda	24	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87	88	
	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	12	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	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	
	Venezuela	77	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7	16



SMT-Figure 1. Estimated landings (t) of small tunas (combined) in the Atlantic and Mediterranean, 1950-2005. 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, 1950-2005. 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. This document focuses on changes that may have taken place since then; 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 meeting. Within the Detailed Report of the stock assessment session (Anon 2005c) is a complete discussion of the uncertainties about stock structure, movements, life history and characteristics of some of the fisheries affecting these stocks.

SHK-1. Fishery indicators

Previous reviews of the shark data base resulted in recommendations to improve the data reporting for sharks, but a large improvement in the quantity and quality of the overall shark catch statistics data base has not yet resulted. The Committee, however, was pleased to note that for the first time Chinese Taipei provided detailed shark statistics of 2003-2005, including Task I, Task II CE and size, split into three species, namely blue, porbeagle, and silky sharks. Reported catches are presented in **SHK-Table 1**. This information is considered very incomplete and inadequate for stock assessment purposes. This year, the Committee reviewed catch information for thresher sharks (*Alopias* spp.) and for the oceanic whitetip (*Carcharhinus longimanus*),and concluded that data on these less abundant species 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. Although this might provide a somewhat more realistic picture of the catches of these species, this approximation was done with little guidance from scientists with expert knowledge about several important fleets which catch them. The estimates thus obtained (**SHK-Figure 1**), although highly uncertain, were used as a tentative basis for stock assessment model applications that require information on both catch and effort. 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 as being very preliminary.

SHK-2. Blue shark

For both North and South Atlantic blue shark, the current biomass appears to be above the biomass that would support MSY. In many of the model runs conducted (using surplus production models, age-structured models and catch-free models), stock status appeared to be close to unfished biomass levels. The results are highly conditional on the assumptions made. Those assumptions include (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 historically experienced some level of stock depletion as suggested by the historical CPUE trend and model outputs. The Committee cannot rule out the possibility that the current stock size is below the biomass that can support MSY, as trends in CPUE suggest depletions of fifty percent or more. For the South Atlantic, the stock may have decreased since 1971, but the magnitude of decline appears to be less than in the North Atlantic. The current stock biomass may be above the biomass at MSY, but due to the lack of a clear signal from the catch rates, there is a wider variety of possible historical stock trends: from virtually undepleted to fully exploited. The assessment of shortfin mako stocks is 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

The Commission directed in [Rec. 04-10] that in "2005, the SCRS shall review the assessment of shortfin mako sharks (*Isurus oxyrinchus*) and recommend management alternatives for consideration by the Commission." This review was undertaken and the Committee cannot rule out the possibility that the current shortfin mako shark biomass in the North Atlantic is below the biomass that can support MSY. Should the Commission wish to improve the status of this stock, measures to reduce fishing mortality should be taken. Shortfin mako sharks are taken in a broad range of fisheries, both as targeted catch and as by-catch, and our knowledge of overall catch levels is inadequate. As such, there is no basis for recommending catch limits for this stock .Although technical measures such as modifications to fishing gear, restrictions on fishing areas and times, minimum or maximum sizes for allowable retained catch might prove beneficial, without more detailed information gathered through research programs designed to estimate the potential benefits of such measures, the Committee recommends that reductions in fleet capacity and effective effort could provide the most direct benefit to shortfin mako sharks. In the same recommendation [Rec. 04-10], the Commission also directed that "SCRS shall reassess blue shark (*Prionace glauca*) and shortfin mako no later than 2007." Nevertheless, considering the relatively short time elapsed since the last assessment (3 years), the little improvement achieved in the provision of shark data to ICCAT since then, as well as the acute need to pre-process and analyze the available data, prior to the assessment, including the need to develop methods for the reconstruction of catch history, the Committee recommends that a data preparatory meeting in advance of the next stock assessment be conducted. The Committee also noted that in order to allow for an effective implementation of Rec. 04-10, the 5% 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. No specific value was recommended by the Group. Conversion factors between fins and body weights need to be developed and implemented on a species and /or fleet-specific basis.

BSH-Table 1a. Task I nominal catch (t) of blue shark reported to ICCAT.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			204	9	613	121	380	1162	1467	867	832	2348	3533	2343	7879	8310	8422	9036	36895	33211	34208	38512	34315	31424	35241	35787	18814
longline	Landings	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	259
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743	1103	0	179	1689	2173	1966	2160	1568	2520
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275	12	10	4	53	18	0	5	6	0	11
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		China P.R.	0	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	0	692	1206	1272
		EC.Cyprus	0	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.España	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0
		EC.Portugal	0	0	0	0	0	0	0	0	0	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602	6926	3586	7266
		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
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	2596	1589	1044	996	850	893	494	532	742	830	1473	0
		Mexico	0	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	0	2213	0	1906	6616
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	22	0	0	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	0	82	63	232	128	154
		Trinidad and Tobago	0	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	0	0	0	0	0	0	0	0	0	0	0	8	8	4	6	1	3	0	1	3	0	1	7	2
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0
		Uruguay	0	0	0	0	0	0	0	0	0	0	8	84	15	93	64	252	286	242	126	119	59	159	620	492	400
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	26
	Discards	Canada	0	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	0	526	421	480	741	772	184	1136	572	618	609	185	173	97	137	105	68	0	63	76
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
Other surf.	Landings	Benin	0	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	0	0	0	0	0	0	0	4	6	99	3
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0
		EC.Denmark	0	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.France	0	9	8	14	39	50	67	91	79	130	187	276	322	350	266	278	213	163	0	395	207	109	0	98	120
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	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	0	81	76
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	302	1
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0	0	1	0	12	9	6	0	0	2
		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	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	0
		U.S.A.	204	0	605	107	341	1112	874	355	271	87	308	214	672	21	19	277	210	252	217	291	39	0	0	0	0
	Discards	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	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	22	4	0	0	0	0	1	0
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0

SMA-Table 1b. Task I nominal catch (t) of shortfin mako shark reported to ICCAT.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			999	1681	899	1734	3747	1892	953	1457	1513	1245	1210	1302	2957	2952	4866	2771	5577	5275	4002	4858	4683	5380	7370	7409	3790
longline	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	190	0	27	219	409	226	283	177	256
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	56	99	55	54	59	60	61	63	69	74
		China P.R.	0	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	0	710	77	82
		EC.España	0	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	0	193	314	220	796	649	749	785	519	424	446	706	523	471	1781	411	1366
		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
		Japan	593	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	0	10	0	0	0	0	10	16	0	10	6	9
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	459	0	509	1415
		Panama	0	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	0	19	13	0	77	19	138	126	125
		Trinidad and Tobago	0	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.	0	0	0	0	0	0	0	0	0	0	0	0	278	310	281	233	244	0	0	2	181	167	142	188	186
		Uruguay	21	92	120	202	118	48	39	24	18	25	14	15	29	12	21	24	28	21	43	63	70	58	239	275	185
		Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	38
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	20
	Discards	Mexico	0	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	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	0	2	0	0	0	0	0	0
Other surf.	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	0
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	11	11	15	17	20	10	17	10	10	17
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	9	13	7	17	12	15	23	10	10	9	15	15	30	15	14
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	74	0
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	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	2	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	3	0	0	0	0	0	0
		U.S.A.	385	613	368	929	2947	1296	462	795	670	268	210	250	667	317	1422	232	164	148	69	290	215	248	0	222	0
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0

POR-Table 1c. Task I nominal catch (t) of porbeagle reported to ICCAT.

			1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			1370	584	1141	706	664	706	813	957	971	1282	1944	2588	1889	2676	2121	1548	1859	1468	1143	1469	998	848	332	725	556
All gears	Landings	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0
		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	0
		Canada	0	1	9	20	26	24	59	83	73	78	329	813	919	1575	1353	1051	1334	1070	965	902	499	237	142	232	202
		Chile	0	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.Denmark	158	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	0	1	0	0	0	0	31	27	27	0	20	25	57	35	15	0
		EC.France	768	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	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	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	0	2	1
		EC.Poland	0	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	0	3	3	2	2	1	0	0	0	0	0	0	0	0	9	4	10	101	54	16
		EC.Sweden	5	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	2	1	2	5	12	6	3	3	15	9	0	0	0	0	0	0	0	1	6	8	12	10	0	0	24
		Falklands	0	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	344	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	0	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	0	1	0	0	0	0	1	0	0	8	18	0	1	0	0	0	0	0	0
		Norway	93	33	33	96	80	24	25	11	25	43	32	41	24	24	26	28	17	27	32	22	11	14	19	0	8
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	1	0	2	2	5	1	50	106	35	78	56	13	3	1	1	1	0	1	0
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	13	2	4	0	8	34	8	28
	Discards	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
		U.S.A.	0	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	0	1	1	0	0	0	0	0	0

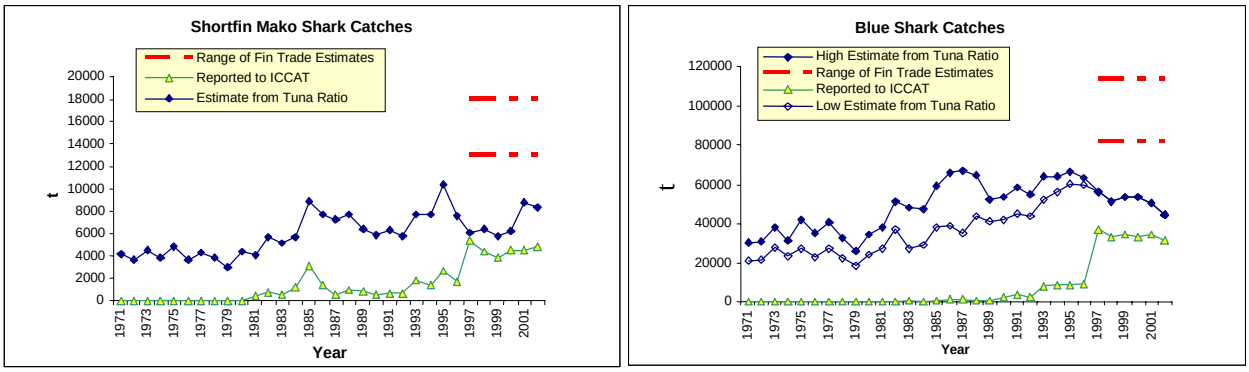
OCS-Table 1d. Task I nominal catch (t) of oceanic whitetip shark reported to ICCAT.

			1983	1985	1986	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL			1	0	0	1	0	0	8	11	10	14	8	12	15	2	642	543	205	179	189	81
OCS	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	638	534	203	174	187	78
		EC.España	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
		Mexico	0	0	0	0	0	0	0	0	2	3	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	1	0	0
		U.S.A.	1	0	0	1	0	0	0	8	3	3	8	8	6	2	2	3	2	3	2	3
	Discards	Mexico	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	8	4	4	6	0	0	0	0	0	0	0	0	0	0

THR-Table 1e. Task I nominal catch(t) of all thresher reported to ICCAT.

		1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
TOTAL		15	31	14	8	6	189	94	77	62	42	60	60	90	107	112	356	261	113	229	224	282	233	233	267
Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	37	0	8	100	46	71	111	82	113
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212	213	66	98	164	82	41	68	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	2	2	111	18	24	86
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	7	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	18	17
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	10	5	3	2
	U.S.A.	15	31	14	8	6	16	52	28	18	12	20	37	61	60	37	67	48	38	22	5	5	13	8	7
	Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	45	6	20
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	173	43	49	44	30	39	23	28	43	61	39	0	0	0	0	0	0	0	0

* All thresher includes ALV *(Alopias vulpinus)*, BTH *(Alopias superciliosus)* and THR *(Alopias* spp.).



SHK-Figure 1. Comparison of shark catch reported to ICCAT with estimates resulting from tuna to shark ratios and from fin trade data for shortfin mako (left) and blue shark (right) in the Atlantic. An approximate range is also presented from a recent study of the Hong Kong shark fin trade.

9. Report of inter-sessional meetings

That Committee considered that only reports of meetings that were not directly related to the stock assessments should be presented and, therefore, their results are not included and presented in the Executive Summaries. Following this criteria, Executive Summaries of the following meetings were presented:

9.1 Workshop on Stock Structure of Atlantic Swordfish

The Workshop was held in Heraklion, Greece, March 13 to 15, 2006.

For assessment and management purposes, the northern and southern Atlantic swordfish stocks are assumed to be separated at 5ºN latitude. The Workshop was convened primarily to review the results of research programs that have been conducted since 1999, in response to the Commission's concern about the uncertainties associated with this boundary (*Resolution by ICCAT on the Clarification of the Stock Structure and Boundaries Between the Swordfish Stocks in the Atlantic* [Res. 99-03]). In addition, the Workshop reviewed recent research on swordfish stock structure in the Mediterranean as well as in other Oceans.

The Workshop discussed 13 scientific presentations showing the available evidence from biological markers, fishery-dependent data (catch, CPUE and size distributions), and genetics, in addition to computer simulation studies.

The results of the research presented at the Workshop gave general support to the stock structure currently assumed for Atlantic Swordfish. The Committee also concluded that the precise delimitation between the northern Atlantic, southern Atlantic and Mediterranean stocks cannot be improved upon without intensified collaborative and multi-disciplinary research. Similarly, the classification of swordfish caught near the boundaries to their stock of origin is subject to uncertainty and cannot be made accurately without intensified collaborative and multi-disciplinary research taking into account fine-scale spatial (e.g., 1º squares) and temporal (e.g., quarterly) sampling strata. Intensified research and collaboration would require a clear commitment from the Commission and from individual Contracting Parties and in terms of making this a priority and providing the necessary resources to carry out the work and to coordinate it throughout the Convention area.

A number of specific research recommendations derived from the Workshop are given in Section 14 of this Report.

Document SCRS/2006/010 contains the detailed report of the meeting.

9.2 Inter-Sessional Meeting of the Tropical Species Group

Tropical Species Group met in Séte, France, April 24 to 28, 2006.

The meeting was convened to continue the previous work in evaluating alternative measures to protect juvenile tropical tunas, taking into account the multi-species nature of the fisheries. This nature affects the assessment and management process at different levels, ranging from the estimates of catches, to the evaluation of management strategies for bigeye, yellowfin and skipjack tunas.

In order to evaluate the accuracy of the results, a detailed analysis of available Task I and Task II data was conducted identifying deficiencies and elaborating specific research recommendations. The meeting also reviewed population parameters under a multi-species perspective and discussed the potential utility of various fishery indicators that may provide better information on the current stock status in the absence of a full stock assessment. Special attention was paid in identifying multi-species indicators capable of giving information on the condition of the fishery as a whole, and the potential ecological impacts. In addition, the data requirements of the so-called integrated statistical stock assessment model were discussed. The meeting also defined realistic scenarios to be considered in the evaluation of alternative management measures.

As a result of these discussions, the Committee made a number of specific recommendations on research and statistics, which are given in Section 14 of this Report.

The SCRS expresses its gratitude to the *Centre de Recherche Halieutique* in Sète, and to the *Institut de Recherche pour le Développement* (IRD) for the support given at this meeting and their hospitalty.

Document SCRS/2006/011 contains the detailed report of the meeting.

9.3 BUM, WHM Stock Assessment

The Blue marlin and White marlin Executive Summary contain the major results of the assessment.

The detailed report of the meeting can be found in document SCRS/2006/012.

9.4 BFT Stock Assessment

The Bluefin Tuna Executive Summaries on bluefin tuna contain the major results of this assessment.

The detailed report of the meeting can be found in document SCRS/2006/013.

9.5 Data Preparatory Meeting for Atlantic Albacore

The Albacore group met in Madrid from July 3 to 6, 2006.

The next assessments of Atlantic albacore tuna stocks are planned for 2007 as mandated by the Commission. This data review meeting was held in preparation for the assessment with the aim of addressing some problems that were encountered during the previous (2003) assessment, and to advance a workplan for the intersessional period.

The Committee reviewed biological parameters, focusing on the differential growth patterns for North and South albacore stocks, Task I and Task II data, catch rate patterns and tagging data, as well as various methodological issues.

In terms of Task I and Task II, important gaps and/or deficiencies were identified and recommendations were for National Scientists to correct the problems. Recommendations were also made for updating the catch-at-size before the assessment, including data up to 2005. During the meeting a different approach was tested and implemented for assigning ages to the catch-at-size data. The Committee also examined several standardized CPUE series and agreed on the various datasets that will be used for the northern and southern stocks.

In terms of methods, the 2007 assessment should generally use the same methods applied in 2003. However, the Committee also agreed to attempt an integrated approach (MULTIFAN-CL-using data since 1950), and agreed on a workplan to make this possible given the greater complexity of these analyses.

Other recommendations are contained in Section 14 of this Report.

Document SCRS/2006/014 contains the detailed report of the meeting.

9.6 SWO Stock Assessment

The Executive Summary on swordfish contains the major results of this assessment.

Document SCRS/2006/015 contains the detailed report of the meeting.

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 2005 and 2006 and the research plan and the corresponding budget for 2007.

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 2007, were presented by the Coordinator.

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, Mr. M. Ortiz, presented the report of the meeting. The Convenor stressed the work carried out by the Secretariat on the preparation of a catalogue of the data available in the ICCAT database. The catalogue is part of the response to the *Recommendation by ICCAT on Compliance with Reporting Obligations* [Rec. 05-09]. The Committee recognized that the data presented by the Secretariat should be considered qualitatively by the Species Groups, taking into account the possible effect of the data deficiencies detected on the quality of the assessments, and consequently, on the Committee´s scientific advice provided to the Commission.

The Committee discussed the presentation of data on catches destined for fattening farms. The Committee pointed out that the criteria for the presentation of data were clearly defined in the *Recommendation by ICCAT to Amend the Recommendation [Rec. 04-06] on Bluefin Tuna Farming* [Rec. 05-04] and reiterated the importance that this Recommendation be implemented and that all Parties concerned provide data. The Committee recognized that the current structure of the forms to submit Task I data contemplate landings and discards and recommended that the Secretariat made the necessary changes to adapt the forms to the requirements of the Recommendation.

In regard to tagging activities, the Committee recognized the need to strengthen the *ad hoc* group on tagging, created in 2005, but which still had not initiated its activities. The Committee considered that the work of this group which is to coordinate the tagging activities that are carried out in ICCAT is fundamental and would result in a substantial improvement in the program results. Likewise, a group would provide important support for the work that the Secretariat carries out on tagging. The SCRS Chairman appointed Drs. Enrique Rodríguez-Marín (EC-Spain) and Eric Prince (USA) to serve as Co-Coordinators of the *ad hoc* group.

The Committee pointed out the improvements made during the year in the content and presentation of statistics as well as in the publications, in particular, the inclusion of a tagging section in the *Statistical Bulletin*. The Committee also appreciated the scheduling of the Sub-Committee meeting in 2006 to avoid an overlap with the other meetings during part of the sessions. This will allow an important participation of the members of the Committee, particularly the rapporteurs of the Species Groups.

The data improvement projects were discussed under this Agenda item, i.e. the Japan Data Improvement Project (JDIP) and the Data Improvement Fund. The latter is related to the *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* [Res. 03-21]. In 2006 a series of activities have been carried out that were charged to these projects which centered mainly on supporting the collection and improvement and statistics and research for countries such as Ghana, Brazil, Uruguay and other African countries that are members of ICCAT, on the development of Chapter 2 of the ICCAT Manual, on training courses, and on financial assistance for developing Contracting Parties at SCRS meetings.

Since the two projects will continue in 2007 and that within ICCAT there are other specific research programs (the BYP and the Enhanced Research Program for Billfish), the Committee considered that efforts should be coordinated and priorities established as regards the improvement of statistics and research. The Committee recommended a meeting of the Coordinators of the various programs in order to prepare a summary of the funds available and to establish priorities. The proposals are included in **Appendix 8**.

The Committee noted with satisfaction the excellent functional nature of the ICCAT relational database incorporating information from the fishing statistics and, to this effect, recommended that the Secretariat prepare software documentation in time for the 2007 SCRS meeting.

The recommendations that are pertinent to this Sub-Committee are listed under Agenda item 15 of this Report and in the Report of the Sub-Committee on Statistics, which is attached as **Appendix 9**.

12. Report of the Sub-Committee on Ecosystems

Dr. H. Arrizabalaga, Coordinator of the new Sub-Committee on Ecosystems chaired the meeting of the Sub-Committee. The report of the meeting is attached as **Appendix 10**.

The pertinent recommendations of this Sub-Committee are listed under Agenda item 14 of this Report.

13. Consideration of plans for future activities

13.1 Inter-Sessional meetings proposed for 2007

Stock assessments for Mediterranean swordfish, northern and southern albacore and bigeye evaluation are scheduled for 2007. Also scheduled are data preparatory meetings on sharks for the stock assessment that the Committee proposes postponing to 2008, a meeting for the tropical species group for the first quarter of the year to assess fishery indicators of yellowfin and skipjack, and a albacore meeting to prepare data and scenarios to be considered by the MULTIFAN CL program, which will be used in the assessment. Furthermore, a Methods Working Group is scheduled. Likewise, a workshop to analyze the demographic stock structure of Mediterranean bluefin tuna has been scheduled, although it is likely that this workshop will be postponed to 2008 with the aim of improving preparation of data. Finally, a joint ICCAT-FAO workshop for the improvement of statistics on billfish in the Caribbean area is pending the setting of the dates with FAO.

Considering the number of assessments foreseen for 2007, it is likely that they can not all be scheduled on dates sufficiently late in the year for fleets to be able to fully process their estimates of catch and effort for 2006.

The program of Inter-Sessional meetings proposed up to now for 2007 is as follows:

Meeting	Proposed dates	Place	Mandate	Notes
Albacores North and South stock assessments	Late July 2007	Madrid	**[Rec. 04-03] and [Rec. 04-04]**	During the first quarter of 2007 a preparatory meeting will be held to discuss the Multifan CL criteria and scenarios
Bigeye stock assessment	Early June 2007	Madrid	**[Rec. 04-01**]	
Sharks stocks assessment data preparation	Preferably in late June or early July 2007	Probably Uruguay	**[Rec. 04-10]**	Although the recommendation consider the assessment not later than 2007 a data preparatory meeting is recommended to better conduct the stocks assessments that would be moved to 2008
Mediterranean swordfish stock assessment	2007-2008	Madrid		To fill gaps in the available data series
Workshop to analyze the Atlantic bluefin stock dynamics in historical periods	2007-2008	Madrid		2008 is recommended due to the need of new information that should be collected before the meeting
Methods working group	Probably in April	Madrid		Issues to include methods for estimating missing catch series
Data evaluation meeting for skipjack and yellowfin	Late March 2007	Madrid		Considering that updated catch at size data for YFT and SKJ could not be available to the tropical species group in 2006 it was recommended to prepare and analyze fishery indicators for this two species in 2007
A joint ICCAT-FAO workshop to improve the Caribbean billfish statistics	2007-2008	To be determined		It is necessary to coordinate the meeting with FAO
Inter-sessional meeting Sub-Committtee on Ecosytems	Early 2007 (February or March)	Madrid	Implied by [Res. 02-14]	Need to coordinate with bird experts
Joint ICCAT GFCM meeting	2007-2008			To study small tuna data and analyses
Ad hoc tagging coordination group	First quarter 2007	Madrid		

As on other occasions, the Committee reiterated that although the Commission does not systematically request assessments (or accepts when these have been proposed by the SCRS), the Committee considers that it is their responsibility to carry out a regular follow-up (in as much as possible, annually) of the fisheries development and proceed, routinely, to carry out necessary analysis to formulate advice on the most recent state of the stocks that are under its mandate. This occurs especially when the available information is contradictory or indicative of the poor stock status.

13.2 Date and place of the next SCRS Meeting

It was agreed to hold the next meeting of the Standing Committee on Research and Statistics in Madrid, on October 1 to 5, 2007. The Sub-Committee on Statistics and the Species Groups will meet from September 24 to 28 at the ICCAT Secretariat. The Committee also suggested holding the meeting of the Sub-Committee on Ecosystems during this week.

The Executive Secretary transmitted the Commission's request to hold the meetings earlier, avoiding thus, the financial restrictions which occur at the end of the fiscal periods. The Committee considered that it was possible to advance the meetings, although this meant that the possibility to obtain data would be reduced considerably. The Committee pointed out that the final decision corresponded to the Commission, after evaluating the effect of advancing the meeting on the availability of the most recent data, and consequently, on the assessment and on the scientific advice that the Committee provides to the Commission.

14. General Recommendations to the Commission

14.1 Recommendations to the Commission with potential financial implications

- The SCRS continues to recommend that the Commission ensures that the ICCAT Secretariat be provided timely with reliable and complete datasets on catch, effort (including vessel attributes), and size in the format requested. These obligations are considered a minimum standard as they are clearly stated in the ICCAT Convention, FAO's Code of Conduct for Responsible Fisheries, as well as the UN Implementation Agreement. The credibility of conducting reliable analytical evaluations of stock status primarily depends on the availability of such basic information.

- The Committee recommends to improve monitoring of the catch, discards and length compositions of targeted and by-catch fisheries, including through the development or strengthening of observer programs.

- The Committee recommends, for cooperation among ICCAT Parties, increase research on a) mitigation measures to reduce by-catch in general, including sharks; b) tagging, including with electronic tags, particularly in the South Atlantic; c) the life history of blue and shortfin mako sharks; d) estimates of historical catches and dead discards of blue and shortfin mako sharks, prior to the next assessment.

- The lack of participants from the coastal countries in inter-sessional meetings continues to be a matter of concern. The Committee recommends that the Commission continue to support capacity-building activities aimed at improved participation from developing Contracting Parties.

- Given the Secretariat's recent increase in workload related to compliance matters 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 needed to support the requests of species groups during stock assessments.

- Due to the importance of the tag recovery network for the success of the research based on tagging studies, and following the considerations of the Sub-Committee on Statistics and the ICCAT Secretariat interest, the recently created ad hoc Tagging Coordination Group proposes an inter-sessional meeting in 2007 focusing on the harmonization of the publicity of on-going tagging programs, tag-recovery rewards, data collection and tagging methodology in order to create a common framework under the ICCAT structure.

- The Committee decided to ask for funding from the regular Commission budget in support of an annual peer-reviewed scientific publication, on the basis of a cost estimate to be provided by the Secretariat.

14.2 Other recommendations

- Considerable uncertainty concerning the catches has been repeatedly raised for more than a decade, but this uncertainty continues to increase due to: 1) a probable increase in the level of unreported catches following the imposition of quotas, and 2) the development of bluefin tuna farming. Although recent progress has been noted in the last two years, the Committee continues to be highly concerned with its inability to accurately track catches, catch at size, origin of catches and fishing effort (number of vessels, vessel characteristics and number of fishing days per vessel) expended on fish that are farmed in cages due to lack of data. The Committee recommends reinforcing efforts to improve compliance with existing data reporting obligations by use of observers on board fishing vessels and cages, as well as through modifications of logbooks to report details on fish transferred to cages in the standard ICCAT format (including size, origin of the catch, and time spent in the cage).

- A possible relationship between the sudden decline in the catches of spawning bluefin tuna that occurred in 1963 in the eastern Atlantic was an important anthropogenic factor that took place a slightly more than ten years before, i.e. the development of new bluefin tuna fisheries on spawners and juveniles. There are different hypotheses which might be considered for explaining this phenomenon, and the Committee recommend a future workshop (in 2007 or 2008) to discuss them further.

Taking into account the multi-species nature of tuna fisheries the Committee considered that the fishery indicators should be more informative. Thus, it was recommended to include somewhere (a new section in the executive reports elsewhere) some indicators of the fishery (and not only at species level), but also CPUE trends and mean weight of the main species caught.

- Contracting Parties should enhance research aimed at reducing uncertainties in the assessments undertaken by the SCRS.

- Catch data from the traps dates back goes from the 16th century up to today. This source of information has been the basis of many scientific studies during the past century that has resulted in a better understanding of the biology and ecology of bluefin tuna. Current information and scientific advice on bluefin stock status still strongly relies on trap catch data (e.g. CPUE time series). The SCRS is therefore particularly concerned about the current situation of the trap fisheries that have already, to a great extent, disappeared from the Mediterranean. If this unique source of information also disappears from the east Atlantic, it will be highly detrimental for scientific monitoring and the assessment of east Atlantic and Mediterranean bluefin tuna. Furtherrmore, the SCRS recommends that measures be implemented to avoid losing this unique source of information.

- The Committee recommends prioritizing the full documentation of the ICCAT database and providing advanced training for additional staff that work on the Secretariat's database system during the year.

- The Committee recommends once again moving towards fully electronic submission of data by all Contracting Parties, and recommended the Secretariat to make available electronic forms that are compatible with different software.

- The Committee recommended holding an inter-sessional meeting to outline the work and the future needs of the Sub-Committee on Ecosystems, as well as to work on the assessment of sea bird mortality in the ICCAT area.

15. Responses to the Commission's requests

15.1 Evaluation of data elements pursuant to Recommendation by ICCAT on Compliance with Statistical Reporting Obligations [Rec. 05-09]

The [Rec. 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.

In some cases, deficiencies and their implications become most evident at the time of an assessment or prior to it, when data-preparatory meetings are held. In the cases of species groups which were assessed in 2006, it was possible to provide a more detailed evaluation of the deficiencies and their resulting implications for provision of advice to the Commission. Upon completion of the next stock assessments for species not recently assessed, the Committee will be able to provide more refined evaluations.

Tuna stock assessments are largely dependent of fishery data. Stock assessments of many pelagic, demersal and benthic coastal resources are, indeed, widely based (and sometimes solely based) on fishery independent data, such as acoustic or bottom trawl surveys done each year by research vessels. Fishery-independent surveys cannot easily be done for tunas (although sometimes for large-scale tagging experiments can be used) and, therefore, detailed and well stratified catch and effort data are absolutely necessary to conduct proper stock assessment of tuna and tuna-like species. As Task I and Task II data are for most species, the only input for ICCAT tuna stock assessments, each fishing nation (or entity) has a fundamental responsibility to provide in due time to the ICCAT Secretariat, all the basic data that are required by SCRS for conduct of ICCAT stock assessments.

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 these programs.

15.1.1 Tropical tunas

A review of data deficiencies was carried out for each species. Overall, data submitted are relatively good and sufficient for assessments, excluding important gaps for the recent period. In general, timeliness of data submission is generally good, although sometimes data is submitted too close to the assessment meetings, which has a negative impact in the conduct of the meetings because the Secretariat has insufficient time to process it.

A better picture of the situation may be obtained during the work planned for the data and fishery indicators preparatory meeting planned in early 2007, before the bigeye assessment Working Group.

BET – Bigeye tuna

A more complete evaluation of the data situation for bigeye will be possible after completing the next assessment, which is planned for 2007. There are some concerns that may need further addressing regarding this species, including the following:

- Size information is limited and decreasing for some fleets, particularly longline;
- Spatio-temporal coverage of size data is very limited for a number of fleets, so substitutions have to be carried out;

The possible use of weight data to complete size sampling for longliners was mentioned; this is currently done in other tuna commissions, and should be attempted in the future. Other ways, such as size distribution obtained from picture processing are also possible.

YFT – Yellowfin tuna

A more refined evaluation for yellowfin will be possible after conducting the next assessment. This could possibly occur in 2008.

- There is limited size sampling data for most longline fleets, and these have been decreasing in recent years;

SKJ – Skipjack tuna

As a more detailed evaluation of skipjack data is planned for 2007, a more detailed evaluation of data limitations will be prepared at that time. However, a proper evaluation of data limitations for this species cannot be done until it is assessed again.

15.1.2 Albacore

Available Task I and Task II data for some of the main fisheries exploiting the North Atlantic stock are incomplete, mostly because data from some of these fisheries have not been reported at the time of the Species Group meeting.

Some revisions and improvements to both Task I and Task II data were done and documented, and will be reported to ICCAT to complete some missing information of historical time series of some fisheries of Contracting Parties, particularly in the Atlantic. The positive effect of these revisions is hoped to become evident at the planned 2007 assessment.

The Committee also notes that important fisheries for northern albacore existed in the middle of the 20th Century, before the database currently used for the age-structured assessments of this stock. The Committee is making efforts to recover and use historical data in order to be able to gain a better understanding of the stock's long-term dynamics.

It is important to provide all required data information well in advance: catch, fishing effort and size distribution to facilitate the work preparation for the assessment session, as catch-at-age matrices for the total international catch need to be computed for both stocks by the Secretariat to be analysed.

It is emphasized that complying with ICCAT data submission deadlines is critical for the preparation and development of the assessment session.

15.1.3 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 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 (SCRS/2004/013, also see Report of the *ad hoc* Data Workshop (Madrid, Spain, 11 October 2003)). During the last decade, there has been an overall shift in targeting towards large bluefin tuna. As the majority of these fish are destined for farming 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. 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 status of the data available has not substantially improved and 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 can 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 the stock collapse it would be necessary to implement increasingly conservative and precautionary management measures.

15.1.4 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 target and non-target fisheries, and this requires that the 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.

Mediterranean

The latest assessment for this stock was accomplished in 2003. Task I data were available from the main producing countries but other countries did not report data separately for the Atlantic and Mediterranean areas. This affected the last assessment to the degree that an unknown portion of the catches may have been mis-categorized as Mediterranean when they were actually from the Atlantic stock, and vice versa. It is anticipated that a more detailed evaluation can be provided after the next assessment.

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.

15.1.5 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 countries. 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, are likely to 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 countries to have to develop indices based on logbook data that 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 working group therefore recommends that observer programs need to be expanded to reduce this bias.

Continued reporting of unclassified billfish and reporting of sailfish in combination with spearfish leads to increase 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 these 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 states. Higher uncertainty in benchmarks will require more conservative management measures if the Commission wishes to limit the risk of further decline in resource status.

15.1.6 Sharks

- As duly noted in the Report of the Shark Stock Assessment carried out in 2004, limitations on the quantity and quality of the data available severely affected the assessment, significantly increasing its uncertainty;
- Progress in stock assessment of pelagic shark species will continue to be greatly impaired unless significant improvement is made in reporting data. These shortcomings apply to blue and shortfin mako sharks, but are particularly problematic for the less abundant species, such as pelagic threshers, longfin makos, and oceanic whitetip sharks;
- 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 fishery and shark stocks collapse.

15.1.7 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 Review of the stock boundaries for Atlantic swordfish [Res. 99-03]

The *Resolution by ICCAT on the Clarification of the Stock Structure and Boundaries Between the Swordfish Stocks in the Atlantic* [Res. 99-03] called for the SCRS to coordinate research programs in order to reduce the current uncertainties about the structure, mixing and boundaries of the swordfish stocks.

The Committee held a Workshop to review the results of research programs (see SCRS/2006/010). The conclusions give general support to the stock structure currently assumed for Atlantic Swordfish. The precise delimitation between the northern Atlantic, southern Atlantic and Mediterranean stocks cannot be improved upon without intensified collaborative and multi-disciplinary research.

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

The *Resolution by ICCAT on Circle Hooks* [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".

The impact of circle hooks on the by-catch of billfish has been recently tested onboard pelagic longline vessels in waters off Brazil, in the Gulf of Mexico and in the Mediterranean. Further testing has to be carried out in other fisheries/fleets so that an overall assessment of the impact of circle hooks on the Atlantic billfish stocks can be completed.

In 2006, information was presented to the Committee on the effect of different types of circle hooks, as well as other factors of gear configuration concerning targeted and incidental catches in the western Mediterranean, including sea turtles, (SCRS/2006/163). This document summarizes the scientific observations made from

676,700 hooks and concludes that, in this experiment and with the types-sizes of hooks used, circle hooks do not seem to significantly reduce the incidental catch of juvenile swordfish or sea turtles. However, swordfish catches (CPUE) significantly decrease with the use of circle hooks compared to other types of non-circular hooks tested. The use of circular hooks seems to increase the possibility of survival of sea turtles caught incidentally since hook occurs in the mouth in 60% of the cases, which facilitates the removal of the hooks and the possibility of survival. However, during this experiment, other factors were identified apart from the types of hooks (set depth, type of bait, fishing times and areas), which appeared to have more importance in the reduction of incidental catches of juvenile swordfish and sea turtles.

Moreover, the Committee had access to a document presented to the IOTC (IOTC_2006-WPBy-04) regarding an experiment carried out in the oceanic waters of the south western Indian Ocean testing various types of combinations of hooks (circular vs straight) and bait. From an observation made on 539,000 hooks, there were only four sea turtles that bit the hooks, and 19 that got caught in the gear. Due to the low incidence of interaction by bite of the hook, it was not possible to obtain conclusions on the impact of the use of one hook type or another.

The Committee considers it necessary to continue these experiments in different fleets to reach conclusions that are representative of the various realities current in the fisheries.

The Committee will continue to monitor progress on this and will report to the Commission when appropriate.

15.4 Review of catches of juvenile bluefin tuna in the Mediterranean [Rec. 02-09]

Following *Recommendation by ICCAT to Develop a Plan Aimed at Reducing the Catches of Juvenile Bluefin Tuna in the Mediterranean* [Rec. 02-09], the Committee has evaluated catch levels of juvenile bluefin tuna by fishing gears and main areas more in depth using the catch-at-size information available at the ICCAT Secretariat. It should be noted that this information is incomplete as some fisheries do not (or poorly) report Task II data (especially in the Mediterranean Sea, see SCRS/2004/013). Further, it is believed that illegal catches of undersize fish continues and is unreported, leading to underestimation of the catch of juvenile bluefin tuna (mostly of fish < 6.4 kg).

Perfect implementation of [Rec. 02-09] is expected to result in some potential long-term improvement in both yield per recruit and spawning biomass per recruit, compared to the situation estimated for 2003 and 2004 if effort does not increase. The resulting spawning biomass per recruit level, however, would still be well below levels considered safe. This is because current selectivity and the overall fishing mortality pattern estimated in this assessment indicates that fishing mortality is more than three times the level which would permit the stock to stabilize at the MSY level. Current fishing is expected to drive the spawning biomass to very low levels (< 10%) of virgin biomass, which is considered to give rise to a high risk of stock collapse.

15.5 Review of information on farmed bluefin tuna growth rates [Rec. 05-04]

The *Recommendation by ICCAT to amend the recommendation by ICCAT on bluefin tuna farming* [Rec. 05-04] requires the SCRS to undertake trials to identify growth rates including weight gains during the fattening or caging period.

Since the implementation of this recommendation did not enter into force until June 2006, no new studies have been initiated at this time.

However, bluefin tuna farming issues in the Mediterranean Sea have been discussed and reported in number of SCRS papers in the past (SCRS/2002/035, SCRS/2002/036 and SCRS/2002/037) and also in the Reports of the GFCM/ICCAT working group on sustainable tuna farming/fattening practices in the Mediterranean (SCRS 2003/020). In addition, SCRS/2004/096 provided information on the factors for conversion of farmed BFT gilled and gutted product weight to round weight.

Bluefin tuna farming issues were discussed during the 6th GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean held in Sliema, Malta, April 15-19, 2002 (SCRS/2002/010). At that time, it was confirmed that the factor of 0.8, which is currently applied to fattening practice of large bluefin tuna (i.e., assuming 25% gain in weight due to fattening), should be maintained. However, in the paper SCRS/2005/114, which reports research activities on bluefin tuna tagging activities within grow-out farming cages, significantly higher growth rates of small bluefin tuna in the cages are given. Currently, in most of the BFT farms there are

difficulties related to accurate estimation of initial size of individual fish that enter in the cages. Consequently, even if sizes of these fish at harvesting are accurately measured, no accurate estimation of weight gain during the rearing period can be obtained.

It is possible that growth rates could be significantly different from farm to farm and even from year to year (due to differences in feeding practices, feed compositions, environmental conditions, duration of caging, etc.). Therefore, no one general estimate should be made that will cover all situations for back-calculating of the initial quantity of captured tunas that were put in the farming cages.

For the most recent bluefin tuna stock assessment purpose, a weight gain of 25% due to the fattening was assumed.

15.6 Consideration of requests from the 4th Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies

Introduction

The Working Group on Bluefin Tuna Management's requests to the SCRS were recast as scenarios amenable to analysis by the SCRS. For each scenario, the Committee attempted to address the impact of changes in management measures on fisheries and stocks of the eastern Atlantic (including the Mediterranean Sea) and the western Atlantic.

In general, the scenarios address changes in the following types of management measures:

- Minimum sizes
- Time/area restrictions by gear type
- TACs
- Definitions of management units

The scenario analyses below consider each type of change separately, assuming the other type of management measures are held constant. Applying a combination of measures to achieve objectives may have the merit as no single measure may be sufficient and a combination of measures may add robustness. Conclusions of the scenario analyses assume a high degree of compliance with regulations, and they may be invalid otherwise.

The scenario analyses include an analysis of the status quo for purposes of comparison.

Implications of mixing

There is mounting evidence of mixing of fish of eastern and western Atlantic origin. This mixing potentially occurs to some degree throughout the Atlantic Ocean such that it is unlikely that any management unit boundary line will be perfectly effective in separating the fish according to their spawning ground origin. There may be management boundaries that are more effective than the current boundary at 45 degrees W, but there is insufficient information to determine where to place them.

Mixing of fish of western and eastern origin needs to be considered in scenario analyses. The impact of changes in management measures in the eastern Atlantic on the western Atlantic stock and fisheries is potentially significant because of mixing. If the stock size in the eastern Atlantic declines, there will be fewer fish of eastern origin in the western Atlantic. This will mean that the fishing mortality on fish of western origin will increase in the western Atlantic (assuming the catch remains the same). In addition, if the fishing mortality in the eastern Atlantic increases, the mortality on fish of western origin taken in the East will also increase. Conversely, if the abundance of fish in the eastern Atlantic improves, it will probably be beneficial for the western Atlantic stock and fisheries.

Changing management measures in the western Atlantic will probably have minimal impact on the eastern Atlantic because the number of fish of western origin in the eastern Atlantic is small compared to the number of fish of eastern origin and because the fishery in the western Atlantic is small compared to the eastern Atlantic fishery.

The general implications of mixing discussed above apply to all of the scenarios below.

Analysis of scenarios

Scenario 0. Status Quo - No change in management measures.

General Comment: See summary table in the Executive Summary of the eastern and western Atlantic assessments.

1. No change in management in the eastern Atlantic- The current selectivity and overall fishing mortality pattern estimated in the last assessment imply that current fishing mortality is probably more than three times the level which would permit the stock to stabilize at the MSY level and that current fishing is expected to drive the spawning biomass to very low levels. Unless the current regulatory scheme is adjusted to impose greater control over the fisheries by improving compliance and to reduce fishing mortality rates on both juveniles and adults, it will lead to further reduction in spawning stock biomass with a high risk of fisheries and stock collapse.

2. No change in management in the western Atlantic- The stock is relatively stable at a historically low level. Projections indicate that spawning stock size will remain near current levels over the next five years if the status quo TAC is taken. However, the outlook for the western Atlantic could be much worse depending on the outlook for the eastern Atlantic, which is not good under the status quo. The general implications of mixing described above (i.e., increasing fishing mortality on fish of western origin as abundance of fish of eastern origin declines) apply, such that sustainability of the western Atlantic fishery and stock probably depends on sustainability of eastern Atlantic.

3. Outlook overall for no change in management- There is a high risk that neither the East nor the West TACs or spawning stocks can be sustained under the status quo scenario.

- Request of SCRS by Commission Working Group on Integrated Management Measures: Assess ***the impact and effectiveness of the current multi-annual management plan, including the new minimum size, the eradication of the tolerance and the regulation of farming activities***.

Scenario 1.1- More effective protection for small fish (as a result of new minimum size, eradication of tolerance, and/or improved compliance).

General Comment: Increasing protection for small fish will increase long term potential yield and spawning stock biomass. Compliance requires market control and observers on board of vessels to monitor discards, which are likely to occur especially if fish are growing beyond the minimum size while they are available to fisheries. Uncontrolled discards or unreported undersized catch could further deteriorate fishery statistics. None of the minimum size regulations tested would be able to recover the stock to safe levels, unless accompanied with time-area closures. Increasing size limits without accompanying measures is likely to cause increase in IUU fishing activities. Also time/area closures are needed for non-selective gears that could catch undersized fish.

1. Increase protection for small fish in the eastern Atlantic- Analyses indicate that increasing the size limit up to 30kg will improve both the YPR and SPR, but the SSB is unlikely to recover to historical levels (i.e. those of the 1970s) or to reach 20% of SPR at virgin levels. Also, size limit will not protect spawners directly that currently suffer high fishing mortalities. Increasing the size limit will negatively affect traditional fisheries based on small fishes, which could disappear partially or completely (leading to the disappearance of the only available and long-term CPUE index for juvenile fish in the eastern stock).
   Increasing protection for small fish in the eastern Atlantic would likely be beneficial for the western Atlantic (see general implications of mixing).

2. Increase protection for small fish in the western Atlantic- SCRS analyses have indicated only modest increases in spawning stock size and long term potential yield are expected with minimum size limits under 50 kg because small fish currently comprise a relatively low fraction of the western catch. Similarly, eliminating the existing tolerance for small fish, or even increasing it, will only have a modest impact, and it could be compensated for with a small increase in minimum size.

Scenario 1.2- Regulate fish farming activity.

General Comment: Presumably, the intention is to improve compliance with the TAC in the eastern Atlantic, and to improve the quality of data for assessments.

1. Regulate fish farming activity in the eastern Atlantic Management area- At present, fish farming only occurs in the Mediterranean Sea and is based on fish being captured in the Mediterranean. Observers on board a significant proportion of cages will improve the size composition and origins of fish put into cages. Measures should also be taken so that the farming capacity is controlled.

2. Regulate fish farming activity in the western Atlantic- Not applicable since there is no current fish farming activity in the western Atlantic at this time.

− Request of SCRS by Commission Working Group on Integrated Management Measures: ***Evaluate the effects and consequences on the juvenile component of the stocks of current patterns of fishing for supply of fish farming activities***.

Scenario 2- Continuation of the recent trend in size composition of the catch toward a greater proportion of large fish.

General Comment: Shifting the size composition toward larger fish is generally beneficial in terms of long term potential yield and spawning stock size given appropriate levels of fishing mortality. However, high levels of fishing mortality rate coupled with a shift towards larger fish could accelerate decline in spawning biomass and have detrimental impacts on long term recruitment and long term yield.

1. Eastern Atlantic- Recent shifts from small to large bluefin tuna of some Mediterranean fleets have increased the overall YPR, but fishing mortality has continued to increase on small fish and has reached high levels on large fish. This is due to increasing fishing capacity in the Mediterranean during the last decade, as well as fishing practices, which mostly occur on spawning concentrations. Current fishing mortalities levels are not sustainable and should rapidly be decreased on both segments (i.e. juveniles and adults) to avoid the risk of fisheries and stock collapse.

2. Western Atlantic- Not applicable.

− Request of SCRS by Commission Working Group on Integrated Management Measures: ***Advise on possible additional measures which might be envisaged to reinforce the current management measures***.

Scenario 3.0- Additional measures to reinforce current management.

General Comment: All of the additional measures that the SCRS considered are addressed under other scenarios. There may be additional measures that would reinforce management compliance with current measures, but these are beyond the scope of the SCRS's remit.

− Request of SCRS by Commission Working Group on Integrated Management Measures: ***Maintenance of the current management regime, modified where appropriate, in light of the SCRS advice***.

Scenario 4.0- Current management regime with reduction in TAC.

General Comment: There is a high risk of fishery and stock collapse unless the eastern Atlantic management unit catch is reduced. The situation is relatively stable in the western Atlantic, although a decline is expected if catch equals or exceeds the current TAC. If there is a collapse in the eastern Atlantic, the western Atlantic will also suffer. Other management measures (minimum size regulations and time/area closures) which might modify the current management regime are considered in other scenarios.

1. Reduction in TAC in the eastern Atlantic- Unless the compliance is strongly improved, it is not expected that a reduction in TAC would be more effective. Moreover, reduction in TAC alone will not guarantee additional protection of the spawning stock biomass.

2. Reduction in TAC in the western Atlantic- Short-term projections suggest that the stock will not increase unless the TAC is reduced to 2300 t or less. The short term projections do not consider the general implications of mixing discussed above. Unless more stringent conservation measures, such as a reduction in

the TAC, are implemented and complied with in the eastern Atlantic, the outlook for the western Atlantic might be worse than indicated by short term projections.

- Request of SCRS by Commission Working Group on Integrated Management Measures: ***Maintenance, modification or elimination of the current boundary at 45 degrees W and the management consequences of eventual changes on the current management measures in place for both western and eastern stocks***.

General Comment: Scenarios 0-4 (above) maintain the current management boundary definition at 45 degrees W.

Scenario 5.1- Manage as a single management unit (eliminate the current 45 degree W boundary).

1. Impact on the eastern Atlantic- A single management unit will have little effect on the eastern stock and the main concern regarding the high mortalities on both juveniles and adults, low spawning stock biomass and risk of fisheries and stock collapse will still have to be addressed.

2. Impact on the western Atlantic- Previous analyses by the SCRS have demonstrated that assessments based on a single management unit exhibit trends similar to those obtained for the eastern management unit. This means that sharp declines in the western stock would likely go undetected. Accordingly, if fishing shifts from the eastern Atlantic towards the coast of North America where fish of western origin likely make up a higher proportion of the catch, the impact on the western stock could be catastrophic.

Scenario 5.2 Move management boundary farther to the east (*e.g.*, 35 degrees W).

General Comment: At present, the catch in the central Atlantic west of 45 degrees W. is managed as part of the overall TAC for the eastern Atlantic. There is strong evidence that some of the fish caught in the Central Atlantic reside some of the time in the western Atlantic. Some of them are likely to be of western Atlantic origin and contribute to the western spawning stock.

1. Impact on the eastern Atlantic- Moving the management boundary eastward will again have little effect on the eastern stock (see above).

2. Impact on the western Atlantic- If the current catch for a possible extended western Atlantic management area is increased by the amount of catch that would have occurred in the area added to the western Atlantic, and fishing shifts toward the coast of North America, where fish of western origin might make up a higher proportion of the catch, the impact on western spawners would be negative. However, if the TAC for the extended western management area was maintained at or below the current TAC for the current west Atlantic management area, then the impact on western spawners could be positive. A more definitive analysis of this scenario requires more detailed information on the spatial patterns and quantitative estimates of mixing, and a specification of the total TAC and the geographic distribution of fishing.

- Request of SCRS by Commission Working Group on Integrated Management Measures: ***Setting appropriate management measures for areas identified by the SCRS where mixing occurs on a regular basis***.

Scenario 6.0- Establish a central Atlantic management area (where significant mixing occurs) with a TAC and/or other management measures as appropriate.

General Comment: See the General Comment for Scenario 5.2. There is strong evidence of mixing for the central Atlantic. The SCRS identified an area in the central Atlantic referred to as area 3 as an area of known mixing. However, mixing probably occurs throughout the Atlantic to some degree, and it will require more data and analyses to specify the geographic boundaries of the most appropriate central Atlantic management area relative to mixing.

1. Implications for the eastern Atlantic- Same comment as above.

2. Implications for the western Atlantic- To the extent that catch in the central Atlantic is reduced, there should be a benefit to the fishery and the spawning stock in the western Atlantic. The analysis of this scenario can be more definitive than for Scenario 5.2 because redistribution of fishing effort is a less important consideration.

- Request of SCRS by Commission Working Group on Integrated Management Measures: ***Identify spawning and nursery areas and, for those areas, evaluate the impact and effectiveness of time and/or closures for commercial, sport and recreational fisheries***.

Scenario 7.0- Additional time/area closures related to spawning and nursery areas.

General Comment: Time/area closures may result in a reduction in total catch and shift the size distribution of the catch. The former is beneficial in terms of stock abundance. The latter may have either a positive or negative impact on long term sustainable yield and spawning stock size. A TAC is another way to reduce the catch, if there was good compliance (which has not been the case for the Eastern Atlantic to date), but it is not as effective as time/area closures for protecting components of the breeding population, size composition, or subpopulations and genetic diversity. Furthermore, time/area closures might be easier to enforce.

Time/area closures designed to protect spawners on the spawning grounds likely have an additional positive effect on bluefin recruitment, because bluefin tuna spawning activities would not be disturbed by fishing. Therefore, it is possible that more optimistic outcomes of scenarios dealing with time/area closures to protect spawners on spawning grounds might be expected.

Also see Scenario 8.2 for a discussion of large time/area closures.

1. Eastern Atlantic

Time-area closures in Mediterranean alone. These scenarios will improve substantially the SPR and reduce fishing mortalities on spawners. The benefit is depending on the time period, a closure of the Mediterranean in May-July leading to the highest gain. These scenarios will primarily affect PS and LL fisheries operating in the Mediterranean as well as farming activity. However, if fishing effort is reallocated in time and/or space, the benefit will decrease and this could further generate conflicts among fisheries. By-catches from non targeted fisheries will lead to additional discards. Fisheries operating mostly in the time closures will disappear partially or completely.

Time-area closures in the Mediterranean and the east Atlantic. This scenario will improve even more the SPR, however, the benefit is depending again on the time period of closure. It will primarily affect PS and LL fisheries operating in the Mediterranean. Fisheries operating mostly in the time closures will disappear partially or completely (leading to the disappearance of the available and long-term CPUE indices for large and juvenile fish in the eastern stock).

Time-area closures in the Mediterranean and the East Atlantic plus size limits. These scenarios lead to the highest gains in terms of SPR that are often above the 20% threshold (i.e. a limit that is often considered as safe). YPR also increases. The 25 kg minimum size limit allows a substantial % SPR benefit in comparison to the 10 kg. These scenarios will seriously affect all fisheries in the eastern management unit.

Time-area closures that improve conservation in the eastern Atlantic would likely be beneficial for the western Atlantic (see general implications of mixing).

2. Western Atlantic

A large time/area closure for the Gulf of Mexico, the only known spawning area in the western Atlantic, was considered. The total number of bluefin tuna spawners taken in the Gulf of Mexico (including estimated discards) is small, therefore a closure is likely to have minimal impact on the condition of the stock. Furthermore, analyses indicate that effort might be redirected resulting in a possible increase in mortality of bluefin tuna. It should also be noted that any benefits that might accrue from reducing the catch of the spawning stock will be substantially mitigated or even reversed if the catch of younger animals is increased to make up for the forgone yield. For example, the current TAC would not be sustainable if spawning age/size fish are afforded absolute protection (by a time/area closure or any other means) because young fish weigh much less and many more could be taken before the TAC was filled. Reducing the TAC is a more direct way to achieve benefits with more certainty when there is compliance.

- Request of SCRS by Commission Working Group on Integrated Management Measures: ***Without prejudice to the second bullet above, eliminating the current 45 degree W management area boundary and instead introducing time and area closures for directed bluefin tuna pelagic longline fishing activities***.

Scenario 8.1- Single management unit for the entire Atlantic (including the Mediterranean Sea) with large time/area closures for directed pelagic longline fishing along the coast of North America and in the Mediterranean Sea).

General Comment: This scenario is similar to the scenario for a single management area, except it emphasizes large time/area closures to protect fish during, pre- and post- spawning migrations and on spawning grounds. This scenario might shift the catch toward smaller fish, which reduces long term potential yield and spawning stock biomass. Furthermore, the by-catch of bluefin tuna in pelagic longline fishing for other species will reduce the benefits for bluefin of the time/area closure.

1. Implications for eastern Atlantic- Since longline fishing in the Mediterranean Sea takes only a small portion of the catch of the eastern management unit, the conservation benefits are likely to be small in the eastern Atlantic, and thus, the implications of mixing (see the General Comment on Mixing above) for the western Atlantic are probably not important.

2. Implication for western Atlantic- The potential negative impact described above for scenario 5.1 could be mitigated to some degree by large scale time/area closures to longline fishing. However, in the western Atlantic, most of the catch is taken by other gears and it is unclear that time/area closures for pelagic longline fishing alone will achieve management objectives. Moreover, if the time/area closure of this scenario shifts the catch from spawners to younger fish, there might be a minor benefit for the spawning stock in the short term, but younger fish will be negatively impacted, leading to lower long term potential yield and spawning stock biomass (similar to scenario 7.0).

Scenario 8.2- Same as 7.1 except time/area closures apply to all types of fishing capable of taking bluefin tuna.

General Comment: Applying time/area closures to all types of fishing follows the proposal by Japan at Fukuoka meeting.

1. Implications for the eastern Atlantic- The emphasis on large time/area closures might act to reduce the catch below the TAC or to prevent it from exceeding the TAC in the eastern Atlantic where compliance is a serious concern. A closure of the entire Mediterranean Sea for a significant period of time including the spawning season, could lead to a beneficial reduction in catch (in terms of resulting abundance of the stock, see scenarios 7.0). If so, the western Atlantic would benefit as a result of mixing (see the General Comment on the Implications of Mixing above).

2. Implications for the western Atlantic- A large time/area closure to all types of fishing capable of taking bluefin tuna, such as the one proposed by Japan, could reduce the ability to catch bluefin tuna such that the TAC is not taken. A reduction in catch would benefit stock abundance, but if the size distribution of the catch is shifted toward smaller fish, the long term sustainable yield and spawning biomass will be reduced (see discussion for Scenario 7.0). Reducing the TAC is a more direct way of achieving conservation benefits in the western Atlantic.

In conclusion, the analyses presented above are based on general principles and detailed analyses, but the necessary information to address these questions fully is lacking. The SCRS reminds the Commission that a detailed Research Plan has been developed that would be helpful in evaluating many of the scenarios identified by the Working Group on Integrated Bluefin Tuna Management. The Committee notes that the costs of such a research program are far below the value of these fishery resources.

The above analyses were developed to respond to the specific questions posed by the Commission's Working Group on Integrated Management Measures. The SCRS management recommendations are contained under Item BFTE-6 of the Eastern Bluefin Tuna Executive Summary.

15.7 Evaluation of the mortality of immature N. Atlantic swordfish [Rec. 02-04]

The 2002 *Resolution by ICCAT for the Evaluation of Small Swordfish Mortality* [Res. 02-04] asked that the SCRS "monitor and analyze the effects on the mortality of immature swordfish, the stock, and fishing activities of the new management measures for North Atlantic swordfish for 2003 and 2004" and report to the Commission. The 2006 assessment and supporting analyses (SCRS/2006/015; SCRS/2006/172) provide size- and age-specific information useful for monitoring the effectiveness of management measures for reducing mortality of immature North Atlantic swordfish.

The Commission adopted in July 1991, Rec. [90-02], which implemented a minimum size intended to reduce mortality on juvenile swordfish. Subsequently, the Commission agreed to reduce TAC, starting in 1997 ([Rec. 96-07]) while maintaining minimum size regulations. After improvement in North Atlantic SWO status was measured, the Commission adopted Rec. [02-02 and Rec. 03-03] which set TAC for years 2003 to 2006 at about the estimated MSY, while also maintaining minimum size restrictions.

There exist several bases for evaluating the recent patterns in fishing mortality of immature swordfish. First, patterns in estimated catch (both total catch which includes discards, and landed catch which excludes discards) of immature swordfish (ages 1-2, **Figures 15.7.1**, **Table 15.7.1**) have shown a decline from the peak estimated levels prior to the implementation of minimum size restrictions. Total estimated catch of age 1 and 2 swordfish show a greater decline after implementation of reduction in TAC in 1997 than immediately after implementation of the minimum size in the early 1990s. In terms of proportion of total catch, the percentage of fish less than either 119 cm or 125 cm LJFL has generally been above 15% of the total estimated catch over the entire time-period.

Fishing mortality estimates take both catch and fishing effort into account and provide a measure of the proportion of the population impacted by fishing. Estimates of fishing mortality for the youngest fish (ages 1 and 2), show a pattern of decline in the period since 1997 **(Figure 15.7.2)**, corresponding to reduced overall catches and, consequently, an overall reduction of impact on the population of these age classes. Because of limited information, we are unable to reliably estimate the fishing mortality of these age classes for the most recent few years. The estimated decline in F for the oldest fish shows a more consistent pattern across this time period and indicates a relatively larger proportional reduction than for younger fish. As a result, the estimated overall fishery selectivity (a measure of the degree of focus on and availability of different age categories for the overall fishery) for the youngest fish in the population is estimated to be less responsive to management interventions in this case **(Figure 15.7.3)**. Although there is evidence of recent (since about year 2000) decline in the overall selectivity levels for the youngest fish, we are yet unable to monitor if this pattern continued past 2003 because of limited information. Overall, the selectivity on young fish has declined somewhat since the implementation of minimum size limits in the early 1990s, but remains substantially above that estimated for the 1978-1980 period **(Figure 15.7.4.)**.

Higher selectivity for younger, immature fish results in lower levels of sustainable catch and lower levels of spawning stock for a given level of fishing effort. While the current fishing mortality rate is estimated to be close to that which could provide maximum yield from recruits now in the population, it would also result in a spawning stock that is below the level commonly regarded as safe in terms of avoiding risks of decline in recruitment. **Figure 15.7.5** compares the yield and spawning stock potential implications for each of the three fishery selectivity patterns shown in **Figure 15.7.4**. At current effort levels, a selectivity pattern similar to that estimated for the 1978-80 period would lead to potential gains of about 7% in long-term sustainable yield (nearly 1000 t), while at the same time, permitting increase in spawning potential to safer levels (>30% SPR).

Table 15.7.1 Estimates of catch and disposition of northern Atlantic swordfish corresponding to ICCAT minimum size standards from 1986-2005.

	Landings							Discards							Total						
Year	#	<119	≥119	%<119	<125	≥125	%<125	#	<119	≥119	%<119	<125	≥125	%<125	#	<119	≥119	%<119	<125	≥125	%<125
1986	386266	72952	313314	18.9	96249	290017	24.9								386266	72952	313314	18.9	96249	290017	24.9
1987	476069	108312	367757	22.8	136476	339593	28.7								476069	108312	367757	22.8	136476	339593	28.7
1988	458411	125827	332584	27.4	155615	302796	33.9								458411	125827	332584	27.4	155615	302796	33.9
1989	410380	101294	309086	24.7	128757	281623	31.4								410380	101294	309086	24.7	128757	281623	31.4
1990	374596	75982	298613	20.3	103132	271464	27.5								374596	75982	298613	20.3	103132	271464	27.5
1991	327063	55732	271331	17.0	72104	254958	22.0	20152	16072	4080	79.8	18296	1855	90.8	347214	71804	275410	20.7	90401	256813	26.0
1992	316169	44822	271347	14.2	62679	253490	19.8	31011	22380	8631	72.2	26500	4511	85.5	347180	67202	279978	19.4	89179	258001	25.7
1993	349269	50934	298335	14.6	70858	278411	20.3	33075	25083	7992	75.8	29051	4025	87.8	382344	76016	306328	19.9	99908	282436	26.1
1994	317556	50800	266756	16.0	70501	247055	22.2	49827	38353	11475	77.0	45582	4245	91.5	367383	89153	278231	24.3	116083	251300	31.6
1995	358029	55735	302294	15.6	76437	281591	21.3	35228	23754	11474	67.4	29443	5785	83.6	393257	79489	313768	20.2	105880	287377	26.9
1996	355436	68397	287040	19.2	87173	268264	24.5	37688	28561	9127	75.8	34001	3686	90.2	393124	96958	296167	24.7	121174	271950	30.8
1997	297307	79252	218055	26.7	96880	200427	32.6	31488	24133	7356	76.6	28875	2614	91.7	328795	103384	225411	31.4	125754	203041	38.2
1998	287593	47281	240311	16.4	72003	215590	25.0	32447	25152	7294	77.5	30218	2229	93.1	320040	72434	247606	22.6	102221	217819	31.9
1999	276316	42136	234180	15.2	64704	211613	23.4	39192	31775	7417	81.1	36524	2668	93.2	315509	73911	241598	23.4	101228	214281	32.1
2000	261895	45067	216828	17.2	68824	193070	26.3	58771	30925	27847	52.6	37008	21764	63.0	320666	75992	244674	23.7	105832	214834	33.0
2001	227779	43888	183891	19.3	64357	163422	28.3	23009	1898	21111	8.2	2966	20043	12.9	250788	45786	205001	18.3	67323	183465	26.8
2002	218131	40147	177985	18.4	60695	157436	27.8	22230	7883	14347	35.5	9624	12607	43.3	240362	48030	192332	20.0	70319	170043	29.3
2003	260659	41305	219354	15.8	65236	195423	25.0	13460	329	13131	2.4	1306	12154	9.7	274119	41634	232485	15.2	66542	207577	24.3
2004	287887	50611	237276	17.6	74170	213717	25.8	6559	236	6323	3.6	939	5620	14.3	294446	50847	243599	17.3	75109	219337	25.5
2005	272994	49228	223766	18.0	72413	200582	26.5	6586	377	6209	5.7	1095	5491	16.6	279581	49605	229975	17.7	73508	206073	26.3

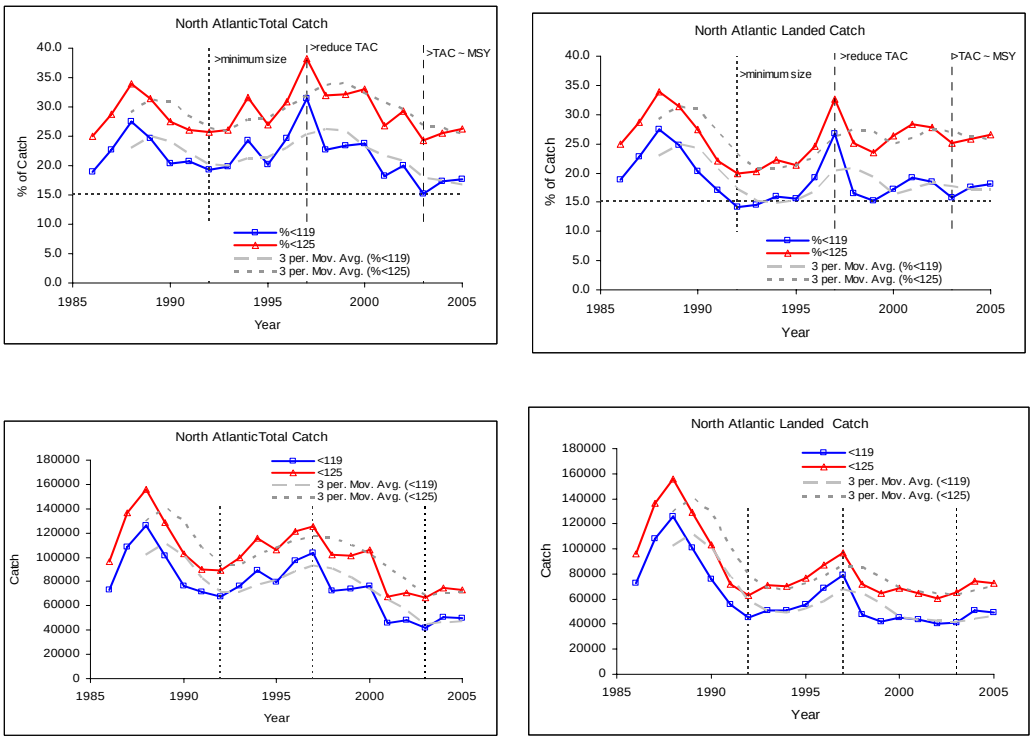


Figure 15.7.1 Estimated catch % and total catch of northern Atlantic swordfish <119 or <125 cm LJFL for the period 1986-2005 with corresponding 3-year running averages. Also indicated as verticals are years in which Commission recommendations affecting minimum size or TAC became fully effective.

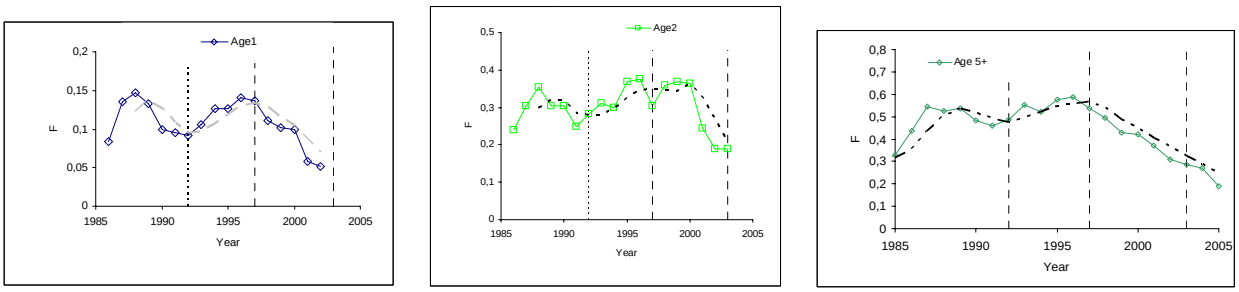


Figure 15.7.2. Estimated patterns in fishing mortality rate for age 1, age 2, and age 5+ northern Atlantic swordfish with 3-year running averages shown. Estimated F's are shown only for the most recent time period for which estimates are considered reliable. Also indicated as vertical lines are years in which Commission recommendations affecting minimum size or TAC became fully effective.

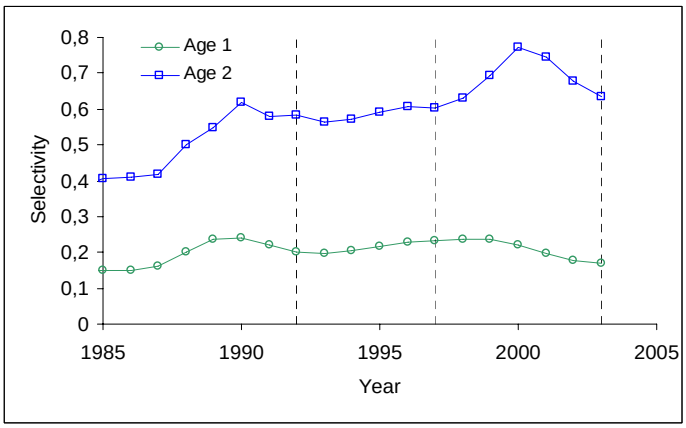


Figure 15.7.3 Estimated trend in selectivity (F at age scaled to the maximum F at age for each year) for age 1 and age 2 northern Atlantic swordfish since 1985 until the year for which we have reliable estimates for these year classes. Also indicated as vertical lines are years in which Commission recommendations affecting minimum size or TAC became fully effective.

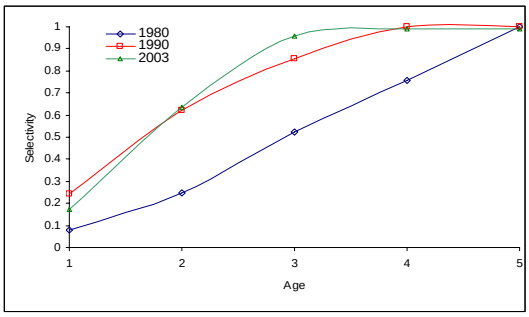


Figure 15.7.4. Estimated geometric mean in age-specific selectivity for 3 time periods: 1978-1980, 1988-1990, and 2000-2003.

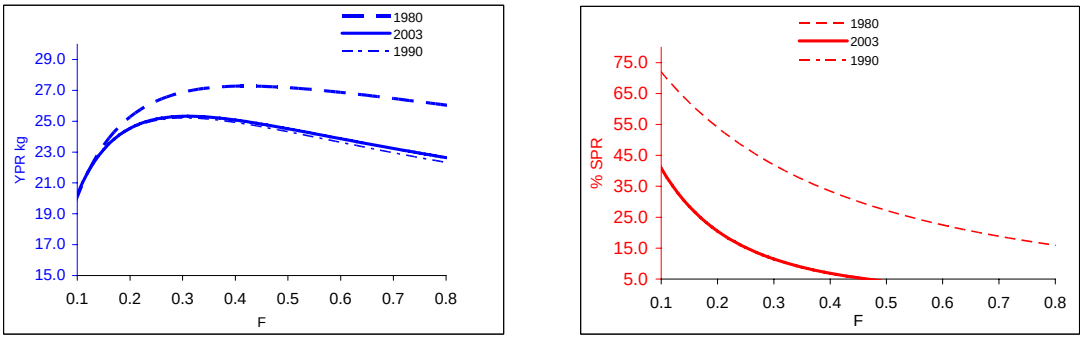


Figure 15.7.5. Yield (YPR, left panel) and %Spawner per Recruit (SPR, right panel) results for the fishery selectivity patterns shown in **Figure 15.7.4**. The 2003 and 1990 results are nearly identical over the ranges shown.

16. Other matters

16.1 Proposal from FIRMS on terms to use to define the state of the stocks

The Secretariat presented document SCRS/2006/023 which asked the Committee to consider whether a proposed set of standard descriptors could be used to classify stock status in terms of abundance and exploitation rate, and whether such descriptors could be compatible with the language used in the Executive Summaries prepared by the SCRS.

The Committee noted that subjective judgment was necessary in order to match the information contained in the Executive Summary tables with some of the descriptors proposed by FIRMS. In addition, the Committee noted that some of the proposed descriptors were imprecise.

In general, delegates expressed a need for more time to consider the FIRMS proposal and recommended that it be brought back for consideration at the 2007 SCRS meeting.

16.2 Proposal for the creation of a peer-reviewed publication on tunas

The Committee studied the proposal presented by the Secretariat **(Appendix 11)** on creating a peer-reviewed publication subject on tunas and tuna-like species. This publication will be in addition to the Collective Volume series that will continue to be published regularly. The proposal suggested the possibility of incorporating this publication within an established journal and included in the "Science Citation Index", either publishing numerous monographic issues or within a sub-series, dedicated to the object species of ICCAT, with a periodic nature and its own reference.

The Committee considered that this second proposal was the one that best suited its objectives, although it is more costly, in terms of human and financial resources. The Committee discussed the objectives of a publication of this type, recognizing that it was an effective means to extensively publicize the work of the SCRS to the scientific community and to exchange points of view. In this sense, the Committee pointed out the importance that the journal selected have an impact in the scientific world.

The Committee decided to fully support this proposal and to request the Commission to finance it, estimated at €25,000 annually.

The Committee also recognized that to initiate and maintain a publication of this type, the Secretariat should have the support of an Editorial Committee (EC) made up of members of the SCRS. This Editorial Committee, on which the various continents present in ICCAT will be represented, will also promote collaboration among scientists for the preparation of documents for peer reviews.

The Executive Secretary pointed out the time dedicated by the Secretariat that such an ambitious publication would require and its financial impact. Notwithstanding, he offered the Secretariat's support to carry out this publication.

16.3 Officers Meeting

The SCRS Chairman informed that an Officers Meeting had been held on September 30, 2006. The conclusions **(Appendix 12)** of this group were helpful for the development of the meeting of the Committee and they were discussed under various Agenda items.

16.4 Training

In terms of capacity building activities, the SCRS expressed the necessity to identify potential needs for training courses in developing Contracting Parties. In addition, it is necessary to identify Contracting Party institutions that could offer training courses to satisfy those needs.

17. ICCAT 40th anniversary presentations

On occasion of ICCAT´s 40th anniversary, a special commemorative session was held during the meeting of the Committee.

The Executive Secretary opened the session and welcomed the former Committee Chairmen and Executive Secretaries invited to this session. Mr. Meski also remembered the deceased officers and Committee members.

Dr. G. Scott, current Chairman of the Committee, acted as moderator.

The Chairmen and Executive Secretaries present at the meeting discussed the history of ICCAT, stressing the scientific challenges that the Committee has faced and the responses and advice that it had provided to the Commission throughout all these years. Through their interventions, the important work carried out by the Committee was clearly manifested as was the Committee´s capacity to react to the problems it faced, all of this from the perspective of rigorous and transparent scientific work.

The former SCRS Chairmen and Executive Secretaries present at the session were as follows: SCRS Chairman: Dr. Vasco Valdez (Portugal, 1970'1975), Dr. Alain Fonteneau (France, 1977-1981), Dr. Alberto González-Garcés (Spain, 1985-1989), Dr. José Luis Cort (Spain, 1989-1993), Dr. Ziro Suzuki (Japan, 1993-1997), Dr. Joseph Powers (United States, 1997-2000), Dr. Joao G. Pereira (Portugal, 2001-2005). Executive Secretaries: Mr. Olegario Rodríguez and Mr. Adolfo Ribeiro Lima.

The Committee appreciated the information provided and considered that it could be of considerable help in the future work of the Committee.

18. Adoption of report and closure

The Report of the SCRS was adopted by the Committee.

The Executive Secretary congratulated the Committee for the excellent work carried out and encouraged it to continue meeting the challenges it faces with the same enthusiasm and efficiency.

The SCRS Chairman thanked the participants, the interpreters and the Secretariat for their contribution to the success of the meeting and adjourned the 2006 SCRS.

Appendix 1

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

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 Workshop on Stock Structure of Atlantic Swordfish
   9.2 Inter-Sessional Meeting of the Tropical Species Group
   9.3 BUM, WHM Stock Assessment
   9.4 BFT Stock Assessment
   9.5 Data preparatory meeting for Atlantic albacore
   9.6 SWO 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 Meeting 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 2007
    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 Evaluation of data elements pursuant to [Rec. 05-09]
    15.2 Review of the stock boundaries for Atlantic swordfish [Res. 99-03]
    15.3 Feasibility of assessing the impact of circle hooks on dead discards from longline fisheries [Res. 05-08]
    15.4 Review of catches of juvenile bluefin tuna in the Mediterranean [Rec. 02-09]
    15.5 Review of information on farmed bluefin tuna growth rates [Rec. 05-04]
    15.6 Consideration of requests from the 4th Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies
    15.7 Evaluation of the mortality of immature N. Atlantic swordfish [Rec. 02-04]
16. Other matters
17. ICCAT 40th anniversary presentations
18. Adoption of report and closure

Appendix 2

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Appendix 3

LIST OF SCRS DOCUMENTS

Number	*Title*	*Authors*	*Meeting*
SCRS/2006/010	Report of the 2006 ICCAT Workshop on Swordfish Stock Structure *(Heraklion, Crete, Greece, March 13 to 15, 2006)*	Anonymous	SWO-Stock Str.
SCRS/2006/011	Report of the 2006 ICCAT Inter-sessional Meeting of the Tropical Species Working Group *(Séte, France, April 24 to 28, 2006)*	Anonymous	TROP
SCRS/2006/012	Report of the 2006 ICCAT Billfish Stock Assessment *(Madrid, May 15 to 19, 2006)*	Anonymous	BILL
SCRS/2006/013	Report of the 2006 Atlantic Bluefin Tuna Stock Assessment Session *(Madrid, June 12-18, 2006*)	Anonymous	BFT
SCRS/2006/014	Report of the 2006 ICCAT Data Preparatory Meeting for Atlantic Albacore (*Madrid, July 3 to 7, 2006*)	Anonymous	ALB
SCRS/2006/015	Report of the 2006 Assessment of Atlantic Swordfish (*Madrid, September 4 to 8, 2006*)	Anonymous	SWO-Assess
SCRS/2006/016	Report of the sharks species group meeting	Anonymous	SCRS
SCRS/2006/017	Report of the tropical species group meeting	Anonymous	SCRS
SCRS/2006/023	Stock Status and Trends Descriptors in FIRMS: Compatibility with SCRS Reports	ICCAT SECRETARIAT	SCRS
SCRS/2006/024	Observer programme of activities for tuna sampling in Ghana 2006 preliminary report for August 2006	BANNERMAN, P.	SCRS
SCRS/2006/025	Stock structure of swordfish *(Xiphias gladius)* in the Atlantic: A review of the non-genetic evidence	NEILSON, J. D., S. D. Paul & S. Smith	SWO-Stock Str.
SCRS/2006/026	Identification on Atlantic swordfish stock structure inferred by mitochondrial control region DNA sequence characters	CHING-PING, L., J. Mejuto & Sh.-Y. Yeh	SWO-Stock Str.
SCRS/2006/027	Marked genetic difference between the north and south Atlantic stocks of the swordfish *(Xiphias gladius)* revealed by a single nucleotide polymorphism at CaM intron locus	CHOW, S.	SWO-Stock Str.
SCRS/2006/028	Ten microsatellite loci show that Mediterranean swordfish are genetically unique from other populations worldwide	REEB, C.A. and B. Block	SWO-Stock Str.
SCRS/2006/029	Implications of swordfish *(Xiphias gladius)* stock structure and mixing on management benchmarks.	BROOKS, E.N. and P. Apostolaki	SWO-Stock Str.
SCRS/2006/030	Evaluation de la structure du stock d'espadon *(Xiphias gladius)* dans l'Ocean Indien à l'aide d'une approche multidisciplinaire	JEAN, C., J. Bourjea, D. Miossec & M. Taquet	SWO-Stock Str.
SCRS/2006/031	Les espadons *(Xyphias gladius)* de la pêcherie artisanale maritime ivoirienne de 1988 à 2004 : structure de taille des stocks exploitées.	N'DA, K. & G.R. Dedo	SWO-ASSESS
SCRS/2006/032	Mercury and lead in muscle of Atlantic swordfish (*Xiphias gladius L., 1758*) as a tool for stock delimitation	BRANCO, V., M. Neves dos Santos, A. Garcia & C. Vale	SWO-ASSESS
SCRS/2006/033	Investigation of the within Mediterranean genetic structure of swordfish populations based on microsatellite markers	KOTOULAS, G., G. Tserpes, C. Piccineti, P. Peristeraki, J. Mejuto, J.M. De la Serna, A. Antoniou, P. Kasapidis,K. Oikonomaki, B. Garcia-Cortes & A. Magoulas	SWO-Stock Str.
SCRS/2006/034	Global genetic structure of the swordfish *(Xiphias gladius)* as revealed by microsatellite markers	KOTOULAS, G., J. Mejuto, A. Antoniou, P. Kasapidis, G. Tserpes, C. Piccineti, P. Peristeraki, B. Garcia-Cortes, K. Oikonomaki, J.M. De la Serna & A. Magoulas	SWO-Stock Str.
SCRS/2006/035	Genetic structure of the swordfish *(Xiphias gladius)* stocks in the Atlantic using microsatellite DNA analysis	KASAPIDIS, P., J. Mejuto, G. Tserpes, A. Antoniou, B. Garcia-Cortes, P. Peristeraki, K. Oikonomaki, G. Kotoulas and A. Magoulas	SWO-Stock Str.
SCRS/2006/036	Parasitic infections of swordfish (*Xiphias gladius* L., 1758) from Mediterranean Sea and North Atlantic Ocean: Biological tags for stock characterization in European waters	MATTIUCCI, S., V. Farina, A. Garcia, M. N. Santos, S. Damiano & G. Nascetti	SWO-Stock Str.

SCRS/2006/037	Capturas, distribución y composición de tallas de pez espada *(Xiphias gladius)* en el Atlántico occidental	MORA, O. & A. Domingo	
SCRS/2006/038	Swordfish genetic population structure in North Atlantic and Mediterranean	VIÑAS, J., J. Alvarado Bremer, J. Mejuto, J. M. de la Serna, B. García-Cortés & C. Pla	SWO-Stock Str.
SCRS/2006/039	Análisis de la información biológica y pesquera del pez espada (*Xiphias gladius* L.) en el Mediterráneo y Atlántico Norte, aplicable al estudio de la estructura de stock	DE LA SERNA, J.M., J.M. Ortiz de Urbina & D. Macías	
SCRS/2006/040	Genetic structure of Mediterranean and Atlantic swordfish investigated using allozymes and RFLPs	CIMMARUTA, R., M. Paoletti, P. Bondanelli, M.N. Santos, A. Garcia & G. Nascetti	SWO-Stock Str.
SCRS/2006/041	Genetic population structure of Atlantic swordfish: Current status, controversies, and future directions	ALVARADO BREMER, J. R., J. Mejutoc, J. Gómez-Márquezd, Carles Pla-Zanuye, J. Viñasf, Carla Marquesg, Fabio Hazing, M. Griffithsh,1, B. Elyi, B. Sánchezc, and T.W. Greigj	SWO-Stock Str.
SCRS/2006/042	Reproductive parameters of the Mediterranean swordfish *(Xiphias gladius)* stock compared to reproductive parameters in the Atlantic	MACÍAS, D., L. Lema, M.J. Gómez-Vives, J.M. Ortiz de Urbina & J.M. de la Serna.	
SCRS/2006/043	GLM CPUE standardizations: Interpretation risks for model fits from alternative software packages	GOODYEAR, C. P. and M. Ortiz	BILL
SCRS/2006/044	Note upon the period used to run the SCRS sequential population analysis on tropical tunas	FONTENEAU, A.	TROP
SCRS/2006/045	Note upon the historical standardized fishing efforts in the FIS and French purse seiners Task II statistics that have been routinely submitted to ICCAT Secretariat during the 1969-1997 period	FONTENEAU, A., R. Pianet	TROP
SCRS/2006/046	Las capturas uruguayas de atún ojo grande, *Thunnus obesus.(1981-2004)*	MORA, O. y A. Domingo	
SCRS/2006/047	Le débarquement des "faux thons" ou "faux poissons" au port de pêche d'Abidjan : phénomène en résurgence dans les données ICCAT en Côte d'Ivoire	N'Da K., D. G. Rene and A. Hervé	SCRS
SCRS/2006/048	Some clues for correcting the tagging data base of tropical tunas	GAERTNER, D., P. Kebe and C. Palma	SCRS
SCRS/2006/049	Tuna management and closed areas	FONTENEAU, A.	SCRS
SCRS/2006/050	Preliminary analysis of standardized catch per unit effort of bigeye tuna *(Thunnus obesus)* caught by Taiwanese longline fleets in the Atlantic Ocean by general additive model	HSU, C.C.	SCRS
SCRS/2006/051	Adoption of the AVDTH program for improving Ghanaian statistics and a new sampling scheme. The way forward	BANNERMAN, P. and R. Sarralde	SCRS
SCRS/2006/052	Datos estadísticos de la pesquería de túnidos	ARIZ, J. R. Delgado de Molina, J.C. Santana y A. Delgado de Molina	SCRS
SCRS/2006/053	Estadísticas españolas de la pesquería atunera tropical, en el Océano Atlántico, hasta 2005	DELGADO DE MOLINA, A. J.C. Santana, R. Delgado de Molina, R. Sarralde y J. Arizr	SCRS
SCRS/2006/054	Estudio de las pautas de comportamiento del patudo (*Thunnus obesus* (1839)) con marcas archivo	DELGADO DE MOLINA, A. J.C. Santana, J. Ariz, R. Delgado de Molina y F. Abascal	SCRS
SCRS/2006/055	Analysis of sex-ratio by length class for bluefin tuna (BFT) (*Thunnus thynnus)* caught by trap nets and LL from Libyan waters 2000-2005	TAWIL, M., A. Elmgawshi, A.Shefren and A.Elmargni	SCRS
SCRS/2006/056	Standardized fishing effort of albacore, *Thunnus alalunga*, caught by the Spanish troll fleet in the North East Atlantic from 1981 to 2005	ORTIZ DE ZÁRATE, V. and J.M. Ortiz de Urbina	SCRS
SCRS/2006/057	Standardized fishing effort of albacore, *Thunnus alalunga*, caught by the Spanish bait boat fleet in the north east Atlantic from 1981 to 2005	ORTIZ DE ZÁRATE, V. and J.M. Ortiz de Urbina	SCRS
SCRS/2006/058	Revision of Task I & Task II data of albacore (*Thunnus alalunga*) Spanish surface fisheries operating in the North Atlantic	ORTIZ DE ZÁRATE, V. C. Rodríguez-Cabello, A. Delgado de Molina and S. Barreiro	SCRS
SCRS/2006/059	The Spanish albacore (*Thunnus alalunga*) surface fishery in the north eastern Atlantic in 2005	ORTIZ DE ZÁRATE, V., S. Barreiro, C. Rodríguez-Cabello and J. Valeiras	SCRS

SCRS/2006/060	Preliminary approach to evaluate the importance of discards and other uses of billfish in the Spanish surface longline fishery carried out in different oceans between 1993-2004-	MEJUTO, J., B. García-Cortés, A.M. Ramos-Cartelle	BILL
SCRS/2006/061	Spatial-temporal distribution, sex ratio at size and gonad index of white marlin *(Tetrapturus albidus)* and longbill spearfish *(Tetrapturus pfluegeri)* in the western central Atlantic during the period of 2002-2005	AROCHA, F., A. Barrios and D.W. Lee	BILL
SCRS/2006/062	Actividades desarrolladas en el programa de investigación intensiva sobre marlines en Venezuela. Periodo 2004-2005	MARCANO, L.A., F. Arocha, J. Alío, J. Marcano y A. Larez	BILL
SCRS/2006/063	Relative indices of abundance for Atlantic billfish estimated from catch per unit of fishing effort data from the Ghanaian gillnet fleet	BANNERMAN, P., D. Die, M. Fitchett and A. Brinson	BILL
SCRS/2006/064	Application of a bayesian surplus production model to Atlantic blue and white marlin	BABCOCK, E.A.	BILL
SCRS/2006/065	Standardized catch per unit of effort of white marlin, *Tetrapturus albidus*, and blue marlin, *Makaira nigricans*, caught by Brazilian commercial longline fleet	HAZIN, F.H., H.G. Hazin, P.Travassos and I.M. Oliveira	BILL
SCRS/2006/066	Updated white marlin (*Tetrapterus albidus*) and blue marlin (*Makaira nigricans*) catch rates from the U.S. pelagic longline in the northwest Atlantic and Gulf of Mexico 1986-2005	DIAZ, G.A. and M. Ortiz	BILL
SCRS/2006/067	Updated white marlin *(Tetrapturus albidus)* and blue marlin *(Makaira nigricans)* catch rates from the U.S. recreational tournament fishery in the Northwest Atlantic, U.S. Gulf of Mexico, Bahamas and U.S. Caribbean 1973-2005	DIAZ, G.A., M. Ortiz and E.D. Prince	BILL
SCRS/2006/068	Ring counts and timing of ring formation in fin spines of white marlin (*Tetrapturus albidus*) from the Venezuelan longline and artisanal fisheries	DREW, D.J. Die and F. Arocha	BILL
SCRS/2006/069	Amélioration des données statistiques de la pêche thonière dans la zone de l 'Atlantique Est Tropicale	KEBE, P., P. Pallarés, M. Wazawa and R. Pianet	SCRS
SCRS/2006/070	Catch and effort data of the Turkish bluefın tuna fishery (2002-2005)	KARAKULAK, F.S.	BFT
SCRS/2006/071	Standardized CPUE of bluefin tuna *(Thunnus thynnus)* caught by Spanish traps for the period 1981-2004	ORTIZ DE URBINA, J.M.,J-M.Fromentin, V.R. Restrepo, H. Arrizabalaga and J.M. de la Serna	BFT
SCRS/2006/072	Estimates of total mortality of eastern Atlantic bluefin tuna based on year-class curves	FROMENTIN, J-M., H. Arrizabalaga, V.R. Restrepo and J.M. Ortiz de Urbina	BFT
SCRS/2006/073	Estimates of selectivity for eastern Atlantic bluefin tuna from catch curves	RESTREPO, V.R., J. Ortiz de Urbina, J-M Fromentin, and H. Arrizabalaga	BFT
SCRS/2006/074	Analysis of the potential impact of several management measures for eastern Atlantic bluefin tuna on the basis of yield per recruit	ARRIZABALAGA, H., V. Restrepo, J-M Fromentin, J.M. Ortiz de Urbina	BFT
SCRS/2006/075	Alternatives to the Bay of Biscay juvenile bluefin tuna baitboat index	GARCÍA, D., H. Arrizabalaga and I. Artetxe	BFT
SCRS/2006/076	Indices of stock status obtained from the Canadian bluefin tuna fishery	NEILSON, J.D., S.D. Paul and M. Ortiz	BFT
SCRS/2006/077	Pilot study of bluefin tuna age validation	NEILSON, J.D., and S.E. Campana	BFT
SCRS/2006/078	Analyse des indices d'abondance standardisés relatifs aux captures du thon rouge par les madragues de l'Atlantique marocain. Période 1998-2005	ABID, N. and M. Idrissi	BFT
SCRS/2006/079	Are the growth curves currently used for Atlantic bluefin tuna statistically different?	RESTREPO, V.R., E. Rodríguez-Marín and C. Rodríguez-Cabello	BFT
SCRS/2006/080	SCRS 2006: Towards clear and firm ICCAT reports on Atlantic bluefin tuna stocks? An open letter to the bluefin group and to the SCRS	FONTENEAU, A.	BFT
SCRS/2006/081	Large pelagics survey bluefin tuna length validation assessment	VAN VOORHEES, D., R. Salz, J. Foster, J. Desfosse, C. Brown, M. Schulze-Haugen and C. Rogers	BFT
SCRS/2006/082	Development of indices of bluefin tuna *(Thunnus thynnus)* spawning biomass in the Gulf of Mexico using delta-lognormal models	INGRAM, G.W. Jr., W.J. Richards, G.P. Scott and S.C. Turner	BFT

SCRS/2006/083	Standardized catch rates of large bluefin tuna *(Thunnus thynnus)* from the U.S. pelagic longline fishery in the Gulf of Mexico and off the Florida east coast during 1987-2005	CASS-CALAY, S.L.	BFT
SCRS/2006/084	Standardized catch rates of bluefin tuna, (T*hunnus thynnus*), from the rod and reel/handline fishery off the northeast United States during 1980-2005	BROWN, C.A.	BFT
SCRS/2006/085	Initial specifications for Atlantic bluefin tuna operating and management procedure models	Anonymous	BFT
SCRS/2006/086	A finite-state continuous-time approach to inferring regional movement rates of Atlantic bluefin tuna using conventional tagging studies	MILLER, T.J.	BFT
SCRS/2006/087	An alternative stock assessment of western Atlantic bluefin tuna using a bayesian state-space surplus production model	MCALLISTER, M. and T. Carruthers	BFT
SCRS/2006/088	Do some Atlantic bluefin tuna skip spawning?	SECOR, D.H.	BFT
SCRS/2006/089	Genetic data and electronic tagging indicate that the Gulf of Mexico and Mediterranean Sea are reproductively isolated stocks of bluefin tuna *(Thunnus thynnus)*	BOUSTANY, A.M., C.A. Reeb, S.L. H. Teo, G. De Metrio and B.A. Block	BFT
SCRS/2006/090	Size frequency distribution analysis, age composition, and maturity of western bluefin tuna in the Gulf of Mexico from the U.S. (1981-2005) and Japanese (1975-1891) longline fleets	DIAZ, G. and S.C. Turner	BFT
SCRS/2006/091	Preliminary analyses of the possible impacts of alternative minimum size limits for Atlantic bluefin tuna	PORCH, C.E. and S.C. Turner	BFT
SCRS/2006/092	Temporal and spatial analyses of pelagic longline time/area closures in the Gulf of Mexico to reduce discards of bluefin tuna	WILSON, J., C. Rilling, J.Desfosse, K. Brewster-Geisz	BFT
SCRS/2006/093	Improving bluefin catch at size & catch at age data base for the 2006 assessment	KEBE, P.	BFT
SCRS/2006/094rev	Updated standardization of bluefin tuna, *Thunnus thynnus*, catch per unit of effort in the baitboat fishery of the Bay of Biscay (eastern Atlantic). Time series from 1975 to 2004	RODRÍGUEZ-MARÍN, E., M. Soto, M. Ortiz, C. Rodríguez-Cabello and J.L. Cort.	BFT-SCRS
SCRS/2006/095	Revisión histórica de la base de datos de ICCAT de la especie atún rojo capturado por barcos con bandera Española. Descripción y codificación de las flotas y revisión de las capturas y tallas de atún rojo	RODRÍGUEZ-MARÍN, E., E. Alot, S. Barreiro, C. Rodríguez-Cabello, A. Ramos, A. Delgado de Molina, J.M. De La Serna y J. Mejuto.	BFT
SCRS/2006/096	Estimation of north east Atlantic bluefin tuna *(Thunnus thynnus)* growth parameters from tagging data	RESTREPO, V.R., C. Rodríguez-Cabello and E. Rodríguez-Marín, J.L. Cort and M. De La Serna	BFT
SCRS/2006/097	Standardized bluefin CPUE from the Japanese longline fishery in the Atlantic	TAKEUCHI, Y., N. Miyabe, H. Yamada and M. Kanaiwa	BFT
SCRS/2006/098	Average catch of bluefin tuna obtained by the Spanish purse seine fleet in the west Mediterranean by boat and month during the 1994-2004 period. Impact of the change of fishing area on performance	DE LA SERNA, J.M., and E. Rodriguez-Marin	BFT
SCRS/2006/099	Situation récente de la pêcherie du thon rouge *(Thunnus thynnus)* des côtes marocaines	ABID, N. et M. Idrissi	BFT
SCRS/2006/100	Analysis of recent catch data of blue marlin caught by Japanese longliners in the Atlantic using log-book information	YOKAWA, K.	bill
SCRS/2006/101	Analysis of recent catch data of white marlin caught by Japanese longliners in the Atlantic using log-book information	YOKAWAY, K.	bill
SCRS/2006/102	Updated white marlin and blue marlin catch rates from the Taiwanese longline fishery in the Atlantic	YEH, Y.M.	bill
SCRS/2006/103	Preliminary results on the reproductive biology of the white marlin, *Tetrapturus albidus* Poey 1960, in the western equatorial Atlantic Ocean	OLIVEIRA, I.M., F.H.V. Hazin, P. Travassos, P.B. Pinheiro, and H.G. Hazin	bill
SCRS/2006/104	Prelimary results on reproductive biology of blue marlin, *Makaira nigricans* (Lacépède, 1803) in the tropical western Atlantic Ocean	MARTINS, C., P. Pinheiro, P. Travassos and F. Hazin	bill
SCRS/2006/105	Estimation of the relative abundance of Atlantic Billfish: effects of three approaches to cope with catches equal to zero	ANDRADE, H.A.	bill

SCRS/2006/106	Ratio of live Atlantic blue marlin and white marlin caught by Japanese longliners obtained by the data from the observer program in Atlantic Ocean	SEMBA,Y. and K.Yokawa	bill
SCRS/2006/107	Application of age-length-keys to estimate catch-at-age for North Atlantic albacore *(Thunnus alalunga)* stock	ORTIZ DE ZÁRATE, V., X. Valeiras, C. Rodríguez-Cabello and M. Ruiz	ALB
SCRS/2006/108	An initial illustrative application of a cpue*area approach to checking assessment consistency for North Atlantic bluefin using recent Japanese longline data	BUTTERWORTH, D. S., M. Kanaiwa, Y. Takeuchi and N. Miyabe	BFT
SCRS/2006/109	Morphology of rings on otolith and spine characters from North Atlantic albacore of 40-44 cm fork length	LU, Ch-P., V. Ortiz de Zárate and S-Y. Yeh	ALB
SCRS/2006/110	Age and growth of South Atlantic albacore – a revision after the revelation of otolith's daily ring counts	LEE, L-K., and Sh. Y. Yeh	ALB
SCRS/2006/111	Brief review of size data for Atlantic albacore caught by Japanese longline fishery	UOSAKI, K.	ALB
SCRS/2006/112	Estimation of the relative abundance of albacore (*Thunnus alalunga*) using multi-fleet dataset and delta-lognormal models	ANDRADE, H.	ALB
SCRS/2006/113	New standardized south Atlantic albacore CPUE for the South African baitboat fishery, 1999-2005	SMITH, and J. Glazer	ALB
SCRS/2006/114	Sampling protocol for skeletal structures of north Atlantic albacore tuna (*Thunnus alalunga*) and ageing interpretation	ORTIZ de ZARATE et al	
SCRS/2006/115	Activity of the Spanish surface longline fleet catching swordfish *(Xiphias gladius)*during the year 2004	MEJUTO, J., B. García-Cortés , J. M. De La Serna, A. Ramos-Cartelle	SWO
SCRS/2006/116	Updated sex- and age-specific CPUE from the Canadian swordfish longline fishery, 1988-2005	PAUL, S.D. and J.D. Neilson	SWO
SCRS/2006/117	Standardized swordfish *(Xiphias gladius)* CPUE of Santos longliners operating off southern Brazil (1971-2005)	MOURATO, B.L., H.A. Andrade, A.F. Amorim, C.A. Arfelli	SWO
SCRS/2006/118	Análisis de la CPUE y la composición de tallas del SWO *(Xiphias gladius)*, capturado por la flota uruguaya (2001-2005) en el Atlántico SW	DOMINGO, A., O. Mora, M. Pons, P. Miller, G. Pereyra	SWO
SCRS/2006/119	Genetic and growth profiles of three specimens of swordfish *(Xiphias gladius)* tagged and recaptured in the North Atlantic	KASAPIDIS, P., X. Valeiras, A. Antoniou, G. Kotoulas, B. García-Cortés and J. Mejuto	SWO
SCRS/2006/120	Standardization of South Atlantic swordfish by-catch rate for Taiwanese longline fleet	CHANG, S.K., H.H. Lee and H.I. Liu	SWO
SCRS/2006/121rev.	Update of standardized CPUE of swordfish caught by Japanese longliners	YOKAWA, K.	SWO
SCRS/2006/122	Interannual variability of bluefin larval growth observed during the spawning seasons 2003-2005	GARCÍA, A., J. Quintanilla, I. Alvárez, A. Carpena, D. Cortés, F. Alemany, and J.M. Rodríguez	SCRS
SCRS/2006/123	Report of CLIOTOP workshop of working group 1 on early life history of top predators	GARCÍA, A., A. Bakun and D. Margulies	SCRS
SCRS/2006/124	Update of standardized catch rates by sex and age for swordfish *(Xiphias gladius)* from the U.S. longline fleet 1981-2005	ORTIZ, M.	SWO
SCRS/2006/125	Situation recente de la pêcherie Marocaine de l'espadon *(Xiphias gladius)*. Periode: 1996-2005	ABID, N. et M. Idrissi	SWO
SCRS/2006/126	Fishing strategy and target species of the Brazilian tuna longline fishery, from 1978 to 2005, inferred from cluster analysis	HAZIN, H.G., F. Hazin , P. Travassos , F. C. Carvalho, and K. Erzini	SWO
SCRS/2006/127	Standardization of swordfish CPUE series caught by Brazilian longliners in the Atlantic Ocean, by GLM, using the targeting strategy inferred by cluster analysis	HAZIN, H.G., F. Hazin, P. Travassos , F. C. Carvalho, and K. Erzini	SWO
SCRS/2006/128	Essential fish habitat and spatial prediction of swordfish (*Xiphias gladius*) catches in the south Atlantic	HAZIN, H. and K. Erzini	SWO
SCRS/2006/129	An updated biomass index of abundance for north Atlantic swordfish 1963-2005	ORTIZ, M., J. Mejuto, S. Paul, K. Yokawa, M. Neves and J. J. Hoey	SCRS
SCRS/2006/130	Effects of a seasonal closure of the Mediterranean swordfish fisheries on the stock Production levels	TSERPES, G. and P. Peristeraki	SCRS
SCRS/2006/131	Fisheries of Bluefin tuna (Thunnus thynnus) spawners in the Northeast Atlantic	CORT, J.L. and L. Nøttestad	SCRS
SCRS/2006/132	Abundancia del tiburón loco (C*archarhinus longimanus*) en el Atlántico sur	DOMINGO, A., P. Miller, R. Forselledo, M. Pons and L. Berrondo	SCRS

SCRS/2006/133	Distribución y estructura poblacional de la raya negra (*Dasyatis violacea*) en el Océano Atlántico sur	FORSELLEDO, R., M. Pons, Ph. Miller and A. Domingo	SCRS
SCRS/2006/134	Distribución y composición de tallas de las tortugas marinas (*Caretta caretta* y *Dermochelys coriacea*) que interactúan con el palangre pelágico en el Atlántico sur	LOPEZ-MENDILAHARSU, M., G. Sales, B. Giffoni, Ph. Miller, G. Maurutto and A. Domingo	SCRS
SCRS/2006/135	Albatros y petreles: su interacción con la flota de palangre pelágico uruguaya en el Atlántico sudoccidental (1998-2006)	JIMÉNEZ, S. and A. Domingo	SCRS
SCRS/2006/136	Distribución espacio temporal y composición de tallas de *Alopias superciliosus* y *A. vulpinus* observados en la flota palangrera uruguaya en el océano Atlántico (2001-2005)	BERRONDO, L., M. Pons, R. Forselledo, P. Miller and A. Domingo	SCRS
SCRS/2006/137	La flota de palangre como fuente de información sobre la distribución de la orca (*Orcinus orca*) en el océano Atlántico sudoccidental (2002-2006)	PASSADORE, C., M. Szephegyi, O. Mora and A. Domingo.	SCRS
SCRS/2006/138	Sailfish, *Istiophorus platypterus* movement pattern off northern Rio de Janeiro state, Brazil (2002-06)	PIMENTA, E., M. Vidal, G. Lima, A. Berbert and A. F. de Amorim	SCRS
SCRS/2006/139	Analysis on billfish fishery off Rio de Janeiro State, Brazil (2002-03)	PIMENTA, E., M. Vidal, G. Lima, A. Berbert and A. F. de Amorim	SCRS
SCRS/2006/140	Standardized CPUE of blue shark (*Prionace glauca*) caught by Santos longliner in southern Brazil (1984-2005)	MOURATE, B.L., H. A. Andrade, A. F. Amorim and C. A. Arfelli	SCRS
SCRS/2006/141	Temporal growth differences of swordfish recruits in the Eastern Mediterranean	PERISTERAKI, P., G. Lazarakis, K. Skarvelis, N. Kypraios and G. Tserpes	SCRS
SCRS/2006/142	Summary of ongoing Canadian bluefin tuna sampling activities supported by the ICCAT Bluefin Tuna Year Program, 2006	CORRIGAN, S.E., J. D. Neilson and S.D. Paul	SCRS
SCRS/2006/143	Estimación de los descartes y de las capturas de especies accesorias en la pesquería española de cerco de túnidos tropicales en el océano Atlántico, entre 2001 y 2006.	Sarralde, R., A. Delgado de Molina, J. C. Santana, R. Delgado de Molina y J. Ariz	SCRS
SCRS/2006/144	Elemental fingerprints in otoliths of juvenile yellowfin tuna from spawning grounds in the Atlantic Ocean	SHUFORD, R. L., J. M. Dean, B. Stéquert, M. LaBonne	SCRS
SCRS/2006/145	Age and growth of yellowfin tuna in the Atlantic Ocean	SHUFORD, R. L., J. M. Dean, B. Stéquert, E. Morize	SCRS
SCRS/2006/146	Standardized catch rates for mako (unclassified *Isurus sp.*) and blue (*Prionace glauca*) sharks in the Virginia - Massachusetts (U:S:) rod and reel fishery during 1986-2005	BROWN, C.A	SCRS
SCRS/2006/147	Catches of pelagic sharks from the northwestern Atlantic, Gulf of Mexico, and Caribbean	CORTÉS, E.	SCRS
SCRS/2006/148	Standardized catch rates for blue shark and shortfin mako from the us pelagic longline logbook program	CORTËS, E.	SCRS
SCRS/2006/149	Post-release survival of sailfish *(Istiophorus platypterus)* captured on commercial pelagic longline gear in the southern Gulf of Mexico	KERSTETTER, D.W. and J.E. Graves	SCRS
SCRS/2006/150	Preliminary results of circle and J-style hook comparisons in the Brazilian pelagic longline fishery	KERSTETTER, D.W, J.C. Pacheco, F.H. Hazin, P.E. Travassos, and J.E. Graves	SCRS
SCRS/2006/151	Standardized catch rates of albacore tuna (*Thunnus alalunga)* from the U.S. pelagic longline fleet 1986-2005	DIAZ, G.A. and M.Ortiz	SCRS
SCRS/2006/152	Recreational catch and release: Resource allocation between commercial and recreational fishermen	GOODYEAR, C.P.	SCRS
SCRS/2006/153	Estimates of biological benchmarks using simulated blue marlin data: Impacts of truncating time series of catch and abundance	GOODYEAR, C.P.	SCRS
SCRS/2006/154	Statistiques de la pêcherie thonière française durant la période 1991 – 2005	PIANET, R., V. Norström, P. Dewals, R. Gnegoury Dédo and Y. Diatta	SCRS
SCRS/2006/155	Statistiques de la pêcherie thonière européenne et assimilée durant la période 1991 – 2005	PIANET,R., V. Norström, P. Dewals, A. Delgado, J. Ariz, R. Saralde,R. Gnegoury Dédo and Y. Diatta	SCRS
SCRS/2006/156	Note about observations of sailfishes during an observer cruise on a French purse-seiner in the Gulf of Guinea	VIERA, A.	SCRS
SCRS/2006/157	Report of the ICCAT Workshop for bluefin tuna direct ageing	CLEAR, N., J.L. Cort, P. Megafonou, J.D. Neilson, M. Neves dos Santos, D. Olafsdottir, C. Rodriguez-Cabello, E. Rodriguez-Marin, M. Ruiz and J. Valeiras	SCRS

SCRS/2006/158	Progress of the ICCAT Enhanced Research Program for Billfish in the Western Atlantic Ocean during 2005	PRINCE, E.D.	SCRS
SCRS/2006/159	Joint United States-Brazil billfish research in the western South Atlantic	KERSTETTER, D.W. and F.H.V. Hazin	SCRS
SCRS/2006/160	Continuité de l'étude sur la disparition des gros géniteurs de plus de 100 kilos	ORDAN, M	SCRS
SCRS/2006/161	Standardized catch rates of bluefin tuna (*Thunnus thynnus*) from the Moroccan Atlantic trap fishery. 1998-2005	ABID, N., M. Idrissi and J. M. Ortiz de Urbina	SCRS
SCRS/2006/163	Resultados de la Acción Piloto RAI-AP-52/2004 de pesca experimental con palangre de superficie dirigido al pez espada en el Mediterráneo occidental	DE LA SERNA, J.M.; J.M. Ortiz de Urbina and S. García Barcelona	SCRS
SCRS/2006/164	Standardized Japanese longline CPUE for bigeye tuna in the Atlantic Ocean from 1961 up to 2005	OKAMOTO, H.	SCRS
SCRS/2006/165	Standardized Japanese longline CPUE for yellowfin tuna on the Atlantic Ocean from 1965 up to 2005	OKAMOTO, H.	SCRS
SCRS/2006/166	Détermination à partir des déchets biologiques de la structure démographique du thon rouge capturé par les madragues de l'Atlantique nord marocain : résultats préliminaires de la campagne de pêche 2006	ABID, N. and M. Idrissi	SCRS
SCRS/2006/167	Progress report on review of Taiwanese fisheries data	CHANG, S-K. and H-I Liu	SCRS
SCRS/2006/168	Brief introduction to the fisheries data improvement program of Chinese Taipei	CHAND, S-K. and S.-C. Chou	SCRS
SCRS/2006/169	Preliminary approach at assessing landings and size composition of drifting nets in Ghanaian coastal fishery for billfishes	BANNERMAN, P.	SCRS
SCRS/2006/170	Preliminary Investigation of size composition of Blue Fin Tuna (Thunnus Thynnus L.) caught by Libyan long line fishery and trap nets From Libyan waters year (2002-2005) and gear competition	TAWIL, Y., A. Elmargni, R. Abdulbari and Y.Tkala	SCRS
SCRS/2006/171	Tagging of the northern bluefin tuna (*Thunnus thynus*) in the east Atlantic and Mediterranean Sea in 2005	TICINA, V.	SCRS
SCRS/2006/172	Additional VPA Analysis of Northern Atlantic Swordfish	SCOTT, G. and C. Porch	SCRS
SCRS/2006/173	Aspects of the reproductive biology of the sandbar shark, *Carcharhinus plumbeus (*nardo, 1827), in coastal waters off Pernambuco, Brazil	HAZIN, F.H.V., P. G. V. Oliveira and B. C. L. Macena	SCRS
SCRS/2006/174	Distribution, catch and length composition of the albacore tuna (*Thunnus alalunga*) caught by the tuna longline fishery in the south Atlantic Ocean	FRÉDOU, F.L., T. Frédou, P. Travassos, J. Lins, C. Arfelli, H. A. Andrade and F. Hazin.	SCRS
SCRS/2006/175	CPUE and catch trends of shark species caught by Brazilian longliners in the Southwestern Atlantic Ocean	HAZIN, F.H.V., H. G. HAZIN and P. TRAVASSOS	SCRS
SCRS/2006/176rev	Aspects of the reproductive biology of the silky shark, *Carcharhinus falciformis (*Nardo, 1827), in the vicinity of archipelago of Saint Peter and Saint Paul, in the equatorial Atlantic Ocean	HAZIN, F.H.V., P. G. V. Oliveira and B. C. L. Macena	SCRS
SCRS/2006/177	Eventos climáticos a pequeña escala y la pesca del atún blanco (*Thunnus alalunga*) en las Islas Canarias	GANZEDO, U., I. Arregi , I. Sancristobal and , J. J. Castro	SCRS
SCRS/2006/178	Biological characteristics of Maltese longlining bluefin tuna landings 2005	MOSTEIRO and Camilleri	SCRS
SCRS/2006/179	Addendum to BFT detailed report	Anonymous	SCRS
SCRS/2006/180	Report of observer program for Chinese longline fishery in the Atlantic Ocean in 2006	CHEN, J., X. Dai, L. XU and L. Song	SCRS
SCRS/2006/181	Implementation of Brazilian National Plan of Action for the Conservation of Albatrosses and Petrels NPOA-Seabird/Brazil	NEVES, T., P. L. Mancini, L. Bugoni, L. E. Bonilha and O. J. M. Filho	SCRS
SCRS/2006/182	Overview of seabird by-catch by Brazilian fisheries in South Atlantic Ocean	NEVES, T., P. L. Mancini, L. Nascimento, A. M.B. Miguéis and L. Bugoni	SCRS

Appendix 4

OPENING ADDRESS BY THE EXECUTIVE SECRETARY

Mr. Chairman,
Honorable Delegates,
Ladies and Gentleman,

As customary, the scientific experts meet this time every year to discuss the concerns of our Commission regarding tuna resources. This year's Scientific Committee meeting takes place 40 years after the signing of the Convention. For 40 years ICCAT has been devoted to matters concerning the conservation of Atlantic tunas. Thanks to the efforts of the eminent scientists of different Contracting Parties, ICCAT has been able to implement management measures that can assure the sustainable exploitation of tuna species.

Our organization has earned a lot of respect and occupies an extremely important place in the international arena. This is thanks to the serious work carried out and to the transparency that has always characterized the discussions held at the various levels.

Requests for ICCAT membership have continued year after year. This shows the interest that ICCAT's mission represents in matters of management of tuna resources in the Atlantic.

As far as the number of Contracting Parties is concerned, ICCAT is by far the most important regional fishery management organization.

This year, the Scientific Committee meeting is held in an unusual context. Essentially, this is because the Commission has, yet again, been requested to establish a new management plan for some of the major species that have been subject to a stock assessment carried out by our Committee. It is clear that there are different views on the approaches and the analyses which could lead to the formulation of recommendations. However, divergence is often a source of compromise, above all, in an environment that is rich, diversified and encouraged by the willingness of our Scientific Committee. Its work is followed and observed from everywhere.

I am convinced that at the end of its work, the Commission will have judicious advice available, which will allow it to undertake the necessary actions aimed at assuring the adequate management of tuna resources in the Convention area.

I wish you a lot encouragement and every success in the work of your meeting.

Thank you.

Appendix 5

WORK PLANS OF SPECIES GROUPS FOR 2007

Tropical Tuna Species Work Plan

Research recommendations:

- To carry 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.
- To review tagging data for tropical species available at ICCAT databases and establish a procedure with the Secretariat, and in co-ordination with the Ad-hoc Tagging Group, for correction of errors and inconsistencies.
- To encourage national scientists to carry out new 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.
- To find strategies to include in the catch the estimation of landings in Abidjan that are directed out of the canning factories (the so-called "false fish"), avoiding risks of double counting.
- A suggestion is made to increase size sampling on the longline fleets. Sampling sizes have been decreasing for a number of years, and the importance of these fleets make gathering of these data an essential task.
- A recommendation is made for national scientists to collect information on the yellowfin size distribution of the catches of the Brazilian baitboat fleets.
- Results presented from archival tags on bigeye were considered very interesting, and it is encouraged to continue such tagging in the future

As requested by the Commission in the *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations* [Rec-05-09], a bigeye assessment will be planned in 2007. However, the question was raised that we may have more concern with the yellowfin stock, due to the declining trend of the total catch in the recent years, even if this decline may be the result of the large decrease of the purse-seine fleet in recent years. It was also outlined that the last assessment for skipjack was done in 1999, and that very few studies have been made on this species since then.

Consequently, the Working Group would like to analyze most of the indicators as defined during its inter-sessional meeting in Sète in April for yellowfin and skipjack. At least, the update of the CAS for the three tropical species should be available for the assessment. This will also be necessary in order to estimate the impact of the moratorium from 1997 to 2005.

Albacore Work Plan

The North and South Atlantic albacore stocks will be assessed in 2007, in conformity with a Commission Recommendation. This Work plan details the tasks that need to be undertaken for a successful assessment.

North Atlantic stock

1. Task I and Task II should be updated to 2005 for all fisheries.
2. Present biological parameters values if new estimates are obtained.

3a Assessment Model ADAPT-VPA (standard analytical method) to define the base case.

Catch-at-age matrix for the international total catch will be derived by applying the Kimura-Chikuni method implemented and tested during the ICCAT Data Preparatory Meeting for Atlantic Albacore SCRS/2006/014. The ICCAT Secretariat will be involved in this action.

National Scientists should prepare standardized CPUE series for major fisheries by year and age group, using data up to 2005.

South Atlantic stock

1. Task I and Task II should be updated to 2005 for all fisheries.
2. Present biological parameters values if new estimates are obtained.
3. Assessment Model Age structured Production Model to define the base case.

National Scientists should prepare standardized CPUE series for major fisheries by year and age group, using data up to 2005.

Alternative Modelling for North and South Stocks

Assessment Model MULTIFAN-CL (statistical method)

Following fishery components were identified (see Report of the 2006 Data Preparatory meeting for details):

South

1. Japanese Longline (JPN LL)
2. Chinese-Taipei Longline (CH Tai LL)
3. Brazil Longline (BRA LL)
4. South Africa and Namibia Bait boat (RSA+Namibia BB, until 1998)
5. South Africa and Namibia Bait boat (RSA+Namibia BB, since 1999)
6. Other surface fisheries, mainly in the North (SURF)
7. Other longline fisheries (Other LL)

North

1. ESP BB recent
2. ESP TR recent
3. FR+ESP TR early
4. FR+ESP BB early
5. Azores BB
6. JPN LL
7. CH Tai LL
8. COR+PAN LL early
9. Other LL
10. Other SURF

The following options should be used:

Effort: Standardized Indices for fleets 1 to 5 and Task II data for fleets 6 and 7.
Size: Task II data for all fleets
Time step: quarterly assuming natural quarters (i.e. first quarter: Jan-Feb-March)
Spatial structure: no
Tag data: no
Length at age data: yes
Growth estimates: Linf, K, S.D
M estimate: constant, strong prior
Catchability (q) changes: fleets 2 to 7
SRR: Beverton and Holt model

National Scientists should prepare standardized CPUE series for major fisheries, using data up to at least 2005. For MULTIFAN-CL method, indices should be age-aggregated and should be expressed by year-quarter.

The Secretariat should setup a workspace within the ICCAT web site to facilitate the exchange and provision of data between national scientists and Secretariat working on those stocks. The work plan schedule in the report of the 2006 Data preparatory meeting should be followed in order to accomplish these tasks.

Bluefin Tuna Work Plan

The Bluefin Tuna Working Group does not plan to conduct a new assessment for three to four years, depending (of course) on actions taken by the Commission and events in the fisheries. In the interim the Working Group plans to focus efforts on the research activities outlined within the Bluefin Year Program and within the proposed Bluefin Research Plan (presented in 2005 SCRS Report; note that this Plan has not been funded, however, aspects may be addressed at a minimal level through *ad hoc* national efforts). Also, the Working Group will investigate the implications of historical fishery events on the current status of Bluefin (see Recommendations for a workshop in 2007 or 2008 on this issue). Finally, the Working Group will continue to develop comparative models for evaluating Bluefin dynamics and status including models that incorporate spatial variability, operating models of the bluefin system and models which address uncertainty in basic catch inputs.

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 2003. The next assessments for North and South Atlantic Swordfish are proposed for 2010, and for the Mediterranean Swordfish stock, an updated assessment is planned in 2007 or 2008.

Proposed work

North and South Atlantic

A list of recommended work has been provided in the Detailed Report of the 2006 Swordfish Stock Assessment (SCRS/2006/015). Among those recommendations, the following are 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/02/31) 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 Methods WG meeting 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

In case of an assessment in 2007, a series of actions should be taken in advance of the assessment in order to fill gaps in the available data series and ensure the active participation of scientists from as many as possible Mediterranean countries.

1. A document should be prepared by the ICCAT Secretariat indicating the available time-series of data in the ICCAT data-base in terms of catch, effort and size data for all swordfish fisheries operating in the Mediterranean. This document should be made available to ICCAT scientists three months in advance of the assessment. **Action: ICCAT Secretariat**.

2. National scientists should make every effort to fill in the gaps identified in (1), above, especially in terms of catch by fishery (Task I) and detailed catch/effort and size statistics (Task II), at least up to 2004. Data must be provided to the Secretariat two weeks in advance of the assessment n order to be included in the assessment (see www.iccat.es for instructions for submitting data). **Action: National Scientists**.

3. Detailed information should be provided to the Secretariat regarding the available time-series of CPUE data for each swordfish fishery (target and not-target) operating in the Mediterranean. For this purpose, the Secretariat should seek coordination with GFCM in order to obtain complete information from non-ICCAT members. Such information should be as detailed as possible (by gear type, fishing area, etc) and presented to the Secretariat two weeks in advance of the assessment. If possible, scientists should prepare time series of standardized CPUE data. **Action: National Scientists**.

4. Scientists should prepare scientific documents with relevant information for the assessment such as studies on maturity, gear selectivity, etc. **Action: National Scientists**.

5. The Secretariat should prepare time series of total catch and catch-at-size from the ICCAT database and make them available to scientists before the assessment meeting. **Action: ICCAT Secretariat**.

It should be noted that for the accomplishment of a proper assessment it is necessary to include data from as many fisheries as possible, **particularly** from the fisheries of the main swordfish-producing countries such as Italy, Morocco, Greece and Spain.

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 assessments 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).

Proposed work

- Complete estimation of growth curves for blue marlin and white marlin and continue the study of the spawning distribution of billfish. Continue the program that aims to describe vertical distribution and habitat of billfish.

- Coordinate a review of billfish catches in the eastern Caribbean with the FAO-WECAFC ad hoc group on moored FADs.

- 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.

- Continue and expand conventional tagging activities in the south Atlantic and start tagging in the eastern Atlantic.

- A review of sampling programs of artisanal fisheries.

Small Tuna Work Plan

Following the management recommendations by the Committee, the highest priority for 2007 will be to identify small tuna assessment activities currently carried out by other regional organizations (GFCM, Caribbean Regional Fisheries Mechanism) and potentially to collaborate with these other organizations in order 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 collecting the spread information on the biology of the main species belonging to this group.

Sharks Work Plan

The last assessments for Atlantic blue and shortfin mako sharks were conducted in 2004. Although there is no assessment scheduled for this year, national scientists are requested to update relative abundance series on north and south blue and shortfin mako sharks, in order to allow an evaluation of recent trends. Estimates of historical catches and dead discards of sharks from both by-catch and directed shark fisheries should also be provided to the Secretariat. A first estimate of catches of the oceanic whitetip (*Carcharhinus longimanus*) and the tresher sharks (*Alopias* spp.) should also be envisaged. Finally, based on the data presented in previous years, as well as on new data that might be presented this year, the group should try to continue to establish and suggest conversion factors between fins and body weights for different fin sets, at least for the main species caught and for the fleets for which no conversion factors have been established yet.

Appendix 6

BLUEFIN YEAR PROGRAM (BYP)
EXECUTIVE SUMMARY

Introduction

The Bluefin Tuna Year Program (BYP) Working Group reviewed the progress made under this program during 2005-2006, and concluded that most of the research goals outlined were being met.

The current financial status is reviewed below and proposed budget for direct BYP funded research for 2006-2007 were made. 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 critical needs. It is noted that the BYP seed monies have in fact played important roles to start off the research subjects considered under the BYP. It is obvious that future funding levels need to be significantly elevated. In this sense, the Committee welcomed the recent research funds made available by the EU for bluefin research distributed 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. Nevertheless, the sampling has not conducted in fully coordinated ways. For this reason, more active and efficient coordination is required to those scientists involved in the BYP biological sampling. Similar coordination is also required for standardizing methodologies for ageing and other subjects.

1. Financial report

The financial status of the BYP funds through October 3, 2006 was reviewed. With the expected 2007 Commission contribution of €14,588, the 2006-2007 BYP operating budget should be on the order of €32,288 **(Table 1)**.

2. Progress made on 2005-2006 Bluefin Year Program Research Plan

2.1 Western Atlantic

As a contribution to the BYP of ICCAT, Canada undertook a program of sampling of bluefin tuna in the Gulf of St. Lawrence from August to September, 2004. The program was continued over the same time frame in 2005 and 2006 (SCRS/2006/142). Fish from this area are of special interest, as they tend to be among the largest bluefin tuna caught in the Western North Atlantic.

An important objective of the sampling program included obtaining hard parts for age determination studies (vertebrae, fin spines and otoliths) and comparison of ages derived from various structures. There is interest in developing new age-length keys for bluefin tuna (Rodriguez-Marin *et al.* 2003), and in comparing estimates of ages obtained from various hard parts.

Another objective was to provide samples for studies of otolith microchemistry, to contribute towards the resolution of the significant issue of bluefin tuna mixing and stock structure.

Tissue samples (muscle and liver), were collected for stable isotope analysis, and gill filament samples were taken for genetic analysis of stock structure. In 2006, emphasis was placed on collecting a complete set of ageing structures (fin spine, vertebrae, otoliths) from as many fish as possible.

Vertebrae were collected from 59 bluefin ranging in size from 134 to 447 kg round weight. Other ageing structures collected include 59 otolith pairs and 44 dorsal fin spines, along with gill filament, muscle and liver material. In 2004 and 2005, a hand saw was used for sectioning tuna heads. Use of a reciprocating electric saw

considerably enhanced our ability to cut these large heads quickly. Use of this equipment is recommended for future research.

The ongoing sampling of bluefin tuna in the Gulf of St. Lawrence is a successful, cost-effective means of obtaining scientific information from among the largest bluefin tuna specimens in the North Atlantic. Sampling costs from the 2006 fishing season amounted to $8,500 Canadian dollars. Canada would like to continue sampling bluefin tuna during 2007, but due to rising costs is requesting €6,000 from the BYP.

The United States also continued biological sampling programs as well as other various research projects through 2006. Such projects include pop-up archival tagging to investigate migration route and spawning site fidelity, otolith microchemistry study, genetic study, ichtyoplankton survey, development of operating models to evaluate possible harvest control rules management procedures, and so on.

2.2 Eastern Atlantic and Mediterranean

Research was carried out, to a great extent, with national contributions and EC funding.

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 2005-2006, 12,529 fishes were sampled by means of observers on board and in landing ports (IEO Sampling and Information Network). 144 full sets of samples were collected in the Spanish BFT fisheries (mainly longline and recreational fisheries). Full sets consisted of samples for stock structure (genetic & microconstituents), growth (spines &/or otoliths), maturity, fecundity and feeding analysis. In addition 84 sets of incomplete samples were also collected to reinforce the consistency of the conclusions in previous studies. Special emphasis was applied to collect samples in certain size classes (90-130 cm FL) where the previous annual sets were deficient. In this sense, recreational fishery monitoring was very valuable.

Furthermore, biological samples (gonads, liver, dorsal spines and otoliths) were obtained from the Turkish fishery

2.2.2 Research on maturity

In 2005 a study on size and age at sexual maturity of female bluefin tunas from the Mediterranean Sea by Turkish and EU scientists in 2001-2004 was completed.

On the other hand, in 2006, once the REPRO-DOTT project was finished, maturity studies on wild BFT population were carried out under the PNDB EU project in Spain. Samples are being analysed in order to assess maturity and fecundity rates. Results for both studies are underway.

2.2.3 Research on tuna farming

Research on BFT farming, has been carried out within framework of the ICCAT BYP since 2002 as initially proposed. In 2006, an observer program on board the Spanish purse seiners started in the Mediterranean, which includes collecting information on the origin of the catch transferred to the cages as well as biological sampling in tuna farms.

2.2.4 Research on spawning areas

The tuna larval surveys being carried out from 2001-2005 in the Balearic archipelago in the framework of the IEO project TUNIBAL suffered external sources of finance and ship time cutbacks during 2006. Nevertheless, to keep on the monitoring of tuna larval surveys, the 2006 TUNIBAL survey was overlapped with the monitoring of a physical oceanographic survey off the Balearic channels carried out during bluefin spawning season. The complementary sampling of tuna larvae under this framework implies a substantial reduction of the area coverage and the collection of environmental information covered under the previous TUNIBAL surveys.

2.2.5 Electronic tagging

In 2003, the BYP Working Group recommended increasing effort on electronic tagging in the Mediterranean Sea as well as encouraged cooperation between scientists of coastal countries. In this sense, a total of 57 bluefin tunas were tagged in the Western and Eastern Mediterranean Sea (a cooperation between the Istanbul University (Turkey) and University of Bari (Italy), supported by Association of Bluefin Tuna Farmers and Exporters-OYID (Turkey) and Gulf of Cadiz (Spain). These activities were carried out by Cyprus, French, Greek, Irish, Italian, Maltese, Portuguese, Spanish and Turkish scientists in the framework of an European tagging program, financed by EU.

In Mazarron, Murcia (Spain), the *Instituto Español de Oceanografía* (IEO) tagged 22 bluefin tuna with pop-up tags. This activity was done with the collaboration of the *Grupo Fuentes* (farming company).

Furthermore, preliminary sonic tagging activities of juvenile bluefin tuna were carried out in the Bay of Biscay.

In 2006, more than 100 pop-up tags, funded by EU, are scheduled to be applied to large bluefin in various EU countries (Cyprus, France, Ireland, Italy, Portugal and Spain).

2.2.6 Conventional tagging

A conventional tagging survey has been carried out in the Bay of Biscay in the third quarter of 2006, with 42 medium size bluefin tagged. Furthermore a conventional tagging survey of juvenile bluefin tuna is scheduled in the area close to the Strait of Gibraltar in the fourth quarter of 2006.

On the other hand, opportunistic tagging of juvenile bluefin tuna is being accomplished in collaboration with both professional and recreational fishermen in the western Mediterranean and Bay of Biscay.

2.2.7 Direct ageing

In 2003 the BYP Working Group recommended that a bluefin ageing network of scientists who have worked on age determination of bluefin be initiated. Following this recommendation, in April 2006 a bluefin tuna direct ageing workshop was held in Santander, Spain. This workshop was supported by the BYP and the *Instituto Español de Oceanografía* (IEO) funding. The main conclusions and recommendations obtained from the workshop are the following:

Conclusions

1. An agreement in reading criteria and peripheral translucent band interpretation was achieved.

2. Agreement between readers was higher for spines as compared to vertebrae and otoliths. The coefficient of variation was 7% (percent of agreement was more than 50%) in spines and 10% (40% agreement) in the other two calcified structures. These results should be revised for otoliths and spines since a bigger sampling is needed.

3. Age agreement between readers of the spines and vertebrae from the same bluefin for ages less than 12 years are good, indicating that both structures may be used indistinctly for age determination of these age range.

4. Bluefin tuna age determination becomes very difficult from age ten onwards using whole vertebra. This increasing difficulty also occurs when using spine sections, but this method continues to be useful for older ages. Otolith sections can be used for the whole age range although some difficulties in age interpretation occur in the first five years of bluefin tuna life. Further research for the vertebra section age interpretation method is needed.

5. None of these three structures can be excluded for routine ageing because certain fisheries, fish processing or fish markets would prevent sampling some of them. This means that more ageing comparison studies are needed between calcified structures of the same specimen.

6. Preliminary results from radiocarbon assays on otoliths indicate that bluefin tuna can live more years than previously established and may indicate that currently used asymptotic size and growth rate for both stocks need to be reviewed.

Recommendations

1. In order to obtain updated growth curves, possibly by sex, for both east and west bluefin tuna, it is necessary to support cooperation and coordination for establishing sampling protocol. Other methodologies such as tagging should be encouraged for growth studies.

2. Comparative ageing studies between different hard parts of the same fish must be expanded to include wide range of ages and larger numbers of samples.

3. The research involving bomb radiocarbon validation of western bluefin tuna should be continued and expanded to include a broader range of year-classes, including the 1960s, when radiocarbon was rapidly increasing.

3. Research Plan for 2007*

There has been considerable progress to date on the sampling plan developed by the BYP in 1999 and continued through 2006, but at a lower cost than originally anticipated. While there is a need to maintain sampling to achieve the plan outlined in the BYP sampling plan (Anon. 2000), the BYP research funds in 2006 and 2007 permit some continued broadening of the research plan to include additional high priority research. Should the Commission support the large-scale Bluefin Research Initiative in 2005 as it has requested the SCRS to further develop this research plan, the research elements identified in the BYP shall be incorporated into that activity.

As highest priority for the BYP in 2006-2007, the BYP Working Group recommends expenditures of €32,288 to cover expenses associated with stock structure, tagging, and hard parts sampling for ageing during the upcoming year. It is time to attempt to better harmonize the various activities under the BYP, especially considering that various EU members have started bluefin related research activities as mentioned before. To achieve better harmonization among these members, good coordination is indispensable for the success of the research objectives by the three sub-coordinators who were nominated to assist the BYP east (BYPE) and BYP west (BYPW) Coordinators. The BYPE and BYPW Coordinators remain the responsible scientific authority for the BYP research (subject to the approval of general plans by the SCRS) and the BYPE and BYPW Coordinators shall continue to review and approve, as appropriate, expenditures to be made under the research plans outlined below. For the purpose of assisting the BYPE and BYPW Coordinators as described in the BYP sampling plan, sub-coordinators shall provide advice to the Coordinators on the most appropriate sampling and research activities to be undertaken under the general topic areas of Biological Sampling and Tagging. Sub-coordinators for these research themes nominated are E. Rodriguez-Marin and D. Macias (IEO Santander, IEO Malaga: Biological Sampling), A. Garcia (IEO, Malaga: Larval Sampling), and V. Ticina (Croatia, Tagging).

Under this framework, after taking into account prior commitments of the BYP for research approved, €6,000 are allocated to cover continued biological sampling in Canada, €8,000 for tag recovery and tag-recapture related

data collection in tuna farms in Croatia, and €2,000 each for coordination of biological sampling, as well as tagging activities.

In addition, as noted in SCRS/2006/013 (Detailed Report of the Bluefin Tuna Assessment), "… the Group suggested incorporating estimates from the bomb radiocarbon age validation research into the age-growth updates, and increasing the number of samples, size range and area distribution of samples used".

Canada has obtained external funds to process an additional 20 samples, each costing about €1,000. Additional incremental support from the BYP program could be used to expand the size range of the material used, thus enhancing the confidence in the results of the age validation study.

* Research proposals for 2006-2007 were discussed. These are available from the Secretariat.

While the work has been strongly supported within the SCRS, this work is optional in nature, since it expands work which will proceed even in the absence of BYP support. Amount requested – €4,000, contingent on balance of funds available.

Table 1. Recommended 2006-2007 BYP contributions to bluefin research (€).

Project description 2006-2007	*BYP Fund*		
	Request	*Balance*	*Research priority*
		17,700	
Anticipated 2007 Commission contribution	14,588	32,288	
Planned expenditures in 2007			
I. Biological sampling			
W. Atlantic sampling (Canada)	6,000	22,000	1
Biological sampling (hard parts) exchange (shipping cost)	3,000	19,000	1
Biological sampling coordination	2,000	17,000	1
Additional bomb radiocarbon age validation	4,000	13,000	2
II. Tagging (established by BYPE Coordinator)			
Tag recovery and tag-recapture related data collection in tuna farms in Croatia	8,000	5,000	1
Tagging coordination	2,000	3,000	1
Contingency	7,288	0	

Appendix 7

EXECUTIVE SUMMARY
ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH
(Expenditures/Contributions 2006 & Program Plan for 2007)

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 2006. 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 countries that depend on the support of the program to collect fishery data and biological samples.

2006 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/2006/158. Eleven observer trips onboard Venezuelan longline vessels were completed in 2006; although this represents less than half of what had been planned for 2006 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 39 tagged billfish just in the first six months of 2006.

Limited sampling of artisanal catches and of a recreational tournament occurred in Grenada. Brazil continued the collaborative program with US institutions that started in 2005 and that during 2006 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 2006 focused on the use of pop-up satellite tags for the estimation of post release survival and habitat of blue marlin.

A review of billfish statistics in Ghana, Senegal and Cote d'Ivoire initiated in 2006 needs to be completed. Preliminary data on catch from these countries was provided to the billfish working group during the 2006 assessment.

Documents that were produced with the benefit of direct support of the IERPB were SCRS/2006/012, 024, 062, 068, 158, 159 and 169.

2007 Plan and activities

The highest priority for 2007 is to support improvement in the statistics of artisanal fisheries Atlantic wide. Other important activities include the support for the continuation of the monitoring of the 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 it. Details of activities to be carried out in 2007 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.

Western Atlantic

Sample will be conducted on the landings on the following fleets: domestic longline fleet of Barbados, billfish tournaments from Bermuda, billfish tournaments off southeastern Brazil, in Fernando de Noronha Island and other locations off northeastern Brazil, longline fleets landing in St Maarten, Netherlands Antilles, eastern Venezuela 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, Cote 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 that have been supported in the past by this program and support will start to be provided to sampling of longliners from Brazil and 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 2006, however there is a need to continue collection of samples from fleets not covered by the current program.

Coordination

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 countries, and travel to the lesser Antilles and South America by the General Coordinator and the Coordinator from the west. If Senegal and Cote d'Ivoire are successful in securing funds from the ICCAT data improvement project the IERPB Coordinator will make sure that the activities of the IERPB in West Africa are refocused to take advantage and

not to duplicate the efforts of this ICCAT data improvement program. Strong coordination between activities of the IERPB and the data ICCAT improvement project in West Africa will 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. Recipients of funds are responsible for reporting on their activities to the corresponding area Coordinator.

2006 Budget and Expenditures

This report presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2006. The 2006 budget recommended by the Billfish Working Group for IERPB was € 49,950. The only new contribution made to the IERPB during 2006 was an allocation of €11,273.01 from the regular ICCAT budget. Carry over funds left from previous years were €5,016.63, thus total funds available for 2006 were 16,289.84 € **(Table 1)**. As a consequence some of the activities of the program were not carried out. To date, expenditures during 2006 were 14,523.24 € and are detailed in **Table 2**.

In-kind contributions to the Program continued to be made during 2006. 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 to oversee IERPB funded work. Travel cost for these trips were absorbed by the U.S. National Marine Fisheries Service and the University of Miami, and as such represented an in-kind contribution to the Billfish Program for 2006. 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 Cote d'Ivoire provided in kind contributions by supporting the time spent by Mr. Bannerman and Mr. Mr. T. Diouf (Senegal), the co-coordinators for the Eastern Atlantic.

2007 Budget and requested contributions

The summary of the 2007 proposed budget, totaling **€43,150** is attached as **Table 3**. The Working Group requests that the Commission increase its contribution for 2007 to **€22,000** to cover the most critical parts of the 2007 IERPB. Funding at this level is required to continue the program given the historically low 2006 carry-over balance, if one exists at all. The requested contribution from ICCAT and voluntary contributions from other sources will be necessary to carry out the entire Program Plan in 2007 **(Table 4)**.

The consequence of the Commission failing to make the requested contribution (**€22,000)** will be to stop all program activities for 2007 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; (5) 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 the Billfish Program.

Source	€
Balance at start of Fiscal Year 2006	**5,016.83**
Budget recommended by the Working Group	49,950.00
Income (Allocation from ICCAT Regular Budget)	11,273.01
Expenditures (see **Table 2)**	- 14,523.24
BALANCE (as of September 28, 2006)	**1,766.60**

Table 2. Detailed 2006 Budget & Expenditures (as of 28 Sept. 2006).

Balance on December 31, 2005		**5,016.83 €**
Income		**11,273.01 €**
	Contribution from the Comisión	11,273.01 €
Expenditures		**-14,523.24 €**
	Venezuela 1st qtr.	-3,876.60 €
	Bank charges	-16.28 €
	Côte d'Ivoire	-1,500.00 €
	Bank charges	-3.34 €
	Venezuela 2nd qtr.	-3,088.00 €
	Bank charges	-16.29 €
	Senegal	-1,167.00 €
	Bank charges	-16.15 €
	Venezuela 3rd qtr.	-2,565.00 €
	Bank charges	-16.29 €
	Venezuela 4th qtr.	-2,242.00 €
	Bank charges	-16.29 €
Balance as of September 28, 2006		**1,766.60 €**

Table 3. 2007 Summary budget of the ICCAT Enhanced Research Program for Billfish.

Source	€
Balance at start of Fiscal Year 2007	**1,500.00**
Budget recommended by the Working Group	43.150.00
Income (Allocation from ICCAT Regular Budget)	22,000.00
Other contributions	19.650.00
Expenditures (see **Table 2)**	-43,150.00
BALANCE	**0.00**

Table 4. Detailed 2007 Budget & Expenditures.

	Amount (€)
West Atlantic shore-based sampling:	
Venezuela	3,000 *
Barbados	1,000 *
Netherlands Antilles	1,500 *
Brazil	2,000 *
Others	3,000
West Atlantic at-sea sampling:	
Venezuela	6,000 *
Uruguay	2,000 *
Brazil	3,000 *
Others	6,000
East Atlantic shore-based sampling:	
Senegal	2,000 *
Ghana	3,000 *
Côte d'Ivoire	2,000 *
Others	2,000
TAGGING	
Tag reward	1,500
Lottery rewards	500 *
Outreach	2,000
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	**43,150**

* Highest priority.
Authorization of all these expenditures depends on sufficient funds being available by ICCAT and from others.

Appendix 8

COORDINATION OF RESEARCH FUNDS FOR CAPACITY BUILDING

There are currently two distinct funds of support for scientists to help Contracting Parties comply with their obligations to collect data: the Japan Data Improvement Project (JDIP) and the Data Fund. In addition, the funds dedicated to the improvement of statistics within the special research programs on bluefin tuna (BYP) and billfish (ERPB) should be considered as sources of support for ICCAT's statistical and scientific work.

In keeping with the practice initiated in 2005, the Committee considered the funds expected to be available at the start of 2007 for each of these programs and identified the main activities that should be considered for funding (**Table 1**).

The Committee recalled that protocols are already in place for approving the disbursement of funds from any of these programs once a proposal is received. However, it was noted that, with the exception of JDIP, there are no rigid criteria for how fund recipients need to report their expenditures back to ICCAT. The Committee agreed that it would be appropriate for the Secretariat to request a short accounting summary from each recipient institution.

The Committee recalled that Part VII of the 1995 UNFSA calls for the establishment of a fund for capacity building activities and recommended that the Secretariat study whether such funds can be accessed in support of ICCAT science.

Table 1. List of 2007 priorities and possible contributions (Euros).

Balance available Fund in 2007	***JDIP*** [(1)]	***Data Fund***	***BYP*** [(2)]	***ERPB*** [(3)]
Travel assistance	10,000	20,000	4,000	
Observer Programs		5,000	21,000	9,000
Data collection	40,000	25,000		10,000
Historical data recovery		20,000		2,000
Training course		25,000		
Other (posters, manual, etc.)	28,180	5,000		750
Total	***78,180***	***100,000***	***25,000***	***21,750***

(1) Already committed.
(2) Requires budget approval by the Commission in 2007.
(3) Requires budget approval by the Commission in 2007.

Appendix 9

REPORT OF THE 2006 MEETING OF
THE SUB-COMMITTEE ON STATISTICS
Madrid, Spain, September 25-26, 2006

1. Opening, adoption of Agenda and meeting arrangements

The Sub-Committee on Statistics met on September 25 and 26, 2006 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 (**Appendix 1**) was adopted.

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 18, 2006. In response to a Commission request in the *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations* [Rec. 05-09], the Secretariat prepared several tables that summarized data available for Task I and Task II (**Table 1 and 3**), deficiencies of data for 2005 (**Table 2**), submission timelines (**Figure 1**), data revisions in 2006 (**Table 4**), bluefin farming data (**Tables 5 and 6**), Trade and Catch Task I comparison information (**Tables 7**), and survey response information (**Table 8**,).

The Secretariat informed that these tables showed only presence/absence of data. The Sub-Committee discussed and agreed that each species group is required to assess the 'quality' of the data available and the impact of data deficiencies for their analyses. The Sub-committee noticed that there is not a common standard format of all species for this evaluation. It was suggested to follow the format of reports of other commissions (e.g. the Secretariat of the Pacific Community's Oceanic Fisheries Program), or to use the guidelines from the report of the *Ad Hoc* Data workshop (Madrid, Spain 11 October, 2003).

The Secretariat reiterated the need to comply with ICCAT data submission deadlines set by the Commission once again. **Table 1** shows only data submitted on time and possible no-submissions. The Sub-Committee also agrees in including a footnote for **Table 1** indicating those countries that submitted data after the deadline.

Figure 1 shows when each party reported data for each species with respect to the ICCAT deadline for reporting data. It was proposed that countries that do not submit any data be coded differently and that countries that do not have fisheries for particular species be deleted from the corresponding section(s) in the list

2.2 Tagging data

The Secretariat reported on the revision of the tagging database, noting the participation of national scientists in the validation of tagging data. At present, the database includes more than 390,000 tag-releases and over 21,000 recaptures. A revision of all tagging data for all tropical tunas has been completed and is presented in document SCRS/2006/048. It was requested that the rest of the species groups review the available data and report to the Secretariat for final adoption. The Secretariat also reported on a proposal for updating and translating tagging posters, with support from the Japanese Data Improvement Project. The need for consolidating the information of the country/laboratory that release tags, and mechanisms to streamline the payment of tag-recovery rewards from the different programs, were also discussed. The Sub-Committee considered that the *ad hoc* tagging coordination group created by the SCRS in 2005 could address these issues in its future agenda.

2.3 Revisions to historical data

The Secretariat provided an update of the revised data. This update included reviews submitted by Argentina for the period 1996-2004. These data had not been previously reported to the Secretariat and were approved. Chinese Taipei also revised its catches for 2003 by incorporating the catches of the boats registered in other countries and the catches misreported to other oceans which were subsequently corrected (SCRS/2006/011). Spain submitted revisions for the historical catch of bluefin tuna 1950-2004 (SCRS/2006/095) at the bluefin tuna

assessment in 2006. The United States revised its discards estimates of bluefin tuna for 1992-2004, using the method described by Brown (2002). Japan also revised discards estimates for the most recent years. A complete revision of the data is presented in the Secretariat Report in Section 1.2.

The albacore species group reviewed and recommended to adopt historic data revisions. These included revisions of catch from baitboat and troll from the EC-Spain fisheries for the northern stock (SCRS/2006/058) and review of catches from the Brazilian longline fisheries for the southern stock (SCRS/2006/174). In addition EC-Spain revised and updated their fisheries codes for these fisheries to be in accordance with ICCAT database.

In order to evaluate the accuracy of the results that the tropical species group made during the inter-sessional meeting (Sète, April 2006), a detailed analysis was carried out on available Task I and Task II data to identify deficiencies and develop specific research recommendations (SCRS/2006/11).

2.4 Shark statistics

The Secretariat provided estimated catches of blue, porbeagle and shortfin mako sharks (**Table 3**). It also reported that Task 2 data for sharks has been received by the Secretariat but it has not been included yet in the database because of formatting problems. The shark species group requested the Secretariat to provide Task I data also for thresher and oceanic whitetip sharks. It was requested that the Shark species group discuss a protocol to include this data without increasing the workload of the Secretariat.

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 (**Table 7a, 7b, and 7c**). The Sub-Committee requested that the estimates of trade statistics be divided into exports and re-exports besides information on the submission to the Statistical document which was requested to be added and is now presented in **Table 7d.**

It was noted that, during the 2006 bluefin tuna assessment, trade statistics were used to identify data that had not been submitted to the Secretariat and to estimate the amount of unreported landings. For SWO and BET the task was more difficult and the Secretariat was not able to provide estimates of the unreported landings because of the lack of approved conversion factors between trade report units and live weight biomass. 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.

2.6 Other by-catch species

No rules are established for the Secretariat to collect these by-catch data. Information received is based on individual protocols of the countries that report this type of data. The Sub-Committee agreed that the Sub-Committee on Ecosystems should develop a protocol for by-catch data reporting. It was noted that the hiring of a by-catch coordinator, as recommended by SCRS in the past, would facilitate the compilation and assimilation of by-catch data.

2.7 Rules for revising historical data

The Sub-Committee considered that the protocol established in 2003 does not need to be revised.

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 in the last year despite the heavy workload due to, *inter alia*, numerous stock assessments in 2006. 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. The Sub-Committee

recommends prioritizing the full documentation of the ICCAT database and advanced training for additional personal that supports the Secretariat's database system task during the next year.
The Secretariat reported that progress has been made reclassifying some gears and fleets. It is recommended that the Secretariat continues with this task.

Task I and Task II data are available on the ICCAT web site. These data are not confidential in nature and the Sub-Committee endorses the transparency and public accessibility of the ICCAT data, while noting that they should be used with precaution.

The Secretariat continued to stress the need to submit data using the electronic forms available in order to facilitate assimilation into the database. Once again the Sub-Committee recommended moving towards fully electronic submission of data by all Contracting Parties, and recommended the Secretariat to make electronic forms available that are compatible with different software. The Sub-Committee endorses the request from the Secretariat that when possible, the submission of Task II data from multi-species fisheries, should be carried out for all species together instead of by individual species in order to avoid duplication of fishing effort. The Sub-Committee agrees that the inclusion of data into an Annual Report is not and should not be considered as a formal data submission to the Secretariat. The Sub-Committee praised the Secretariat for its efforts in continuously improving the relational database system.

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 2006 (**Table 8**). The Secretariat informed that only two countries, Morocco and Greece, were added to the list of those that responded to the survey prior to last year. The proposal to the Secretariat is to publish a document summarizing the results of the survey in 2007.

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. In the last inter-sessional CWP meeting, the progress of the FAO-STF (Strategy for improving the information of status and trends of capture in fisheries) project was discussed.

The Secretariat also informed on the work progress with FIRMS (Fishery Resources Monitoring System). FIRMS is a partnership among different regional fishery management organizations. It is expected to be expanded to national agencies in the future. FIRMS provides information on eleven of the stocks assessed by ICCAT. FIRMS was officially introduced last May and contains several stock status summary reports for ICCAT species (http://firms.fao.org).

5.2 National data collection systems and improvements

Ghana

A sampling scheme for data collection and management similar to the one used by the E.C. was implemented (SCRS/2006/051). This program included the training of Ghanaian scientists by means of two different courses on the collection and treatment of Task I and Task II data. This program was under the support of the Japan Data Improvement Project (JDIP).

Chinese Taipei

Document SCRS/2006/167 was presented with information regarding the progress on the review of Chinese Taipei (CT) data in terms of reporting and evaluation, as requested by the ICCAT Recommendation [Rec. 05-02] regarding management of CT bigeye tuna fishery. The Sub-Committee acknowledges the effort made by CT to comply with the Recommendation. The data reporting by CT appears to meet the established ICCAT rules for data submission and the Sub-Committee recommends that the Tropical species group reports on this matter.

Document SCRS/2006/168 was also presented with information regarding the data improvement program developed by CT to either increase fishery-independent data collection or improve data validity on the three essential types of information: size data, catch/effort data and biological samples.

Preliminary results were also presented on methods for obtaining fish length measures from fish images taken onboard of fishing vessels. Size data and species composition could be easily obtained by this method. Results indicated that with proper image transformation(s), the difference between the actual and the measured size in photos can have a 5% margin of error. Following the suggested photo-taking standard procedures, the difference could be further reduced. The Sub-Committee considered that this is a feasible and efficient way to increase independent size data and encouraged CT to continue such development and to submit a report to the SCRS with concrete results next year.

6. Report on data improvement activities

6.1 Japan Data-Improvement Project

At the end of 2004, Japan initiated a five year project to aid several countries meet their data collection and reporting obligations. The report of the Project activities is presented as an Appendix to the Secretariat Report on Statistics and Coordination of Research.

The Sub-Committee acknowledged the positive impact of the JDIP already evident from the active participation of scientists from Latin America and Africa during the stock assessments of billfish, bluefin, and swordfish inter-sessional meetings. A list of JDIP-derived documents is included in the Appendix.

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". The Secretariat presented an update on the Data Fund.

In 2006, the Data Fund was used to finance the participation of scientists to inter-sessional scientific meetings: two participants (Côte d'Ivoire and Venezuela) to the marlin assessment, and three participants (Brazil, Ghana and Uruguay) to the swordfish assessment. In addition, one participant (Ghana) is being funded to attend the SCRS meeting. The Data Fund was also used to co-fund the observer program in Ghana, together with the JDIP. Finally, the Fund was used for contracting out Field Manual contributions.

6.3 Data recovery activities

No items were discussed during the meeting.

7. Review of publications and data dissemination

The Secretariat reported that ICCAT has a partnership with ASFA and it provides summaries of *Collective Volume of Scientific Papers* documents to include 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. The last issue of the Collective Scientific Papers was recently published (Vol. 59) and all *Collective Volume* documents are now available in the ICCAT website. Statistical Bulletin No. 35 is now available in the website and as hard copies. The Secretariat would be grateful for any feedback.

8. Review of progress made for a revised ICCAT Manual

An updated version of the ICCAT manual species description chapter(s) is now available. The Sub-Committee encourages the species groups and national scientists to increase their contribution and review the field manual as requested by the Secretariat. Following the decision of the SCRS, a deadline (October 23, 2006) has been established for the review of the manual and completion of the description of each fishery. Comments on species

descriptions for the field manual should be provided directly to the Secretariat. The Secretariat reported that it will initiate the translation of Chapter 2 to the official languages afterwards, and also request proposals for the fisheries descriptors in Chapter 3, during the upcoming year. It is expected that the Field Manual will be completed by 2008.

9. Consideration of recommendations from inter-sessional meetings

A number of Commission Recommendations require the SCRS to carry out stock assessments in 2007. These include assessments of Atlantic bigeye, Atlantic albacore, blue shark and shortfin mako.

10. Evaluation of data deficiencies pursuant to *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations [Rec. 05-09]*

Issues regarding capture data submitted in 2006 were already addressed in item 2.

11. 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.

2. The Sub-Committee recommends prioritizing the full documentation of the ICCAT database and advanced training for additional personal that supports the Secretariat's database system task during the next year.

3. The Sub-Committee recommended once again moving towards fully electronic submission of data by all Contracting Parties, and recommended to the Secretariat to make available electronics forms that are compatible with different software.

4. The Sub-Committee recommends that when possible, the submission of Task II data from multi-species fisheries should be for all species together instead of by species in order to avoid duplication of fishing effort.

5. The Sub-Committee urged the Secretariat to speed up the translation of the ICCAT web page to the other official languages of the Commission.

6. The Sub-Committee requested the Secretariat to purchase better commercial software for mapping and spatial analysis, and data presentation.

7. The Sub-Committee on Statistics recommends that its meetings continued to be scheduled before the meetings of the Species Groups and requests that in particular Chairs of Species Groups be present at the meeting to address specific statistics concerns within each Group.

8. It was requested that the Shark Species Group discuss a protocol to include this data without increasing the workload of the Secretariat.

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.

10. The Sub-Committee agreed that the Sub-Committee on Ecosystems should develop a protocol for by-catch data reporting. It was noted that the hiring of a by-catch coordinator, as recommended by SCRS in the past, would facilitate the compilation and assimilation of by-catch data.

12. Other matters

No other matters were discussed by the Sub-Committee.

13. Adoption of the report and closure

The report was adopted during the meeting, and the meeting was adjourned.

Reference

BROWN, C. 2001. Revised estimates of bluefin tuna dead discards by the U.S. Atlantic pelagic longline fleet, 1992-1999. Col. Vol. Sci. Pap. ICCAT, 52(3):1007-1021.

Appendix 10

2006 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 in Madrid on October 4, 2006 at the Hotel Gran Velázquez. Dr. H. Arrizabalaga (EC-Spain) chaired the meeting, and Dr. A. Domingo acted as Rapporteur. This was the first formal meeting of the Sub-Committee, created after the SCRS decision in 2005 to merge the Sub-Committees of By-catch and Environment. Besides revising new information regarding Ecosystems, the main objectives of the meeting were to discuss on how the terms of reference of the Sub-Committee should be prioritized, in order to design future work plans.

2. Review of the Sub-Committee's Terms of Reference and discussion of priorities

The Chairman presented a list of all the terms of reference (**Addendum 2 to Appendix 10**) broken down in four major groups: monitoring, research, modeling and assessment. The need to explicitly include the socio-economic considerations in the terms of reference was discussed. Although it is considered that the current version is sufficiently ample so as not to rule out any analysis, it was suggested to consult with the Commission on the appropriateness of discussing socio-economic matters in the SCRS.

Afterwards, a first proposal was made to prioritize the terms of reference, which was discussed and slightly modified by the Sub-Committee. Finally, the priorities remained as follows:

It was agreed to assign three levels of priorities: level 1 for the most urgent matters, level 2 for those desired in the short-term, and level 3 for those desired in the long-term. First of all, level 1 was assigned for the monitoring and research sections, level 2 for modeling, and level 3 for assessment. The exceptions to this general rule were the following:

- Objectives number 1 (inventory of species), 2 (statistics on target species in non-targeted fisheries) and 4 (oceanographic data) under monitoring have priority level 2 (and not 1), because they have been partly dealt with in the species groups and the Sub-Committees on Statistics, Environment and By-Catch, and thus they will only have to be updated occasionally.
- Objective number 2 (reproductive habitat and feeding) under research has priority level 2 (and not 1), since it is in part dealt with in the species groups.
- Objective number 2 (operational models) under assessment has priority level 2 (and not 3). Moreover, objective number 3 (advice on non-targeted species of interest to the Commission) under this advice will be prioritized accordingly when there may be a request of the Commission to respond to any matters concerning this point.

3. Review of new information concerning ecosystems

Several papers were presented with relevant information for the Sub-Committee:

Two papers dealt with marine protected areas (MPA). SCRS/2006/049 discussed the use of MPAs as a tool to both protect tuna resources and pelagic ecosystems. In general terms, MPAs would favour rebuilding biomass of top predators by reducing fishing mortality, and portions of the pelagic ecosystem would also be rebuilt. Not only positive effects are discussed in the document, but also some difficulties in the choice and implementation, and uncertainties on the effects of MPAs are highlighted, specially considering the uncertainties in fish and fisheries behaviour, as well as on the ecosystem functioning. In general, it is advised to use "MPA simulation models" to analyze potential impacts of MPA, as well as the effects of different sources of uncertainty. The document stresses the importance of clear scientific goals before MPA implementation and scientific monitoring to be able to measure the impact of MPAs and learn about pelagic ecosystem functioning.

Document SCRS/2006/092 analyzed the effect of different pelagic longline time-area closures in the Gulf of Mexico to reduce discards and by-catch. For each closure considered, changes in by-catch, discards, and/or catch of tunas, swordfish, marlins, sailfish, spearfish, turtles and sharks were evaluated, with and without the

redistribution of fishing effort. Although there were decreases in the predicted catch, by-catch, or discards of the species considered, no single closure would reduce the by-catch or discards of all species considered and by-catch or discards of some species were predicted to increase. In some case, this increase could be substantial when redistribution of effort was considered.

Document SCRS/2006/134 describes the distribution in size composition of sea turtles (*Caretta caretta* and *Dermochelys coriacea*) that interact with pelagic longline in the south Atlantic. The information obtained was analized from 1,729 sets by on board observers from 1998 to 2005 on Brazilian and Uruguayan pelagic longline fleets that fish in the Atlantic Ocean. The areas and seasons with higher catch rates, as well as the state of maturity of the sea turtles were identified.

Four documents regarding the incidental catch of seabirds were presented. Document SCI/073* presented the Agreement on the Conservation of Albatrosses and Petrels (ACAP) concluded under the UNEP Convention on the Conservation of Migratory Species (CMS). By-catch is the greatest threat to most species listed under ACAP, and the Seabird By-catch Working Group has been charged with drawing up a strategy for ACAP Parties and range states to engage with RFMOs. Agreement's engagements with RFMOs will encourage them to take the necessary actions to reduce at-sea mortality of ACAP species.

Document SCRS/2006/135 presents data on the interaction of albatrosses and petrels with the Uruguayan lonline pelagic fleet in the southwestern Atlantic (1998-2006). There were 1,132 sets analyzed, with a total of 584 sea birds caught incidentally. Twelve species were identified, the majority were albatross species and to a lesser extent petrels, since at least nine of the worldwide endangered species are caught incidentally in areas where their distribution coincides with that of various longline fleet.

Document SCRS/2006/181 described the Implementation of the Brazilian National Plan of Action (NPOA) for the Conservation of Albatrosses and Petrels. NPOA aims to reduce the sea bird by-catch in Brazil and to assure the viability of Procellariiformes' breeding colonies in the Brazilian territory. On the other hand, SCRS/2006/182 provided an overview of sea bird by-catch by Brazilian Fisheries in the South Atlantic Ocean (2000-2005). 473 sets were analyzed and 0.07 birds/1000 hooks were caught. The most commonly captured species were the Black-browed *(Thalassarche melanophris)* and yellow-nosed *(T. chlororhynchos)* albatrosses, white-chinned *(Procellaria aequinoctialis)*, spectacled petrels *(P. conspicillata)* and the great shearwater *(Puffinus gravis)*.

Later, BirdLife International gave a presentation on new population and distribution data on albatrosses and petrels of relevance to ICCAT's sea bird Resolution [Res.02-14]. A workshop took place in March 2006 to assess status and conservation priorities for albatrosses and petrels in the South Atlantic. The workshop reviewed data on population status and trends, satellite tracking data, threats to seabird populations at breeding sites, and data on fishery interactions. The workshop identified as High Priority the implementation of ICCAT Resolution [Res. 02-14] to undertake an assessment of the impact of ICCAT fisheries on sea bird populations.

Two documents were presented in relation to experiments with various types of hooks aimed at reducing the by-catches. Document SCRS/2006/150 presents results of experiments carried out in the western equatorial region of the Atlantic. Catch rates for yellowfin tuna, swordfish, and a composite "all fishes" category were significantly ($P < 0.05$) higher for circle hooks. Bigeye tuna, swordfish, sailfish and yellowfin tuna were hooked significantly more often externally than internally. Yellowfin tuna were over eight times more likely to be hooked in the mouth with circle hooks than with J-style hooks. Bigeye tuna and sailfish showed significantly higher rates of survival at haulback with circle hooks. The results suggested that the use of size 18/0 non-offset circle hooks in the equatorial pelagic longline fishery may increase the survival of by-catch species at haulback with minimal detrimental effects on the catches of target species.

On the other hand, document SCRS/2006/163 reviews the results of a pilot plan to reduce the incidence of juvenile swordfish and sea turtles. The elements selected for testing were the type and size of hook, the depth of hook set, the type and size of bait, the longline type and fishing area. With the combination of elements tested the incidence of juvenile swordfish was reduced by 35% and the incidence of sea turtles by-catch by 60%. The results indicated that, for juvenile swordfish, the depth of the hook set, the bait type, the longline type and the fishing area are more important than the type and size of the hooks. The circular hooks tested did not indicate a significant reduction in juvenile swordfish or sea turtles, although they did facilitate survival of sea turtles because they hook mainly in the mouth, which facilitates their release. On the contrary, for the same reason,

* Available from the Secretariat upon request.

swordfish catches decreased with circular hooks. During the pilot plan, 40% of the species caught were different from the target species (above all *Dasyatis pastinaca*, *Prionace glauca*, *Isurus oxyrinchus*, with very minor catches of marine mammals and no sea birds).

Document SCRS/2006/137 used information on the sighting of killer whales (*Orcinus orca*) in the southwestern Atlantic Ocean (obtained in a study on the interaction of killer whales with the swordfish fisheries). Their spatial distribution was studied and values of sightings per unit of effort (SPUE) were calculated. The major values of SPUE occurred in the rupture of the platform and continental shelf, coinciding mainly with surface temperature fronts.

Four other documents presented information on by-catch: document SCRS/2006/060 uses observer data from the last 13 years to estimate billfish by-catch on longliners targeting swordfish, in the three oceans. Moreover, it quantifies the fate of the by-catch, as being retained, discarded, tagged and released or released alive, and provides size distributions for different species. Document SCRS/2006/143 presents data on discards and catches of by-catch species, obtained by observers on-board Spanish purse seine vessels fishing in the tropical Atlantic from 2001 to 2006. A total of 1,948 sets were observed, with the sets on floating objects being those that resulted in the catch of the major part of the by-catch and discards. Documents SCRS/2006/156 and SCRS/2006/024 also presented some information on by-catch onboard tuna purse seiners.

SCRS/2006/123 summarized the findings of a CLIOTOP Workshop on Early Life History of Top Predators. CLIOTOP is a GLOBEC regional program devoted to the study of oceanic top predators within their ecosystems and is based on a worldwide comparative approach. Two fundamental questions that motivate the working group 1 on Early Life History are "What environmental characteristics define the timing and intensity of reproduction and spawning areas?" and "What environmental and biological characteristics or mechanisms most influence larval survival?". The report provides an insight to the different research tuna early life history actions being carried out in the Mediterranean and the Pacific Ocean, and the following knowledge gaps and research objectives were identified: developing knowledge of vertical distribution of larvae, defining the early life history traits of juveniles, developing knowledge on trophic ecology and understanding the fine-scale spatial structure of larval patches. The importance of larval growth and nutritional condition studies were considered important in providing information on the environmental influence on health status, as well as in view of their potential use in developing ecological indicators useful in marine ecosystem management.

Along these lines, SCRS/2006/122 showed inter-annual differences of bluefin tuna larval growth collected during TUNIBAL surveys carried out during the spawning seasons in the Mediterranean. The 2003 population showed most rapid growth in comparison to the 2004-2005 populations. Research is currently being conducted on possible relationships with environmental conditions. SCRS/2006/141 also showed inter-annual differences in the mean length of zero-class swordfish in the eastern Mediterranean that were related to the sea surface temperatures (SST).

Document SCRS/2006/076 provides a historical time series of the Fulton's K condition factor for bluefin tuna in the southern Gulf of St. Lawrence, showing that it has been following a declining trend and is now (2005) at the lowest values in the series. This trend of declining bluefin tuna condition should be considered a negative signal with potentially harmful consequences to the population.

Various documents took ecosystem considerations into account, in one way or another, in interpreting data on the fisheries:

In document SCRS/2006/128, GRASP (Generalized Regression Analysis and Spatial Prediction) was used to map the spatial distribution of swordfish *(Xiphias gladius)* in the South Atlantic based on generalized additive models (GAMs) relating catch to environmental predictor variables. The importance of environmental variables for the fishery and for the spatial distribution of different size classes was highlighted. Swordfish distribution was associated with convergence zones, and differed for different size classes.

Document SCRS/2006/112 considers a multi-fleet focus for the standardization of albacore CPUE. On the other hand, document SCRS/2006/120 considers target effects to obtain CPUE of by-catch species, and document SCRS/2006/126 investigated changes in fishing strategy and target species, to be used in CPUE standardizations (such as in SCRS/2006/127).

Document SCRS/2006/131 analyzes the development of three symbolic eastern Atlantic fisheries of bluefin tuna spawners: the traps in the Strait of Gibraltar, the North Sea and Bay of Biscay, considering the development of

these as indicators of the current spawning biomass in the eastern Atlantic to the west of Gibraltar, and reflects on the possible causes that led to their decline forty-three years ago. The authors propose different hypotheses, which include potential over-fishing and environmental reasons, and suggest the possibility of further analysing the issue in a future workshop. On the other hand, document SCRS/2006/177 discusses possible relationships between the albacore catches in the Canary Islands and oceanographic-meteorological variables.

Lastly, there were some papers that presented results of the electronic tagging that are useful for studies on behavior and habitat, among others (e.g. SCRS/2006/054 for bigeye tuna and SCRS/2006/089 for bluefin tuna).

Update on GAO database:

During the 2004 plenary session, the Sub-Committee on Environment considered that the GAO software fulfils most of needs identified by the SCRS regarding the environmental databases and it further appears accessible and easy to handle. Therefore, it was decided that ICCAT should, in agreement with the owner of the software (Dr. F. Marsac, IRD-France), host it in the near future, as soon as the updating of the databases is completed.

Due to lack of human resources and because the author had to work on the Indian Ocean, GAO software is not yet completed. A project was funded to integrate GAO in a broader database in the Indian Ocean, and it may be possible to use the resources of this project to finalize the Atlantic part in the course of 2007. During 2006, some quality control procedures were implemented for the database. This was needed after the expansion of the oceanographic stations database to 50ºN, including the Mediterranean and Gulf of Mexico, and the integration of observations from the 19th century (1862 onwards).

The database presently contains 527377 stations collected from 1862 to 2001. The dataset is composed of 411126 multi-parameter stations and 116251 CTD profiles. The depth of the observations ranges from 0 to 800m. The parameters are: depth, temperature, salinity, dissolved oxygen, phosphates, silicates, nitrates and chlorophyll a. The pseudo wind stress and sea surface temperature database has also been updated to the period 1964-2005.

Recent and future meetings of interest:

The Sub-Committee mentioned on the interest of several non-SCRS meetings that occurred recently or will occur in the near future, that may be of interest for the SCRS scientists. These are:

- "Implementing the Ecosystem Approach to Fisheries". September 26–28, 2006, Bergen (Norway). http://cieaf.imr.no/
- "Defining research priorities in support to the Ecosystem Approach to Fisheries management". 24th October 2006, Paris (France). http://www.ifremer.fr/recherche-aep/
- "1st CLIOTOP Symposium". December 3-7, 2007, La Paz (Mexico). http://www.globec.org
- "2nd Int. Syposium on Tagging and Tracking Marine Fish with Electronic Devices". October 8-11, 2007, San Sebastian (Spain). http://unh.edu/taggingsymposium/

4. Work plan for 2007

Document SCI/071[*] was presented in which assessment of the incidental mortality of sea birds was proposed, because of the fishing activity (mainly longline) in the ICCAT area, and to evaluate the impact of this by-catch on the stocks of sea birds affected. In this way, the SCRS can respond to the Commission's Resolution [Res. 02-14]. For this, a framework was presented in which the Sub-Committee would interact with experts in the population dynamics of sea birds in order to discuss the best way to deal with this matter.

The Sub-Committee showed its support for the proposal and decided that it would be most appropriate to hold an inter-sessional meeting with experts on sea bird by-catch, sea bird population dynamics and longline fisheries.

[*] Available from the Secretariat upon request.

The inter-sessional meeting will center on four points:

- A more in-depth discussion on the terms of reference, with consideration on future lines of work and future action.
- Consideration of the need for data, infrastructure and economic resources to attain the objectives of the Sub-Committee.
- Assessment of the mortality of sea birds in the ICCAT fisheries. In preparation for this meeting, a draft assessment framework and a description of available sea bird information could be prepared by a sea bird expert. Similarly, a description of available fisheries information (from ICCAT) would be helpful.
- Compile and summarize all the information available on experiments with various types of hooks in to order to reach a conclusion concerning their effect on by-catches.

5. Recommendations

The Sub-Committee decided to recommend the following:

- Initiate the process to evaluate the mortality of sea birds in 2007.
- Establish contacts with other RFMOs that have experience or intend to incorporate the ecosystem approach to fisheries. Regarding this point, the GFCM explained its experience and expressed its willingness to support, which was well received.
- Since currently this is the only Sub-Committee that is meeting during the SCRS Plenary, it was recommended that in the future the Sub-Committee meet outside the Plenary meeting, and present a report on its activities to the SCRS.
- The Marine Protected Areas (MPA) be considered in the future discussions of the Sub-Committee and the Species Groups, as a possible management tool of ecosystems.

6. Other matters

Reference was made to Recommendation [Rec. 05-11] concerning *Sargassum pelagicum*, and it was noted that there was no information on this matter. Therefore, it was recommended that scientists from the Contracting Parties provide available information to the Sub-Committee, which will facilitate giving a response to the Commission.

Addendum 1 to Appendix 10

Agenda

1. Opening, adoption of Agenda and meeting arrangements
2. Review of the Sub-Committee's Terms of Reference and discussion of priorities
3. Review of new information concerning ecosystems
4. Work plan for 2007
5. Recommendations
6. Other matters
7. Adoption of the report and closure

Addendum 2 to Appendix 10

DRAFT TERMS OF REFERENCE FOR A SUB-COMMITTEE ON ECOSYSTEMS

These Terms of Reference have been developed as a result of a decision made by the SCRS in 2005 to merge the Sub-Committees on By-Catches and the Sub-Committee on Environment into a single group.

The overall goal of the newly-created Sub-Committee on Ecosystems is to integrate the monitoring and research activities related to the ecosystem that are required by the SCRS in fulfilling its advisory role to the Commission. In so doing, the Sub-Committee will serve as the scientific cornerstone in support of an Ecosystem Approach to Fisheries (EAF) in ICCAT.

The Sub-Committee will meet as required by SCRS, usually in conjunction with the SCRS annual meeting. The Sub-Committee's work will encompass the specific tasks listed below, *inter-alia*. As these cannot all be realistically tackled at once, the SCRS will prioritize these tasks.

1. Monitoring

- Create and maintain an inventory of species caught by fleets targeting tuna and tuna-like species in the Atlantic and Mediterranean.
- Improve conventional statistics (catch, effort, size) of ICCAT target species that are caught incidentally in non-targeted fisheries.
- Monitor and improve information on interactions with non-ICCAT target species, with emphasis on those species of interest to the Commission and for which no Species Group has been established (e.g., sea turtles and sea birds).
- Facilitate access by SCRS scientists to oceanographic and environmental data.

2. Research

- Evaluate the relative impact of the different abiotic and biotic factors (including oceanographic and climate phenomena, directed and incidental fishing, predation, competition, pollutions and other human impacts) that affect the abundance, distribution and migration of ICCAT target species.
- Characterize main feeding and reproductive habitats of ICCAT target species.
- Characterize the volume, composition and disposition of non-target species that are caught incidentally in tuna and tuna-like fisheries within the Convention area.
- Investigate trophic interactions of ICCAT target species.
- Investigate the impact that changes in fishing gears or fishing technology have on the catch of target and non-target species.

3. Modeling

- Develop reference points and indicators that explicitly incorporate ecosystem considerations.
- Develop simulation, dynamic and statistical models focusing on mixed-fisheries, multi-species, by-catch and ecosystem issues.

4. Advice

- Develop mechanisms which can be used to better integrate ecosystem considerations into the scientific advice provided by SCRS to the Commission, including but not limited to, Precautionary Approaches.
- Investigate through operational models, potential benefits (at an ecosystem level) of alternative management strategies, such as time-area closures.
- Advise on the impacts of tuna and tuna-like fisheries on the populations of non-target species of interest to the Commission.

Appendix 11

PROPOSAL FOR A PEER REVIEWED PUBLICATION OF SCRS DOCUMENTS

Background

At its 2005 meeting, the SCRS again discussed the possibility of creating a peer reviewed journal, in addition to the *Collective Volume of Scientific Papers*, in which the stock assessments and selected articles could be published. There was agreement that this was the most appropriate means to participate in the scientific discussions that could develop from this type of fora. Within a publication of this type, the SCRS could respond to issues that could arise with a high international profile relative to the ICCAT mandated species.

It was suggested that such a journal could include mechanisms to guarantee more access to all the ICCAT scientists. The Committee agreed to discuss this matter more in depth, including its financial implications, at the 2006 SCRS meeting and decided to recommend that various possibilities be evaluated as regards their possible financial impact.

In accordance with the SCRS recommendation, in 2006 the Secretariat made a series of contacts that resulted in the development of the proposal that is included in this document.

Proposal

The idea of creating a new journal, exclusive to ICCAT or jointly with other RFMOs dedicated to tunas, was considered unfeasible from the start. The work that such a journal with these characteristics requires is quite considerable and the Secretariat's current situation would not be able to sustain it. On the other hand, in order to achieve the threshold of quality (e.g. inclusion in the "Science Citation Index") which lends meaning to this type of journal, considerable extra effort must be made, which would be beyond the scope of the Secretariat.

For this reason the work centered on establishing contacts with well-established journals that are included in the Science Citation Index. The objective of these contacts was to study the possibility of reaching agreements that would permit establishing a specific ICCAT publication within the context of the journal.

The following journals were contacted: *Scientia Marina* and *Fishery Bulletin*. In the case of the *Fishery Bulletin*, the initial contacts, established informally by the SCRS Chairman, clearly showed the difficulty of incorporating a thematic publication within the structure of a journal, such as that which was proposed. However, the contacts maintained with *Scientia Marina* showed possibilities of being able to reach a compromise. Therefore, work was continued in the development of the proposal, which is provided here below.

In principle, two possibilities were offered:

1. Create monographic issues dedicated to tunas and tuna-like species. This option implies a lesser commitment since it does not require any periodicity. The volumes could be published once there were sufficient scientific documents. The documents would be considered within the journal's normal review process, although experts in tunas would be included among the reviewers. The references would be those of the journal and the volumes would be special issues.

2. Create a collection dedicated to tunas and tuna-like species within the journal. This option requires major effort on the part of the SCRS and the Secretariat. In order to maintain this publication, it will be necessary to guarantee annual periodicity. An editorial team will have to be created in which members of the journal's editorial team, SCRS members, and the Secretariat will participate. The advantage of this option is that it would be a publication on tunas with a specific reference.

Scientia Marina Proposal

1. Annual, monographic supplements on tunas

If this option is considered, the coordination and financing of the publication will have to be provided by ICCAT. The monographic issues will be published with hard covers and the cost for a print run of 200 to 300 copies would be between €15,000 and €20,000.

2. Periodic sub-series on tunas

In this option, the estimated editorial and publication costs presented were based on a 150-page volume with 12 articles, applying prices for 2006. These costs include:

- Editing of the English manuscripts accepted: depends basically on the number of manuscripts.

- Layout design and pre-printing: depends basically on the final total number of pages printed.

- Printing: print run (650 journals, of which 550 printed with soft covers (normal edition) (350 of the current print run of the journal) and 200 for the Editors-ICCAT for their own distribution; and 100 with hard covers (supplemental format of *Scientia Marina*) (in principle, with 40 copies for the journal and 60 for the Editors-ICCAT).

- Distribution (mailing): depends on the total weight, i.e. the number of pages.

The cost estimate would amount to about €14,000.

For this sub-series there will be a specific Editorial Council of these volumes in which a member of the journal's Editorial Committee will take part.

Following the SCRS recommendation that mechanisms should be created that facilitate access of all the ICCAT scientists to this publication, and since *Scientia Marina* is only published in English, the budgets presented would have to be incremented by at least €12,000 for the English translation of articles whose originals are in Spanish or French, for the English editing of articles that are presented in that language, and for Secretariat staff time spent on this work, especially that of the Publications Coordinator.

Addendum 1 to Appendix 11 provides a brief presentation of the journal extracted from its web page. For more information, consult: http://www.icm.csic.es/scimar/sci_index.html.

Based on previous experience of ICCAT peer-reviewed publications, it is important that, when taking a decision, the work involved in maintaining this type of publication be taken into account. This work will be carried out, in part, by the Editorial Council, which will include members of the SCRS and the Secretariat and, in part, by the Secretariat, which will carry out the logistical work.

Notwithstanding, and independently of the Committee's decision on this type of publication, it would be interesting to create an Editorial Council within the SCRS. This Council could carry out the task of reviewing and improving the publications, ICCAT´s own publications and, if so decided, external publications, irrespective of the formula that is adopted.

Addendum 1 to Appendix 11

Scientia Marina (ISSN 0214-8358) is the successor to *Investigación Pesquera*, a journal of marine sciences published since 1955 by the Institut de Ciències del Mar de Barcelona (CSIC). *Scientia Marina* is included in the Science Citation Index since 1998 and publishes original papers, reviews and comments concerning research in the following fields:

Marine Biology and Ecology
Fisheries and Fisheries Ecology
Systematics, Faunistics and Marine Biogeography
Physical Oceanography
Chemical Oceanography and
Marine Geology

Emphasis is placed on articles of an interdisciplinary nature and of general interest.

The journal *Scientia Marina* is published quarterly. Four issues form a regular volume. A variable number of supplements are usually published every year. These include monographs or conference proceedings on subjects related to the scope of the journal.

Scientia Marina offers a streamlined manuscript handling process. Final decision on acceptance of manuscripts is usually reached in around seven months; decision on rejection is normally reached in much less time. An accepted manuscript is published around 7 months after acceptance.

Scientia Marina provides open access to articles published through its web site. It is indexed in most abstracting services (among them ISI and ASFA), and is distributed to many marine research institutions around the world.

Color photographs can be published at moderate fees. There are no page charges for usual articles; for long articles, please contact the Editor. Manuscripts must be submitted electronically to the Editor-in-Chief (scimar@icm.csic.es). Instructions to Authors must be strictly followed.

Appendix 12

Report of the SCRS Officers Meeting

The objective of these meetings is to organize the development of the SCRS plenary meeting.

Dr. Scott (SCRS Chairman) chaired the meeting.

The SCRS Timetable was adjusted according with the agenda.

Under item 9 it was discussed which inter-sessional meetings would be reported independently under this item. It was decided to only include the presentation of the swordfish stock structure and tropical species group considering that the rest were reported in the executive summary presentations.

The schedule of the 2007 inter-sessional meetings was also discussed. Based on the Commission and species groups recommendations, the SCRS proposes the following meetings:

- Mediterranean swordfish stock assessment: 2007 or 2008;
- Albacore North and South stock assessments: 2007 (the date is yet to be determined. During the first quarter of 2007 a preparatory meeting will be held to discuss the Multifan CL criteria and scenarios);
- Bigeye stock assessment: 2007 (probably in the middle of the year);
- Sharks stock assessment data preparation: 2007 (preferable in September);
- Workshop to analyze the Mediterranean bluefin stock dynamics in historical periods: 2007-2008 (2008 was recommended due to the need of new information that should be collected before the meeting);
- A joint ICCAT-FAO workshop to improve the statistics on Caribbean billfishes: 2007-2008 (depending of FAO's possibilities).

For other species, different issues on research were also discussed and it was recommended to update and make available to scientists the yellowfin and skipjack catch at size data during the first quarter of 2007. This information is needed to obtain fishery indicators on the stock status and identify possible warning signals.

- In view of these warning signals, a data evaluation meeting for skipjack and yellowfin was proposed for early 2007 to focus attention on the catch at size and tagging information available and to prepare these data for use in assessments.

The need to have a methods group meeting in 2007 was also considered. Different groups have endorsed issues to the method's group during 2006. A wide list of possible issues was elaborated including:

- Simulation analyses to evaluate the minimum information needed by different assessment methods;
- Methods to estimate catch time series with limited and sporadic information (e.g. shark catches by species, sailfish/spearfish separation, and other rare event species of concern to the Commission);
- Methods to address multispecies interactions in an ecosystem approach to fisheries management;
- How to assess new group of species such as birds or turtles that will be considered by the new Sub-Committee on Ecosystems.

Considering the high number of issues, it was decided that the species groups define its priorities that will be discussed on Monday afternoon in order to establish the content and propose a date for the next Group of Methods to meet.

For the longer term it was proposed to hold a sailfish stock assessment meeting in 2009 and a preparatory meeting in 2008.

Possible questions arising related with the presentation of executive summaries were also discussed. In general it was agreed that detailed reports should include the information used in the assessment whereas the catch tables in executive reports should include most recent information. To avoid misunderstandings it should be clearly

specified (footnoted) in the executive report that this information does not correspond exactly with that used in the assessment, since the information was not available at the time the species group met to do its work. All the executive reports should have the same type of clarification.

The way to present the response to the *Recommendation by ICCAT on Compliance with Statistical Reporting Obligations* [Rec. 05-09] was also discussed. The Chairman of the Sub-Committee on Statistics will prepare a summary of the information provided by the Secretariat and discussed by the species groups. However, it was also considered that further analyses should be conducted in order to evaluate the quality of data. It was agreed that the SCRS should work to establish protocols of data quality control. Based on these protocols the analyses should be conducted by the species group.

Document SCRS/2006/023 was presented and discussed. This document presents a list of relative stock status terms proposed by the FIRMS Steering Committee to define the state of the stocks. The commitment of ICCAT as FIRMS partnership is to provide the exact information contained in the executive summaries under the format of the FIRMS fact sheets. This information is included in the FIRMS web page as part of the *Resource reports*. However, in the development of FIRMS, summarized information extracted from the fact sheets is also presented as *Status Trend Summaries*. This summarized information attempts to include a diagnosis of the state of the stock. In order to implement this information, the Steering Committee defined the terms proposed. During the discussions it was considered that the request of being more precise in executive reports regarding the stock status could be considered as a positive aspect. The question on who will decide the terms to include in the stock status table was a matter of concern. However, this information was completely new for some of the officers, therefore it was decided to postpone the discussion for the following week. In order to facilitate discussions, the Secretariat will update the ICCAT stock status inventory.

Appendix 11 includes a proposal to create a tuna peer review publication. The idea of creating a new journal, exclusive to ICCAT or jointly with other RFMOs dedicated to tunas, was considered unfeasible. From the contacts made with well-established journals that are included in the Science Citation Index (*Scientia Marina*). Two different types of publications were proposed: a) Monographic issues dedicated to tunas and tuna-like species and b) Create a collection dedicated to tunas and tuna-like species within the journal. In both cases the budget would approximately amount to 25,000 €.

It was agreed that option b was more appropriate although this option requires major effort on behalf of the SCRS and the Secretariat. Under this option an Editorial Committee (EC) would be created. Work should be shared by the EC and the Secretariat. The EC would be representative of the different continent members of ICCAT. The Committee will not only have editorial work but will also reinforce the coordination between scientists in order to prepare and present papers to this publication. A preliminary EC group was proposed with the following members: David Die, Fabio Hazin, Jean Marc Fromentin, Naozumi Miyabe and a member from the African member countries of ICCAT.

Officers agreed to present the budget to the Commission for approval. Considering the relatively small number of peer review publications contacted by the Secretariat it was recommended that the Secretariat conduct new contacts with other publications such as *Aquatic Living Resources*. This publication also has the advantage of being published in at least two of the three ICCAT official languages (English and French).