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INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

CONTRACTING PARTIES

(as of 31December 2004)

Algeria, Angola, Barbados, Brazil, Canada, Cape Verde, China (People's Rep.), Côte d'Ivoire, Croatia, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Ghana, Guatemala, Guinea (Rep.), Honduras, Iceland, Japan, Korea (Rep.), Libya, Mexico, Morocco, Namibia, Nicaragua, Norway, Panama, Philippines, Russia, Sao Tomé & Principe, Senegal, South Africa, Trinidad & Tobago, Tunisia, Turkey, United Kingdom (Overseas Territories), United States, Uruguay, Vanuatu, Venezuela

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-3- Temperate tunas, South	Brazil, European Community, Japan, Namibia, South Africa, United Kingdom (Overseas Territories), United States, Uruguay	South Africa
-4- Other species	Algeria, Angola, Brazil, Canada, China (People's Rep.), Côte d'Ivoire, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Japan, Korea (Rep.), Mexico, Morocco, Namibia, South Africa, Trinidad & Tobago, Turkey, United Kingdom (Overseas Territories), United States, Uruguay, Venezuela	United States

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FOREWORD

The Chairman of the International Commission for the Conservation of Atlantic Tunas presents his compliments to the Contracting Parties of the International Convention for the Conservation of Atlantic Tunas (signed in Rio de Janeiro, May 14, 1966), as well as to the Delegates and Advisers that represent said Contracting Parties, and has the honor to transmit to them the ***"Report for the Biennial Period, 2004-2005, Part I (2004)"***, which describes the activities of the Commission during the first half of said biennial period.

This issue of the Biennial Report contains the Report of the 14th Special Meeting of the Commission (New Orleans, Louisiana, USA, 15-21 November 2004) and the reports of all the meetings of the Panels, Standing Committees and Sub-Committees, as well as some of the Working Groups. It also includes a summary of the activities of the Secretariat and a series of National Reports of the Contracting Parties of the Commission, relative to their activities in tuna and tuna-like fisheries in the Convention Area.

The Report for 2004 has been published in three volumes. ***Volume 1*** includes the Secretariat's Administrative and Financial Reports, the Proceedings of the Commission Meetings and the reports of all the associated meetings (with the exception of the Report of the Standing Committee on Research and Statistics -SCRS). ***Volume 2*** contains the Secretariat's Report on Statistics and Coordination of Research and the Report of the Standing Committee on Research and Statistics (SCRS) and its appendices. ***Volume 3*** contains the National Reports of the Contracting Parties of the Commission and Reports of Observers.

This Report has been prepared, approved and distributed in accordance with Article III, paragraph 9, and Article IV, paragraph 2-d, of the Convention, and Rule 15 of the Rules of Procedure of the Commission. The Report is available in the three official languages of the Commission: English, French and Spanish.

MASANORI MIYAHARA
Commission Chairman

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SECRETARIAT REPORT ON STATISTICS AND COORDINATION OF RESEARCH 2003-2004

1. Introduction

This report summarizes the activities of the Secretariat only in relation to statistical data collection and coordination of research activities. Other data required by the various recommendations of the Commission are presented separately in individual documents. This document refers only to information received at the time of writing this report (mid-Sept-2004). Some information may be submitted later, after this date.

2. Statistics

2.1 Submission of Task I and Task II data

The deadlines set by the SCRS should allow sufficient time for parties, entities or fishing entities to collect and process the information to be submitted to the Secretariat, which in turn should have a reasonable length of time to process and enter these data into the ICCAT data base with the required controls. A work plan for each species was drawn up, and showed the dates for submission of data. Despite some leeway being given with regard to these dates, the difficulties encountered in previous years have continued. **Table 1** shows an overview of the situation and the details by fleet.

In 2004, 14 Parties reported their statistical information using the new electronic forms (Appendix 3 to SCRS/2003/012). This standard format is an important part of a data assimilation framework developed by the ICCAT Secretariat during last year. In conjunction with the protocols adopted last year, it allows the automatic integration of statistical data into the database. The efficiency and accuracy of this approach was very satisfactory, since the data manipulation is virtually none and the information is previously validated before being integrated into the database.

Given the advantages of this approach, the Secretariat requests a definitive adoption of the electronic formats. Moreover, it encourages all parties to adopt this approach for reporting statistical data to ICCAT. For those ICCAT Parties with large data sets, the Secretariat will develop specific routines based on previously defined formats.

2.2 Revisions to historical data

2.2.1 Algeria

Historical revisions to the bluefin tuna series 1991-1998 were again submitted by Algeria. Following a request by the Secretariat, a scientific document (SCRS/2004/169) was presented by the Algerian authorities to explain the changes. These data have not yet been included in the ICCAT database, pending the decision of the SCRS. **Table 2** shows the differences between the current base and the proposed modifications.

2.2.2 South Africa

It was discovered that for some years the data for South African longline catches had been reported in dressed weight, but had not been converted. These data need to be re-estimated and the ICCAT Task I data revised.

2.2.3 Shark data

During the Inter-Sessional Meeting of the ICCAT Sub-Committee on By-Catches (Shark Stock Assessment), it was noted that catches of shortfin mako had previously been reported by both Côte d'Ivoire and the United States as mako unspecified. It was agreed that these catches be added to shortfin mako catches, but were retained separately in the ICCAT database.

2.2.4 EC-Spain

Following an enquiry by the Spanish authorities about the catch of south Atlantic albacore by Spanish purse seiners, the Secretariat requests that the SCRS undertake a review of the figures in the database.

The issue relates to the Secretariat's understanding that during the years 1999-2001, the figures for the Spanish south Atlantic albacore purse seine catch shown in the Executive Summary catch tables were duplicated. **Table 3** shows the evolution of these data from 1998 to 2003, which is as follows:

A The Spanish purse seine albacore catch taken as a by-catch of the tropical species (bigeye, yellowfin, skipjack) was, up to 1998, included in the ICCAT database in the southeast (SE) area.

B In 1999, the Secretariat received a revised data series for this fishery for the period 1991-1998. The revised data were reported as taken in the east tropical area (ETRO) and they were entered in the database as ETRO. The previous series for the SE area was not eliminated at the time because no duplication was detected due to the differences in area classification (ETRO vs SE). In the process of producing the Executive Summary table for the 1999 SCRS, it was realized that ETRO is not a valid Task I area for albacore (ETRO is a valid area for the tropical species taken by the directed purse seine fisheries); the new series was assigned manually to the North Atlantic stock in the table.

C In 2000, the ETRO data were considered to be from the South Atlantic stock, and hence the revised data series that was reported in 1999 was assigned to the South Atlantic, and added to the previous data series in the preparation of the Executive Summary table.

D In 2001, the new database system was in place and it was used to generate the Executive Summary tables automatically. As ETRO was not within the parameters specified for either the North Atlantic or the South Atlantic albacore stocks, the series was automatically assigned to "Unclassified Area". The original (SE) series also remained in the database.

E In 2002, the Secretariat carried out a thorough revision of the data base and realized that both the SE and ETRO series were in the database. The Secretariat's understanding was that the two series were essentially duplicates. As the ETRO series had been reported in 1999 to update the existing SE data, the SE data which appeared up to 1998 were eliminated from the database and replaced by the ETRO series.

F In 2003, there was no change to the data which figured in the 2002 Executive Summary table.

2.3 Trade data

2.3.1 Submission of information

During the bigeye assessment, Japan submitted a document summarizing the import data for this species. After examining the data, the group concluded that almost all the data for recent years related to countries which have been submitting their data regularly to ICCAT.

Biannual reports of data from the ICCAT statistical document programs were received from Japan, Korea, Chinese Taipei, Singapore, Thailand, Tunisia and the United States, being the largest majority submitted in electronic format. **Table 4** summarizes the information received during 2004.

As in recent years, no individual statistical documents have been received (as recommended by the SCRS contrary to the SCRS recommendation made in the last three years). The Secretariat recommends that ICCAT biannual reports should always be submitted electronically, and once again it reiterates the SCRS recommendation that they must be submitted individually and, if possible, in electronic format.

The document annexed to this report as **Appendix 1** presents a comparison between Task I and trade statistics for bluefin tuna, swordfish and bigeye tuna.

The Secretariat underlines its request that such information must be submitted electronically with individual documents being submitted where possible.

2.3.2 NEI estimates

The Secretariat continues to estimate unreported data on the basis of trade data submitted by Contracting Parties. In some cases it is difficult to estimate these catches, as the ocean from which the catch was taken is unknown.

The issue of bluefin tuna farming in the Mediterranean has increased the uncertainties in estimates for this species. The Working Group on East Atlantic Bluefin Tuna recommended changing the procedure for calculating these estimates, which is discussed in document SCRS/2004/013. **Appendix 1** includes more information.

2.4 Implementation of SCRS recommendations

The SCRS recommended that the origin of the data showing high albacore catches in 2000 and 2001 by St. Vincent and the Grenadines be clarified. The Secretariat found that these data had been reported directly by private companies that operated through St. Vincent and the Grenadines for these years, but which had not been reported in 2002. The question was raised during the Commission meeting in 2003, and the Chairman of the Commission sent a letter to St. Vincent and the Grenadines requesting clarification of albacore catches in 2002 and the monitoring of catches. To date no reply has been received.

The SCRS also recommended improving bluefin tuna data, and a working group met to discuss East Atlantic bluefin tuna data and to re-estimate the substitutions, which had been made to create the catch-at-size file. The report of the working group is available as document SCRS/2004/013.

The SCRS expressed serious concern about the poor quality of data for albacore and small tunas in the Mediterranean and recommended that the GFCM/ICCAT Joint Working Group should attempt to improve this situation. The **7th** *Ad Hoc* Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean met in Malaga, 13-14 May 2004, but was unfortunately able to do little to improve the data. The FAO, however, presented a comparison of the FAO and ICCAT databases for Mediterranean catches. Document SCRS/2004/081 presented by FAO and ICCAT explains the origin of the discrepancies and provides some recommendations to improve the situation. Those countries that have not submitted data will be entered in the ICCAT database, however official data submissions have not been changed although differences existed between these and the FAO database.

It was also expected that Ghana should continue to improve the sampling scheme taking place in Tema and furthermore that the Task I should reflect the real species composition. In the hope that data submitted by Ghana follows these rules, no changes were made by the Secretariat to the data reported.

2.5 Survey on Statistic Collection Systems

In 2003, a total of 17 Parties, Entities or Fishing Entities had responded to the ICCAT Survey on Statistic Collection Systems, of which 13 were Contracting Parties. Given this low level of response, the Secretariat re-circulated the questionnaire in 2004 requesting those who had not already done so to complete it. The Convener of the Sub-Committee on Statistics also urged those Contracting Parties that had not completed the questionnaire to do so as soon as possible. Since these requests, three additional countries have sent their completed questionnaires (Brazil, EC-Spain and South Africa). All the responses received to date are available at the Secretariat. The responses received are still very low to make any conclusions. Each species group should review the data deficiencies and make a list of the focal points where efforts of improvement are needed.

2.6 Data preparation for scientific meetings

2.6.1 GFCM-ICCAT

At the Joint GFCM-ICCAT Meeting (Malaga, 13-14 May 2004), the Secretariat presented the data available for albacore, small tunas and sharks in the Mediterranean area. Unfortunately no further information was submitted during that meeting except the data from FAO. It was noted that 5 or 10% of bluefin catches reported by Turkey may include albacore catches. Greek albacore catches also include other tuna species. The group reiterated the previous recommendations made by the SCRS asking for more active collaboration on behalf of the countries around the Mediterranean area to improve the albacore, bluefin and small tuna data.

2.6.2 Bigeye tuna

A bigeye tuna stock assessment was held in Madrid 28 June-3 July 2004, for which the Secretariat created the catch-at-size file, as described in SCRS/2004/015.

The Secretariat was also actively involved in the creation of datasets for the application of a statistical model for bigeye (MULTIFAN-CL). As the model was spatially-structured and configured to work on a quarterly basis, the preparation of the catch, size samples, effort and tagging data required substantial work. The data are summarized in SCRS/2004/015.

2.6.3 Blue shark and shortfin mako

During the stock assessment of blue and shortfin mako sharks held in Japan 14-18 June 2004, a lack of data for these species in the ICCAT database was noted. In order to carry out the assessment, many of the catches had to be raised in order to be able to estimate total catch. Figure 2 of SCRS/2004/014 shows the differences between estimated catch and reported catch. The data need to be revised in depth, and each country, entity or fishing entity should try to fill the gaps in the series.

2.6.4 Bluefin tuna

Following the recommendation by the East Atlantic Bluefin Tuna Working Group, a new catch-at-size file was created following new substitution rules. Document SCRS/2004/170 provides more details in the process and shows the existing differences.

2.6.5 CATDIS

The CATDIS working file (estimate by the Secretariat of Task I in 5º x 5º squares) was updated up to 2000 for all species except for bigeye, which was updated until 2002. Before the end of this year all the species will be updated up to 2003.

2.7 Tagging

2.7.1 Tagging data base

The information of the tagging data was incorporated into the ICCAT relational database, which includes 350,900 records for releases and 24,832 recoveries. The data set for sharks (75,000 records) was not incorporated to this data base due to problems in identifying the alpha prefix of the tag code and some records for tunas were flagged and pending for clarification. **Table 5** and **Table 6** include the current number of tags by species and the year.

2.7.2 Electronic tags

The payment of rewards for the recovery of electronic tags continues to present problems. A specific laboratory proposed to pay for computers or other equipment instead of a compensation in cash. An inventory of electronic tags, available through the ICCAT webpage was created including useful information as recommended by the SCRS in 2003. The collaboration of all the scientists involved in this issue is essential in order to have data up to date. As of October 2004 this file includes 687 tags received from Italy, Japan, Portugal and the United States. Detailed information is included in **Table 7**.

2.7.3 Conventional tags

The Secretariat continues to collaborate with the scientists in sending tags and applicators. This year 300 tags were sent to France, Spain and Portugal. At the time of writing the report only 37 recoveries were received for the annual lottery.

2.8 Progress made in the ICCAT relational data base

2.8.1 Current status

Currently, ICCAT-DB is a relational database system made of a statistical database of nearly 1.5 gigabytes and around 90 related tables containing all Task I and Task II data (current and historical updates), a tagging database with around 500 megabytes and around 30 related tables, and other specific databases used to manage catch-at-size estimates, CATDIS, trade statistics, contacts, publications, etc.

Conceptually and structurally, the database is considered completed. However, given the open design approach adopted, there is always the possibility for incorporating revisions or add-ons to it.

The consequences of changes to basic structures must be carefully planned. In general, addition of modules has minor implications to the overall system. On the contrary, revisions to the basic structures could have large implications at the level of code revision, and may consume a considerable amount of time.

2.8.2 Progress made

During this current year, the Secretariat concentrated its effort in various areas. The most important are the unification of all the statistical database, the development of the framework to assimilate the statistical data reported in the new electronic forms, the revision of database on tagging (structure and data), and the normalization of the ICCAT coding system which includes the proposal of new codes for fleets, gears and Task I areas.

The statistical database unification was basically a rearrangement of databases and respective structures in a way that allows a simplified and more efficient management of all statistical data. Currently all statistical information reported is previously assimilated by a "preliminary" database for validation purposes. After validation, the information is transferred to a central database. In the case of data revision, an association between "new" and "old" data is carried out, storing the "old" data in a historical database and transferring the "new" data to the central database. This approach allows to manage and track all changes made to Task I and Task II data, and more significantly, simplifies the association between Task I and Task II.

The Secretariat took about six weeks to develop and test the framework that automatically incorporates the data reported in the new electronic forms that are included in the ICCAT database. This framework is finalized and tested for Task II. However, for Task I it is only partially tested and an additional testing period is needed.

The in-depth revision made of the tagging database (data and structure) also included the integration of an inventory of all tags distributed by ICCAT all over the years. Currently, the link between this catalogue and the release/recoveries reported to ICCAT is partial (around 60% of all information reported), and needs to be finalized in the future.

2.8.3 Future enhancements

With the aim of improving the ICCAT database throughout the following year, the Secretariat will focus on the following tasks:

- Continue the work on the revision of tagging data, and complete the ICCAT tag inventory;
- Continue to develop the output programs for the most common requests of data (standard output, special requests, information for the ICCAT web, etc.);
- Integrate the new hierarchical codes adopted for Fleets, Gears and Task I areas, and reclassify the available statistical information with the new codes;
- Document all the ICCAT-DB system;
- Continue to develop the ICCAT web publishing facilities;
- Develop the programs to update CATDIS annually;
- Improve the routines for estimating catch-at-size;
- Develop the facilities to move on to the GIS system.

As usual, the work involved in the tasks aforementioned will run in parallel with the normal workload of the ICCAT Statistical Department. Finalizing them will depend largely on the time available.

2.9 Coding system

2.9.1 Geographical areas for Task I

Following frequent requests for a definition of the Task I areas which have never been precisely defined, the Secretariat has attempted to define the limits of these areas, and proposes that these be adopted by the SCRS for future use. The proposed area limits are shown in **Figure 1**.

2.9.2 Fisheries codes

As recommended by the Intersessional meeting of the Sub-Committee on Statistics held in March 2003, the Secretariat developed a new fleet coding system to include more detailed statistics within the same country/gear classification. **Table 8** shows the codification system proposed by the Secretariat that should be improved and adopted. The same philosophy was used for the gear coding system in **Table 9**.

3. Coordination of research and publications

3.1 Internet

Throughout the year the Secretariat improved the presentation of the ICCAT web page and included interactive tables for information purposes; these include ICCAT Recommendations and Resolutions by year, category or number, and tables including statistical data and forms.

Task I data can now be accessed in three ways, either by downloading an Excel pivot table, by using the FAO FISHSTAT software, or through interactive access which has recently been completed by the Secretariat. This third option allows users to extract data by year, gear, area, species or flag, or a combination of any of these. This option can be used by scientists to ensure that all of the Task I data reported to ICCAT has been correctly entered in the database.

All the Task II data (catch and effort) are also available on the Internet. Next year the size sampling will be included on the ICCAT webpage.

Documents have also been included in the ICCAT web site in anticipation of the SCRS and Commission meetings. In addition, an FTP site is being used to provide for SCRS documents before they are published in the *Collective Volume* series.

3.2 Special research programs

The Secretariat was involved in the coordination of three special research programs: the Bigeye Tuna Year Program (BETYP), the Bluefin Tuna Year Program (BYP) and the Enhanced Program for Billfish Research (EPBR). Reports on these activities are presented elsewhere in documents for the SCRS.

3.3 FIGIS/FIRMS

ICCAT became an official partner in the FIGIS-FIRMS Partnership in 2004 with the approval of the Commission. As part of the agreement, the Secretariat will be required to contribute with the species Executive Summaries from the SCRS Report in a special (XML) format for publication in the FIRMS web site. These reports have not yet been formatted because the partnership needs to finalize a work plan for all partners. A technical meeting for partners is expected in early 2005.

3.4 ASFA

The Secretariat has contracted the National Information Centre for Marine Sciences (India) to input 505 bibliographic entries (SCRS documents from 2000-2004) into the ASFA database. By April 2005, the ICCAT contribution to ASFA will be up-to-date. Progress has also been made on the preparation of a bibliographic database geared more to the needs of ICCAT. Information from ASFA (approximately 2,500 references) corresponding to ICCAT entries, have been integrated into the ICCAT bibliographic database.

3.5 Publications

3.5.1 Data Record

This volume has not been published for the last three years due to the restructuring of the database. The 2003 SCRS, on the advice of the Sub-Committee on Statistics, has recommended that this no longer be published in book form. This information (Task II) is currently published on the Internet by means of a downloadable data file. In the future, the information will be available in a web application (including query facilities). A CD-ROM with all the Task II data available at the Secretariat will be published before the end of 2004. The data available

in the public domain respect the confidentiality of the information as outlined by the Sub-Committee on Statistics (see SCRS/2003/012).

3.5.2 Statistical Bulletin

This publication was published in February 2004, and equivalent information is partially available on the Internet.

3.5.3 Collective Volume (Red Book)

In May 2004, Volume 56 was published on CD-ROM, which contained 109 documents and a total of 1,532 pages. In addition, another 14 documents submitted to the 2003 SCRS were either withdrawn by the senior author or submitted after the SCRS deadline. As in 2002 and 2003, due to the request from numerous scientists and libraries that wished to continue receiving the printed version of the publication, 75 copies of Volume 56 were printed, and were sent to those addresses indicted by the Chief Scientists in response to a survey.

In 2004, further efforts have been made to standardize the Publication Guidelines for both the Detailed Reports and the papers submitted so that publication time is reduced and the end product is more consistent. The *Ad Hoc* Working Group on SCRS Organization recommended that formatting be dealt with by scientists; this resulted in approximately 33% of the papers being returned to authors for re-formatting. The net result was the publication of the Collective Volume two months earlier than in 2003. The Secretariat notes that in 2004, 32% of manuscripts were submitted after the deadline for submission for publication (30 November) and only following a reminder.

Following the suggestion made in the *Ad Hoc* Working Group on SCRS Organization, the Secretariat has set up an FTP site containing electronic copies of all draft SCRS papers available at the Secretariat (those presented at inter-sessional meetings, as well as those sent to the Secretariat before the October meeting).

3.5.4 Biennial Report

Part II of the ICCAT Report for the 2002-2003 Biennial Period was published in three volumes (Commission, SCRS and National Reports), in Spanish, French and English. The Commission volume contains approximately 310 pages, the SCRS volume approximately 210 pages and the National Report volume approximately 140 pages.

3.5.5 Other

In 2004, the ICCAT Staff Regulations and Rules was updated and published in a tri-lingual volume.

4. Other

4.1. Purchase of electronic equipment

In 2003, the Sub-Committee on Statistics recommended that an annual allowance of €50,000 be allocated to the maintenance and updating of electronic equipment and software. This proposal was modified by the Commission and a budget of €25,000 for the purchase of electronic equipment was approved, with an additional €16,000 for the maintenance of the database and €10,000 for the Internet connection for the ICCAT web page.

To date the following equipment has been purchased: 3 computers, 12 flat screens, and 1 printer.

The Secretariat is planning to replace the older computers before the end of the year.

In order to update computers and the software used by the Secretariat with the day-to-day technology, the Committee may suggest to the Commission the necessity to change the computers every four years and to upgrade the software accordingly.

4.2 Inter-agency coordination

ICCAT staff were present at several meetings where statistics or research issues of interest to ICCAT were discussed. A summary of these meetings is included in the Administrative Report.

Table 1. Catalogue of 2003 statistical information reported to ICCAT in 2004 / Catalogue des informations de 2003 soumises a l'ICCAT en 2004 / Catalogo de datos de 2003 reportados a ICCAT durante 2004

						Species																
Status type	Reporting Flag	Fleet Code	Gear group	Fleet info ?	TASK info	Tuna											Sharks			Other spec.	Date Reported
						ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	other	BSH	SMA	other		
CP	Algerie				T1																
					CE																
					size																
					cas																
	Angola	AGO	BB		T1						■			■							2004-09-30
					CE																
					size																
					cas																
	Barbados	BRB	LL		T1	■	■					■		■							2004-09-20
			TR		T1										■						2004-09-20
			UN		T1										■	■					2004-09-20
					CE																
					size																
					cas																
	Brasil	BRA	UN		T1					■					■	■			■		2004-09-07
		BRA-BOL-NATAL	LL		CE	■	■					■	■	■	■		■			■	2004-09-07
		BRA-BRA-CABDELO	LL		CE	■	■		■	■	■	■	■	■	■	■	■	■	■	■	2004-09-07
					size	■						■		■							2004-09-07
		BRA-BRA-ITAJAI	BB		T1	■	■							■	■						2004-09-07
					CE	■	■				■			■							2004-09-07
			LL		T1	■	■		■	■		■	■	■		■	■	■	■	■	2004-09-07
					CE	■	■					■	■	■	■	■	■	■	■		2004-09-07
		BRA-BRA-NATAL	HL	X	T1	■			■	■		■	■	■	■		■	■	■		2004-09-07
			LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■	■	■	■		■	■	■	■	■	■	■	■	■	2004-09-07
					size	■	■					■		■							2004-09-07
		BRA-BRA-RGRANDE	BB		T1						■			■							2004-09-07
			LL		T1	■	■		■			■	■	■			■	■	■		2004-09-07
					CE	■	■					■	■	■			■		■		2004-09-07
		BRA-BRA-RJANERO	BB		T1						■			■							2004-09-07
			HL		T1																2004-09-07
		BRA-BRA-SANTOS	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■					■	■		■						■	2004-09-07
					size	■	■					■		■							2004-09-07
		BRA-BRA-SCTARINA	BB		size						■										2004-09-07
		BRA-CAN-NATAL	LL	X	T1	■	■		■	■		■		■	■			■	■		2004-09-07
					CE		■					■			■		■	■	■	■	2004-09-07
		BRA-ESP-CABDELO	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■					■	■	■	■		■	■	■	■	2004-09-07
		BRA-ESP-NATAL	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE		■					■		■			■		■	■	2004-09-07
		BRA-GUY-NATAL	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
		BRA-HND-CABDELO	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE							■		■	■	■	■	■	■		2004-09-07
		BRA-HND-NATAL	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■					■	■	■	■		■	■	■	■	2004-09-07
		BRA-HND-SANTOS	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■					■	■	■	■		■	■	■	■	2004-09-07
		BRA-ISL-NATAL	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■			■	■		■	■	■	■		■		■	■	2004-09-07
		BRA-PAN-CABDELO	LL		T1	■	■		■	■		■	■	■			■	■	■		2004-09-07
					CE						■	■		■			■	■	■	■	2004-09-07
		BRA-PAN-NATAL	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■					■	■	■	■		■	■	■	■	2004-09-07
		BRA-PRT-CABDLO	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE		■				■	■		■	■		■			■	2004-09-07
		BRA-URY-CABDELO	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■	■			■	■		■			■	■	■	■	2004-09-07
		BRA-URY-ITAJAI	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■	■				■	■	■	■		■	■	■	■	2004-09-07
		BRA-USA-NATAL	LL	X	T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
					CE	■	■					■	■	■	■		■	■	■		2004-09-07
		BRA-VCT-NATAL	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
		BRA-BRA-BELEM	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
		BRA-VUT-NATAL	LL		T1	■	■		■	■		■	■	■	■		■	■	■		2004-09-07
	Canada	CAN	GN		T1													■	■		2004-09-25
					CE													■	■		2004-09-25
					size																
			HL		T1													■	■		2004-09-25
					CE													■	■		2004-09-25
					size																
			RR		T1	■	■	■				■		■							2004-09-25
					CE	■	■	■				■		■							2004-09-25
					size		■	■													2004-09-25
			TL		T1	■	■	■				■		■				■			2004-09-25
					CE	■	■	■				■		■					■		2004-09-25
					size																
			TP		T1			■													2004-09-25
					CE																
					size																
			TW	x	T1													■	■		2004-09-25
					CE													■	■		2004-09-25
					size			■													2004-09-25
			LL	x	T1	■	■	■					■	■	■	■	■	■	■		2004-09-25
					CE	■	■					■	■	■		■	■	■	■		**2004-09-25**
					size	■	■	■				■	■	■							**2004-09-25**
					cas	■	■						■	■							**2004-04-26**
			HP		T1			■				■	■					■	■		2004-09-25
					CE		■	■				■	■								**2004-09-25**
					size		■	■				■	■								**2004-09-25**
					cas		■						■								2004-04-26
			TR		T1			■													2004-09-25
					CE	■	■	■						■							**2004-09-25**
					size	■	■							■							2004-04-26
					cas	■	■							■							2004-04-26
	Cape Verde	CPV	BB		T1						■										2004-09-30
					CE																
					size																
					cas																
			HL		T1						■			■							2004-09-30
					CE																
					size																
					cas																
			PS		T1						■			■							2004-09-30
					CE																
					size																
					cas																
	China, P.R.	CHN	LL		T1	■	■	■	■	■		■	■	■	■		■	■	■		2004-07-22

Status type	Reporting Flag	Fleet Code	Gear group	Fleet info ?	TASK info	Species: Tuna ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	other	Sharks BSH	SMA	other	Other spec.	Date Reported
					CE	■	■	■	■	■		■	■	■		■					2004-07-22
					size																
					cas																
	Côte D'Ivoire	CIV	GN		T1				■	■		■	■					■	■		**2004-05-24**
		CIV-ABIDJAN	GN		size				■	■		■	■						■		2004-04-27
		CIV-S.PEDRO	GN		size				■	■		■	■								2004-04-27
					CE																
					cas																
	Croatia	HRV	PS		T1			■													2004-07-21
					CE			■													2004-07-21
			SP		T1			■													2004-07-21
					CE			■													2004-07-21
					size																
					cas																
	EC.Belgium				T1																
					CE																
					size																
					cas																
	EC.Cyprus	EC.CYP	GN	X	T1	■									■				■		2004-06-03
					CE	■									■				■		2004-06-03
			LL	X	T1	■		■				■					■				2004-06-03
					CE			■				■					■				2004-06-03
			SP	X	T1	■															2004-06-03
					CE																
			TR		T1																
					CE	■															2004-06-03
			TW	X	T1														■		2004-06-03
					size																
					cas																
	EC.Denmark				T1																
					CE																
					size																
					cas																
	EC.España	EC.ESP	LL		T1	■	■	■	■	■	■	■	■	■	■		■	■			**2004-09-22**
			UN		T1			■							■						**2004-08-29**
		EC.ESP-ES-CANARY	BB	X	T1	■	■	■			■	■		■	■						2004-06-25
					CE	■	■	■			■	■		■	■						2004-06-25
					size																
					cas	■	■				■			■								2004-06-25
		EC.ESP-ES-MALAGA	BB		T1	■		■													2004-09-22
					CE	■															2004-09-20
					size	■															2004-09-20
			TR		T1																
					CE	■															2004-09-20
					size	■															2004-09-20
					cas																
			HL		T1			■													2004-09-22
					CE			■													2004-09-22
					size			■													2004-09-22
		EC.ESP-ES-SANTDER	BB		T1	■	■	■													2004-09-22
					CE	■															2004-09-20
					size	■															2004-09-20
					cas		■														2004-06-28
			TR		T1	■	■	■													2004-09-22
					CE	■															2004-09-20
					size	■															2004-09-20
		EC.ESP-ES-ETRO	BB		T1	■	■				■			■	■						2004-04-28
					CE	■	■				■			■							2004-04-28
					size	■	■				■			■							2004-04-28
					cas	■	■				■			■							2004-04-28
			PS		T1	■	■				■			■	■						2004-04-28
					CE	■	■				■			■							2004-06-28
					size	■	■				■			■							2004-06-28
					cas	■	■				■			■							2004-06-28
	EC.Estonia	EC.EST.EE.Vigo	TW	X	T1														■		2004-07-27
					CE																
					size																
					cas																
	EC.France	EC.FRA	BB		T1			■													2004-09-29
					CE																
					size																
					cas																
			PS		T1			■													2004-09-29
					CE																
					size			■													2004-09-20
					cas																
			TW		T1	■		■				■									2004-09-29
					CE																
					size	■															2004-09-20
					cas																
		EC.FRA-FR-ETRO	BB		T1	■	■				■			■							2004-09-29
					CE	■	■				■			■	■						2004-09-29
					size	■	■				■			■	■						2004-09-29
					cas	■	■				■			■	■						2004-09-29
			PS		T1	■	■				■			■							2004-09-29
					CE	■	■				■			■	■						2004-06-28
					size	■	■				■			■	■						2004-06-28
					cas	■	■				■			■	■						2004-06-28
	EC.Germany	EC.DEU			T1																
					CE																
					size																
					cas																
	EC.Greece	EC.GRC	HAND		T1	■		■													2004-09-29
					CE	■		■													2004-10-15
					size																
			LL		T1	■		■				■									2004-09-29
					CE	■		■				■									2004-10-15
					size																
			PS		T1	■		■			■					■					2004-09-29
					CE																
					size																
			UNCL		size			■				■									2004-10-15
					cas																
	EC.Ireland	EC.IRL	TW	x	T1	■		■				■									2004-08-26
					CE	■		■				■									2004-08-26
					size	■															2004-08-26
					cas	■															2004-08-26
	EC.Italy	EC.ITA	GN		size	■		■				■			■						2004-07-12
			HL		T1			■							■						2004-09-27
					size			■													2004-07-12

Status type	Reporting Flag	Fleet Code	Gear group	Fleet info ?	TASK info	Species: Tuna ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	other	Sharks BSH	SMA	other	Other spec.	Date Reported
			LL		T1	■		■			■	■			■						2004-09-28
					size	■						■									2004-07-12
			PS		T1			■													2004-09-29
					size			■													2004-07-12
			RR		T1			■													2004-09-27
			SP		T1	■		■				■			■						2004-09-28
			TR		T1			■				■									2004-09-27
					size			■													2004-07-12
			UN		T1	■		■			■	■			■						2004-09-28
					size	■		■				■			■						2004-07-12
		EC.ITA-IT-TYRR	HL		T1							■									2004-09-28
					CE																
					size			■													2004-05-10
			LL		T1	■		■				■									2004-09-28
					CE																
					size																
			PS		T1			■													2004-09-29
					CE																
					size			■													2004-05-10
			UN		T1	■		■				■									2004-09-28
					CE																
					size																
		EC.ITA-IT-ADRI.S	LL		T1	■						■									2004-09-28
			UN		T1	■						■									2004-09-28
		EC.ITA-IT-ADRIAT	LL		T1			■													2004-09-29
			PS		T1			■													2004-09-29
			SP		T1			■													2004-09-29
		EC.ITA-IT-IONI.N	LL		T1	■		■				■									2004-09-28
			SP		T1			■													2004-09-29
			UN		T1	■						■									2004-09-28
		EC.ITA-IT-IONI.S	LL		T1	■		■				■									2004-09-28
			PS		T1			■													2004-09-29
			SP		T1			■													2004-09-29
			UN		T1	■						■									2004-09-28
		EC.ITA-IT-LIGURY	LL		T1			■				■									2004-09-28
			PS		T1			■													2004-09-29
			SP		T1			■													2004-09-29
			UN		T1	■						■									2004-09-28
		EC.ITA-IT-SARDHA	LL		T1	■		■				■									2004-09-28
			SP		T1			■													2004-09-29
			UN		T1	■						■									2004-09-28
					CE																
					cas																
	EC.Latvia	EC.LVA	TW		T1									■							2004-09-30
					CE																
					size																
					cas																
	EC.Lithuania				T1																
					CE																
					size																
					cas																
	EC.Malta	EC.MLT	LL		T1			■				■									2004-09-29
					CE																
					size																
					cas																
	EC.Netherlands				T1																
					CE																
					size																
					cas																
	EC.Poland				T1																
					CE																
					size																
					cas																
	EC.Portugal	EC.PRT-PT-AZORES	BB	X	T1	■	■	■			■			■	■						2004-08-02
					CE										■						2004-08-02
					size																
			LL	X	T1	■	■		■		■	■	■	■			■	■	■		2004-08-02
					CE																2004-08-02
					size																
		EC.PRT-PT-MADEIRA	BB	X	T1	■	■	■			■			■							2004-08-02
					CE	■	■	■			■			■							2004-08-02
					size	■	■	■			■										2004-07-02
			LL	X	T1	■			■			■					■		■		2004-08-02
					CE				■			■									2004-08-02
					size				■			■									2004-07-02
			PS		T1										■						2004-08-02
					CE										■						2004-08-02
					size																
		EC.PRT-PT-MAINLND	LL		T1	■	■	■	■	■	■	■	■	■	■	■	■	■	■		2004-08-02
					CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■		2004-08-02
					size							■					■				2004-07-13
			PS		T1			■				■		■	■		■	■	■		2004-08-02
					CE			■				■		■	■		■	■			2004-08-02
					size																
			TP		T1			■						■	■						2004-08-02
					CE			■			■										2004-08-02
					size			■							■						2004-07-13
			UN		T1	■	■		■	■	■	■		■	■	■		■	■		2004-08-02
					CE	■	■	■	■	■	■	■		■	■	■	■	■	■		2004-08-02
					size																
					cas																
	EC.Sweden	EC.SWD			T1																
					CE																
					size																
					cas																
	EC.United Kingdom	EC.UK	TW		T1			■								■					2004-08-02
					CE			■								■					2004-08-02
					size																
					cas																
	France. SP et Miquelon	FR.SPM	LL		T1		■	■				■							■		2004-04-05
					CE																
					size																
					cas																
	Gabon	GAB	TW	X	T1							■		■	■	■			■		2004-08-16
					CE																
					size																
					cas																
	Ghana	GHA	BB	X	T1		■				■			■	■						2004-06-22
					CE		■				■			■							2004-06-21
					size									■							2004-06-21

Status type	Reporting Flag	Fleet Code	Gear group	Fleet info ?	TASK info	Species															Other spec.	Date Reported
						Tuna											Sharks					
						ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	other	BSH	SMA	other			
			PS	X	T1		■				■			■	■							2004-06-22
					CE		■				■			■	■							2004-06-21
					size									■								2004-06-21
					cas																	
	Guinea Ecuatorial				T1																	
					CE																	
					size																	
					cas																	
	Guinée Conakry				T1																	
					CE																	
					size																	
					cas																	
	Honduras				T1																	
					CE																	
					size																	
					cas																	
	Iceland				T1																	
					CE																	
					size																	
					cas																	
	Japan	JPN	LL		T1	■	■	■	■	■		■	■	■		■	■		■			**2004-09-27**
					CE	■	■	■	■	■	■	■	■	■		■						2004-05-27
					size	■	■															2004-06-03
					cas		■															2004-04-28
	Korea, Republic of	KOR			T1																	
					CE																	
					size																	
					cas																	
	Libya	LBY	LL		T1		■							■								2004-09-30
					CE																	
					size																	
					cas																	
	Maroc	MAR	GN		T1			■			■	■			■							2004-09-13
			HL		T1			■														2004-09-13
			LL		T1			■				■										2004-09-13
			PS		T1			■			■	■			■							2004-09-13
			TP		T1			■			■				■							2004-09-13
					CE																	
					size																	
					cas																	
	Mexico	MEX	LL	X	T1		■	■	■	■	■	■	■	■	■				■			2004-08-02
					CE																	2004-08-02
					size																	
					cas																	
	Namibia	NAM	BB		T1	■	■					■		■					■			2004-08-02
			LL		T1																	2004-08-02
					CE																	
					size																	
					cas																	
	Norway	NOR	UN		T1														■			2004-07-14
					CE																	
					size																	
					cas																	
	Panama				T1																	
					CE																	
					size																	
					cas																	
	Philippines	PHL-PHL-MANILA	LL		T1		■					■		■		■						2003-04-27
					CE		■					■		■								2004-07-12
					size																	
					cas																	
	Russian Federation	RUS	TW		T1										■							2004-08-31
					CE																	
					size																	
					cas																	
	S. Tomé e Príncipe				T1																	
					CE																	
					size																	
					cas																	
	South Africa	ZAF	BB	X	T1	■	■				■	■		■		■						2004-08-02
					CE	■	■				■	■		■		■						2004-08-02
					size	■								■								2004-08-02
			LL	X	T1	■	■				■	■		■		■	■	■	■			2004-08-02
					CE	■	■				■	■		■		■	■	■	■	■		2004-08-02
					size	■	■					■				■	■	■	■			2004-08-02
			RR		T1	■								■								2004-08-02
		ZAF-KOR	LL	X	T1	■	■					■		■			■					2004-08-02
					CE	■	■					■		■			■					2004-08-02
		ZAF-NAM	LL	X	T1	■	■					■		■			■	■				2004-08-02
					CE	■	■					■		■			■	■				2004-08-02
		ZAF-SYC	LL	X	T1	■	■					■		■		■		■				2004-08-02
					CE	■	■					■		■		■		■				2004-08-02
		ZAF-VCT	LL	X	T1	■	■					■		■		■	■	■				2004-08-02
					CE	■	■					■		■		■	■	■				2004-08-02
					cas																	
	Trinidad and Tobago	TTO	LLHB	X	T1	■	■		■	■		■	■	■	■	■	■	■	■			2004-09-29
					CE	■	■		■	■		■	■	■	■	■	■	■	■			2004-09-29
					size																	
			UNCL	X	T1										■	■			■			2004-09-30
					CE										■	■			■			2004-09-30
					size																	
					cas																	
	Tunisie	TUN	HL		T1			■														2004-09-30
			LL		T1							■										2004-09-30
			PS		T1			■														2004-09-30
			TP		T1							■										2004-09-30
			TW		T1							■										2004-09-30
			UN		T1										■							2004-09-30
					CE																	
					size																	
					cas																	
	Turkey	TUR	PS		T1			■				■			■							2004-10-05
					CE																	
					size																	
					cas																	
	U.S.A.	USA	GN		T1	■					■			■	■							2004-09-28
			HL		T1	■	■	■				■			■							2004-09-28
			HP		T1			■														2004-09-28
			HS		T1										■							2004-09-28
			LL		T1	■	■	■	■	■	■	■	■	■	■							2004-09-28

Status type	Reporting Flag	Fleet Code	Gear group	Fleet info ?	TASK info	Species: Tuna ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	other	Sharks BSH	SMA	other	Other spec.	Date Reported
			PS		T1			■							■						2004-09-28
			RR		T1	■	■	■	■	■	■	■	■	■	■						2004-09-28
			TP		T1	■	■				■			■	■						2004-09-28
			TR		T1										■						2004-09-28
			TW		T1	■	■				■	■		■	■						2004-09-28
			UN		T1				■	■		■	■	■	■						2004-09-28
					CE																
					size																
					cas																
	U.S.S.R.				T1																
					CE																
					size																
					cas																
	UK.Anguilla				T1																
					CE																
					size																
					cas																
	UK.Bermuda	UK.BMU	UN		T1	■	■	■	■		■	■	■	■	■						2004-09-02
					CE																
					size																
					cas																
	UK.British Virgin Islands				T1																
					CE																
					size																
					cas																
	UK.Falklands				T1																
					CE																
					size																
					cas																
	UK.Sta Helena	UK.SHN	BB		T1						■										2004-09-30
					CE																
					size																
					cas																
	UK.Turks and Caicos Islands				T1																
					CE																
					size																
					cas																
	Uruguay	URY	LL		T1		■														2004-06-22
					CE																
					size																
					cas																
	Vanuatu				T1																
					CE																
					size																
					cas																
	Venezuela	VEN	BB		T1	■	■				■			■	■						2004-09-15
					CE	■	■				■			■	■						2004-09-15
					size																
			GN		T1	■			■	■		■	■	■	■				■	■	2004-09-15
					CE																
					size																
			LL		T1	■	■		■	■		■	■	■	■	■			■	■	2004-09-15
					CE	■	■		■	■		■	■	■	■	■			■	■	2004-09-15
					size																
			PS		T1	■	■				■			■	■						2004-09-15
					CE	■	■				■			■	■						2004-09-15
					size																
					cas																
NCC	Chinese Taipei	TAI	LL	X	T1	■	■	■	■	■	■	■	■	■		■					2004-06-16
					size			■													2004-05-28
					CE																
					cas																
	Guyana	GUY	UN		T1											■			■		2004-05-28
					CE																
					size																
					cas																
NCO	Colombia	COL	UN		T1										■						2004-09-30
	NEI	NEI.001-ETRO	BB		T1		■				■			■	■						**2004-04-28**
					CE	■	■				■			■	■						2004-06-28
					size	■	■				■			■	■						2004-06-28
					cas	■	■				■			■	■						2004-06-28
			PS		T1	■	■				■			■	■						**2004-04-28**
					CE	■	■				■			■	■						2004-06-28
					size	■	■				■			■	■						2004-06-28
					cas	■	■				■			■	■						2004-06-28
	Cuba	CUB	LL		T1		■							■							2004-09-30
	Dominica	DMA	UN		T1				■		■				■						2004-08-02
	Dominican Republic	DOM	LL		T1				■	■		■		■							2004-09-13
			TR			■					■				■						2004-09-13
	Grenada	GRD	LL	X	T1				■	■		■		■							2004-09-13
					CE				■	■		■		■							2004-09-13
			TR		T1	■					■				■						2004-09-13
					CE	■															2004-09-13
	Liberia	LBR	UN		T1		■														2004-09-30
	Netherlands Antilles	ANT	BB		T1		■				■			■	■						2004-09-30
			PS		T1		■				■			■	■						2004-09-30
	Saint Kitts and Nevis	KNA-KN-NEVIS	UN		T1										■	■					2004-09-28
		KNA-KN-ST.KITTS	UN		T1											■					2004-09-28
	Senegal	SEN	BB		T1		■				■			■							2004-09-29
	St. Vincent and Grenadines	VCT	LL	X	T1	■	■			■	■	■	■	■		■					2004-08-12
					CE	■	■			■	■	■	■	■		■					2004-08-12
			TR		T1						■				■				■		2004-08-12
	Sta. Lucia	LCA	TR		T1	■	■		■	■	■	■		■	■	■					**2004-07-28**
			UN	X	T1														■		2004-07-28

NOTE The USA reported Task II data in November, 2004, which are not shown in this table.
Korea (Rep) reported Task I data in November 2004, which are not shown in this table.

Table 2. Revised catches submitted by Algeria.

				1991		1992		1993		1994		1995		1996		1997	
COUNTRY	**SPECIES**	**AREA**	**GEAR**	OLD	*NEW*	OLD	*NEW*	OLD	*NEW*	OLD	*NEW*	OLD	*NEW*	OLD	*NEW*	OLD	*NEW*
ALGERIE	BFT	MEDITERRANEAN	TRAP	0	*548*	0	*490*	0	*557*	0	*607*	0	*498*	0	*299*	0	*359*
	BFT		HAND	0	*267*	0	*231*	0	*293*	0	*270*	0	*249*	0	*121*	0	*145*
	BFT		PS	0	*848*	0	*642*	0	*737*	0	*766*	0	*751*	0	*660*	0	*754*
	BFT		GILL	0	*277*	0	*349*	0	*387*	0	*302*	0	*279*	0	*151*	0	*231*
	BFT		LL	0	*175*	0	*159*	0	*223*	0	*255*	0	*195*	0	*133*	0	*106*
	BFT		UNCL	800	*196*	1104	*191*	1097	*242*	1560	*185*	156	*151*	156	*121*	157	*118*
	BFT		**TOTAL**	**800**	***2311***	**1104**	***2062***	**1097**	***2439***	**1560**	***2385***	**156**	***2123***	**156**	***1485***	**157**	***1713***
ALGERIE	BON	MEDITERRANEAN	TRAP	600	*0*	600	*0*	596	0	847	0	351	0	351	0	351	0
	BON		PS	0	*209*	0	*244*	0	*342*	0	*332*	0	*377*	0	*219*	0	*284*
	BON		GILL	0	*35*	0	*52*	0	*75*	0	*66*	0	*98*	0	*45*	0	*51*
	BON		LL	0		0		0	*25*	0		0		0		0	
	BON		UNCL	0	*17*	0	*19*	0	*29*	0	*20*	0	*31*	0	*13*	0	*22*
	BON		**TOTAL**	**600**	***261***	**600**	***315***	**596**	***471***	**847**	***418***	**351**	***506***	**351**	***277***	**351**	***357***
ALGERIE	FRI	MEDITERRANEAN	UNCL	0	*9*	0	*14*	0	*19*	0	*14*	947	*11*	947	*10*	947	*5*
	FRI		PS	0	*148*	0	*220*	0	*267*	0	*247*	0	*188*	0	*202*	0	*156*
	FRI		GILL	0	*17*	0	*36*	0	*62*	0	*45*	0	*31*	0	*26*	0	*18*
	FRI		**TOTAL**	**0**	***174***	**0**	***270***	**0**	***348***	**0**	***306***	**947**	***230***	**947**	***238***	**947**	***179***
ALGERIE	SWO	MEDITERRANEAN	LL	173	*125*	6	*105*	173	*108*	185	*165*	247	*85*	247	*77*	247	*74*
	SWO		UNCL	389	*246*	389	*189*	389	*234*	415	*200*	560	*145*	560	*147*	560	*152*
	SWO		GILL	0	*581*	0	*441*	0	*608*	0	*810*	0	*729*	0	*406*	0	*564*
	SWO		**TOTAL**	**562**	***952***	**395**	***735***	**562**	***950***	**600**	***1175***	**807**	***959***	**807**	***630***	**807**	***790***
ALGERIE	LTA		TRAP	0	*130*	0	*139*	0	*144*	0	*123*	0	*121*	0	*154*	0	*106*
	LTA		PS	0	*332*	0	*374*	0	*295*	0	*290*	0	*343*	0	*341*	0	*301*
	LTA		GILL	0	*20*	0	*27*	0	*21*	0	*18*	0	*37*	0	*22*	0	*19*
	LTA		UNCL	0	*40*	0	*45*	0	*35*	0	*28*	0	*51*	0	*37*	0	*22*
	LTA		**TOTAL**	0	***522***	0	***585***	0	***495***	0	***459***	0	***552***	0	***554***	0	***448***
ALGERIE	BOP		GILL	0	*57*	0	*95*	0	*128*	0	*108*	0	*78*	0	*91*	0	*197*
	BOP		UNCL	0	*30*	0	*40*	0	*70*	0	*45*	0	*14*	0	*28*	0	*27*
	BOP		**TOTAL**	0	***87***	0	***135***	0	***198***	0	***153***	0	***92***	0	***119***	0	***224***
ALGERIE	**SKJ**		**UNCL**	0	***44***	0	***90***		***50***		***204***		***138***		***198***		***89***

Table 3. Historical albacore Spanish data in the South Atlantic.

	GEAR	AREA	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
SCRS 1997	PS	South Atl	389	1691	849	725	217	14		
	LL	South Atl	0	0	0	0	0	0		
	Total		*389*	*1691*	*849*	*725*	*217*	*14*		
SCRS 1998	PS	South Atl	389	1691	848	725	217	14	63	
	LL	South Atl	0	0	0	0	0	0	0	
	Total		*389*	*1691*	*848*	*725*	*217*	*14*	*63*	
SCRS 1999*	PS	South Atl	389	1691	848	725	217	14	63	0
	PS (North Atl)**	North Atl	279	1816	649	682	255	4	66	173
	LL	South Atl	1	127	135	149	202	180	190	20
	Total		*669*	*3634*	*1632*	*1556*	*674*	*198*	*319*	*193*
SCRS 2000*	PS	South Atl	668	3507	1496	1407	472	18	129	173
	LL	South Atl	1	127	135	149	202	180	190	20
	Total		*669*	*3634*	*1631*	*1556*	*674*	*198*	*319*	*193*
SCRS 2001*	PS	Uncl. area	279	1816	648	682	255	4	66	
	PS	South Atl	389	1691	849	725	217	14	63	193
	LL	South Atl	1	127	135	149	202	180	190	20
	Total		*669*	*3634*	*1632*	*1556*	*674*	*198*	*319*	*213*
SCRS 2002	PS	South Atl	279	1816	648	682	255	4	66	173
	LL	South Atl	1	127	135	149	202	180	190	20
	Total		*280*	*1943*	*783*	*831*	*457*	*184*	*256*	*193*
SCRS 2003	PS	South Atl	279	1816	648	682	255	4	66	173
	LL	South Atl	1	127	135	149	202	180	190	20
	Total		*280*	*1943*	*783*	*831*	*457*	*184*	*256*	*193*

* Years in which data seem double reported.

**New data series that should have substituted the PS series, entry error in the North area.

Table 4. Catalogue of biannual reports of Statistical documents (SD) and Re-export Certificates (RC) reported to ICCAT for 2003.

Species	*Doc. Type*	*Reporting Flag*	*Year*	*Semester*	*Reporting date*	*Ref. Num*	*Standard format*	*Electronic data*	*In database*
BET	SD	Chinese Taipe	2003	1	26/09/2003	1818	X		X
	SD	Japan	2003	1	01/10/2003		X	X	X
	SD	Japan	2003	2	31/03/2004	479	X	X	X
	SD	Korea	2003	1	20/10/2003	2001	X	X	X
	SD	Korea	2003	2	01/04/2004	487	X	X	X
	SD	Thailand	2003	1	09/04/2003		X	X	X
	SD	Thailand	2003	2	28/04/2004	720	X		X
	RC	Chinese Taipe	2003	1	26/09/2003	1818	X		X
	RC	Japan	2003	1	01/10/2003		X	X	X
	RC	Japan	2003	2	31/03/2004	479	X	X	X
	RC	Korea	2003	1	20/10/2003	2001	X	X	X
	RC	Korea	2003	2	01/04/2004	487	X	X	X
	RC	Thailand	2003	1	09/04/2003		X	X	X
	RC	Thailand	2003	2	16/04/2004	609720	X		X
BFT	SD	Chinese Taipe	2003	1	26/09/2003	1818	X		X
	SD	Japan	2003	1	01/10/2003		X	X	X
	SD	Japan	2003	2	31/03/2004	479	X	X	X
	SD	Korea	2003	1	20/10/2003	2001	X	X	X
	SD	Korea	2003	2	01/04/2004	487	X	X	X
	SD	Tunisia	2003	2	29/01/2004	156	X		X
	SD	USA	2003	1	09/10/2003	1911	X		X
	SD	USA	2003	2	21/04/2004	634	X		X
	RC	Chinese Taipe	2003	1	26/09/2003	1818	X		X
	RC	Japan	2003	1	01/10/2003		X	X	X
	RC	Japan	2003	2	31/03/2004	479	X	X	X
	RC	Korea	2003	1	20/10/2003	2001	X	X	X
	RC	Korea	2003	2	01/04/2004	487	X	X	X
	RC	USA	2003	1	09/10/2003	1911	X		X
	RC	USA	2003	2	21/04/2004	634	X		X
SWO	SD	Japan	2003	1	01/10/2003		X	X	X
	SD	Japan	2003	2	31/03/2004	479	X	X	X
	SD	Korea	2003	1	20/10/2003	2001	X	X	X
	SD	Korea	2003	2	01/04/2004	487	X	X	X
	SD	Singapore	2004	1	04/08/2004		X		X
	RC	Japan	2003	1	01/10/2003		X	X	X
	RC	Japan	2003	2	31/03/2004	479	X	X	X
	RC	Korea	2003	1	20/10/2003	2001	X	X	X
	RC	Korea	2003	2	01/04/2004	487	X	X	X

Table.5. Number of tags released and validated in ICCAT database, by species and year.

Year	ALB	BET	BFT	BIL	BLF	BLM	BLT	BON	BUM	CER	KGM	LTA	SAI	SBF	SKJ	SPF	SSM	SWO	TUN	WAH	WHM	YFT	total
1940			24	3	2	1			9		9		76		62	1		2			26	6	221
1950													2										2
1951													1										1
1952													2										2
1953													1								1		2
1954			193										3								4		200
1955			230						4				13		2						141		390
1956			99						9				2								415	102	627
1957			37	8									59								137	1	242
1958			38	8					1				31								38		116
1959			147	7				1	2				252		1						200		610
1960	15	2	236	2	8	1		3	5				936		1						107	59	1375
1961	3		185	4	24	8		13	5		27		1306		24			2		1	236	19	1857
1962	2	9	127	9	19	8		16	15		5		1498		28			1			380	4	2121
1963	16	45	222	341	11	33		7	116		3		1423		8			1		4	654	39	2923
1964	25	34	552	15	76	27		1	63		2		1306		585			32		3	531	107	3359
1965	1	4	1806	12	85	24		1	50		3		1317		334			28		6	376	18	4065
1966	11	21	4131	2	86	22		6	43		2		1279		780			27		4	482	23	6919
1967		3	713	1	19	25			43				877		41	1		20		1	523	50	2317
1968	19		519		34	31		4	67				849		25			25		1	881	32	2487
1969	11	1	566		29	35		3	102		1		819		53		2	25		12	1307	12	2978
1970	15		733	1	37	18		23	69				632		111	2		80		3	833	12	2569
1971	37	4	446		89	9		3	113				1076		45	1		12		2	973	36	2846
1972	24	17	287		27	6		7	110				920		35	1		3			466	13	1916
1973	17	126	397		71	17		11	95				915		53					2	274	17	1995
1974	1	17	1750	1	55	183		16	95		3		870		17	2		9		5	260	27	3311
1975	11	16	355	1	54	90		13	94		9		1018		62			21		2	451	23	2220
1976	246		2442		43	68		13	142		12		1467		28					4	312	68	4845
1977	49	19	2281		45	23		7	170		1		1397		60			17		9	327	133	4538
1978	146	109	1885	4	19	4		26	299		2		1556		126	20		121		1	834	93	5245
1979	36	10	1244		20			5	283				1885		39	27	1	49			736	87	4422
1980	227	97	3527	1	36	7		6	487		6	1	2160		356	18		261		2	982	185	8359
1981	22	211	2253		58			4	437				1898		1159	2		185		2	771	602	7604
1982	57	7	619		35	17		1	362			2	1676		1966			99		3	940	199	5983
1983	291	5	873		123	1		2	419				1839		28	2		80		1	1032	352	5048
1984	201	7	949	12	93	3		7	521		5	1	2238	1	105	2		72			1049	282	5548
1985	146	5	545		80	8		1	613		1	2	1949		38	3		157			911	174	4633
1986	214	96	900		70			4	795	1	461	6	2263		77	5	211	267			917	303	6590
1987	40	23	65		51	5		2	1368		762	1	2024		15	9	1502	292			1049	208	7416
1988	540	9	1261	1	38	13			1700		408		2518		39	12	30	346		1	1118	319	8353
1989	3115	26	248		50	8		9	2048	3	285		2222		68	14	1	163			1224	309	9793
1990	4655	69	1986		53	4		6	2178		483	3	3593		270	20	28	412	5	6	1310	632	15713
1991	4735	210	3543	3	82	42		6	2628	1	1991		5077		103	36	37	1436	9	2	1728	1038	22707
1992	46	246	1574		49	94		2	2549	1	4161	1	5912		174	25	28	1631	3	8	1774	548	18826
1993	219	218	991		82	264		1	3102	3	2624		5592		6	87	16	1528	3		2316	915	17967
1994	338	262	2120		37	327	14	18	3188		887	7	5774		345	84	7	1780	10	5	1987	1615	18805
1995	14	111	1998		14	320		50	3735		1170		6641		45	90	1	985	1	2	2785	792	18754
1996	20	116	3526		19	492			4357		228		5004		548	105	1	617	3	6	1663	345	17050
1997	4	586	3976		26	345			3392		23		5551		3099	141		737	4	5	1986	462	20337
1998	74	40	1951		6	273		2	3239		12		5081		418	124		310	4	3	2740	571	14848
1999	3	3657	751		12	437			4570		11		7030		3048	171		181	3	5	1675	1121	22675
2000	20	1421	706	4	17	189			2572		3		4065		1502	103		92	4	6	1039	921	12664
2001	12	348	314	1	2			2	12				22		3649	2		1			4	1885	6254
2002	80	1199	4						8				12		4561			2			5	1760	7631
2003	350	262	6						1													2	621
total	16108	9668	56331	441	1886	3482	14	302	46285	9	13600	24	103929	1	24139	1110	1865	12109	49	117	42910	16521	350900

Table 6. Number of tags recovered validated in ICCAT database, by specie and year.

Year	ALB	BET	BFT	BIL	BLF	BLM	BON	BUM	CER	KGM	LTA	SAI	SBF	SKJ	SPF	SSM	SWO	TUN	WHM	YFT	total
1951												1									1
1952												2									2
1953												1									1
1954			1																		1
1956												2									2
1957												3							1		4
1958												1									1
1959			4									3							1		8
1960												1									1
1961			2									8								1	11
1962			6									6									12
1963			19									15							2	1	37
1964			102									6		1					9		118
1965			200									3							8	1	212
1966			584									14					1		10	1	610
1967			712									17							5		734
1968	8		203					2				11					1		10		235
1969	10		57					1				7					2		19		96
1970	10		162									4					7		24		207
1971	23		142		1			1				3							37		207
1972	19	14	83					1				6					2		18		143
1973	19	127	118		1							6					1		12		284
1974	13	12	105		3	1		1				14					1		9		159
1975	9	16	158			1		2				15					2		5	1	209
1976	4	1	267		1	2						30					1		7	1	314
1977	5	1	142			2		1				30							9	6	196
1978	18	115	348	2			20					24		9			2		6	16	560
1979	4	7	213					1				28		6			3		8	2	272
1980	4	67	211					1		1		40		151			5		16	24	520
1981	3	333	448		8		4	4				81		884			16		25	253	2059
1982	2	30	39		2		3				3	64		2153			28		45	69	2438
1983	23	4	70		22			2				50		36			28		34	47	316
1984	3	5	45		20		2	8		2		43		84			13		22	56	303
1985			61		19			5			2	66	1	28			2		46	17	247
1986	2	89	61		15		1	4		4	7	89		39			10		34	80	435
1987			12		7			3		13		38		3			4		16	15	111
1988	28		53					9		8		77					10		30	16	231
1989	28	1	35		6			18		11		50		22			21		17	16	225
1990	123		56		9			17		25	2	112		226			17		25	14	626
1991	106		87		2			27		72	2	176		69		4	19		52	60	676
1992	137	2	59	1	10			35		172	1	176		155			23		47	50	868
1993	25	2	92		5	1		23	1	127		209					79		44	42	650
1994	16	31	169		3	1		49		96		204		122			110	1	82	165	1049
1995	14	15	94		2		2	38		81		123		9			67		66	142	653
1996	2	19	187			1		66		36		114		64			56		98	59	702
1997	3	186	384					168		22		186		593	2		60		88	107	1799
1998	2	67	152			1		176		6		197		93			64		143	35	936
1999	2	1061	132			1		281		4		181		512	2		30		107	150	2463
2000	2	520	47					94				118		116	2		29		22	58	1008
2001	2	63	96	1	2	2		42				51		141			15		17	33	465
2002	1	136	30					44				47		877			11		24	222	1392
2003		14												8			1				23
total	670	2938	6248	4	138	13	32	1124	1	680	17	2753	1	6401	6	4	741	1	1300	1760	24832

Table 7. Number of electronic tags available at the ICCAT Secretariat.

Country	*Species*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*Total*
ITALY	BFT							34	34
JAPAN	BFT			60		16			76
PORTUGAL	BET					11	7		18
USA	BFT	33	8	13	53	78	130	124	439
	BKM						1		1
	BUM	7			2	6	32		47
	SAI						1		1
	SMA						2		2
	SWO						29		29
	WHM						30		30
	YFT				10				10
Grand Total		40	8	73	65	111	232	158	687

Table 8. Fleet-Identification codes proposed by the Secretariat

Fleet			Reporting Flag			Vessel-Flag	PortZone			
ID	Code	Name	ID	Code	Name	A2_ISO		PartyCode	StatusType	PartyID
001DZ00	DZA	Algerie	001	DZA	Algerie	DZ	---	DZA	CP	31
002AR00	ARG	Argentina	002	ARG	Argentina	AR	---	---	NCO	99
003BB00	BRA-BRB	Brasil (Barbados)	003	BRA	Brasil	BB	---	BRA	CP	7
003BO00	BRA-BOL	Brasil (Bolivia)				BO	---	BRA	CP	7
003BR00	BRA	Brasil				BR	---	BRA	CP	7
003BZ00	BRA-BLZ	Brasil (Belize)				BZ	---	BRA	CP	7
003CA00	BRA-CAN	Brasil (Canada)				CA	---	BRA	CP	7
003ES00	BRA-ESP	Brasil (España)				ES	---	BRA	CP	7
003GQ00	BRA-GNQ	Brasil (Eq. Guinea)				GQ	---	BRA	CP	7
003GY00	BRA-GUY	Brasil (Guyan)				GY	---	BRA	CP	7
003HN00	BRA-HND	Brasil (Honduras)				HN	---	BRA	CP	7
003IS00	BRA-ISL	Brasil (Iceland)				IS	---	BRA	CP	7
003JP00	BRA-JPN	Brasil (Japan)				JP	---	BRA	CP	7
003KR00	BRA-KOR	Brasil (Korea)				KR	---	BRA	CP	7
003KY00	BRA-CYM	Brasil (Cayman Islands)				KY	---	BRA	CP	7
003PA00	BRA-PAN	Brasil (Panama)				PA	---	BRA	CP	7
003PT00	BRA-PRT	Brasil (Portugal)				PT	---	BRA	CP	7
003TW00	BRA-TAI	Brasil (Taipei)				TW	---	BRA	CP	7
003US00	BRA-USA	BRASIL (USA)				US	---	BRA	CP	7
003UY00	BRA-URY	Brasil (Uruguay)				UY	---	BRA	CP	7
003VC00	BRA-VCT	Brasil (St. Vincent)				VC	---	BRA	CP	7
003VU00	BRA-VUT	Brasil (Vanuatu)				VU	---	BRA	CP	7
004CA00	CAN	Canada	004	CAN	Canada	CA	---	CAN	CP	5
004JP00	CAN-JPN	Canada (Japan)				JP	---	CAN	CP	5
005TW00	TAI	Chinese Taipei	005	TAI	Chinese Taipei	TW	---	TAI	NCC	90
006CU00	CUB	Cuba	006	CUB	Cuba	CU	---	---	NCO	99
007DK00	EC.DNK	EC.Denmark	007	EC.DNK	EC.Denmark	DK	---	EC	CP	24
008FR00	EC.FRA	EC.France	008	EC.FRA	EC.France	FR	---	EC	CP	24
008FR01	EC.FRA-FR	EC.France (Mainland)				FR	Mainland based	EC	CP	24
008FR02	EC.FRA-FR-GP	EC.France (Guadaloupe based)				FR	Guadaloupe	EC	CP	24
008FR03	EC.FRA-FR-MQ	EC.France (Martinique based)				FR	Martinique	EC	CP	24
009DE00	EC.DEU	EC.Germany	009	EC.DEU	EC.Germany	DE	---	EC	CP	24
009DE99	EC.RFA	EC.Germany, Fed. Rep.				DE	---	EC	CP	24
010GR00	EC.GRC	EC.Greece	010	EC.GRC	EC.Greece	GR	---	EC	CP	24
011IT00	EC.ITA	EC.Italy	011	EC.ITA	EC.Italy	IT	---	EC	CP	24
011IT01	EC.ITA-IT-TY.LI	EC.Italy (Tyrreniam & Ligurian seas)				IT	Tyrrenean & Ligurian s	EC	CP	24
011IT02	EC.ITA-IT-SIC.ST	EC.Italy (Strait of Sicily)				IT	Strait of Sicily	EC	CP	24
011IT10	EC.ITA-IT-ADRIAT	EC.Italy (Adriatic sea)				IT	Adriatic sea	EC	CP	24
011IT11	EC.ITA-IT-ADRI.C	EC.Italy (Central Adriatic sea)				IT	Central Adriatic sea	EC	CP	24
011IT12	EC.ITA-IT-ADRI.S	EC.Italy (South Adriatic sea)				IT	South Adriatic sea	EC	CP	24
011IT20	EC.ITA-IT-IONIAN	EC.Italy (Ionian sea)				IT	Ionian sea	EC	CP	24
011IT21	EC.ITA-IT-IONI.N	EC.Italy (North Ionian sea)				IT	North Ionian sea	EC	CP	24
011IT22	EC.ITA-IT-IONI.S	EC.Italy (South Ionian sea)				IT	South Ionian sea	EC	CP	24

011IT30	EC.ITA-IT-LIGURY	EC.Italy (Ligurian sea)				IT	Ligurian sea	EC	CP	24
011IT40	EC.ITA-IT-SARDHA	EC.Italy (Sardenha)				IT	Sardenha	EC	CP	24
011IT50	EC.ITA-IT-TYRREN	EC.Italy (Tyrrenean sea)				IT	Tyrrenean sea	EC	CP	24
011IT51	EC.ITA-IT-TYRR.N	EC.Italy (North Tyrrenean sea)				IT	North Tyrrenean sea	EC	CP	24
011IT52	EC.ITA-IT-TYRR.S	EC.Italy (South Tyrrenean sea)				IT	South Tyrrenean sea	EC	CP	24
012JP00	JPN	Japan	012	JPN	Japan	JP	---	JPN	CP	2
013KR00	KOR	Korea, Republic of	013	KOR	Korea, Republic of	KR	---	KOR	CP	9
014LY00	LBY	Libya	014	LBY	Libya	LY	---	LBY	CP	21
015MT00	EC.MLT	EC.Malta	015	EC.MLT	EC.Malta	MT	---	EC	CP	24
016MA00	MAR	Maroc	016	MAR	Maroc	MA	---	MAR	CP	8
017NO00	NOR	Norway	017	NOR	Norway	NO	---	NOR	CP	37
018PL00	EC.POL	EC.Poland	018	EC.POL	EC.Poland	PL	---	EC	CP	24
019PT00	EC.PRT	EC.Portugal	019	EC.PRT	EC.Portugal	PT	---	EC	CP	24
019PT01	EC.PRT-PT-MAINLND	EC.Portugal (Mainland based)				PT	Mainland	EC	CP	24
019PT02	EC.PRT-PT-AZORES	EC.Portugal (Azores based)				PT	Azores	EC	CP	24
019PT03	EC.PRT-PT-MADEIRA	EC.Portugal (Madeira based)				PT	Madeira	EC	CP	24
020IS00	ZAF-ISL	South Africa (Island)	020	ZAF	South Africa	IS	---	ZAF	CP	3
020KR00	ZAF-KOR	South Africa (Korea)				KR	---	ZAF	CP	3
020NA00	ZAF-NAM	South Africa (Namibia)				NA	---	ZAF	CP	3
020PA00	ZAF-PAN	South Africa (Panama)				PA	---	ZAF	CP	3
020SC00	ZAF-SYC	South Africa (Seychelles)				SC	---	ZAF	CP	3
020VC00	ZAF-VCT	South Africa (St. Vincent)				VC	---	ZAF	CP	3
020ZA00	ZAF	South Africa				ZA	---	ZAF	CP	3
021ES00	EC.ESP	EC.España	021	EC.ESP	EC.España	ES	---	EC	CP	24
021ES01	EC.ESP-ES-CANARY	EC.España (Canary based)				ES	Canarias	EC	CP	24
021ES02	EC.ESP-ES-FTRBIA	EC.España (Fuenterrabia based)				ES	Fuenterrabia	EC	CP	24
021ES03	EC.ESP-ES-CORNHA	EC.España (Coruña based)				ES	Coruña	EC	CP	24
021ES04	EC.ESP-ES-MALAGA	EC.España (Malaga based)				ES	Malaga	EC	CP	24
021ES05	EC.ESP-ES-STNDER	EC.España (Santander based)				ES	Santander	EC	CP	24
021ES06	EC.ESP-ES-VIGO	EC.España (Vigo based)				ES	Vigo	EC	CP	24
021ES07	EC.ESP-ES-ETRO	EC.España (East tropical fishery)				ES	ETRO	EC	CP	24
022SE00	EC.SWE	EC.Sweden	022	EC.SWE	EC.Sweden	SE	---	EC	CP	24
023TN00	TUN	Tunisie	023	TUN	Tunisie	TN	---	TUN	CP	25
023TN01	TUN-TN-MONAST	Tunisie (Monastir based)				TN	---	TUN	CP	25
024TR00	TUR	Turkey	024	TUR	Turkey	TR	---	TUR	CP	35
025US00	USA	U.S.A.	025	USA	U.S.A.	US	---	USA	CP	1
026YU00	YUG-Ex	Ex. Yugoslavia	026	YUG	Yugoslavia	YU	---	---	NCO	99
027GH00	GHA	Ghana	027	GHA	Ghana	GH	---	GHA	CP	4
027GH01	GHA.BASED	Ghana (Ghanian based)				GH	based in Ghana	GHA	CP	4
027GH02	GHA.LOCMARK	Ghana (Ghanian local market)				GH	Local market	GHA	CP	4
028PA00	PAN	Panama	028	PAN	Panama	PA	---	PAN	CP	26
029VE00	VEN	Venezuela (foreign based)	029	VEN	Venezuela	VE	---	VEN	CP	17
029VE01	VEN-FOR.FLTS	Venezuela				VE	---	VEN	CP	17
030GD00	GRD	Grenada	030	GRD	Grenada	GD	---	---	NCO	99
031MX00	MEX	Mexico	031	MEX	Mexico	MX	---	MEX	CP	32
034AO00	AGO	Angola	034	AGO	Angola	AO	---	AGO	CP	11
035RU00	RUS	U.S.S.R.	035	USR	U.S.S.R.	RU	---	RUS	CP	12

037DO00	DOM	Dominican Republic	037	DOM	Dominican Republic	DO	---	---	NCO	99
038IL00	ISR	Israel	038	ISR	Israel	IL	---	---	NCO	99
039LB00	LBN	Lebanon	039	LBN	Lebanon	LB	---	---	NCO	99
040SL00	SLE	Sierra Leone	040	SLE	Sierra Leone	SL	---	---	NCO	99
041TT00	TTO	Trinidad and Tobago	041	TTO	Trinidad and Tobago	TT	---	TTO	CP	27
042UY00	URY	Uruguay	042	URY	Uruguay	UY	---	URY	CP	15
043VI00	VIR	US Virgin Islands	043	VIR	US Virgin Islands	VI	---	---	NCO	99
047BG00	BGR	Bulgaria	047	BGR	Bulgaria	BG	---	---	NCO	99
048CY00	EC.CYP	EC.Cyprus	048	EC.CYP	EC.Cyprus	CY	---	EC	CP	24
049DE00	DDR	Germany Democratic Rep.	049	DDR	Germany Democratic Rep.	DE	---	---	NCO	99
050CI00	CIV	Côte D'Ivoire	050	CIV	Côte D'Ivoire	CI	---	CIV	CP	10
050CI01	CIV (Abidjan based)	Côte D'Ivoire				CI	Abidjan	CIV	CP	10
051LR00	LBR	Liberia	051	LBR	Liberia	LR	---	---	NCO	99
052RO00	ROU	Rumania	052	ROU	Rumania	RO	---	---	NCO	99
053SN00	SEN	Senegal	053	SEN	Senegal	SN	---	---	NCO	99
058PR00	PRI	Puerto Rico	058	PRI	Puerto Rico	PR	---	---	NCO	99
060EG00	EGY	Egypt	060	EGY	Egypt	EG	---	---	NCO	99
061SH00	UK.SHN	Sta. Helena	061	UK.SHN	Sta. Helena	SH	---	UK.OT	CP	20
062CO00	COL	Colombia	062	COL	Colombia	CO	---	---	NCO	99
063BB00	BRB	Barbados	063	BRB	Barbados	BB	---	BRB	CP	29
064SY00	SYR	Syrian Arab Republic	064	SYR	Syrian Arab Republic	SY	---	---	NCO	99
065CV00	CPV	Cape Verde	065	CPV	Cape Verde	CV	---	CPV	CP	14
066IE00	EC.IRL	EC.Ireland	066	EC.IRL	EC.Ireland	IE	---	EC	CP	24
067BJ00	BEN	Benin	067	BEN	Benin	BJ	---	---	NCO	99
068GA00	GAB	Gabon	068	GAB	Gabon	GA	---	GAB	CP	13
069CG00	COG	Congo	069	COG	Congo	CG	---	---	NCO	99
070NL00	EC.NLD	EC.Netherlands	070	EC.NLD	EC.Netherlands	NL	---	EC	CP	24
071HN00	HND	Honduras	071	HND	Honduras	HN	---	HND	CP	30
072TG00	TGO	Togo	072	TGO	Togo	TG	---	---	NCO	99
074KY00	CYM	Cayman Islands	074	CYM	Cayman Islands	KY	---	---	NCO	99
076AN00	ANT	Netherlands Antilles	076	ANT	Netherlands Antilles	AN	---	---	NCO	99
077LC00	LCA	Sta. Lucia	077	LCA	Sta. Lucia	LC	---	---	NCO	99
079ST00	STP	S. Tomé e Príncipe	079	STP	S. Tomé e Príncipe	ST	---	STP	CP	16
081GQ00	GNQ	Guinea Ecuatorial	081	GNQ	Guinea Ecuatorial	GQ	---	GNQ	CP	18
082MR00	MRT	Mauritania	082	MRT	Mauritania	MR	---	---	NCO	99
083BM00	UK.BMU	UK.Bermuda	083	UK.BMU	UK.Bermuda	BM	---	UK.OT	CP	20
084CM00	CMR	Cameroon	084	CMR	Cameroon	CM	---	---	NCO	99
088NG00	NGA	Nigeria	088	NGA	Nigeria	NG	---	---	NCO	99
090AW00	ABW	Aruba	090	ABW	Aruba	AW	---	---	NCO	99
094GW00	GNB	Guinea Bissau	094	GNB	Guinea Bissau	GW	---	---	NCO	99
101HR00	HRV	Croatia	101	HRV	Croatia	HR	---	HRV	CP	23
104RU00	RUS	Russian Federation	104	RUS	Russian Federation	RU	---	RUS	CP	12
105GN00	GIN	Guinée Conakry	105	GIN	Guinée Conakry	GN	---	GIN	CP	19
110UA00	UKR	Ukraine	110	UKR	Ukraine	UA	---	---	NCO	99
111VC00	VCT	St. Vincent and Grenadines	111	VCT	St. Vincent and Grenadines	VC	---	---	NCO	99
112GB00	EC.GBR	EC.United Kingdom	112	EC.GBR	EC.United Kingdom	GB	---	EC	CP	24
113NA00	NAM	Namibia	113	NAM	Namibia	NA	---	NAM	CP	28

114AG00	ATG	Antigua and Barbuda	114	ATG	Antigua and Barbuda	AG	---	---	NCO	99
115JM00	JAM	Jamaica	115	JAM	Jamaica	JM	---	---	NCO	99
116DM00	DMA	Dominica	116	DMA	Dominica	DM	---	---	NCO	99
118CN00	CHN	China, People's Republic of	118	CHN	China, People's Republic of	CN	---	CHN	CP	22
119GY00	GUY	Guyana	119	GUY	Guyana	GY	---	GUY	NCC	91
134BZ00	BLZ	Belize	134	BLZ	Belize	BZ	---	---	NCO	99
142CR00	CRI	Costa Rica	142	CRI	Costa Rica	CR	---	---	NCO	99
143EE00	EC.EST	EC.Estonia	143	EC.EST	EC.Estonia	EE	---	EC	CP	24
143EE01	EC.EST.EE.Vigo	EC.Estonia (Vigo based)				EE	Vigo	EC	CP	24
144GE00	GEO	Georgia	144	GEO	Georgia	GE	---	---	NCO	99
145LV00	EC.LVA	EC.Latvia	145	EC.LVA	EC.Latvia	LV	---	EC	CP	24
146LT00	EC.LTU	EC.Lithuania	146	EC.LTU	EC.Lithuania	LT	---	EC	CP	24
147GM00	GMB	Gambia	147	GMB	Gambia	GM	---	---	NCO	99
148AL00	ALB	Albania	148	ALB	Albania	AL	---	---	NCO	99
152YU00	YUG	Yugoslavia Fed. Rep.	152	YUG	Yugoslavia	YU	---	---	NCO	99
156IS00	ISL	Iceland	156	ISL	Iceland	IS	---	ISL	CP	34
157BY00	BLR	Belarus	157	BLR	Belarus	BY	---	---	NCO	99
164FO00	FRO	Faroe Islands	164	FRO	Faroe Islands	FO	---	---	NCO	99
165PH00	PHL	Philippines	165	PHL	Philippines	PH	---	PHL	CP	36
166KH00	KHM	Cambodia	166	KHM	Cambodia	KH	---	---	NCO	99
167FK00	UK.FLK	Falkland Islands	167	UK.FLK	Falkland Islands	FK	---	UK.OT	CP	20
172PM00	FR.SPM	FR-Saint Pierre et Miquelon	172	FR.SPM	FR.Saint Pierre et Miquelon	PM	---	FR.PM	CP	6
178PS00	PSE	Palestinian Territory, Occupied	178	PSE	Palestinian Territory, Occupied	PS	---	---	NCO	99
178PS01	PSE-PS-GAZA.ST	Palestenean (Gaza strip based)				PS	---	---	NCO	99
179SC00	SYC	Seychelles	179	SYC	Seychelles	SC	---	---	NCO	99
185KN00	KNA	St. Kitts and Nevis	185	KNA	Saint Kitts and Nevis	KN	---	---	NCO	99
185KN01	KNA-KN-ST.KITTS	St. Kitts and Nevis (St. Kitts based)				KN	---	---	NCO	99
185KN02	KNA-KN-NEVIS	St. Kitts and Nevis (Nevis based)				KN	---	---	NCO	99
191MU00	MUS	Mauritius	191	MUS	Mauritius	MU	---	---	NCO	99
192IN00	IND	India	192	IND	India	IN	---	---	NCO	99
193VU00	VUT	Vanuatu	193	VUT	Vanuatu	VU	---	VUT	CP	33
194IR00	IRN	Iran, Islamic Republic of	194	IRN	Iran, Islamic Republic of	IR	---	---	NCO	99
195MY00	MYS	Malaysia	195	MYS	Malaysia	MY	---	---	NCO	99
196GT00	GTM	Guatemala	196	GTM	Guatemala	GT	---	---	NCO	99
197SV00	SLV	El Salvador	197	SLV	El Salvador	SV	---	---	NCO	99
198AI00	UK.AIA	Anguilla	198	UK.AIA	Anguilla	AI	---	UK.OT	CP	20
199TC00	UK.TCA	Turks and Caicos Islands	199	UK.TCA	Turks and Caicos Islands	TC	---	UK.OT	CP	20
200BE00	EC.BEL	EC.Belgium	200	EC.BEL	EC.Belgium	BE	---	EC	CP	24
201VG00	UK.VGB	British Virgin Islands	201	UK.VGB	British Virgin Islands	VG	---	UK.OT	CP	20
202TH00	THA	Thailand	202	THA	Thailand	TH	---	---	NCO	99
203CL00	CHL	Chile	203	CHL	Chile	CL	---	---	NCO	99
510DK00	NEI.007	NEI (Denmark)	500	NEI.FLAGS	Flag related NEI's	DK	---	---	NCO	99
511FR00	NEI.008	NEI (France)				FR	---	---	NCO	99
512GR00	NEI.010	NEI (Greece)				GR	---	---	NCO	99
513IT00	NEI.011	NEI (Italy)				IT	---	---	NCO	99
514MA00	NEI.016	NEI (Norway)				MA	---	---	NCO	99
515PT00	NEI.019	NEI (Portugal)				PT	---	---	NCO	99

516ES00	NEI.021	NEI (Espana)				ES	---	---	NCO	99
517PA00	NEI.028	NEI (Panama)				PA	---	---	NCO	99
518MX00	NEI.031	NEI (Mexico)				MX	---	---	NCO	99
519SL00	NEI.040	NEI (Sierra Leone)				SL	---	---	NCO	99
520UY00	NEI.042	NEI (Uruguay)				UY	---	---	NCO	99
521IE00	NEI.066	NEI (Ireland)				IE	---	---	NCO	99
522HN00	NEI.071	NEI (Honduras)				HN	---	---	NCO	99
523ST00	NEI.079	NEI (S. Tomé e Principe)				ST	---	---	NCO	99
524GQ00	NEI.081	NEI (Eq. Guinea)				GQ	---	---	NCO	99
525GW00	NEI.094	NEI (Guine Bissau)				GW	---	---	NCO	99
526RU00	NEI.104	NEI (Russian Fed.)				RU	---	---	NCO	99
527GN00	NEI.105	NEI (G. Conakry)				GN	---	---	NCO	99
528VC00	NEI.111	NEI (St. Vincent)				VC	---	---	NCO	99
529GB00	NEI.112	NEI (EC.GBR)				GB	---	---	NCO	99
530CN00	NEI.118	NEI (China)				CN	---	---	NCO	99
531BZ00	NEI.134	NEI (Belize)				BZ	---	---	NCO	99
532GE00	NEI.144	NEI (Georgia)				GE	---	---	NCO	99
533GM00	NEI.147	NEI (Gambia)				GM	---	---	NCO	99
534BY00	NEI.157	NEI (Belarus)				BY	---	---	NCO	99
535KH00	NEI.166	NEI (Cambodia)				KH	---	---	NCO	99
536PM00	NEI.172	NEI (France, S. Pierre Miquellon)				PM	---	---	NCO	99
501--00	NEI.001	NEI (ETRO)	501	NEI.001	Combined NEI	--	---	---	NCO	99
502--00	NEI.002	NEI (Mediterranean Unclassified)	502	NEI.002	Combined NEI	--	---	---	NCO	99
503--00	NEI.COMB	NEI (Combined fleets BFT)	503	NEI.COMB	Combined NEI	--	---	---	NCO	99
504--00	NEI.UK.OT	NEI (UK-O. Territories unclassified)	504	NEI.UK.OT	Combined NEI	--	---	---	NCO	99
800--00	MIX.FIS	France + C. Ivoire + Senegal	800	MIX.FIS	Mixed flags	--	---	---	NCO	99
801--00	MIX.KR+PA	Korea + Panama	801	MIX.KR+PA	Mixed flags	--	---	---	NCO	99
802--00	MIX.FR+ES	EC-France + España	802	MIX.FR+ES	Mixed flags	--	---	---	NCO	99
900JP00	JPN.REF	Japan (Reference data)	900	JPN.ref	Japan	JP	---	---	NCO	99
910CA00	JPN.OB.CAN	Japan (observed by Canada)	910	JPN.obs	Japan (foreign obs.)	CA	---	---	NCO	99
910SH00	JPN.OB.SHN	Japan (observed by Sta. Helena)				SH	---	---	NCO	99
910US00	JPN.OB.USA	Japan (observed by USA)				US	---	---	NCO	99
911SH00	TAI.OB.SHN	Chinese Taipei (observed by Sta. Helena)	911	TAI.Obs	Chinese Taipei (foreign obs.)	SH	---	---	NCO	99
912SH00	HND.OB.SHN	Honduras (observed by Sta. Helena)	912	HND.Obs	Honduras (foreign obs.)	SH	---	---	NCO	99
913SH00	PAN.OB.SHN	Panama (observed by Sta. Helena)	913	PAN.Obs	Panama (foreign obs.)	SH	---	---	NCO	99
914SH00	SGP.OB.SHN	Singapore (Observed by Sta. Helena)	914	SGP.Obs	Singapore (foreign obs.)	SH	---	---	NCO	99
915SH00	BLZ.OB.SHN	Belize (Observed by Sta. Helena)	915	BLZ.Obs	Belize (foreign obs.)	SH	---	---	NCO	99
916SH00	SYC.OB.SHN	Seychelles (Observed by Sta. Helena)	916	SYC.Obs	Seychelles (foreign obs.)	SH	---	---	NCO	99
920--00	GHA.ICCAT	Ghana (ICCAT program)	920	GHA.ICCAT	Ghana (ICCAT program)	--	---	---	NCO	99
921--00	JPN.ICCAT	Japan (ICCAT program)	921	JPN.ICCAT	Japan (ICCAT program)	--	---	---	NCO	99
922--00	CUB.ICCAT	Cuba (ICCAT program)	922	CUB.ICCAT	Cuba (ICCAT program)	--	---	---	NCO	99
923--00	CHN.ICCAT	China (ICCAT program)	923	CHN.ICCAT	China (ICCAT program)	--	---	---	NCO	99
999--99	UNCL.FLEETS	OTHERS (Unclassified fleets)	999	UNCL	Unclassified flag	--	---	---	NCO	99

Table 9. Gear classification

CATEGORY

GearCategID	GearCategory	ISSCFGcateg
0	Unclassified	--
1	Hooks and lines	09
2	Gillnets & entangling nets	07
3	Surrounding nets	01
4	Seine nets	02
5	traps	08
6	trawls	03
7	Grapling & wounding	10
8	Recreational (sport)	25

GROUP

GearGrpID	GearGrpCode	GearGroup	GearCategID	FAO	ISSCFG
0	UN	Not specified	0	--	--
11	LL	Longlines	1	09.3.0	Set longlines
12	LD	Drift longlines	1	09.4.0	Drift longlines
13	TR	Trolling	1	09.6.0	Trolling lines
14	BB	Bait boats	1	09.9.0	Hooks & lines (n. spec.)
15	RR	Rod and reel	1	09.9.0	Hooks & lines (n. spec.)
16	TL	Tended line	1	09.9.0	Hooks & lines (n. spec.)
17	HL	Hand lines	1	09.2.0	Handline & pole-lines
21	GN	Gillnets	2	07.1.0	Set gillnets
22	TN	Trammel net	2	07.5.0	Trammel nets
30	PS	Purse seines double	3	01.1.0	Purse seines
40	HS	Haul seines	4	02.1.0	Beach seines
50	TP	Traps	5	08.9.0	Traps (not specified)
60	TW	Trawl	6	03.9.0	Trawls (not speciefied)
70	HP	Harpoons	7	10.1.0	Harpoons
80	SP	Recreational	25	25.0.0	Recreational (sport)

WATERcat

P	pelagic (surf)
H	hemipelagic (mid water)
D	Bentonic (depp water)

SCALEcat

S	Small
M	Medium
L	Large

GearID	GearCode	fishing water	GearName	GearGrpID	GearGrpName	GearIDold	GearCodeOld
00.00	UNC	n/a	Unclassified: Gears not reported	00	UNC	13	UNCL
11.00	LL	n/a	Longline (not specified)	11	LL	1	LL
11.01	LLMB	bottom	Longline: With mother boat	11	LL	2	LLMB
11.02	LLFB	bottom	Longline: Foreign-based	11	LL	3	LLFB
11.03	LLHB	bottom	Longline: Home-based	11	LL	4	LLHB
11.04	LLPB	bottom	Longline:"Stone-ball" (used by Spain)	11	LL	43	LLPB
11.05	LLJP	bottom	Longline: japanese type (used by Spain)	11	LL	42	LLJAP
11.10	LLB	bottom	Longline: Deep water set longlines	11	LL	32	BLL
11.11	LLB.ALB	bottom	Longline: targeting ALB (Spain)	11	LL	41	LLALB
11.12	LLB.BFT	bottom	Longline: Targetting BFT (used by Italy)	11	LL	45	LLBFT
11.13	LLB.SWO	bottom	Longline: Targetting SWO (used by Italy)	11	LL	46	LLSWO
11.50	LLS	surf	Longline: Surface	11	LL	48	LL-surf
12.00	LD	bottom	Drift longline (used by Italy)	12	LD	47	LL-deri
13.00	TR	surf	Trolling	13	TR	9	TROL
14.00	BB	surf	Baitboat	14	BB	17	BB
14.01	BBI	surf	Baitboat: Ice-well	14	BB	15	BBI
14.02	BBF	surf	Baitboat: Freezer	14	BB	16	BBF
15.00	RR	surf	Sport: Rod-and-reel	15	RR	22	RR
15.01	RRSP	surf	Sport: Recreational fisheries (mostly rod and reel)	15	RR	12	SPOR
15.02	RRFB	surf	Sport: Rod-and-reel catching large fish	15	RR	27	RRFB
15.03	RRFS	surf	Sport: Rod-and-reel catching small fish	15	RR	28	RRFS
16.00	TL	surf	Tended line	16	TL	36	TL
17.00	HL	surf	Handline	17	HL	19	HAND
17.01	HLSP	surf	Sport: Hand line	17	HL	31	SPHL
21.00	GN	surf	Gillnet: Drift net	21	GN	24	GILL
21.00	GNM	surf	Gillnet: Drift nets - misto (used by Italy)	21	GN	44	GILLM
22.00	TN	surf	Trammel net	22	TN	30	TN
30.00	PS	surf	Purse seine (not specified)	30	PS	6	PS
30.01	PS	surf	Purse seine: Using live bait	30	PS	21	PSLB
30.02	PS	surf	Purse seine: Catching large fish	30	PS	25	PSFB
30.03	PS	surf	Purse seine: Catching small fish	30	PS	26	PSFS
30.10	PS1M	surf	Purse seine: Medium scale (between 50 and 200 MT capacity)	30	PS	20	PSM
30.11	PS1S	surf	Purse seine: Small scale (less than 50 MT capacity)	30	PS	7	PSS
30.12	PS1L	surf	Purse seine: Large scale (over 200 MT capacity)	30	PS	5	PSG
30.20	PS2	surf	Purse seine: Double-boats	30	PS	8	PSD
40.00	HS	surf	Haul seine	40	HS	29	HS
50.00	TP	surf	Trap (not specified)	50	TP	10	TRAP
50.01	TPM	surf	TRAP: not-fixed	50	TP	49	TRAPM
60.00	TW	n/a	Trawl (not unspecified)	60	TW	14	TRAW
60.01	TWM	surf	Trawl: Mid-water pelagic trawl	60	TW	23	MWT
60.02	TW	mid-water	Trawl: Mid-water paired trawl	60	TW	34	MWTD
70.00	HP	surf	Harpoon	70	HP	18	HARP
80.00	SP		Recreational (not specified)	80			
??	oth		Surface fisheries unclassified	?	oth	11	SURF

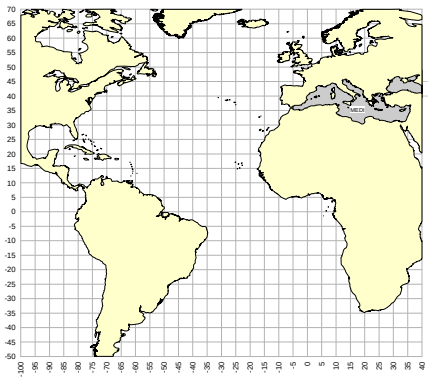


Fig.1a. Mediterranean area

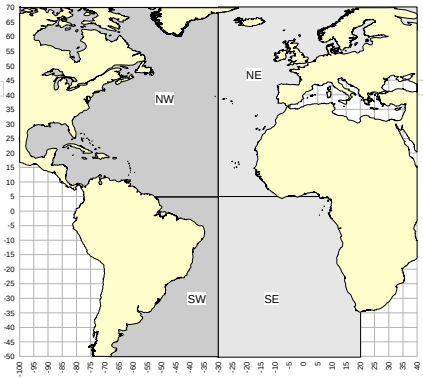


Fig.1b. NW_NE-SW_SE

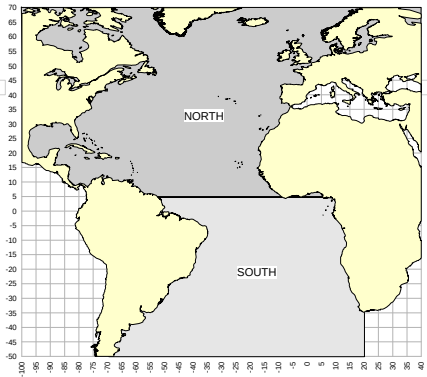


Fig.1c. North_South

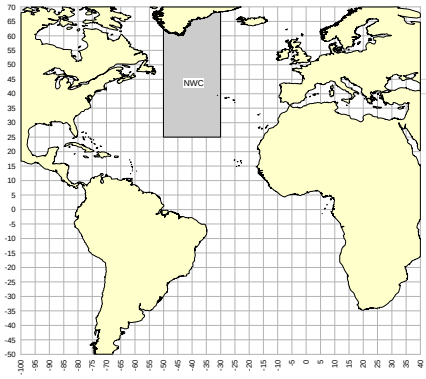


Fig.1d. North_west_central

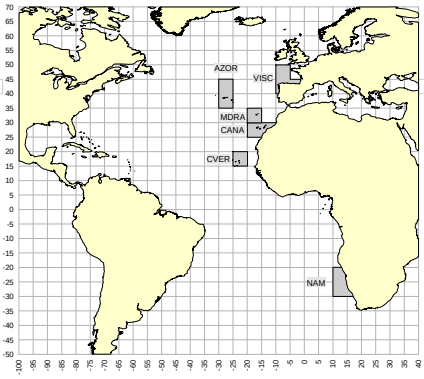


Fig.1e. Locals areas

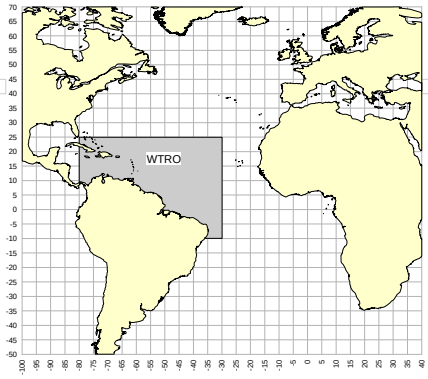


Fig.1f. West tropical

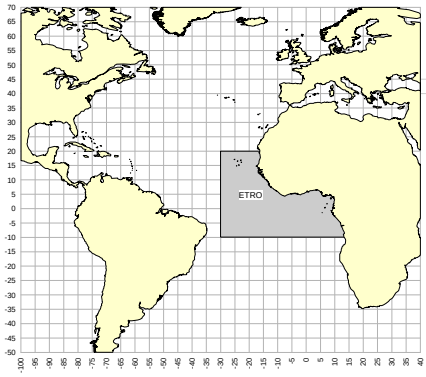


Fig.1g. East tropical

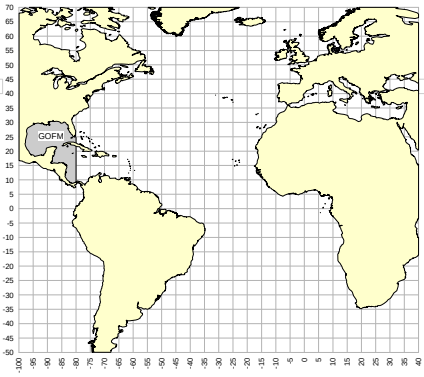


Fig. 1h. Gulf of Mexico

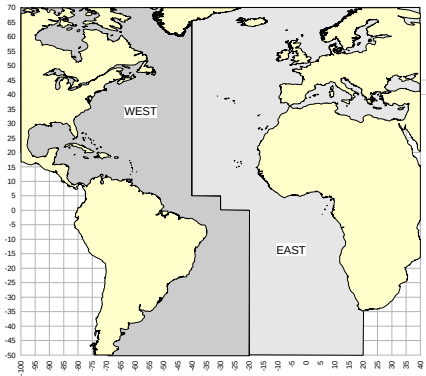


Fig. 1i. East_West (sailfish)

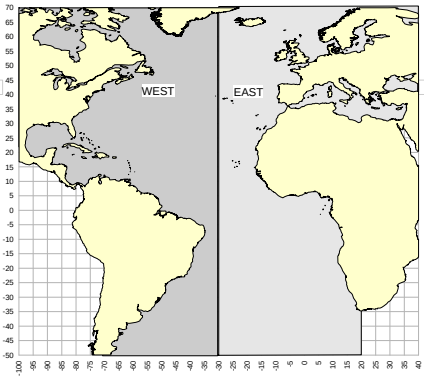


Fig. 1j. East_West(YFT-SKJ)

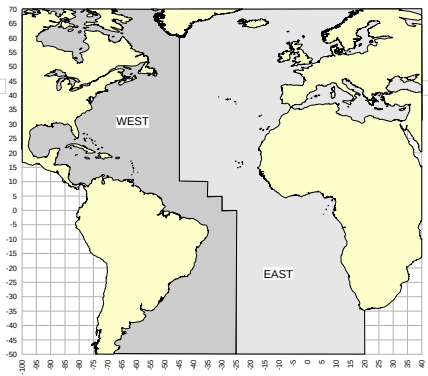


Fig.1k. East_West (bluefin)

Figure 1. Geographic delimitations of areas used in Task I.

Appendix 1

Comparison Between Task I Data and Trade Data and Revised NEI Estimates

In accordance with the ICCAT Recommendations, the Secretariat received reports of statistical documents for bluefin tuna, swordfish and bigeye tuna and also information on re-export certificates. When possible, the data in product type from the statistical documents and the re-export certificates were converted to live weight and, if there were no conversion factors available, the weight from the trade data in product type was maintained. Then, the nominal catch from Task I was compared with the trade data thus estimating possible unreported catch.

Bluefin tuna

For the comparative analysis the information from the trade data of **Appendix Table 1** was not used for the following reasons:

- Information on the ocean was not submitted,
- The Atlantic area was not specified,
- The Party/Entity/Fishing Entity for re-export product was not reported.

The conversion factors in **Appendix Table 2** were used without any exception. In **Appendix Table 3** the estimate of NEI-Combined was estimated according to the recommendations made by the ICCAT working group at the Data Exploratory meeting for the East Atlantic and Mediterranean (SCRS/2004/013). The result of this calculation shows zero catch for NEI-Combined except 2003. At the time of the writing this report the information for 2003 was very incomplete. We have also presented in **Appendix Table 4** a comparison between Task I and trade data by flag, area, gear and year.

Swordfish and bigeye tuna

The Secretariat was unable to find conversion factors from product type to live weight for these two species. The information received for swordfish and bigeye was very poor. Nevertheless, in **Appendix Table 5** and **Appendix Table 6** a comparison is made of Task I and trade data in product type.

Appendix Table 1. BFT trade imformation (SDs & RCs) not used in the comparative analysis (t)

				EC SD's	**KOR SD's**			**TUN SD's**	**TWN SD's**	**USA SD's**											
				EC imports	**KOR imports**			**TUN impor**	**TWN impo**	**CAN imports**			**JPN imports**					**exports to unknown countries**				
				wild	**wild**		**farm**	**wild**	**wild**	**wild**			**wild**					**wild**				
				SD	**SD**	**RC**	**SD**	**SD**	**SD**	**RC**			**RC**					**ex**				
Data	Area	Flag	GearGrp	2001	2003	2003	2003	2003	2003	2000	2002	2003	1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
round weight	AE	EC.España	LL												1	0						
		EC.Portugal	LL		10																	
		Japan	LL		18																	
		Maroc	RR	53																		
			TP	133	463																	
	AW	Canada	HP										1									
			RR										1		1	2	1					
		Mexico	LL							0			3	7	1							
		U.S.A.	HP															95	125	63	24	30
			LL															14	15	7	1	5
			PS															251	282	198	216	251
			RR															563	526	749	672	428
			UNC															0				
	MED	Chinese Tai	LL		134																	
		Croatia	PS		31																	
		EC.España	LL												1							
			PS		103						0	0	6	6		0						
		EC.France	PS		36			1490														
		EC.Italy	LL												1							
			PS		39																	
			TP						1													
			UNC		10		3															
		EC.Malta	LL		163																	
			PS		1																	
		Japan	LL		57																	
		Libya	LL		34																	
		Maroc	RR	12																		
			TP		3																	
		Tunisie	PS	1201	24																	
		Turkey	UNC				12															
Product weight (invalid area and/or gear)	ATL	Canada	RR		1,778																	
		EC.España	TP		15,587																	
		Japan	LL		10,869																	
		Maroc	RR		2,278																	
			TP		27,938																	
	UNK	Chinese Tai	UNC			40,05																
		EC.España	UNC			73,4624																
		EC.France	UNC			4,681																
		EC.Italy	UNC			31,9902																
		EC.Malta	UNC			5,362																
		Japan	UNC			0,629	0,1277															
		Libya	UNC			27,6918																
		Maroc	UNC			194,236																
		Turkey	UNC			0,3558																

Appendix Table 2. Conversion factors

		Area	BM	DR	FL	GG	OT	RD
Wild		AE	10,9	1,25	1,67	1,16	2	1
		AW	10,9	1,25	1,67	1,16	2	1
		MED	10,28	1,25	1,67	1,16	2	1
Farmed		AE	1	1,25	1,67	1,16	2	1
		AW	1	1,25	1,67	1,16	2	1
		MED	1	1,25	1,67	1,16	2	1

BM = Belly meat
DR = Dressed weight
FL = Fillets
GG = Gilled & gutted
OT = Others
RD = Round weight

Appendix Table 3. NEI-COMB revised estimates for MED and AE (t, round weight) between 1993 and 2003.

TASK-I — T1

Area	Flag	Gear	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AE	EC	TP	1244	1136	942	1222	2742	1570	2007	1456	1255	1565	
	Maroc	TP	387	494	210	699	1240	1518	852	1540	2330	1670	1305
MED	Croatia	HP											
		LL					11	16	10		9	1	
		PS	1058	1410	1220	1360	1088	889	921	930	890	975	1137
		RR					6	1	39		4	1	2
		TW											
		UNC											
	Croatia Sum		1058	1410	1220	1360	1105	906	970	930	903	977	1139
	EC	BB	48		206	5	4	11	4	0		1	
		GN	209	72	109	57	150		10	13	26		
		HP	2	2	4	10	20		5	5	2		
		LL	687	2294	3571	3210	2989	1030	1497	1292	1284	1198	80
		PS	12590	18214	16035	17296	15973	11711	9275	11267	10835	10749	
		RR	1194	1803	2683	1472	1732	387	687	1061	853	1073	
		TP	205	182	242	298	155	424	309	353	427	365	
		TR		13	15			9	8			12	
		TW											
		UNC	293	782	455	930	588	355	441	526	32	24	
	EC Sum		15228	23362	23320	23278	21611	13927	12237	14517	13459	13422	80
	Libya	LL	67	802	865	80	448	409	450	1002	1866		
		PS	568	470	495	598	32	230	195	16			
		TP		150	180	134	72	181	100	44	74		
		UNC											
	Libya Sum		635	1422	1540	812	552	820	745	1063	1940		
	Maroc	GN	6	16	92	30	17	18	6	6	9	14	20
		LL											
		PS											170
		RR		373	816	541	455	544	600	650	195	407	570
		TP	73	703	127	15	63	2	30	39	307		
	Maroc Sum		79	1092	1035	586	535	564	636	695	511	421	760
	Tunisie	LL											
		PS	1997	2253	1617	2147	1992	1662	2263	2134	2432	2510	
		RR	43	81	57	92	113	48	43	37	58	15	
		TP	92	169	223	154	95	35	46	13	3	3	
		TR											
		UNC											
	Tunisie Sum		2132	2503	1897	2393	2200	1745	2352	2184	2493	2528	
	Turkey	GN											
		LL											
		PS	3084	3466	4219	4616	5093	5899	1200	1070	2100	2300	
		RR											
		UNC			1								
	Turkey Sum		3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	

TRADE — Japanese Imports (no farm) — direct (SD) — J1

Area	Flag	Gear	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AE	EC	TP		1963	1100	670	3223	2127	4063	1560	1294	2143	1162
	Maroc	TP	72	440	262	508	860	1986	544	1444	2480	919	1183
MED	Croatia	HP				0							
		LL				3	6	14	8	3	10	3	
		PS				1	377	152	17	141	232	291	333
		RR				30	23	10	35	38	29	7	5
		TW						0					
		UNC					0				0		3
	Croatia Sum					35	406	177	60	182	271	301	340
	EC	BB		6	53	41	55	107	23	59	49	14	5
		GN		0		31		8		1	2		
		HP											
		LL		1498	4375	2723	2089	814	1657	1406	1249	779	1140
		PS	260	6322	6481	6771	5598	6056	6676	3505	669	267	1230
		RR	40	227	761	479	546	319	273	338	227	387	86
		TP		123	188	180	83	161	133	163	229	301	83
		TR					0				0		
		TW						1		0	0		
		UNC		149	107	21	10	2	2	89	170	145	46
	EC Sum		300	8325	11965	10245	8381	7468	8763	5561	2594	1894	2590
	Libya	LL						191	240	461	344	157	291
		PS		1			20	13		24			188
		TP		1			6	28	22			58	39
		UNC		34				4		29			
	Libya Sum			37			26	236	262	514	344	216	518
	Maroc	GN											
		LL				0							
		PS											
		RR			28	1	11	91		38	4		
		TP		3	2	2		11					
	Maroc Sum			3	29	3	11	102		38	4		
	Tunisie	LL		0	1				1	1	8		
		PS		68	600	1212	547	945	668	620	519	333	253
		RR		0	3	23	4	1	2	2	0	3	
		TP		49	102	26	27	10	22	0	5	16	3
		TR		0	11	28	5						
		UNC		3	2	1	5			0	3	6	
	Tunisie Sum			121	719	1289	589	956	693	623	535	358	256
	Turkey	GN					8						
		LL										3	
		PS		61	139	156	359	417	292	506	444	1055	1099
		RR				1						10	9
		UNC		33	1	6	2		44	28	68	336	662
	Turkey Sum			94	140	163	369	417	336	534	512	1405	1770

TRADE — Japanese Imports (no farm) indirect (RC) J2; Japanese Imports (farm) direct (SD) JF1 and indirect (RC) JF2; USA Imports (no farm) direct (SD) U1

Area	Flag	Gear	J2 1999	J2 2000	J2 2001	J2 2002	J2 2003	JF1 1997	JF1 1998	JF1 1999	JF1 2000	JF1 2001	JF1 2002	JF1 2003	JF2 2000	JF2 2001	JF2 2002	JF2 2003	U1 1999	U1 2000	U1 2001	U1 2002	U1 2003
AE	EC	TP	185	6	51	21	35												14				13
	Maroc	TP	48	92	331	659	300																
MED	Croatia	HP																					
		LL																					
		PS			2				86	35	674	1006	1915	2602						0	2		11
		RR																					
		TW																					
		UNC							18	248				4									
	Croatia Sum				2				105	284	674	1006	1915	2606						0	2		11
	EC	BB																					
		GN																					
		HP																					
		LL	155	93	83	325	45			0				4					26	24	83	80	46
		PS	2131	887	1667	551		262	1447	3111	4395	5870	7570	5506	2	373	975	567	98	183	262	315	291
		RR		19															6	8	17	2	7
		TP		73																		5	
		TR																					
		TW																					
		UNC		104	11	2029	2359				10			120			258	1084			1		27
	EC Sum		2286	1175	1761	2906	2404	262	1447	3111	4405	5870	7570	5629	2	373	1232	1652	131	214	363	402	371
	Libya	LL			18		41																
		PS			158	317																	
		TP																					
		UNC			63																		
	Libya Sum				239	317	41																
	Maroc	GN																					
		LL																					
		PS				3																	
		RR				2	112													0			
		TP																					
	Maroc Sum					6	112													0			
	Tunisie	LL																					
		PS			187									15			40	1200	9	23	7	1	
		RR																					
		TP																					
		TR																					
		UNC												8									
	Tunisie Sum				187									23			40	1200	9	23	7	1	
	Turkey	GN																					
		LL																					
		PS																			71	5	46
		RR																					
		UNC																					1
	Turkey Sum																				71	5	46

DIFFERENCE = T1 - (J1+J2+U1 + 0.8(JF1+JF2)

Area	Flag	Gear	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AE	EC	TP	1244	-827	-158	552	-481	-557	-2255	-109	-89	-599	-1210
	Maroc	TP	315	54	-52	191	380	-468	260	3	-481	92	-178
MED	Croatia	HP	0	0	0	0	0	0	0	0	0	0	0
		LL	0	0	0	-3	5	2	2	-3	-1	-2	0
		PS	1058	1410	1220	1359	711	668	875	250	-151	-848	-1288
		RR	0	0	0	-30	-17	-9	4	-38	-25	-6	-3
		TW	0	0	0	0	0	0	0	0	0	0	0
		UNC	0	0	0	0	0	-15	-198	0	0	0	-6
	Croatia Sum		1058	1410	1220	1325	699	646	683	209	-177	-856	-1296
	EC	BB	48	-6	153	-36	-51	-96	-19	-59	-49	-14	-5
		GN	209	72	109	26	150	-8	10	12	24	0	0
		HP	2	2	4	10	20	0	5	5	2	0	0
		LL	687	796	-803	487	900	216	-342	-230	-131	13	-1153
		PS	12330	11892	9554	10525	10165	4497	-2118	3174	3244	2781	-6380
		RR	1155	1576	1922	993	1186	68	408	695	609	684	-93
		TP	205	59	54	118	72	263	176	116	198	58	-83
		TR	0	13	15	0	0	9	8	0	0	12	0
		TW	0	0	0	0	0	-1	0	0	0	0	0
		UNC	293	633	348	909	578	353	439	326	-150	-2357	-3395
	EC Sum		14928	15037	11355	13033	13021	5301	-1432	4040	3746	1179	-11109
	Libya	LL	67	802	865	80	448	218	210	542	1504	-157	-332
		PS	568	469	495	598	12	218	195	-8	-158	-317	-188
		TP	0	149	180	134	66	153	78	44	74	-58	-39
		UNC	0	-34	0	0	0	-4	0	-29	-63	0	0
	Libya Sum		635	1385	1540	812	526	584	483	549	1357	-533	-559
	Maroc	GN	6	16	92	30	17	18	6	6	9	14	20
		LL	0	0	0	0	0	0	0	0	0	0	0
		PS	0	0	0	0	0	0	0	0	0	-3	170
		RR	0	373	788	540	444	453	600	612	191	405	458
		TP	73	700	125	13	63	-9	30	39	307	0	0
	Maroc Sum		79	1089	1006	583	524	462	636	657	507	415	648
	Tunisie	LL	0	0	-1	0	0	0	-1	-1	-8	0	0
		PS	1997	2185	1017	935	1445	717	1585	1492	1720	2145	-1225
		RR	43	81	54	69	109	47	41	35	58	12	0
		TP	92	120	121	128	68	25	24	13	-2	-13	-3
		TR	0	0	-11	-28	-5	0	0	0	0	0	0
		UNC	0	-3	-2	-1	-5	0	0	0	-3	-6	-6
	Tunisie Sum		2132	2382	1178	1104	1611	789	1650	1538	1764	2138	-1234
	Turkey	GN	0	0	0	0	-8	0	0	0	0	0	0
		LL	0	0	0	0	0	0	0	0	0	-3	0
		PS	3084	3405	4080	4460	4734	5482	908	564	1584	1240	-1145
		RR	0	0	0	-1	0	0	0	0	0	-10	-9
		UNC	0	-33	0	-6	-2	0	-44	-28	-68	-336	-662
	Turkey Sum		3084	3372	4080	4453	4724	5482	864	536	1516	890	-1816
	Sum(shaded)		23475	23901	20169	22053	21004	12240	889	7422	8143	2725	-16754
	NEI-COMB (new)		0	0	0	0	0	0	0	0	0	0	-16754
	NEI-COMB (old)		0	773	211		101	1030	1995	109	571	508	

Appendix Table 4. BFT comparison between Task I catches and trade statistics (round weight) between 1993 and 2003, by area, flag and gear. Shaded cells indicate DIFFERENCES <

				TASK-I										TRADE																								DIFFERENCE = T1 - (J1+J2+U1 + 0.8(JF1+JF2)									
														Japanese Imports (no farm)										Japanese Imports (farm)										USA Imports (no farm)													
														direct (SD)								indirect (RC)					direct (SD)							indirect (RC)				direct (SD)									
				T1										J1								J2					JF1							JF2				U1									
Area	*Status*	*Flag*	*Gear*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*1999*	*2000*	*2001*	*2002*	*2003*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2000*	*2001*	*2002*	*2003*	*1999*	*2000*	*2001*	*2002*	*2003*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*
MED	CP	Algerie	GN						200	158	214	312	287																																										
			LL								700	109	186																																										
			PS						900	1056	778	917	922																																										
			RR						180	208	159	163	129																																										
			TL						93	174	88																																												
			TP						399	367	290	366	41																																										
			TR														0																																				
			UNC	1097	1560	156	156	157	175	179	101	145	145																																									
		China, People's R	LL		97	137	93	49										57		20																																		
		Croatia	HP															0																																				
			LL					11	16	10		9	1					3	6	14	8	3	10	3																														
			PS	1058	1410	1220	1360	1088	889	921	930	890	975	1137				1	377	152	17	141	232	291	333			2				86	35	674	1006	1915	2602			0	2		11																
			RR					6	1	39		4	1	2				30	23	10	35	38	29	7	5																														
			TW																	0																																	
			UNC																0																			18	248			4													
		EC.Cyprus	LL	10	10	10	10	10	21	31	61	85	91	79								18		6	4																			9	12	2									
			RR	4											0	0																																				
		EC.España	BB	48		206	5	4	11	4			1		1	34	13		62	1																																
			LL	40	178	368	369	871	253	418	493	644	436		960	3036	832	1056	272	554	588	515	300	678			1	4									2						1	8	17	29	28												
			PS	1431	1725	2896	1657	1172	1573	1504	1676	1453	1686		187	5368	5307	3284	737	397	784	221	169	98	27		25	14				262	1447	3111	4395	5754	5964	5317			137	18	87	161	258	315	291												
			RR	200	93	726	206	69	94	29	78	109	58				1	3		1		2	12	11																														
			TP	6		1	1	1	5	1	0	1	0						0	5	0			0																														
			TR		13	15			9	8			12						0																																		
			UNC	293	732	395	350	88	55	39	526	28	22					1				3	1	10	37				23	4				10																				
		EC.France	BB																3																																		
			GN															31		8		1	2																														
			LL														0	5		23		22	24	0	1																												
			PS	6965	11803	9494	8547	7701	6800	5907	6780	6119	5810			480	720	2921	3682	1918	97	282	389	82	133	2131	671	386	227							97	153	2	4	1												
			RR	30	40	50											8	1	1		0																														
			TP													1								0																												
			TR																					0																												
			TW																	1		0	0																													
			UNC			60	580	500	300	246						4	91	7	8		2	6	17	20	6		19											1														
		EC.Greece	BB													2	19	28	40	42	23	59	49	14	5																										
			GN													0																																				
			LL	68	88	57	58	58	3	10	15	12	36			17	4	4	3	0	9	4	0																				14	13	2							
			PS	32	32	32	32	32	4	5	10	8	8			8				2	4	1																														
			RR	339	766	915	784	1127	279	233	597	341	394			185	387	399	495	305	251	237	212	375	85																		3	4	17	2	5						
			TP													0																																				
			UNC													131	4	2		1		3	39	8																												
		EC.Ireland	PS																	0																																
		EC.Italy	BB							0	0					3			15																																
			GN	209	72	109	57	150		10	13	26																																						
			HP	2	2	4	10	20		5	5	2																																					
			LL	135	1018	2103	2100	1620	292	515	287	260	395			407	1180	1388	781	406	910	687	433	464	442	6	15	62	303	15							1				25	15	44	27	14						
			PS	4162	4654	3613	7060	7068	3334	1859	2801	3256	3246		73	461	453	566	1179	3739	5791	3001	112	86	327		191	1208	324						115	1606	189	2	373	740	397	9	17	2		0						
			RR	621	904	992	482	536	14	425	386	403	621		40	42	228	76	51	13	21	99	3	1	0		19													3	3										
			TP	199	182	241	297	154	419	308	353	427	364			120	188	180	82	156	133	163	229	301	83		73																	5							
			UNC		50					156	0	4	2			14	12	10	2	1		77	113	108	3		85	11	2006	2355				119					258	1084			1		25	0	36	1	156	-161	-122	-2319	-334
		EC.Malta	LL	251	572	587	399	393	407	447	376	219	240			114	154	220	249	53	84	87	213	9	1	150	78	20	18	31																				
			PS													5									309			59																			0	0	-5	0	0	0	0	0	-59	0	-309
			RR														137				0																											0	0	-137	0	0	0	0	0	0	
			TP													2																																	0	-2	0	0	0	0	0	0	0	
			UNC															1	0	0																											0	0	0	-1	0	0	0	0	0	
		EC.Portugal	LL	183	428	446	274	37	54	76	61	64		2				274		61	101		64																											183	428	446	0	37	-7	-25	61	0	2
		EC.United Kingd	RR													0																																	0	0	0	0	0	0	0	0	0	
			UNC													0																																	0	0	0	0	0	0	0	0	0	
		Guinea Ecuatoria	LL																659	333	78	17																											0	0	0	0	-659	-333	-78	-17	0	0
		Guinée Conakry	LL													282	240	171	399	428																											0	-282	-240	-171	-399	-428	0	0	0	0
		Japan	LL	793	536	813	765	185	361	381	136	152	390			813	765	185	361	381	136	152	390																										793	536	813	765	185	361	381	136	152	390
		Korea, Republic	LL		684	458	591	410	66							82	74	32	248	110																											0	602	384	559	162	-44	0	0	0	0
		Libya	LL	67	802	865	80	448	409	450	1002	1866								191	240	461	344	157	291			18		41																			67	802	865	80	448	218	210	542	1504	-157	-33
			PS	568	470	495	598	32	230	195	16					1			20	13		24		188			158	317																			568	469	495	598	12	218	195	-8	-158	-317	-18
			TP		150	180	134	72	181	100	44	74				1			6	28	22			58	39																							0	149	180	134	66	153	78	44	74	-58	-39
			UNC													34				4		29					63																				0	-34	0	0	0	-4	0	-29	-63	0	0
		Maroc	GN	6	16	92	30	17	18	6	6	9	14	20																																			6	16	92	30	17	18	6	6	9	14	20
			LL															0																															0	0	0	0	0	0	0	0	0	
			PS											170														3																			0	0	0	0	0	0	0	0	-3	170
			RR		373	816	541	455	544	600	650	195	407	570			28	1	11	91		38	4					2	112																			0	373	788	540	444	453	600	612	191	405	450
			TP	73	703	127	15	63	2	30	39	307			3	2	2		11																													73	700	125	13	63	-9	30	39	307	0
		Mexico	LL																			0																											0	0	0	0	0	0	0	0	0	
		Panama	LL		467	1499	1498	2850	236						467	1056	1262	825	579																													0	443	236	2025	-343	0	0	0	0	0
		Tunisie	LL												0	1					1	1	8																											0	0	-1	0	0	0	-1	-1	-8	0
			PS	1997	2253	1617	2147	1992	1662	2263	2134	2432	2510		68	600	1212	547	945	668	620	519	333	253			187										15			40	1200	9	23	7	1												
			RR	43	81	57	92	113	48	43	37	58	15		0	3	23	4	1	2	2	0	3																											43	81	54	69	109	47	41	35	58	12
			TP	92	169	223	154	95	35	46	13	3	3		49	102	26	27	10	22	0	5	16	3																									92	120	121	128	68	25	24	13	-2	-13	-3
			TR												0	11	28	5																													0	0	-11	-28	-5	0	0	0	0	0
			UNC												3	2	1	5			0	3	6																8								0	-3	-2	-1	-5	0	0	-3	-6	-4
		Turkey	GN																8																															0	0	0	0	-8	0	0	0	0	0
			LL																					3																									0	0	0	0	0	0	0	-3	-1	
			PS	3084	3466	4219	4616	5093	5899	1200	1070	2100	2300		61	139	156	359	417	292	506	444	1055	1099																									71	5	46	3084	3405	4080	4460	4734	5482	908	564	1584	1240	-114
			RR															1						10	9																									0	0	0	-1	0	0	0	0	-10	-9
			UNC			1									33	1	6	2		44	28	68	336	662																									0	-33	0	-6	-2	0	-44	-28	-68	-336	-66
		U.S.A.	LL												1																																	0	-1	0	0	0	0	0	0	0	0
			UNC																					0																									0	0	0	0	0	0	0	0	0	0
		France + Spair	PS																					429																									0	0	0	0	0	0	0	0	0	-429
		Italy + Spair	LL																					14																									0	0	0	0	0	0	0	0	0	-14
			PS																					2																									0	0	0	0	0	0	0	0	0	-2
	NCC	Chinese Taipei	LL	328	709	494	411	278	106	27	169	329	508	421		696	494	411	275		27	22	448	326	30					134																			328	13	0	0	3	106	0	147	-119	182	25
	NCO	Belize	LL													145	399																															0	-145	-399	0	0	0	0	0	0	0
		Combined NEI	LL	0																																													0	0	0	0	0	0	0	0	0	0
			UNC		773	211		101	1030	1995	109	571	508																																			0	773	211	0	101	1030	1995	109	571	508
		NEI (all flags)	LL		427	639	171	1066	761	98	17																																					0	427	639	171	1066	761	98	17	0	0
			RR						64	42																																						0	0	0	0	0	64	42	0	0	0
		Israel	LL																					2	3																									0	0	0	0	0	0	0	0	-2	
			UNC				14																																									0	0	0	0	14	0	0	0	0	0
		Yugoslavia	PS			2	4																																									0	0	2	4	0	0	0	0	0	0
			UNC								4																																					0	0	0	0	0	0	4	0	0	0
AE	CP	China, People's R	LL						85	103	80	68	39	19						33	73	53	121	38	57																									0	0	0	0	0	52	30	26	-53	1	-38
		EC.Cyprus	LL																					5																									0	0	0	0	0	0	0	0	-5	0
		EC.Denmark	UNC	37		0	0		1																																						37	0	0	0	0	1	0	0	0	0
		EC.España	BB	3834	1999	2878	4967	2957	2242	1311	1921	2319	2410	2		154	7	19	534	124	52	2	10																											3834	1845	2871	4948	2423	2118	1259	1919	2308	2410	2
			LL						5	8	3	4	0					5	32	113	116	95	5	6							40									12	16	8	1	0	0	0	0	-5	-27	-136	-125	-108	-13	-6
			PS																64	1																					2					0	0	0	0	0	-64	-1	-2	0	0
			RR					162	28	33	126	61	63		113			4	47	8	49	29	123	1	6			3													4					-113	0	0	0	-4	115	20	-16	97	-69	61	-6
			TL																		1																											0	0	0	0	0	0	0	-1	0	0	0
			TP	1244	1136	941	1207	2723	1525	2005	1416	1240	1548		1963	1100	657	3204	2088	4061	1523	1279	2128	1158	185	6	51	21	35																			14									13	1244	-827	-159	550	-481	-563	-2255	-113	-90	-600	-120
			TR							3																																					0	0	0	0	0	0	3	0	0	0
			UNC		2						8	9	68					0	8			8	19																									0	2	0	0	0	-8	-1	0	-10	68	0
		EC.France	BB	164	66	181	310	134	282	270	91	105	150			47			0																															164	66	134	310	134	282	270	91	105	150
			GN	497	21	144	253	3	72	71	57	68	6									1																											497	21	144	253	3	72	71	57	68	6
			LL																			1				1																							0	0	0	0	0	0	-1	-1	0	0
			RR																			0																											0	0	0	0	0	0	0	0	0	0
			TR	2																																											2	0	0	0	0	0	0	0	0	0
			TW	436	224	400		57	259	247	394	456	599																																			436	224	400	0	57	259	247	394	456	599
			UNC		25			75														1																											0	25	0	0	75	0	0	0	-1	0	0
		EC.Greece	RR												0																																			0	0	0	0	0	0	0	0	0	0
		EC.Ireland	GN						3	1	0	1																																					0	0	0	0	0	3	1	0	1	0
			LL					14	2	1										0																													0	0	0	0	14	2	1	0	0	0

			PS																2	2	1																	0	0	0	0	-2	-2	-1	0	0	0	0
			RR																			0	2	5	1													0	0	0	0	0	0	0	0	-2	-5	-1
			TR								2																											0	0	0	0	0	0	0	2	0	0	0
			TW						16	50	20	6	15	3									1	1														0	0	0	0	0	16	50	20	6	14	3
			UNC																			8	4	1														0	0	0	0	0	0	0	-8	-4	-1	0
		EC.Italy	LL															1																				0	0	0	-1	0	0	0	0	0	0	0
		EC.Malta	LL																											37								0	0	0	0	0	0	0	0	0	0	-37
		EC.Portugal	BB	2	220	34	80	447	252	5	2	2	7	1																								2	220	34	80	447	252	5	2	2	7	1
			LL	4	8		97	246	18	404	398	383	160	33	10	432	361	98	50	200	44	52	91	106														-6	-424	-361	-1	196	-182	360	345	292	54	33
			PS		0									0																								0	0	0	0	0	0	0	0	0	0	0
			RR														1	10	43	10			3															0	0	-1	-10	-43	-10	0	0	-3	0	0
			TP			1	15	19	45	2	40	15	17					13	19	39	2	37	15	16	4													0	0	1	2	0	6	0	3	1	1	-4
			TW				7																															0	0	0	7	0	0	0	0	0	0	0
			UNC	19	12	0			8	0	1	3	3	27				1	68	17		1									1		0					19	12	0	-1	-68	-9	0	1	3	3	26
		EC.United Kingd	GN			1	0	0		0																												0	0	1	0	0	0	0	0	0	0	0
			LL					0		10																												0	0	0	0	0	0	10	0	0	0	0
			TW						1	2	0																											0	0	0	0	0	1	2	0	0	0	0
		FR.Saint Pierre e	LL											1																								0	0	0	0	0	0	0	0	0	0	1
		Guinea Ecuatoria	LL																208																			0	0	0	0	-208	0	0	0	0	0	0
		Guinée Conakry	LL													0	190	73																				0	0	-190	-73	0	0	0	0	0	0	0
			UNC		330																																	0	330	0	0	0	0	0	0	0	0	0
		Honduras	LL												104																							-104	0	0	0	0	0	0	0	0	0	0
		Iceland	LL						1	27			1								28	17	5															0	0	0	0	0	1	-1	-17	-5	1	0
			TW						1																													0	0	0	0	0	1	0	0	0	0	0
			UNC																			13																0	0	0	0	0	0	0	-13	0	0	0
		Japan	LL	2484	2075	3971	3341	2905	3195	2690	2895	2425	2536																									2484	2075	3971	3341	2905	3195	2690	2895	2425	2536	0
		Korea, Republic c	LL		4	205	92	203			6	1				4			0																			0	0	205	92	203	0	0	6	1	0	0
		Libya	LL				576	477	511	450																												0	0	0	576	477	511	450	0	0	0	0
			PS								487																											0	0	0	0	0	0	0	487	0	0	0
		Maroc	GN	4	13	10	13		31	30	28	17	11																									4	13	10	13	0	31	30	28	17	11	0
			LL											2																								0	0	0	0	0	0	0	0	0	0	2
			PS	24	213	458	323	828	317	709	660	150	884	490																								24	213	458	323	828	317	709	660	150	884	490
			RR																		35	41	20	3	13	34	199	65	66									0	0	0	0	0	0	-68	-240	-85	-69	-13
			TP	387	494	210	699	1240	1518	852	1540	2330	1670	1305	72	440	262	508	860	1986	544	1444	2480	919	1183	48	92	331	659	300								315	54	-52	191	380	-468	260	3	-481	92	-178
			UNC																			13	2															0	0	0	0	0	0	0	-13	-2	0	0
		Namibia	LL										0																									0	0	0	0	0	0	0	0	0	0	0
		Norway	GN																		4																	0	0	0	0	0	0	-4	0	0	0	0
			PS							5																												0	0	0	0	0	0	5	0	0	0	0
			TW								0																											0	0	0	0	0	0	0	0	0	0	0
		Panama	LL		1	19	550	255		1						1	19	16	95																			0	0	0	534	160	0	1	0	0	0	0
			PS							12																												0	0	0	0	0	0	12	0	0	0	0
		South Africa	LL																						1													0	0	0	0	0	0	0	0	0	0	-1
		Turkey	PS															0																				0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	HP													2																						0	-2	0	0	0	0	0	0	0	0	0
			LL													1						0																0	-1	0	0	0	0	0	0	0	0	0
			RR													0						0																0	0	0	0	0	0	0	0	0	0	0
			TR													1																						0	-1	0	0	0	0	0	0	0	0	0
	NCC	Chinese Taipei	LL	6	20	8	61	226	350	222	144	304	158	24			8	61	229	307	222	41	154	40														6	20	0	0	-3	43	0	103	150	118	24
	NCO	Faroe Islands	LL						67	104	118									57	70	67	38															0	0	0	0	0	10	34	51	-38	0	0
		Flag related NEI'	LL	223	68	189	71	208	66																													223	68	189	71	208	66	0	0	0	0	0
		Guinea Bissau	LL																	66																		0	0	0	0	0	-66	0	0	0	0	0
		Seychelles	LL										2																									0	0	0	0	0	0	0	0	0	2	0
		Sierra Leone	LL								93	118																										0	0	0	0	0	0	0	93	118	0	0
AW	CP	Brasil	BB									0																										0	0	0	0	0	0	0	0	0	0	0
			LL		0	0				13		0									15																	0	0	0	0	0	0	-2	0	0	0	0
		Canada	BB													1	1	9	2	4		1	2															0	-1	-1	-9	-2	-4	0	-1	-2	0	0
			GN									0																										0	0	0	0	0	0	0	0	0	0	0
			HP	33	34	43	32	55	36	38	18	20	13			37	39	29	47	29	25	15	8	2	9									2	2	1	1	33	-3	4	3	8	7	13	1	10	10	-10
			LL	25	5	4	22	12	32	31	47	20	53			4	4	20	4	19	12	4	0	5	4								0	0	2	3	4	25	1	0	2	8	13	19	42	18	46	-8
			PS													0																						0	0	0	0	0	0	0	0	0	0	0
			RR	88	71	195	155	245	303	348	433	402	508			141	324	303	270	305	379	313	348	403	308								31	144	108	143	120	88	-70	-129	-148	-25	-2	-62	-24	-53	-38	-428
			TL	284	203	262	298	138	172	125	81	79	39			115	119	121	78	105	50	30	5	4	6								8	5	6	18	3	284	88	143	177	60	67	66	45	68	17	-9
			TP	29	79	72	90	59	68	44	16	16	28			64	67	87	54	63	37	6	5	8	21								2	6	1	1	2	29	15	5	3	5	5	5	4	10	19	-24
			UNC													7	8	6	8	5	1	12	2	1	40								1		0	2	0	0	-7	-8	-6	-8	-5	-2	-12	-3	-2	-40
		EC.España	RR													4								1														0	-4	0	0	0	0	0	0	0	-1	0
		EC.France	LL																					1														0	0	0	0	0	0	0	0	0	-1	0
			RR																		1	0		0														0	0	0	0	0	0	-1	0	0	0	0
		EC.Ireland	LL																	0																		0	0	0	0	0	0	0	0	0	0	0
			PS																1		9	5	2	0														0	0	0	0	-1	0	-9	-5	-2	0	0
		EC.Portugal	LL										0																									0	0	0	0	0	0	0	0	0	0	0
		EC.United Kingd	GN										0																									0	0	0	0	0	0	0	0	0	0	0
		FR.Saint Pierre e	UNC							1			3																									0	0	0	0	0	0	1	0	0	3	0
		Guinea Ecuatoria	LL																		440	143																0	0	0	0	0	0	-440	-143	0	0	0
		Japan	LL	581	427	387	436	330	691	365	492	506	575																									581	427	387	436	330	691	365	492	506	575	0
		Mexico	LL		4			2	8	14	29	10	12	22			3	2	1	1	3	8	2	2	6								5	15	9	5	1	0	4	-3	-2	1	7	6	6	-1	6	16
		U.S.A.	GN		0	1	4					0				1	0	1	1																			0	-1	1	3	-1	0	0	0	0	0	0
			HP	88	68	77	96	98	133	116	184	102	55			61	64	77	76	76	85	124	66	25	30													88	7	13	19	22	57	31	60	36	30	-30
			LL	120	178	214	141	87	90	112	133	63	88			16	36	24	18	13	25	16	6	4	7													120	162	178	117	69	77	87	117	56	84	-7
			PS	295	301	249	245	250	249	248	275	196	208			433	238	242	247	248	252	270	194	214	259													295	-132	11	3	3	1	-4	5	2	-6	-259
			RR	764	690	910	873	948	806	775	686	1253	1562			541	516	497	653	493	571	531	755	681	433													764	149	394	376	295	313	205	156	498	881	-433
			TP													3																						0	-3	0	0	0	0	0	0	0	0	0
			TR													1		0			0																	0	-1	0	0	0	0	0	0	0	0	0
			UNC	1	2	1	3	2	1	0	0	0				3	0	0	1	0	0	0																1	-1	1	3	1	1	0	0	0	0	0
		UK.Bermuda	LL								1								1																			0	0	0	0	-1	0	0	1	0	0	0
			UNC				1	2	2	1		1	1	0																								0	0	0	1	2	2	1	0	1	1	0
		Uruguay	LL	1	0	2							1																									1	0	2	0	0	0	0	0	0	1	0
	NCC	Chinese Taipei	LL					2																														0	0	0	0	2	0	0	0	0	0	0
	NCO	Cuba	LL										74																									0	0	0	0	0	0	0	0	0	74	0
		Faroe Islands	LL																			61																0	0	0	0	0	0	0	-61	0	0	0
		Flag related NEI'	LL				2			429	270	49																										0	0	0	2	0	0	429	270	49	0	0
		Sierra Leone	LL																				377	128				11	7									0	0	0	0	0	0	0	0	-388	-135	0
		Sta. Lucia	RR	2	43	9																																2	43	9	0	0	0	0	0	0	0	0
			UNC				3																															0	0	0	3	0	0	0	0	0	0	0

Appendix Table 5 SWO comparison between Task I catches and trade statistics (product weight) between 2000 and 2003, by flag and gear.

			TASK-I				*TRADE*	
							Direct Imports (SD)	
							JPN	*KOR*
Status	*Flag*	*Gear*	*2000*	*2001*	*2002*	*2003*	*2003*	*2003*
CP	Algerie	GN	599	642	467			
		LL		133	99			
		TL	51					
		UNCL	166	306	248			
	Barbados	LL	13	19	10	10		
	Brasil	BB			7			
		LL	4697	4075	2903	2904		
		RR				3		
		UNCL		7				
	Canada	GN		0				
		HP	95	121	38			
		LL	923	984	954			
		RR	0					
		TW	1		0			
	China, People's Republic of	LL	366	302	513	669	18	
	Côte D'Ivoire	GN				43		
		S.UN	20	19	19			
	EC.Cyprus	LL	82	135	104	47		
	EC.España	BB	12	1	3	1		
		LL	12365	11158	11116		57	
		S.UN	16	5	19			
		TP	4	4	2			
		UNCL	23	73	56			
	EC.France	BB	2					
		GN	61					
		TW	60		74			
		UNCL		12	27			
	EC.Greece	LL	1960	1730	1680			
	EC.Ireland	GN	32	14				
		TR	2					
		TW	1	3	5	12		
	EC.Italy	GN	4863					
		HP	8					
		LL	2639	2236	1841			
		TP	2					
		UNCL	3	4152	1698			
	EC.Malta	LL	175	102	257			
	EC.Portugal	BB			0			
		LL	942	987	1019	1051		
		PS	1	3	0	0		
		S.UN	194	252	134	335		
		TP		0	0			
	EC.United Kingdom	GN	1		0			
	FR.Saint Pierre et Miquelon	LL				3		
		UNCL			10			
	Gabon	TW				9		
	Ghana	GN		531	372			
		S.UN	117					
	Japan	LL	1529	1265	1128			
	Korea, Republic of	LL	10	0	2		63	
	Libya	LL	8	6				
	Maroc	GN	2554	2219	2294	1727		
		LL	243	1018	1303	1893		
		PS	22	303	1	1		
		TP	3	9	4	8		
	Mexico	LL	37	27	34	32		
	Namibia	BB	17	144		4		
		LL	452	607	504	187		
	New Zealand	LL					0	
	Philippines	LL		7	5	52	26	
	South Africa	BB	1			0		
		LL	229	397	500	280	6	3
		UNCL					1	
	Sta. Helena	LL		20	4			
	Trinidad and Tobago	LL	41	75	92			
	Tunisie	LL	483	567	1138			
	Turkey	GN	373					
		UNCL		360				
	U.S.A.	GN	0		0			
		HP	1	7	3			
		LL	3460	2541	2641			
		PS		5				
		RR	24	10	59			
		TP	0		0			
		TW	11	3	4			
		UNCL	1	2	8			
	UK.Bermuda	LL	3					
		UNCL		2	0	0		
	Uruguay	LL	713	789	768		4	
	Venezuela	GN		9	9	16		
		LL	30	12	25	29		
NCC	Chinese Taipei	LL	1650	1448	1474	1511	187	
		UNCL					2	
NCO	Argentina	TW		5				
	Australia	UNCL					55	
	Belize (foreign obs.)	LL	8					
	Cuba	LL			10			
	Dominica	UNCL		1				
	Faroe Islands	LL	4					
	Grenada	LL			54	88		
		UNCL	84					
	Israel	LL					0	
	Mixed flags	PS	4					
	Seychelles	LL	10		6			
	Sierra Leone	LL	2	2				
	St. Vincent and Grenadines	LL		22		7		
		UNCL	0					
	Sta. Lucia	TR				0		

Appendix Table 6. BET comparison between Task I catches and trade statistics (product weight) between 2000 and 2003, by flag and gear.

				TASK-I				*TRADE*			
								JPN	***KOR***		***TWN***
								SD	***RC***	***SD***	***SD***
Area	*Status*	*Flag*	*Gear*	*2000*	*2001*	*2002*	*2003*	*2003*	*2003*	*2003*	*2003*
Atlantic	CP	Barbados	LL	18	6	11	11				
		Brasil	BB	6	126	0	81				
			LL	2762	2534	2582	2356				
		Canada	HP	0							
			LL	285	220	265					
			RR	10	12	12					
			TL	31	9	2					
		Cape Verde	RR	2							
		China, People's Republic of	LL	6564	7210	5840	7890	7909		8	
		EC.España	BB	4084	3897	2775	4026				
			LL	598	211	333					
			PS	6427	5923	7038	6372	10			
			TR	141	103						
			UNCL			379					
		EC.France	BB	1921	1593	786	758				
			GN	0							
			PS	4013	3355	3463	3182				
			TW	15		44					
		EC.Ireland	TW		10						
		EC.Portugal	BB	1498	1605	2420	1572				
			LL	1		170	83				
			S.UN				0				
		FR.Saint Pierre et Miquelon	LL				0				
			UNCL			21					
		Gabon	GN	47	68						
			S.UN	102	15						
			TR	1							
			TW		38						
		Ghana	BB	2105	6573	4378	1566				
			PS	3481	7522	1516	3250				
		Japan	LL	24411	18056	15097	18585			4	0
		Korea, Republic of	LL	43	1	87		122			
		Libya	LL	400	31	593					
		Maroc	S.UN	770	857						
			UNCL			913					
		Mexico	LL	2	2	7	4				
		Namibia	BB	107	359	77	65				
			LL	482	280	196	150				
		Panama	BB	90							
			LL	484							
			PS	378	89	63					
		Philippines	LL	975	377	837	855	649			
		Russian Federation	PS	91							
		South Africa	BB	48	104	22	8				
			LL	177	63	282	90				
		Sta. Helena	BB	8	4	5					
			LL		1						
		Trinidad and Tobago	LL	5	11	30					
		U.S.A.	GN		0						
			LL	532	682	511					
			RR	40	400	65					
			TP	0							
			TW	2	0	0					
			UNCL		2	0					
		UK.Bermuda	LL	0							
			UNCL		0	0	0				
		Uruguay	LL	25	51	67	43				
		Venezuela	BB	7	131	153	91				
			LL	38	17	33	66				
			PS	181	513	444	359				
			UNCL		47						
	NCC	Chinese Taipei	LL	16795	16429	18483	18682	17818		263	
	NCO	Belize (foreign obs.)	LL	0							
		Combined NEI	BB	1306	1169	458	913				
			PS	979	1855	1790	4324				
		Congo	PS	8							
			UNCL		8	8					
		Cuba	LL			16					
		Dominica	UNCL		5						
		Faroe Islands	LL	8							
		Flag related NEI's	LL	15092	8470	531					
		Grenada	LL			0					
			UNCL	0	0						
		Liberia	UNCL	57	57	57					
		Netherlands Antilles	BB	0							
			PS	2359	2803	1879					
		Senegal	BB	2262	2616	1130					
		Seychelles	LL	58		162					
		Seychelles (foreign obs.)	LL	0							
		Sierra Leone	LL	6	2						
		St. Vincent and Grenadines	LL	1215	506	15	103				
			UNCL	1	0						
		Sta. Lucia	RR		1						
			TR				135				
			UNCL			2					
Unknown	CP	Japan	UNCL						22		
		Korea, Republic of	UNCL						162		
	NCO	Seychelles	UNCL						25		

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

(Madrid, Spain – 4-8 October 2004)

1 Opening of the meeting

The 2003 Meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, 4 October, at the Hotel Velazquez, in Madrid, by Dr. Joao Gil Pereira, the Chairman of the Committee. Dr. Pereira welcomed the participants to the annual meeting.

Dr. Pereira introduced the new Executive Secretary, Mr. Driss Meski. Mr. Meski welcomed all the participants, and stressed the importance of the work of the SCRS, which is the basis of Commission management and conservation measures. He assured the Committee of his and the Secretariat's full support to facilitate the work of the Committee, and wished the scientists a successful meeting. The opening address of the Executive Secretary is attached as **Appendix 4**.

2 Adoption of Agenda and arrangements for the meeting

The Tentative Agenda was reviewed and adopted as in **Appendix 1**.

The following scientists served as Rapporteurs for the species sections (Agenda item 8) of the 2004 SCRS Report:

Tropical tunas- general	R. Pianet
YFT - Yellowfin tuna	C. Brown
BET - Bigeye tuna	N. Miyabe
SKJ - Skipjack tuna	D. Gaertner
ALB - Albacore	V. Ortiz de Zarate
BFT - Bluefin tuna	J. Powers (W), J.M. Fromentin (E)
BIL - Billfishes	D. Die
SWO- Swordfish	G. Scott (Atl.), G. Tserpes (Med.)
SBF - Southern Bluefin	CCSBT
SMT - Small tunas	A. Hattour

The ICCAT Secretariat served as rapporteur for all other SCRS Agenda items.

3 Introduction of Contracting Party delegations

Delegates from the following 15 Contracting Parties were present at the 2004 SCRS Meeting: Brazil, Canada, China, Côte d'Ivoire, Croatia, European Community, Japan, Korea, Mexico, Morocco, Sao Tome and Principe, South Africa, Turkey, United Kingdom (Overseas Territories) and United States of America. The List of Participants of the Species Groups and the SCRS Plenary is attached as **Appendix 2**.

4 Introduction and admission of observers

The Representative of FAO, the depository of the ICCAT Convention, was introduced and welcomed. The address to the Committee by Mr. Majkowski is included in **Appendix 4**.

Scientists from Chinese Taipei, Senegal and the Caribbean Community (CARICOM) were admitted to the meeting as observers (see **Appendix 2**).

5 Admission of scientific documents

The Secretariat informed the Committee that about 153 scientific documents had been submitted during the year, many prepared for inter-sessional meetings. Not all of these documents were made available in paper format for the SCRS meeting, as authors must provide 80 copies for distribution at the Plenary, but all those received electronically by 1 October 2004 were available on the ICCAT ftp site. It was noted that this had been very helpful, and scientists were encouraged to submit copies of their documents as far as possible in advance of the meeting, in order for these to be made available before the SCRS.

In addition to the scientific papers, there were six inter-sessional scientific meeting reports, 17 National Reports and Reports of Observers, and several documents prepared by the Secretariat. The List of Documents is attached as **Appendix 3**.

6 Report of Secretariat activities in data and research

The Secretariat briefly summarized the main points of the Secretariat's Report on Statistics and Coordination of Research in 2003-2004, which had been presented to the Meeting of the Sub-Committee Statistics and thoroughly discussed at that time.

The Committee congratulated the Secretariat on the improvements both in the data collection system and the ICCAT web-site. The Secretariat informed the Committee that further improvements were expected in the future, and that a project was currently under way to make available electronic copies of all documents which have been published in the ICCAT *Collective Volume of Scientific Papers.* It was also clarified that ICCAT was committed to providing the scientific abstracts to ASFA.

7 Review of national fisheries and research programs

Brazil

In 2003, the Brazilian tuna longline fleet consisted of 119 vessels, a 7.7% decrease from 2002, when 129 vessels were operating. The number of baitboats in 2003 was 39, with an increase of 5.1 % from 2002.

The Brazilian catch of tunas and tuna-like fishes, including billfishes, sharks, and other species of minor importance, was 48,828.4 t (round weight), representing a decrease of about 3.4% from 2002, when 50,575.5 t were caught. The majority of the catch was again taken by baitboats (about 50%), with skipjack tuna being the most abundant species (20,416.1 t). The total catch of the tuna longline fishery, equal to 14,869.6 t, was about 8.8% lower than 2002. Swordfish was the most abundant species with a catch close to 3,000 t. Bigeye tuna and blue shark, accounting for 15.9% (2,373.9 t) and 14.5% (2,160.1 t) of the catches, were respectively the second and third most caught species. Yellowfin tuna ranked fourth, with 1,940.9 t. The total catch of white marlin, blue marlin and sailfish, including dead and live discards, was 262.6 t, 577.0 t, and 346.7 t, respectively. Besides the blue shark, 1,710.7 t of other shark species were caught as by-catch as well as a target species.

The responsibility for all issues relating to highly migratory species in Brazil (including data collection and submission to ICCAT) pertains to the Special Secretary of Aquaculture and Fisheries (SEAP), which has the status of Ministry. However, several institutions directly assisted the Secretariat in processing and analyzing data: *Universidade Federal Rural de Pernambuco* (Federal Rural University of Pernambuco - UFRPE) and *Universidade Federal do Rio Grande do Norte* (Federal University of Rio Grande do Nortel), located in the Northeast, *Universidade Federal do Pará* (Federal University of Pará), located in the North, *Instituto de Pesca* (Fishery Institute), located in the Southeast, and *Universidade do Vale do Itajaí* (Itajaí University - UNIVALI), located in the South. These institutions, together with IBAMA- *Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* (Brazilian Institute for the Environment and Renewable Natural Resources), continued to conduct several research and statistics activities on tuna species caught by Brazilian boats.

Besides the catch and effort data regularly collected from Brazilian tuna fisheries, a total of 111,671 fish were measured at landing as follows: 875 yellowfin; 558 bigeye; 319 albacore; 1,139 swordfish; and 108,780 skipjack. Data have also been collected from several recreational fisheries based off southeast Brazil, mainly in Rio de Janeiro-RJ and Ilhabela-SP, where sport tournaments are conducted by local yacht clubs and billfish tag and release (tags from The Billfish Foundation) has been conducted since the early 1990s.

In order to adequately comply with ICCAT recommendations, the Brazilian Government has, in the past, implemented several fishery regulations. A new Rule (I.N. 02/2004), regulating Brazilian tuna fishery, was published on April 12, 2004, establishing the catch limits for South and North Atlantic swordfish, North Atlantic albacore, white marlin and blue marlin. It also reiterated the mandatory release of all specimens of marlins that are still alive by the time of boarding. The sale of any white marlin or blue marlin landed was also prohibited until December 31, 2004.

Canada

Bluefin tuna are harvested in Canadian waters from July through December over the Scotian Shelf, in the Gulf of St. Lawrence, in the Bay of Fundy, and off Newfoundland. The Canadian nominal landings of Atlantic bluefin tuna in 2003 were 556.6 t. In addition, 14.0 t were estimated to have been discarded dead from the pelagic longline fleet. All traditional bluefin tuna fishing areas produced catches of tuna in 2003. The tended line fishery in the area between Georges and Browns Bank off southwest Nova Scotia known as the Hell Hole and the Gulf of St. Lawrence rod and reel fishery produced the largest fractions of the total Canadian landings in 2003, each constituting about 34% of the Canadian landings. Additional catches were also taken from the St. Margaret's Bay traps, from the rod and reel fishery off northeastern Nova Scotia, and from coastal fishing areas off Nova Scotia. In the Bay of Fundy, bluefin tuna were taken by electric harpoon. Finally, a tended line fishery exists on the Tail of the Grand Banks of Newfoundland.

Swordfish occur in Canadian waters from April to December, primarily on the edge of Georges Bank, the Scotian Shelf and the Grand Banks of Newfoundland. The Canadian nominal landings of swordfish in 2003 were 1284.9 t. Landings of undersized swordfish were 2% (by number). Based on data from at-sea Observers on the pelagic longline fleet, 78.6 t of swordfish were estimated to have been discarded dead. In 2002, swordfish fishery changed from a competitive one to one operated under Individual Transferable Quotas (ITQs). Under the ITQ system, fishers are able to direct for swordfish or use the Individual Quota for by-catch to support the other tunas fishery. This resulted in a longer fishing season for swordfish than in previous years.

The other tunas (albacore, bigeye and yellowfin) are at the northern edge of their range in Canada, and have traditionally been a minor portion of the overall Canadian catch of large pelagic species. However, more attention has been given to fishing for these species, and the ITQ management regime allows for more emphasis on the development of the other tunas fishery.

Among the shark species, Canada has a directed longline fishery for porbeagle. Historically, blue shark and shortfin mako have been a by-catch of the Canadian swordfish and groundfish longline fisheries. Total reported landings in 2003 were 142 t of porbeagle, 6.1 t of blue shark and 73 t of shortfin mako. Observer records indicate a substantial discarded catch of blue shark and shortfin mako.

Some highlights of Canada's research program in 2003 are as follows:

1 Evaluation of the effectiveness of time/area closures for minimizing by-catches of bluefin tuna in pelagic longline fisheries.
2 Collaborative research on genetics of bluefin and bigeye tuna.
3 Comparative studies of growth of Atlantic and Pacific porbeagle shark populations.

Details on Canada's research program may be found in the National Report.

China (People's Rep.)

Longline is the only fishing gear for tunas by China fishing fleet in the Atlantic Ocean. The total number of tuna longliners operating in the Atlantic Ocean was 38 in 2003. The total catch of tuna and tuna-like species amounted to 10,048 t in 2003, higher than that of 2002. Bigeye tuna (7889.7 t) is the most important species, accounting for 78.5% of the total, 5.7% more than that of 2002. The yellowfin tuna catch increased from 696.7 t in 2002 to 1,049.7 t in 2003. The swordfish catch amounted to 669.1 t, a 30.4% decrease from the previous year. The estimated catch of blue shark and short fin mako amounted to 600 t and 260 t, respectively.

The data compiled, including Task I and Task II as well as the number of fishing vessels, have been routinely reported to the ICCAT Secretariat by Shanghai Fisheries University (SHFU). China started carrying out a tuna observer program in ICCAT waters in 2001. One observer was sent to the Chinese Atlantic tuna longline fishing fleet. The observer covered area was 15°N-15°S, 10°W-40°W.

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 Tuna Working Group in Shanghai Fisheries University in order to comply with the catch limits. The Government of China is establishing a fishing vessel management system, including the issuance of licenses to all Chinese fishing vessels in the high seas of the world oceans, and plans to implement a VMS program in two years.

Côte d'Ivoire

Côte d'Ivoire, while it does not have tuna vessels, plays a very important role in the management of tunas in the Atlantic. The *Centre de Recherches Océanologiques* (CRO) (Center for Oceanographic Research) is in charge of the research work on marine and high seas fisheries. This center is responsible for the research and statistics on tunas landed regularly at the fishing port of Abidjan. During the course of 2003, the industrial tuna fishery was monitored by the CRO, together with the *Institut de Recherche por le Developpement* (IRD) (Research Institute for Development) and the *Instituto Español de Oceanografía* (IEO) (Spanish Institute of Oceanography).

Besides this industrial fishery, there is an artisanal fishery that also lands small tunas and mainly billfishes (marlins and swordfish) and sharks. The monitoring of this fishery has been reinforced due to the ICCAT Enhanced Research Program on Billifsh.

The landings of tunas at the fishing port of Adibjan in 2003 were mainly made by Spanish (15), French (14) and Ghanaian (12) purse seiners. In addition to these, there were 8 vessels flying flags of other countries.

In 2003, the industrial fleet landed or transshipped 131,964 t of tunas and 9,534 t of "false" tuna at the fishing port of Abidjan. Catches of the artisanal fishery were about 500 t, comprised mainly of billfish and small tunas.

Croatia

The total Croatian catch of tuna and tuna-like fishes in 2003 was 1,139 metric tons (t). Bluefin tuna comprise 100% of the catch. Purse seine catches amounted to 1,137 t, and 2 t were caught by sport fishing. Almost the total purse seine catch is transferred to floating cages for growing purposes.

Additionally, 1,123 t of large bluefin tuna have been imported to Croatia in 2003 from France and Spain for growing purposes.

There were 31 reported licensed large-scale vessels (>24 m), while 20 of these have reported catches in 2003.

A study on bluefin tuna farming, based on the tagging of live specimens in the grow-out floating cages, within the framework of the Bluefin Year Program (BYP), is still under way. A new conversion factor has been estimated regarding the conversion from gilled and gutted (GG) product weight (originated from farming) to round weight (RWT) as reported in document SCRS/2004/096. In addition, samples of heart muscles have been taken for genetic studies.

A new national regulation entered into force in 2003, introducing mandatory reporting of farming data.

European Community

EC-Cyprus

Annual fisheries information

Large pelagic species are taken by a large variety of fishing gears in the inshore fishery and by both a multi-purpose and trawl fishery in international waters, mainly in the eastern and central Mediterranean. In 2003, 33 vessels were licensed and 14 of them reported bluefin tuna catches. The recreational fishery is also directed at these species, basically albacore.

Bluefin tuna are fished from April to November. The nominal catches in 2003 were 78.9 t. Bluefin tuna catches increased in the last five years, as the demand on the market has increased. Swordfish are also caught from April to November, with a peak season in the summer months. Nominal landings is 2003 were 47.4 tons; 22 vessels

have been involved in this fishery. Nominal catches of albacore and bonito in 2003 were 30 and 10.4 t, respectively. Albacore catches increased in 2003 as the multi-purpose vessels have been targeting this species. Shark catches in the inshore fishery were insignificant. The multi-purpose fleet reported 12.9 t of shark species in 2003.

Research and statistics

– Research

Under the National Program for Fisheries Data Collection for 2005, a pilot bluefin tuna tagging project is foreseen. Discard sampling in the large pelagic fisheries will also be undertaken.

– Statistics

All trawlers and multi-purpose vessels are required by law to keep logbooks. Production from the inshore fishery is collected from a 10% sampling of this fleet segment. Production of trawlers is collected by daily return of the logbooks. Those of the multi-purpose fleet are collected after each trip. The system ensures 100% log records and individual weights.

Cyprus is participating in the MedFisis project, which is aimed at improving the statistical system (collection and processing of data).

EC-France

Information on the national fisheries

French total catches of tunas and tuna-like species in the Atlantic Ocean and Mediterranean in 2003 amounted to 66,880 t, i.e., considerably higher than that of 2002 (64,850 t). This relative stabilization has come about following a decline in French catches observed since the mid-1990s, mainly due to the effect of the moratoria in the Gulf of Guinea, to the decrease in the number of tropical purse seiners, and to the decreases in catches of temperate tunas.

– Temperate tunas

Albacore: Albacore fishing in the Atlantic Ocean in the 2003 fishing season was carried out primarily by pelagic trawl, and secondly by baitboat and purse seine, as a result of the re-conversion of driftnet vessels. The 2003 total catches amounted to 3,641 t.

In the Mediterranean, albacore are caught very incidentally by purse seiners, and are actively fished by the sport fishers from mid-August and the end of October; their catches vary between 3 and 5 t.

Bluefin tuna: The overall French catches of bluefin tuna amounted to 6,497.5 t in 2003.

In the Mediterranean, bluefin tuna are caught mainly by purse seiners since the 1970s. The 2003 catch (5,849.4 t) continues the declining trend in catches observed since 1994 (11,800 t). The majority of the fishing effort, traditionally concentrated in the western part of the Mediterranean basin, shows an increasingly marked extension towards North Africa, on the one hand, and towards the eastern Mediterranean basin on the other. The majority of the fish caught have an average weight of 10-30 kg, except during the fishing season of the Balearic Islands and Malta, when catches are mainly comprised of fish weighing 140-250 kg.

Bluefin tuna catches in the East Atlantic amounted to 648.1 t in 2003. Albacore continues to be the main target species of the French tuna fisheries in the northeastern Atlantic, whereas bluefin tuna catches are minor. The other fleets catch bluefin tuna as by-catch using pelagic trawl.

Other species: Swordfish are caught occasionally in the northeastern Atlantic, as by-catch of the fleets targeting albacore.

– Tropical tunas

The total catches of tropical tunas (baitboats and purse seiners) in 2003 amounted to 56,742 t (32,429 t of yellowfin tuna, 19,898 t of skipjack tuna, 3,940 t of bigeye tuna, 63 t of southern albacore, 167 t of by-catches, and 246 t of discards), representing a 6% increase as compared to 2002, with a decline in overall effort, in terms of number of days fishing (-3%). Given the multi-species nature of the tropical tuna fisheries, information by fleet is more appropriate than information by species.

1 **Purse seine:** Fourteen (14) French vessels caught 53,341 t of tunas in 2003, representing a slight increase (8%) as compared to 2002: 31,672 t of yellowfin tuna, 18,021 t of skipjack tuna, 3,182 t of bigeye tuna, 63 t of southern albacore, 159 t of by-catches, and 246 t of discards. A comparison between the average catches obtained prior to the implementation of the moratoria (1991-1996, 65,600 t) and those made after its application (1998-2003, 50,600 t) shows an important decrease in catches. This is due mainly to the important decline in sets on floating objects and to some increase in fishing on free schools, all in an overall context of a decrease in fishing effort in terms of vessels and in days at sea.

2 **Baitboat:** Five (5) vessels based in Dakar obtained a total catch of 3,401 t in 2003, as follows: 757 t of yellowfin tuna, 1,878 t of skipjack tuna, 758 t of bigeye tuna, and 8 t of frigate tuna and Atlantic black skipjack. This catch is considerably less than that of 2002 (-25%), obtained by a fleet that has been stable for five years.

As concerns tropical tunas, fishery statistics and research are carried out in close collaboration with the research institutes of Côte d'Ivoire and Senegal, according to the procedures defined in previous statistical studies and in the context of a regulation that establishes a Community framework for the collection and management of the data necessary for a common fishery policy. These statistics cover 100% of the logbooks of this fleet and in 2003, 460,000 tropical tunas were sampled to determine species composition of the landings (i.e., 8.2 tunas per ton landed) and 194,000 fish were measured (i.e., 3.4 tunas per ton landed) to determine stock structure of the landings of the major species from vessels fishing within the Community framework. The detailed fishery statistics on French inter-tropical fleets in 2003 have been submitted in a timely manner to ICCAT and were the subject of two documents presented to the Bigeye Tuna Working Group (June 2003)

Research and statistics

French research on temperate tuna and tuna-like species is carried out by the *Institut Français de Recherche pour l'Exploitation de la Mer* (IFREMER). The *Institut de Recherche pour le Développement* (IRD) conducts research on the tropical species.

– Bluefin tuna and albacore

The fleets that direct their activity at bluefin tuna and albacore have to submit fishing logbooks in compliance with the European regulation. For the North Atlantic, biological sampling of the landings of the catches is carried out to evaluate the size structure of the catches.

In 2003, the IFREMER carried out an observer program on board French tuna purse seiners fishing bluefin tuna in the Mediterranean to estimate the size composition of the catches. The protocol and the sampling strategy were defined by IFREMER and the operations were carried out by two independent scientific observers (each one embarked on a purse seiner during the course of two specific fishing seasons). The results indicate that the sampling obtained is nevertheless insufficient to be representative of this fleet and besides it is more biased since the large fish are very under-sampled (because they are preferably transferred live to the cages). In conclusion, only the development of a joint observer program on board the purse seiners and in the cages will result in covering the size composition of the purse seine catches.

In the spring of 2000 the "Stromboli" program was initiated, a research program on bluefin tuna co-financed by the European Union and coordinated by France; the program ended in 2002. In 2003 aerial surveys have been carried out in the Gulf of Lyon, which was a follow-up of the work carried out within the framework of the "Stromboli" program to test the possibility of establishing an abundance index on juvenile bluefin tuna.

A new research program, "FEMS", was stared in 2002, co-financed by the EU, coordinated by CEFAS (UK), in which France actively participates, and expected to continue until 2005. Its objective is to develop simulation models to evaluate the different management strategies of the fish stocks exploited. The tuna stocks included in

this project are: the East Atlantic bluefin tuna stock, the North Atlantic albacore stock, and the three major stocks of Atlantic tropical tunas.

These programs contribute to the objectives of the ICCAT Bluefin Year Program (BYP).

– Tropical tunas

Scientists of the IRD actively participated in the BETYP Symposium (Madrid, March 2004) where they presented four documents, independently or in collaboration with other scientists, at the Second World Meeting on Bigeye Tuna (Madrid, March 2004), where three documents were presented and at the pertinent working (Statistics, Tropical Species Working Group, SCRS).

Other research carried out on tropical tunas concerned the following: (1) the analysis of the ethology and the dynamics of the association between schools and baitboats developed by the Dakar fleet, in the course of being finalized with the last publications, particularly within the framework of the BETYP Symposium; (2) two purse seine observer trips in January and July 2003 in the Gulf of Guinea within the framework of the "trophodynamic" program, whose results confirm that tuna schools search for single species concentrations of prey for feeding, which constitute the almost total food regime of adult yellowfin fished by purse seine; (3) the continuation of the study, in collaboration with the PNAAPD of Mexico, on the utilization of neural networks to simulate the behavior of purse seine fish and evaluate the impact of the exchange of information among fishers on the estimation of abundance; (4) work carried out on the tag attrition models as well as with a Bayesian approach, for a comparison of the efficiency of the two types of tags on the recovery rates of bigeye tuna (2 articles); (5) within the framework of the European FEMS project (see above), a study has been published on the sensitivity of errors of some biological parameters (growth, natural mortality) on the stock assessments; (6) real-time monitoring of the environmental conditions of the sub-surface in the Gulf of Guinea within the framework of the PIRATA program; (7) the updating (to 2003) of the majority of the GAO databases (Atlantic and Indian Oceans), with the inclusion of supplemental functions in the user interface.

EC-Greece

Annual fisheries information

The fishery is characterized by a variety of vessel types and fishing gears, with landing sites dispersed in many locations depending on the season and the local abundance of the different species. The local fleets depend entirely on the exploitation of coastal species, involving a multi-species fishery in the eastern Mediterranean.

The system is very complex to monitor due to the large number of landing sites.

Bluefin tuna are mainly caught by longline and hand line, with catches amounting to 397 t in 2003. Bluefin tuna catches by purse seiners were only 25 t. Albacore catches by longline and hand line amounted to 472 t in 2003, and those by purse seine were 478 t. Swordfish production by longline in 2003 was 1,538 t. As for other tunas, the total production reached 348 t (246 t of *Auxis* spp. and 102 t of skipjack tuna), mainly caught by purse seine.

Research and statistics

The operational statistical data collection system for bluefin tuna production improved this year by applying a special mechanism for monitoring catches that also includes better enforcement by Port Authorities in landing declarations. For other species, a combination of a system of non-compulsory landing declarations, marketed quantities at auction, and scientific data collection were used to improve the production estimates by different gears. Considerable effort was deployed in establishing a logbook system for fishing vessels.

EC-Ireland

The Irish fishery for tunas and tuna like fishes is restricted to a commercial fishery for northern albacore tuna in the northeast Atlantic. In 2003 the fishery was carried out by a fleet of 25 vessels, reporting an annual catch of 755 t, a decrease of 31% from the previous year's figures. A total of 12 t of broadbill swordfish and 3 t of bluefin tuna were reported as by-catch in the northern albacore fishery and in non-tuna pelagic fisheries. Recreational vessels less than 12 meters in length caught and released 15 bluefin tuna, of which three were also tagged using archival satellite tags. No by-catch of sharks was observed or reported.

Fishing for northern albacore tuna was conducted, in the main, by mid-water pair pelagic trawlers (MWTD). In addition, two vessels used trolling gear and a single vessel was engaged in trials using experimental longlines. The fishery commenced in July in the Bay of Biscay in an area bounded by latitudes 43º to 48ºN and longitudes 1º to 6ºW. Fishing continued in this area until the end of August and thereafter moved northwest during September and October towards the Chapelle bank and off the continental shelf to the southwest of Ireland.

Ireland has conducted annual scientific monitoring program of the northern albacore tuna fishery since Irish vessels began to exploit this species. During 2003 scientific observers recorded biological data from 45 hauls on 3 pairs of vessels. Fork lengths were collected from 2,359 fish with 593 measured in August and 1,766 in September. In addition, dorsal fin spines were collected from 125 individuals to obtain estimates of fish age.

In response to market demands, in 2003 the Irish fleet targeted large fish in the north and northwest of the Bay of Biscay. Sampled fish ranged in size from 49 cm to 118 cm fork length with a mean fork length of 74 cm and with clearly defined modes at 52 cm and 80 cm. These fish were larger than those taken in the southeast of the Bay of Biscay (44º- 46ºN and 2º- 4ºW) in the previous year (mean 61 cm FL).

In recent years schools of bluefin tuna (*Thunnus thynnus*) have appeared off the coast of Ireland in the late summer and autumn. As the origin of these tuna and their destination after leaving the Irish coast remain uncertain, scientists from the Irish Sea-fisheries Board (BIM) and Stanford University tagged three bluefin tuna (ranging in size from 221 cm to 264 cm curved fork length) with pop-up satellite archival transmitting (PAT) tags in September. Data on the movement patterns, depth and temperature preferences have been collected from two of these fish.

A minimum landing size of 6.4 kg for bluefin tuna and 25 kg for broadbill swordfish, mandated under European Council Regulation No. 850/98, is enforced and implemented by Irish vessels operating in the northern albacore tuna fishery. In response to market demands, juvenile fish (1-2 yr) were actively avoided by Irish vessels in the northern albacore tuna fishery in 2003.

EC-Italy

The Italian tuna fleet remained almost stable in 2003, with no significant variation. The fishing pattern remained almost the same as the previous year, except for the displacement of some vessels in the southern Mediterranean, where a productive fishing ground for albacore has been identified. The bluefin tuna fishery has been managed by applying the quota system to each single vessel, as previous years. The swordfish fishery had a strong increase in production, due to the high availability of this species and to the long favorable weather conditions.

Production showed some variations: the bluefin tuna catches reached 4,972 t, swordfish catches reached a total of 8,395 t, albacore provided 6,912 t, while there were 3,753 t of several minor tuna species. The detailed catches, by species, fishing area and gear have been provided to the ICCAT Secretariat, as Task I data.

At the same time, the enforcement of the EC Data Collection regulation (Reg. CE 1543/00) provided good sampling for the most important species (bluefin tuna, albacore, swordfish and Atlantic bonito), continuing the effort already carried out in 2002. Because of the important difficulties encountered in sampling some fishing activities, like tuna purse seining, this scientific work was the base to provide reliable statistics and size frequencies for most of the fisheries. Furthermore, updated biological information has been provided.

Research activities have been continued on a national or international basis. The pilot study on the bluefin tuna sport fishing has been completed and the results regularly reported to ICCAT. At the same time, a national tagging program, using electronic pop-up tags, has been carried out, in collaboration with Spanish and Turkish scientists, providing new information about the movements of bluefin tuna tagged in the eastern Mediterranean. All the Italian teams traditionally working on large pelagic species have been involved in the EC Data Collection framework, under national co-ordination provided by the Italian Society of Marine Biology. Italian scientists also cooperate in several EC research programs, such as REPRO-DOTT, SFITUM and others concerning tuna and tuna like species, and also cooperate in the FAO-COPEMED project on the same subject. Italian scientists also attended relevant international meetings, like the ICCAT-GFCM Joint Expert Meeting on Large Pelagic Species in Malaga and the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies in Marseille.

EC-Malta

Annual fisheries information

Bluefin tuna and swordfish are the target species of a surface longline fishery, involving 91 vessels. In 2003, landings of bluefin tuna amounted to 255.2 t and while those of swordfish were 162.5 t. In addition, 4.7 t of albacore have been taken as by-catch in the bluefin tuna fishery.

Research and statistics

Malta took part in the FAO-COPEMED project. The results obtained in this project have been presented to ICCAT SCRS as scientific documents. Tagging activities have been undertaken in the context of the Bluefin Year Program.

The domestication aspects of the bluefin tuna are investigated through the participation in the DOTT project (European Commission 5th RTD Framework Program). Cages have also been installed to conduct other research activities on bluefin tuna.

EC-Portugal

Portuguese catches of tuna and tuna-like-species amounted to 9,398 t in 2003, which represents a decrease of 33% over the catch of 1998 (13,979 t). This decreasing trend is mainly due to the decline in baitboat fisheries in recent years. Apart from the tuna and tuna-like species catches a total amount of 5,423 t of pelagic sharks were caught as by-catch from the longline fisheries.

Portuguese tuna fisheries take place mainly in the Azores and Madeira archipelagos, where local baitboat fleets target different species of tuna, depending on the season and local abundance of each species. In 2003, these bait-boat fleets caught 6,355 t in Azores and 2,150 t in Madeira, which included 4,300 t of skipjack, 1,609 t of bigeye tuna, 967 t of albacore and 3 t of yellowfin tuna. Part of the Azores fleet fished in the Madeira area during 2003.

A long-line fleet based at Portugal mainland targeting mainly swordfish and operating both in the North and South Atlantic, caught during 2003 a total of 1,056 t of swordfish, of which 354 t were caught in the South Atlantic. The catches of the long-line fleets based in the Azores and Madeira and operating in the NE Atlantic amounted to 309 and 21 t, respectively.

Longliners based in Madeira which had been operating since 1990 in the Eastern Atlantic and in the Mediterranean, catching an average of 300 t of bluefin tuna per year, did not operate in the 2003.

One tuna-trap has been operating in the South of Portugal since 1995, targeting mainly bluefin tuna. In 2003 the total catch amounted to 122 t, of which 26 t corresponded to bluefin tuna.

Research programs on tuna and tuna-like species have been carried out by the Azores University, the Fisheries Research Laboratory of Madeira and the National Research Institute for Agriculture and Fisheries (INIAP/IPIMAR) in mainland Portugal. The collection of tuna statistics and sampling size frequencies have been routinely reported to the ICCAT Secretariat and the results of the scientific research have also been submitted to the regular meetings and inter-sessional workshops of the SCRS.

An observer program on the Azores baitboat fishery has been carried out since 1998, covering more than 50% of the fleet.

EC-Spain

Spanish catches of tunas and tuna-like species in 2003 in the ICCAT area were 110,669 t (preliminary data): 24,884 t of yellowfin tuna; 11,768 t of bigeye tuna; 44,837 t of skipjack tuna; 12,723 t of albacore; 9,149 t of swordfish; 4,650 t of bluefin tuna; 444 t of billfishes; and 247 t of others). Size sampling was conducted on 349,438 fish (preliminary data): 43,363 yellowfin; 67,709 skipjack; 39,597 bigeye; 52,828 albacore; 55,238 bluefin; 75,415 swordfish; and 15,288 other species. In addition, 197,624 fish were identified for species. Forty-two (42) scientific documents were presented to the 2004 SCRS. The most important fisheries continue to be those for tropical tunas (including Canary Islands tunas), with purse seine and baitboat gears, and those for

temperate tunas, such as bluefin tuna, albacore, swordfish and small tunas, with a variety of gears. In the tropical tuna fisheries 368,681 fish were sampled, with size data on 170,787 fish. The major source of information on the purse seine fishery is the fishing logbooks (88% coverage). Since 1990, there has been a massive introduction of artificial floating objects. Four (4) observer trips were carried out in 2003 and 2004. There was active participation in the Bigeye Tuna Year Program (BETYP) and the final BETYP Symposium. A bigeye tagging trip was carried out (265 tunas tagged) and data from the various tagging cruises were analyzed. Work was conducted on the development of the base case of an operational model for bigeye (FEMS project). In the baitboat fisheries, the major catches are made by objects ("manchas") fishing. Their estimated logbook coverage rate is close to 100%. In 2003 43,714 tuna were measured in Dakar, Senegal. In the Canary Islands 22,417 tunas of various species were measured and the data coverage is close to 100%.

As concerns bluefin tuna, there were 28,134 fish sampled in the Atlantic and species sampling continued for growth and genetics studies. In the Mediterranean, observer activities continued on board longliners and 1,203 bluefin tuna were sampled in canneries. Sampling continued for biological studies. The TUNIBAL projects on bluefin tuna spawning areas by means of larval surveys continued as did the REPRODOTT and GPM projects on the reproduction of bluefin tuna in captivity and in the natural environment, and the SFITUM project on the importance of the bluefin tuna recreational fishery. Work continued on relative abundance indices, growth, mortality, migrations, stock structure, environmental influence, and other research on tag-recapture with traditional, electronic and "dummy" archival tags, as well as coordination of the COPEMED project.

With regard to albacore, surveys were carried out (85-95% coverage) and 52,828 fish were sampled (4.2 fish per ton). Opportunistic-sport tagging activities continued. Studies were conducted on the effects of sampling error on the estimates of catch by age, in the albacore abundance index of the troll fleet, as well as the relation between the albacore stocks and the environment. The FEMS project was initiated on the development of an integrated framework to evaluate the management strategies applied to the North stock of albacore. Work was done on the ICCAT Manual.

Swordfish activities centered on the scientific monitoring of the fleet activity and comparison of the olfactory and visual capacity of swordfish based on experiments in the natural environment using different types of bait (natural, artificial and mixed). Work was carried out on the biological aspects of the most important species associated with this fishery and on their tag-recapture data according to historical information available from international tagging projects. There were 58,498 swordfish sampled in the Atlantic (26% coverage) and size-sex sampling continued. There were 600 fish were tagged and released and 180 recoveries of different species has been received. In the Mediterranean, sampling and observer activity continued and about 17,000 swordfish and other associated species were sampled. Studies were conducted on biological parameters and on associated species and several documents were prepared within the COPEMED and GFCM-ICCAT framework.

As concerns small tunas, significant progress was made in biological research of the species, on biological parameters of frigate tuna, Atlantic bonito and Atlantic black skipjack. Within the FAO-COPEMED project on Large Pelagics, scientific results were presented at the 2nd Meeting of the Working Group held in Marseille (France).

Japan

All the Japanese catch in the Atlantic Ocean has been made by the longline fishery since 1993. In recent years, the number of Japanese longline boats has been decreasing from 291 of 1996 to 193 and 201 in 2002 and 2003, respectively. This decline has also synchronized with the decline of fishing effort (about 40%) in the Atlantic, although 2003 effort was slightly recovered. The reduction of fishing effort is attributable to the shift of longline vessels to the Pacific or to other areas partly due to the low catches for bigeye.

The provisional 2003 catch of tunas and tuna-like fishes in the Atlantic Ocean and Mediterranean Sea by the Japanese fishery is estimated to be 30,000 t (an increase of 6,000 t over 2002). Bigeye tuna is the most important species, accounting for about 65% of the total catch, followed by bluefin tuna, yellowfin tuna, southern bluefin tuna, albacore and swordfish. In 2003, catches for most species increased except for bluefin tuna. It appears there have been no new known changes to this fishery in recent years except for the above-mentioned decline of fishing effort.

Korea (Rep. of)

The 2003 catch of tunas and tuna-like fishes by the Korean longline fishery in the Atlantic Ocean amounted to 402 t, representing a 31% increase from the previous year's figure. Yellowfin and bigeye tuna made up of the major component of the total Korean longline catch, accounting for 52% and 36%, respectively, of the total catch. Yellowfin tuna catches increased from 7.8 t in 2002 to 209 t in 2003 and bigeye tuna catches increased to 143 t. Small quantities of albacore and billfishes were also caught by longliners.

The scientific monitoring work carried out by the National Fisheries Research and Development Institute (NFRDI) continued. This monitoring covers the collection of catch and fishing effort statistics from Korean tuna longliners in the Atlantic to meet the ICCAT data requirements. To implement the recommendations adopted by ICCAT, Korea has taken the necessary measures, including the introduction of new domestic regulations. Since 2002, the Korean Government has initiated the training of international observers to control the international fisheries, including the tuna fisheries.

Mexico

Fishing effort of the longline fleet in the Gulf of Mexico is directed at yellowfin tuna *(Thunnus albacares)*. In 2003, there were 30 active vessels, carrying out a total of 413 fishing trips and reporting a catch of 1,362 t of yellowfin tuna. In addition, there was an incidental catch in this fishery of bluefin tuna (18 t), bigeye tuna (4 t), swordfish (40 t), sailfish (45 t) and minor amounts of blue marlin and white marlin. Of the group of sharks caught as by-catch, those of oceanic whitetip *(Carcharhinus longimanus)*, blacktip sharp *(C. limbatus)*, and shortfin mako *(Isurus oxyrhinchus)* are noteworthy. Besides this fishery, the Gulf of Mexico waters sustain an artisanal fishery for small tunas along the coasts of the Gulf of Mexico and the Caribbean Sea. In this fishery, there was a total reported catch of 10,960 t of small tunas in 2003, of which those of spotted Spanish mackerel *(Scomberomorus maculatus)*, king mackerel *(Scomberomorus cavalla)* and Atlantic bonito *(Sarda sarda)* are noteworthy. As concerns research, Mexico continues to maintain a National Observer Program for the longline fleet, covering 100% of the fishing trips. Through this program, information is collected that supports the various areas of research, in which the research work on the dynamics of the incidental catches of non-target species, such as other tunas, billfish, sharks and chelonians. The analysis consists of observing the possible relations that the catches of fish from these groups have with variables such hook type, depth of the set, time of the year and others. The objective is to observe which of these variables have an influence on by-catches, so as to reduce them or eliminate them. Currently, only partial results are available from the Exploratory Data Analysis, with a time-area perspective.

Morocco

Fishing for tuna and tuna-like species is an important component in the maritime fishing sector and continues to occupy an important place in the national economy of this sector.

The major tuna species caught by Moroccan fishers are bluefin tuna, bigeye tuna, swordfish, yellowfin and small tunas (skipjack, Atlantic bonito, frigate tuna, etc.) as well as many other species.

In 2003, the catches of tunas and tuna-like species amounted to 10,104 t, representing a 19% decrease as compared to catches in 2002.

This decline is mainly due to the decrease in the catches of small tunas (-40%) and bluefin tuna, due to poor weather conditions which prevailed during the trap setting periods.

As regards the conservation and management measures on the tuna resources, Morocco continues to apply all the recommendations and resolutions adopted by ICCAT, in order to contribute to the sustainable and rational exploitation of these shared stocks.

In 2003, the *Institut National de Recherche Halieutique* continued its research programs aimed at the study of the biology and the exploitation of tuna and tuna-like species, with the support of the COPEMED project.

South Africa

The South African tuna fishery comprises three sectors, namely baitboat and sport, which target albacore when seasonally available in near-shore waters off southwest Africa, and tuna longline, which predominantly targets

swordfish throughout the year. A small percentage of tuna are also taken as by-catch in the pelagic shark longline fishery. Of the 163 authorized baitboat vessels only 88 vessels were active in 2003. The tuna longline sector continued to operate under experimental permits and 22 of 30 vessels were active 2003. There were approximately 50 vessels active in the sport sector and seven vessels in the pelagic shark longline sector in 2003.

Total albacore landings in 2003 by the baitboat fleet was estimated at 3,322 t, which is the lowest on record since 1983, and was almost 3,000 t lower than the annual ten year average from 1993-2002. This decline was due to a decrease in fishing effort in this sector as a result of the strong South African currency and the unavailability of the resource in near-shore waters, making albacore fishing economically unviable. Longline fishing effort decreased by 40%, from 1.1 million hooks in 2002 to 0.7 million hooks in 2003, and was also affected by the strong South African currency. Nominal swordfish CPUE continued to decline from 785 kg/1000 hooks in 1998 to 311 kg/1000 hooks, which resulted in some fishers shifting fishing effort into the southwest Indian Ocean. Reported landings of bigeye tuna (90 t) and yellowfin tuna (24 t) and nominal CPUE for these species also decreased in comparison to 2002 figures. Shark longline effort increased by 500% from 35,000 hooks in 2002 to 174,000 hooks in 2003, due to increased market prices for shark. Consequently, reported landings (in dressed weight) increased from 4 t to 132 t for blue sharks and 1 t to 96 t for shortfin mako sharks.

Port sampling trips for albacore length measures declined to two trips in 2003. An onboard scientific observer program for tuna longliners has been in existence since 1998 and is aimed at covering 20% of all fishing trips. Observer coverage declined from 17% in 2001 to 7% of 202 fishing trips in 2003.

The major focus of research, since 1998, has been the life history and stock delineation of swordfish occurring in the waters of Southern Africa. Consequently, biological material of swordfish for ageing, sexing, maturation, diet and genetic studies are continually collected. A tagging program for billfish, tunas and pelagic sharks is expected to be implemented in 2005.

Tunisia

During 2003, about 53 tuna vessels measuring between 15 and 38 meters total draft, and three traps set in the Gulf of Tunis carried out to tuna fishing along the Tunisian coasts. In addition, 90 longliners of various sizes continued to fish in Tunisian waters targeting swordfish.

The catches of tunas and tuna-like species (swordfish) amounted to 3,575 t. In terms of proportion, small tunas comprised the major component of the catches, with 69.8% of the total catches, i.e., 2,498 t, while bluefin tuna catches, estimated at 791 t, only represent 22.1%. Swordfish catches have also declined, from 1,138 t in 2002 to only 288 t, representing 8.1% of the national landings.

Purse seine landings of bluefin tuna continue to constitute more than 96.5% of the national catches of this species.

The contribution of the three Tunisian traps sent in the North of the country, to the catches of bluefin tuna is decreasing more and more. In 2003 their accumulated production was did not exceed 5 t of bluefin tuna, which represents less than 0.6% of the national catches.

In 2003, six bluefin tuna farms were created, with a total capacity of 2,400 t. The national caches only amounted to 587 t, which obliged the various companies to import bluefin tuna from elsewhere. In this way, 745 t of live bluefin tuna were repatriated to Tunisian cages. According to the report of the services concerned with this activity, production would be on the order of 1,627 t.

As concerns research activities, Tunisia continues to carry out research work on large pelagics, through the *Institut National des Sciences et Technologie de la Mer* (INSTM). The INSTM actively participates in the research activities of FAO/COPEMED, a program aimed at improving knowledge on the fishery, the biology and ecology of large pelagics in the Mediterranean, which is co-financed by the FAO/COPEMED and the INSTM.

Turkey

The total Turkish catch of bluefin tuna and tuna species in 2003 was about 9,330 t. The catch of about 3,300 t of bluefin tunas was made by 50 licensed purse seiners. Almost all of the purse seine catch was transferred to

floating cages for on-growing. Albacore comprised about 5% of the bluefin tuna catch. In 2003, no official catch data for bullet tuna and Atlantic black skipjack were given. The total catch of swordfish in 2003 was about 350 t.

In 2003, biological sampling on bluefin tunas (gonads, liver, muscle, dorsal spines and otoliths) from the purse seine fisheries and farms was conducted, giving the first histological evidence of the presence of spawning of bluefin tunas in the Levantine Sea in May 2001, 2002, 2003 and 2004. It was shown that the reproductive period of bluefin tuna in the eastern Mediterranean can be dated to around mid-late May, almost one month earlier than this spawning period in other Mediterranean spawning grounds.

Forty-three (43) bluefin tuna, donated by Turkish purse seiners and bluefin tuna farms, were tagged by pop-up satellite tags during the same period when gonad samples were collected. The results show that no bluefin tuna tagged in the Levantine Sea moved towards the Strait of Gibraltar after spawning. On 5-18 June 2004, the first larval cruise TUNALEV was conducted in the Levantine Sea. For the first time, good numbers of bluefin tuna, bullet tuna and Atlantic black skipjack larvae were found, indicating the first evidence of spawning in the Levantine Sea.

As regards the mandatory reporting of bluefin tuna farming in Turkish waters, a new regulation entered into force in 2003.

The minimum catch size of bluefin tunas is 90 cm FL. The minimum size for bonitos is 25 cm FL, with a catch restriction between 1 April and 1 September.

United Kingdom (Overseas Territories)

The Bermuda commercial fishing fleet consisted of 220 vessels during the year 2003 with approximately 75 of the vessels actively fishing for tuna and tuna-like species. Most of the fishing effort is carried out in the inner 50 km of the Bermuda Exclusive Economic Zone, which includes two offshore banks, while longline vessels work further offshore.

For the year 2003, the total catch of tuna and tuna-like species was 155 t. This represents approximately a 45 t increase in the total catch over 2002. This increase was made up almost entirely of larger catches of wahoo and yellowfin tuna taken by commercial trolling. The larger catches may be due in part to an increase in fishing effort for pelagic species but inter-annual variability in the abundance of these highly migratory species is also an important factor.

Bermuda remained active in the ICCAT Enhanced Program for Billfish Research. A study on the post-release survival of blue marlin caught on recreational fishing vessels in the western Atlantic, utilizing pop-up satellite tags, continued this year. In 2003, there were further deployments of pop-up tags in Bermuda waters and in the Caribbean. In addition, tournament sampling of blue marlin continued to provide important data on reproductive seasonality at Bermuda's northerly latitude (32°N). The Bermuda Marine Resources Division (formerly Fisheries) continues to be engaged in a number of regional research programs directed at various pelagic species including wahoo, yellowfin, tuna blackfin tuna and blue marlin. These studies include species biology, population genetics and tagging. In addition, recreational fishing for tuna and tuna-like species is monitored (mainly through tournaments) thus ensuring compliance with all ICCAT recommendations.

United States

Total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2003 was about 27,000 t, an increase of about 9% from about 25,000 t in 2002. The estimated swordfish catch in 2003 (including estimated dead discards) marginally decreased (25 t) and was about 2,800 t. Provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico increased in 2003 to about 2,500 t from about 2,400 t in 2002. The estimated 2003 Gulf of Mexico landings of yellowfin tuna accounted for about 33% of the estimated total U.S. yellowfin landings in 2003. U.S. vessels fishing in the northwest Atlantic landed in 2003 an estimated 1,489 t of bluefin, a decrease of 400 t compared to 2002. Provisional skipjack landings decreased by 9 t to 78 t from 2002 to 2003, estimated bigeye landings decreased by 117 t compared to 2002 to an estimated 483 t in 2003, and estimated albacore landings decreased from 2002 to 2003 by 39 t to 449 t.

In addition to monitoring landings and size of swordfish, bluefin tuna, yellowfin tuna, billfish, and other large pelagic species through continued port and tournament sampling, logbook and dealer reporting procedures, and scientific observer sampling of the U.S. fleet, major research activities in the past year 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 larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico. Research on development of robust estimation techniques for population analyses and on approaches for characterization of uncertainty in assessments and methods for translating that uncertainty into risk levels associated with alternative management approaches was further conducted. U.S. scientists also continued to coordinate efforts for the ICCAT Enhanced Research Program for Billfish and for the Bluefin Year Program. Participants in the Southeast Fisheries Science Center's Cooperative Tagging Center (CTC) and The Billfish Foundation tagging program tagged and released 4,829 billfishes (swordfish, marlins, sailfish, and spearfish) and 608 tunas in 2003. This represents a decrease of 43% for billfish and a 9% decrease for tunas from 2002 levels. Electronic tagging studies of bluefin tuna and of marlins were substantially enhanced. 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.

During the past year, U.S. scientists participated in the various scheduled ICCAT intersessional meetings held in 2004 and prepared 30 scientific working papers in support of the working group activity.

Observers from Cooperating Parties, Entities or Fishing Entities

Chinese Taipei

Chinese Taipei started to fish tuna and tuna-like species in the Atlantic Ocean since early-1960s. Large-scale longline vessels (>200 Gross Registered Tonnage) have declined since 1996, particularly those vessels larger than 500 GRT, whereas Chinese Taipei registered small-scale tuna longline vessels (< 100 GRT) that operated in the western tropical Atlantic Ocean numbered about 17 in the same time period. In 2003, the total number of vessels was 163, including 13 re-registered vessels.

The fishery has only targeted albacore since the beginning in both the North and South Atlantic Ocean, and since the development of deep longline operations in late-1980s in the tropical Atlantic Ocean, some of the fishing effort has shifted to target bigeye and yellowfin tunas. Those three species constituted of over 86% of the annual catch since 1991. The catch composition of the Chinese Taipei registered small-scaled longline fleet shows a very similar target status with large scale-longline vessels.

The total catch made by the fleet was preliminarily estimated to be about 51,400 t in 2003, including 2,537 t from re-registered vessels under encouragement of ICCAT and the Japan-Chinese Taipei Joint Action Plan (in February 1999). The albacore in 2003 was estimated at 21,686 t, of which 4,539 t were caught in the North Atlantic Ocean and 17,147 t in the South. There was a 234 t increase for the North Atlantic Ocean, from 4,305 t, and a 75 t decrease for the South Atlantic Ocean, from 17,222 t in 2002. Catches of bigeye tuna and yellowfin tuna from the Atlantic Ocean in 2003 were estimated at about 19,541 t and 6,486 t, respectively. The 2003 catch of bigeye tuna includes a 1,250 t quota transfer from Japan, and shows an increase over the total catch in 2002 (16,503 t). The 2003 catch of yellowfin tuna also increased from the 2002 catch (4,542 t).

The catch of re-registered vessels has been reported in Chinese Taipei’s catch report. The preliminary catch estimates of re-registered vessels operating in the Atlantic Ocean for albacore, bigeye tuna, yellowfin tuna and swordfish were 222 t, 1,822 t, 380 t and 74 t in 2003, respectively. More detailed information on other tuna species is described in the report of Chinese Taipei (NAT-39).

Routine collection and compilation of fishery data on tuna and tuna-like species have continued. Recently, the Fishery Agency of Chinese Taipei not only initiated an Observer Program, but it also improved the national data collection systems, such as VMS, to improve data collection. In addition to conventional data collection, another focus for fishing activities and catch information of small-scale longline vessels is planned, combined with the port sampling program starting from the coming year. 2004 is the third year Chinese Taipei dispatched observers in the Atlantic Ocean to collect information on fishing activities. The information and data collected through this program can be classified into three categories, including fishing effort and catch, oceanographic data and biological information on target species and by-catch species. The analysis of the collected data is in process.

The Fishery Agency of Chinese Taipei supports research programs on main tuna and tuna-like species and has continued providing financial contribution for scientific research programs implemented by ICCAT. As a CPC observer, the amount of US$80,000 has been contributed to the ICCAT Secretariat for fiscal year 2004.

Guyana

Guyana's large pelagic fishery is currently restricted to the harvest of several shark species, Spanish mackerel, and king mackerel. All fishing occurs within Guyana's Exclusive Economic Zone (EEZ). The shark fishery developed in the late 1970s-early 1980s, in order to supply a growing local market. In 2003, 991 fishing vessels were involved in the large pelagic fishery, with sharks targeted mainly by the larger vessels using gillnets with a mesh size of 6-8 inches. In 2003, shark production amounted to 1811 t, with the total catch of Spanish and king mackerels being 388 t and 390 t, respectively. Juvenile sharks, taken as by-catch by the vessels operating gillnets in shallow waters, comprised 2% of the total shark catch in 2003. Juvenile sharks were landed whole. All other sharks continued to be landed dressed, making it difficult to record all of the catch by individual species. In 2003, the Coast Guard conducted 27 fisheries surveillance trips, i.e., just over two trips per month. Tuna and tuna-like species are known to occur in Guyana's waters, and Guyana is interested in developing a fishery to target these species that conforms fully to ICCAT regulations.

Observers from intergovernmental organizations

Caribbean Community (CARICOM)

Those CARICOM countries that are not members of ICCAT and which are submitting separate national reports in 2003 are: Guyana, St. Vincent and the Grenadines, and Belize. The report prepared by the Caribbean Regional Fisheries Mechanism (CRFM), on behalf of CARICOM, includes data and information from four other CARICOM countries that are also not members of ICCAT, namely: Grenada, Dominica, St. Kitts and Nevis, and St. Lucia. Large pelagic fisheries in these latter four countries involve multi-species, multi-gear, opportunistic operations. Small recreational fisheries operate in the four islands, with some catch data recorded during annual fishing tournaments. The catch levels and species composition of the catches observed in the four countries in 2003 were similar to those of 2002. The practice of fishing around FADs has become more organized in three islands, and this has improved the efficiency of local fishing operations in recent years. The most important species landed in 2003 were yellowfin and skipjack tunas, small tunas, and billfishes. In June 2003, the CRFM held its first annual scientific meeting, and examined wahoo and Spanish mackerel data available from a few eastern Caribbean CARICOM countries. Grenada continued to impose gear and other restrictions to help limit swordfish catches, and St. Lucia now regulates the total allowed catch per recreational fisher per trip, as well as the areas of recreational fishing operations.

Observers from non-Contracting Parties, Entities or Fishing Entities

Senegal

In Senegal there are three types of tuna fisheries, as follows:

- The industrial fishery that mainly targets three species: yellowfin (YFT), skipjack (SKJ) and bigeye (BET). These species are caught by the baitboat fleet which lands all its catches at the port of Dakar. Catches in 2003 amounted to 1,470 t (279 t of yellowfin tuna, 733 t of skipjack tuna and 407 t of bigeye tuna). The most important catches were obtained from June to December, which corresponds to the period of activity of the tuna vessels.

- The artisanal fishery that catches coastal tunas: Atlantic black skipjack (LTA), west African Spanish mackerel (MAW), Atlantic bonito (BON), and billfish (swordfish-SWO, blue marlin-BUM, sailfish (SAI). The total catches in 2003 amounted to 4,113 t (2,659 t of Atlantic black skipjack-LTA, 592 t of west African Spanish mackerel-MAW, 622 t of Atlantic bonito-BON, and 240 t of sailfish-SAI).

- The sport fishery that targets billfish, sailfish and swordfish during the fishing season from May to November. A total (in number) of 1,265 sailfish and 79 billfish, on average, were caught from 1997 to 2000 with maximum catches from June to August.

The statistical data collection system is based on a daily logbook that is distributed at the various landing sites or from sampling which is also carried out.

Besides these fisheries, in 2003 two tuna canneries will be in operating (PFS and SE-SNCDS).

8. Executive Summaries on species

The Committee stresses that the main purpose of an Executive Summary is to provide a succinct overview to the Commission. These are summaries of the biology and fisheries affecting stocks of concern, the status and outlooks for these stocks, evaluations of effectiveness of management measures agreed by the Commission, and recommendations for additional management measures that the Committee feels would improve the odds of meeting the Commission's objective of attaining Maximum Sustainable Yield levels from the stocks. In order to avoid misunderstanding the Committee's intent, the SCRS stresses the need to recognize and cite all the conditions and uncertainties identified in the Executive Summary, if figures and tables are used apart from the entire Executive Summary Report.

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

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

8.1 YFT - YELLOWFIN TUNA

The last stock assessment was carried out 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.

YFT-1. Biology

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans, where they form large schools. The sizes exploited range from 30 cm to 170 cm FL. Smaller fish (juveniles) form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish are found in surface and sub-surface waters. The majority of the long-term recoveries have been tagged in the West Atlantic and recovered in the East Atlantic, where several recaptures are recorded each year. Maturity occurs at about 100 cm FL. Reproductive output among females has been shown to be highly variable, although the extent of this is unknown. The main spawning ground is the equatorial zone of the Gulf of Guinea, with spawning 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 (Atlantic Yellowfin Working Group, Tenerife 1993), 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 patterns are variable with size, being relatively slow initially, and 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 assumption is supported by tagging studies for Pacific yellowfin. New data on biology and catches obtained from the Brazilian longline fishery were presented in 2004.

YFT-2. Description of the fisheries

Yellowfin tuna are caught in the entire tropical Atlantic, between 45ºN and 40ºS, by surface gears (purse seine, baitboat and handline) and by longline. Total Atlantic catches in 2003 amounted to 123,929 t **(YFT-Table 1, YFT-Figure 1** and **YFT-Figure 2**), the lowest level since 1984. It should be noted that the catch totals shown include estimates derived from Japanese import statistics, which list the country of origin but do not indicate flag of the landing vessel nor ocean of origin for the catch. In 2003, landings estimated through these import statistics totaled only 578 t. Further investigation of the historical import statistics is planned in order to ascertain if flag and ocean can be confirmed.

In the eastern Atlantic, there are several baitboat fisheries that operate along the African coast. The most important is the fishery based at Tema (averaging about 2.5 kg per fish); another is based in Dakar (averaging about 7 kg) and others operate in the various archipelagos in the Atlantic (Azores, Madeira, Canary Islands and Cape Verde) with average weights around 30 kg. Purse seiners catch large yellowfin in the Equatorial region in the first quarter of the year, coinciding with the spawning season and area. They also catch small yellowfin in association with skipjack and bigeye using floating objects. Fish caught in free schools average around 34 kg, whereas those caught using floating objects average about 4 kg, with an overall average of around 18 kg.

In the western Atlantic, Venezuelan and Brazilian baitboats catch yellowfin (averaging about 14 kg) together with skipjack and other small tuna. Purse seine fisheries have operated since 1980 in coastal areas to the north of the coast of Venezuela.

Longline fisheries capturing yellowfin tuna (averaging 27-51 kg) are found throughout the Atlantic. **YFT-Figure 2** shows the total Atlantic catches by gear.

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. Unfortunately, at the time of the assessment meeting, only 19% of the 2002 catch had been reported (calculated relative to the catch reports available at the time of the SCRS Plenary). The results from all models were considered in the formulation of the Committee's advice.

Overall trends in the catch at age available at the time of the assessment are shown in **YFT-Figure 3**. The variability in overall catch at age is primarily due to variability in catches of ages 0 and 1 (note that the catches in numbers of ages 0 and especially 1 were particularly high during the period 1998-2001).

Both equilibrium and non-equilibrium production models were examined in 2003. The effective effort used for the production models was calculated by first creating a combined index from the available abundance indices by fleet and gear, and weighting each index by the catch of that fishery. One of the non-equilibrium models applied estimated the annual effective fishing effort internally, allowing the fishing power trends by fleet to vary.

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 estimate 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 (**YFT-Figures 4a-b**); the main differences in the results were related to the assumptions of each model. The Committee was unable to estimate the level of uncertainty associated with these point estimates.

An age-structured virtual population analysis (VPA) was made using eight indices of abundance. The results from this model were more comparable to production model results than in previous assessments, owing in part to a greater consistency between several of the indices used. The VPA results compare well to the trends in fishing mortality and biomass estimated from production models. The VPA estimates that the levels of fishing mortality and spawning biomass in recent years have been very close to MSY levels (**YFT-Figures 5a-b**). The estimate of MSY derived from these analyses was 148,200 t.

In summary, the age-structured and production model analyses implied that although the 2001 catches of 159,000 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. Consistent with these model results, yield-per-recruit analyses also indicated that 2001 fishing mortality rates could have been either above or about the level which could produce MSY. Yield-per-recruit analyses further indicated that an increase in effort is 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 **(YFT-Figures 6a-b)**.

YFT-4. Outlook

Since reported yellowfin landings in 2001 appeared to be somewhat above the MSY level estimated during the 2003 assessment and fishing effort and fishing mortality may have been in excess of the levels associated with MSY, it is important to ensure that effective effort does not increase beyond the 2001 level. Projections indicate that stock biomass is likely to decrease if fishing mortality increases to the level estimated for 1992, which is currently being approached or exceeded. Thus the possibility that the fishing power of the purse seiners and other fleets may further increase, even if the total capacity of the fleet were to remain constant, is also cause for concern. It should be noted that the current estimates of total yellowfin landings in 2002 and 2003, which were not available at the time of the assessment, are 139,000 t and 124,000 t, respectively.

YFT-5. Effects of current regulations

In 1973, the Commission adopted a regulation that imposed a minimum size of 3.2 kg for yellowfin tuna, with a 15% tolerance in the number of fish per landing. This regulation has not been adhered to, as the proportion of landings of yellowfin tuna less than 3.2 kg has been far in excess of 15% per year for the purse seine and baitboat fisheries. Based on the catch species composition and catch-at-size data available during the 2003 assessment, yearly catches in number ranged between 54% and 72% undersized yellowfin tuna by purse seiners, from 63% to 82% undersized fish for baitboats over the period 1997-2001. Landings of undersized fish occur primarily in the equatorial fisheries. Unfortunately, it is difficult to realize substantial reductions in catches of undersized fish in these fisheries because small yellowfin are mostly associated with skipjack, especially when fishing occurs on floating objects; thus it is difficult to avoid catching small yellowfin when catching skipjack, the latter being an important component of eastern Atlantic (equatorial) purse seine fleet catches. The Committee plans further investigations of the utility of minimum size regulations and alternative measures to reduce juvenile mortality in this multi-species fishery.

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 (**YFT-Figure 5b**).

An evaluation of the effects of the moratorium on FAD fishing was conducted as a response to the Commission [ICCAT *Report for the Biennial Period 2002-03, Part II (2003), Vol. 2 (2004)*] and is detailed in "2003 ICCAT Tropical Tuna Species Working Group Session" [Col. Vol. Sci. Pap. 56(2):283-352 (2004)].

YFT-6. Management recommendations

Estimated catches of yellowfin tuna have averaged 141,000 t over the past three years. This average falls near the lower estimate of the range of MSY from the age-structured and production model analyses conducted during the 2003 assessment. The Committee considers that the yield of 159,000 t in 2001 is likely somewhat above the replacement yield and that levels of fishing effort and fishing mortality may have been near MSY. Total catches since 2001 have been declining, but without a new assessment it is not clear whether or not this reflects decreases in fishing effort and fishing mortality. Therefore the Committee reaffirms its support for the Commission's 1993 recommendation "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." During the 2003 assessment, the Committee's estimates of effective fishing effort for recent years fell near the estimate for 1992.

The Committee also continues to recommend that effective measures be found to reduce fishing mortality of small yellowfin, based on previous results of yield-per-recruit analysis. In 2003, the Committee evaluated the effects of the moratorium on fishing on floating objects (and other measures to reduce catches of small fish) begun in late 1997, but there were insufficient data to fully evaluate the impact on yellowfin tuna. In general, the approach was intended to benefit bigeye tuna and is not expected to reduce the mortality of juvenile yellowfin tuna. In fact, the fishing mortality on juvenile yellowfin tuna appears to have increased substantially during the moratorium years, although it is unclear that this is related to the moratorium.

ATLANTIC YELLOWFIN TUNA SUMMARY	
Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2001)	159,000 t
(2002)	139,000 t
(2003)	124,000 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].
- Effective fishing effort not to exceed 1992 level [Rec. 93-04].
- Closed area/season for fishing on FADs [Rec. 99-01].

[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 2003 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 (landinds and discards, t) of Atlantic yellowfin by major area, gear and flag 1979-2003

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL			127517	130961	155818	165001	165373	113940	156547	146535	144428	135219	161322	192456	163848	160492	158338	168170	149112	150624	136469	147459	141717	132870	158904	139004	123929
	AT.E		114158	117798	138114	138711	124953	76053	113656	106606	110304	99180	123239	157112	123371	120167	115163	113854	108075	111903	99604	110718	104943	95461	116415	108872	98125
	AT.W		13359	13163	17704	26290	39666	37481	42365	31751	27680	30284	32807	27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30184	38098	29317	24978
	UNCL		0	0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	816	826
Landings	AT.E	Bait boat	13715	7690	9788	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18470	15652	13496	13804	13974	17480	19056	13009	19886	14163	13312
		Longline	6777	12508	7986	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8036	7495	8436	5221	5259	7640
		Other Surf.	1375	574	5347	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	1632	1738	1981	1872
		Purse seine	92291	97026	114993	111820	103502	50860	86576	85325	86141	73117	102200	127673	96314	98660	90505	87794	84770	87586	77634	83647	76922	72383	89569	87469	75301
	AT.W	Bait boat	605	392	1917	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315	6009	3764
		Longline	9277	6735	11323	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11465	12684	11578	10178
		Other Surf.	2442	901	1642	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4580	5345	5200	7027	3763	6429
		Purse seine	1035	5135	2822	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13072	7966	4607
	UNCL	Longline	0	0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	737	826
		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	79	--
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	--
Landings	AT.E	Angola	904	558	959	1467	788	237	350	59	51	246	67	292	510	441	211	137	216	78	70	115	170	35	34	34	34
		Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Benin	48	95	100	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1	0	--
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	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	581	864	5281	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1661	1661
		Cayman Islands	0	602	1460	100	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	84	71	1535	1652	586	262	1033
		Chinese Taipei	190	71	432	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4672
		Congo	0	140	50	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	0	0	0	0	0	0	--
		Cuba	3168	5128	2945	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	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	2	0	0	0	0	0	--
		EC.España	40083	38759	51428	54164	51946	40049	66874	61878	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	30937	31260	24709
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	47776	54372	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	0	255	54	16	0	55	151	223	97	25	36	72	334	334
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0	0	--
		EC.Poland	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		EC.Portugal	185	77	208	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	178	194	3	6	4
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	--
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	88	218	225	225	295	225	162	270	245	44
		Gambia	0	0	0	0	0	0	0	0	0	0	0	2	16	15	0	0	0	0	0	0	0	0	0	0	--
		Georgia	0	0	0	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0	0	--
		Ghana	1426	1974	5510	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	16504	17807	28328	17010	30642	23499	19030
		Guinea Ecuatorial	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	1241	2217	2863	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2268	1485	1506	1766
		Korea, Republic of	6449	5349	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	--
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	--
		Maroc	2986	3243	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108
		NEI-1	0	0	0	3121	5388	1104	0	0	2077	3140	5436	12513	3988	10049	8251	6186	6143	8437	5981	7224	5190	5448	9273	8209	4913
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165	13	139
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3183	6082	6110	3962	5441	4793	4035	6667 *
		Norway	0	0	0	0	0	0	0	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0
		Panama	739	1661	341	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7838	8644	10854	5759	3137	1753	930	1103	574	1022	--
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	737	0	0	0
		S. Tomé e Príncipe	28	31	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0	0	--
		Senegal	0	0	0	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	11	0
		South Africa	4595	540	178	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	229	318	353	316	144	295
		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	1	0
		U.S.A.	2884	1614	1472	636	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.	806	448	541	1004	1282	2168	3768	1851	1275	3207	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.Sta. Helena	69	55	59	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	--
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	--
		Venezuela	0	0	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Catch estimated by SCRS as no species composition correction had been made. The figure reported by Netherlands Antilles is 7082 t.

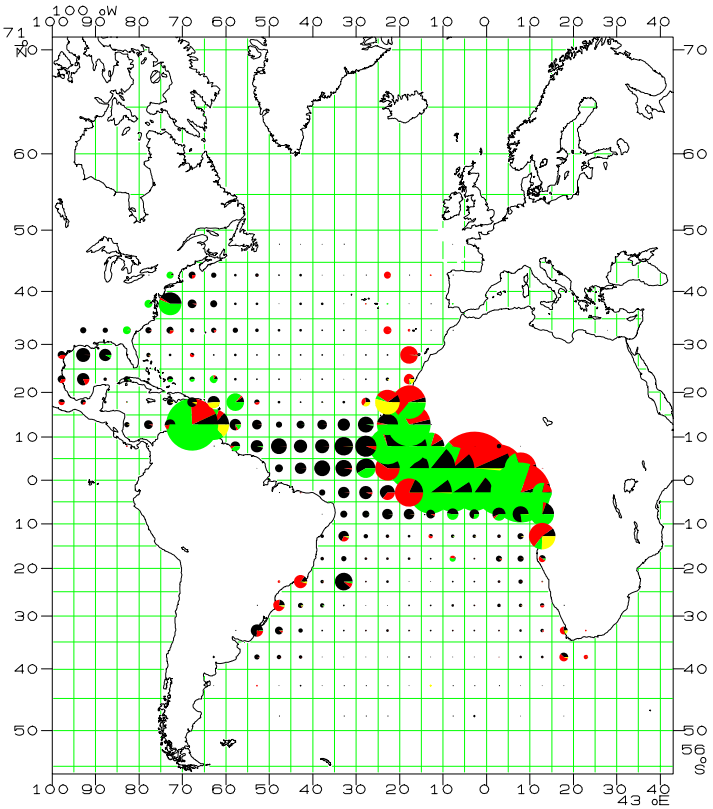
	AT.W	Argentina	0	0	8	7	0	0	44	23	18	66	33	23	34	1	0	0	0	0	0	0	0	0	0	0	--
		Barbados	81	40	30	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142	115	116
		Brazil	1353	1008	2084	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503
		Canada	0	0	0	0	0	0	0	2	40	30	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73

YFT-Table 1. Estimated catches (landinds and discards, t) of Atlantic yellowfin by major area, gear and flag 1979-2003

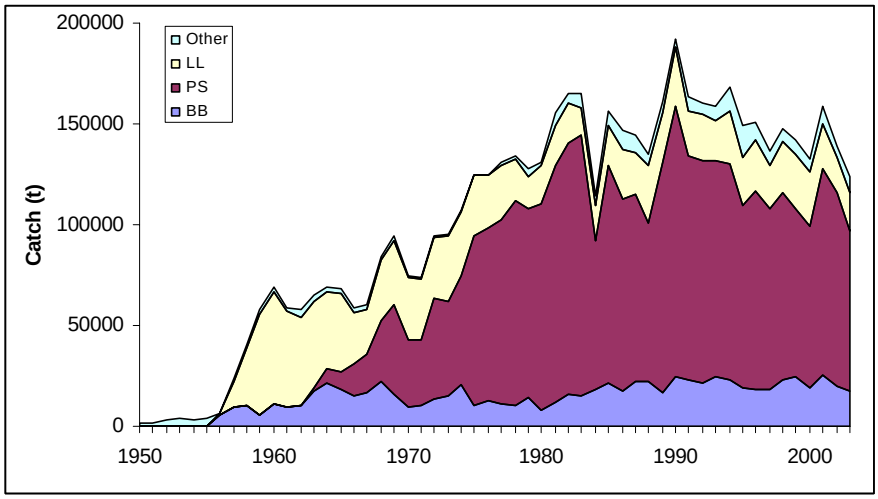
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17
		Chinese Taipei	848	616	435	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1814
		Colombia	0	0	0	3	29	0	180	211	258	206	136	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46
		Cuba	232	689	1997	1503	793	2538	1906	2081	1062	98	91	53	18	11	1	14	54	40	40	15	15	0	0	65	65
		Dominica	0	0	0	0	0	0	0	0	0	0	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	220	226	226	226	226
		EC.España	1052	0	0	0	1957	3976	1000	0	0	1	3	2	1462	1314	989	7	4	36	34	46	30	171	0	0	0
		EC.France	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		Ghana	0	265	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	148	487	64	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	0	0	0
		Japan	1707	1117	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1602	1085	545	740
		Korea, Republic of	4414	1933	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	
		Mexico	0	16	42	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313
		Netherlands Antilles	173	173	173	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0	0	--
		Panama	102	807	262	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	--
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	1	40	48	22	65	16	43	37	35	48	38	33	24	884	568
		Sta. Lucia	28	27	25	26	23	56	79	125	76	97	70	58	49	58	92	130	144	110	110	276	123	134	145	94	139
		Trinidad and Tobago	0	0	0	0	232	31	0	0	0	1	11	304	543	4	4	120	79	183	223	213	163	112	122	125	186
		U.S.A.	298	553	1688	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7702
		UK.Bermuda	26	35	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47
		Uruguay	0	0	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	90	91	--
		Venezuela	2811	5397	4500	14426	26576	21879	20535	11755	11137	10949	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	18651	11421	7411
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	
	UNCL	China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	156	200	124	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	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	168	209	175
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0
		Panama	0	0	0	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	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	1956	1341	280	0
		NEI-other	0	0	0	0	754	406	526	956	1297	2324	2780	4100	4318	3836	2671	4404	4202	5962	6100	8339	7409	5269	2883	175	578

Dashes indicate that no report was received or estimate made

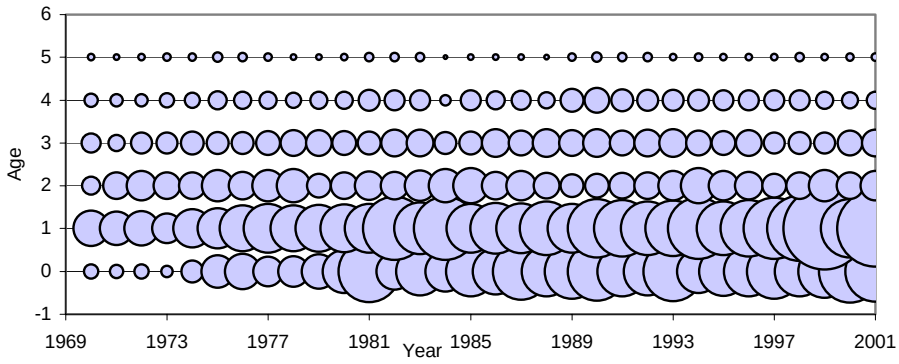
NEI-1 estimates are based on scientific data. 'NEI-other' estimates are based on the comparison between trade statistics and reported catches, and flag and ocean of catch is uncertain.



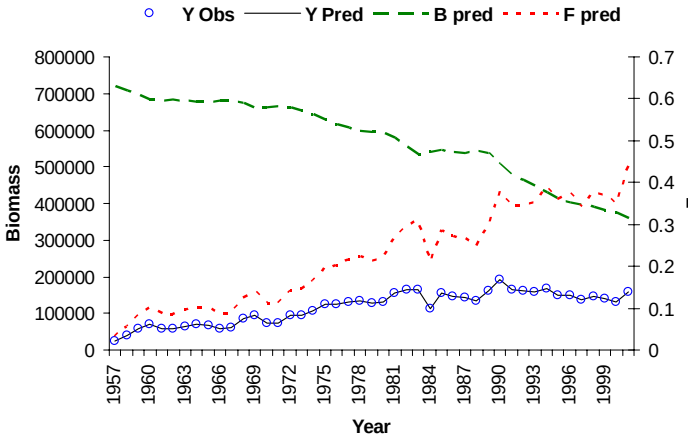
YFT-Fig.1. Geographical distribution of Atlantic yellowfin tuna catches, by fishing gear, 1950-2000 combined. Black, medium-shaded, dark-shaded and light-shaded areas in circles correspond to catches by longline, purse seine, baitboat and other fisheries, respectively.



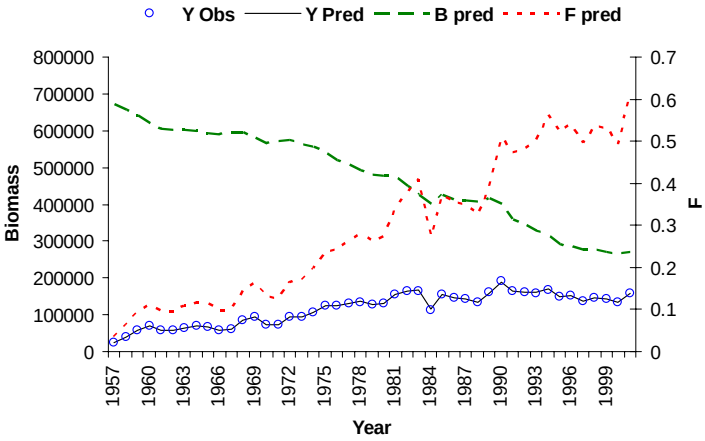
YFT-Fig. 2. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2003.



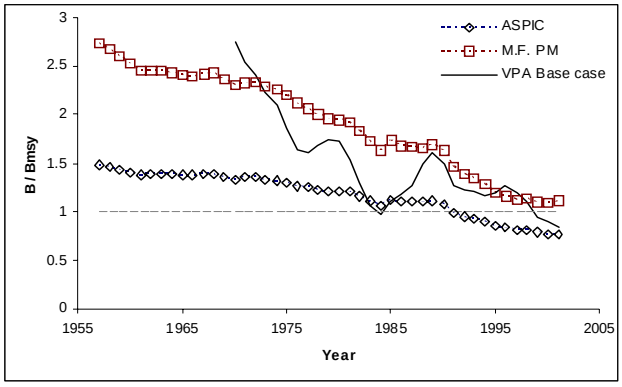
YFT-Fig.3. Relative distribution of Atlantic yellowfin tuna catches by age and year (bubble size is proportional to total catches).



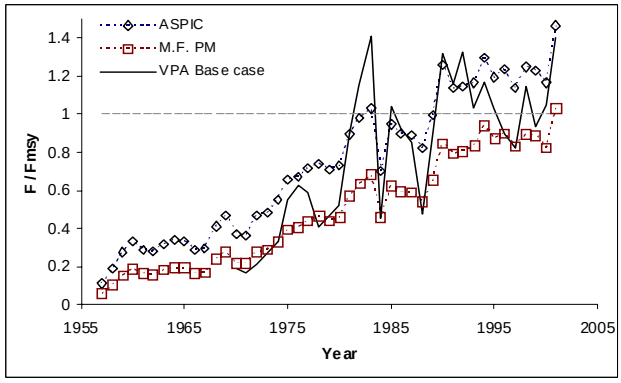
YFT-Fig.4a. Trends in yield (observed and predicted), predicted biomass and predicted fishing mortality from the ASPIC non-equilibrium production model.



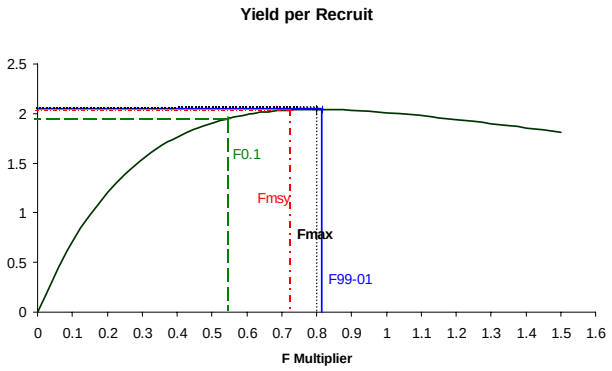
YFT-Fig. 4b. Trends in yield (observed and predicted), predicted biomass and predicted fishing mortality from the Multifleet non-equilibrium production model.



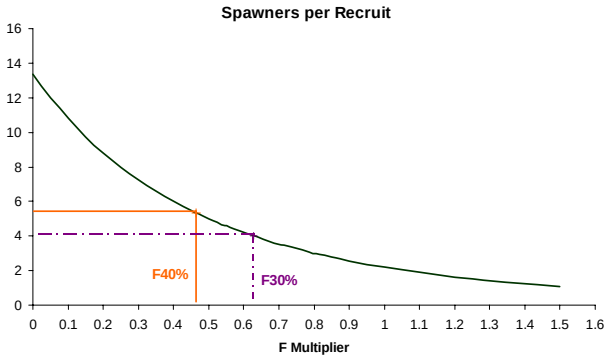
YFT-Fig. 5a. Comparison of relative biomass trends calculated using VPA and non-equilibrium production models.



YFT-Fig. 5b. Comparison of relative fishing mortality trends calculated using VPA and non-equilibrium production models.



YFT-Fig. 6a. Yield-per-recruit based on VPA estimated selectivities. F Multiplier is the value of F that is multiplied by age-specific selectivities.



YFT-Fig. 6b. Spawners-per-recruit based on VPA estimated selectivities. F Multiplier is the value of F that is multiplied by age-specific selectivities.

8.2 BET - BIGEYE TUNA

This year, a new stock assessment was conducted for bigeye tuna in July. Due to the early date of the meeting, the catch information for 2003 was incomplete and could not be incorporated in the assessment.

The ambitious Bigeye Tuna Year Program (BETYP) was proposed and was adopted by the Commission in 1996. The activities were started in 1999 after external funds were made available. The major activities of the Program, such as tagging, genetic studies, modeling, and port sampling, have been completed and the preliminary reports were presented to ICCAT. The program culminated in a Symposium held in March 2004 in Madrid, during which the knowledge gained was shared and discussed with scientists and managers from throughout the world. The Second World Meeting on Bigeye Tuna took place immediately after the Symposium, giving an opportunity for scientists working in different oceans to exchange views on common problems in fisheries management, data, biological parameters, models, etc., Some of the recommendations made in both meetings were implemented during the 2004 assessment session. Thus, the outcomes of the BETYP are already being utilized to assist and improve the task of the Committee substantially.

BET-1. Biology

The geographical distribution of bigeye tuna is very wide and covers almost the entire Atlantic Ocean between 50°N and 45°S. 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.

An estimate of natural mortality (M) for juvenile fish was provided based on the results of an IRD tagging program conducted in relation to the BETYP. According to this study, the level of M is at a similar level as currently used for the Atlantic stock as well as for other oceans.

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.

BET-2. Description of the fisheries

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

The total annual catch **(BET-Figure 2)** increased up to the mid-1970s reaching 60,000 t and fluctuated over the next 15 years. In 1991, it surpassed 95,000 t and continued to increase, reaching a historic high of about 130,000 t in 1994. Catch has declined since then and it was 76,000 t in 2002. The total reported catch for 2003 was about 85,000 t, which indicated an increase of about 9,000 t over 2002.

The major baitboat fisheries are located in Ghana, Senegal, the Canary Islands, Madeira and Azores. The tropical purse seine fleets operate in the Gulf of Guinea and off Senegal in the East Atlantic and off Venezuela

in the West Atlantic. The fleets are comprised of EC-France EC-Spain, Ghana and other flag vessels managed by EC companies in the east, and the Venezuelan fleet operates in the west. While bigeye tuna is a primary target species for most of the longline and some baitboat fisheries, this species has always been of secondary importance for other surface fisheries. Unlike yellowfin, bigeye tuna are mostly caught in operations on associated schools such as log and artificial fish aggregating devices (FADs).

There are two major longline fisheries, operated by Japan and Chinese Taipei, whose catch accounted for 45% of the total catch in weight in 2002. In recent years, China and the Philippines started fishing in 1993 and 1998, respectively.

The activities of illegal, unreported and unregulated (IUU) longliners that fly flags of convenience appear to have started in the early 1980s, and became significant thereafter. The catches by those activities were estimated from the Japanese import statistics but considered uncertain. Estimates indicate a peak in unreported catches of 25,000 t in 1998 and a quick reduction thereafter **(BET-Figure 3)**. This quick reduction reflects increased reporting by the countries/entities who engaged in this activity as well as the efforts made by the longline countries that have cooperated in reducing the number of IUU boats. Nevertheless, the Committee expressed concern that unreported catches may have been underestimated.

BET-3. State of the stocks

The 2004 stock assessment was conducted by various types of models. However, there were considerable sources of uncertainty arising from the lack of information regarding (a) reliable indices of abundance for small bigeye from surface fisheries, (b) the species composition of Ghanaian fisheries that target tropical tunas, and (c) details on the historical catch and fishing activities of IUU fleets (e.g., size, location and total catch).

Three indices of relative abundance were available to assess the status of the stock. All were from longline fisheries conducted by Japan, Chinese Taipei and U.S. While the Japanese indices **(BET-Figure 4)** have the longest duration since 1961 and represent roughly 20-40% of the total catch, the other two indices are shorter and generally account for a smaller fraction of the catch than the Japanese fishery does. These three indices primarily relate to medium and large-size fish.

Various types of production models were applied to the available data. It should be noted that this year's model fits to the data were better than in past assessments, although they required similar assumptions regarding stock productivity. The point estimates of MSY obtained from different production models ranged from 93,000 t to 113,000 t. The lower limit of this range is higher than the one estimated in the 2002 assessment, probably due to the revised indices and the addition of new index. An estimate obtained from another age-aggregated model was 114,000 t. The inclusion of estimation uncertainty would broaden this range considerably.

These analyses estimate that the total catch was larger than the upper limit of MSY estimates for most years between 1993 and 1999, causing the stock to decline considerably, leveling off thereafter as total catches decreased **(BET-Figure 5)**. These results also indicate that the current biomass is slightly below or above (85%-107%) the biomass at MSY, and that current fishing mortality is also in the range of 73% to 101% of the level that would produce MSY (see **Summary Table**). However, indications from the most targeted and wide-ranging fishery are of a more pessimistic status than implied by these model results **(BFT-Figure 4)**.

Several types of age-structured analyses were conducted using the above-mentioned longline indices from the central fishing grounds and catch-at-age data converted from the available catch-at-size data. In general, the trajectories of biomass and fishing mortality rates are in accordance with the production model analyses. Model fits appeared improved over those of past assessments, apparently as a result of using a new growth curve for the calculation of catch at age. However, time constraints did not permit a full and detailed exploration of these analyses.

The application of a statistical integrated model was attempted on bigeye stock for the first time. This model is able to more directly account for the statistical properties of the various data types used and is useful for testing alternative hypotheses on the population dynamics. The results are promising but it is premature to utilize them at this time. The Committee recommends further development and refinement of this model be made in order to provide better scientific advice to the Commission.

BET-4. Outlook

Stock projections were conducted based on the production model results, assuming a catch of 75,480[1] t in 2003 and varying levels of constant catch thereafter. The projection results suggest that the biomass of the stock will likely decline further with constant catches of 100,000 t or more. On average, increases in biomass are expected with catches of 90,000 t or less. However, due to uncertainty, there is a non-negligible probability of further decline of the stock with a constant future catch of 100,000 t or more **(BET-Figure 6)**.

BET-5. Effects of current regulations

The Commission asked the Committee to analyze the effectiveness of the current minimum size recommendation and advise on alternative measures for the protection of juvenile bigeye, taking into account the current moratorium. A response to the Commission is provided separately under Agenda Item 16 of the 2004 Committee Meeting.

The bigeye minimum size regulation of 3.2 kg [Rec. 79-01] was adopted in 1980 to reinforce the same regulation for yellowfin. It is clear that a large quantity of juvenile bigeye tuna smaller than 3.2 kg continues to be captured mostly from the equatorial surface fleets (baitboat and purse seine). The percentage and total number of fish smaller than the minimum size **(BET-Figure 7)** has increased since 1989 and was more than 45% of the total fish caught or more than 6 million fish thereafter, although the absolute number of undersized fish might have been reduced in some fisheries. According to previous yield-per-recruit analyses, a full implementation of this regulation could result in an increase in yield-per-recruit by almost 20% at F_{max} (**BET-Figure 8**).

The moratorium on FAD fishing by surface gears in the Gulf of Guinea has been implemented by ICCAT since 1999. The full evaluation of this program is somewhat hindered by the multi-species nature of surface fisheries and the existence of other types of fisheries. The updated analysis indicated that this regulation appeared effective in reducing mortality for juvenile bigeye and increasing SBR (see 2003 Report of the Evaluation of the Moratorium on Surface Fisheries). The full compliance with this regulation by all surface fisheries will greatly increase the effectiveness of this regulation. The Committee was pleased to note that Ghana implemented this moratorium in the 2003/2004 season (SCRS/2004/027).

Limiting the annual catch to the average catch in two years of 1991 and 1992 entered into force for the major fishing countries whose 1999 catch reported to the 2000 SCRS was larger than 2,100 t [Rec. 01-01]. The 2003 total reported catch for the major countries and fishing entities to which the catch limit applies (EC-Spain, EC-France, EC-Portugal, Japan, Ghana, China and Chinese Taipei) was 67,700 t and 18,800 t lower than the total catch limit (86,500 t). As a whole, the total catch in 2003 for all countries is about 11,300 t lower than the average total catch of 1991 and 1992.

BET-6. Management recommendations

Previous yield-per-recruit and spawner-per-recruit analyses highlighted the potential importance of reducing fishing mortality on small fish. However, the percentage of fish less than this minimum size (3.2 kg) is very high (46-62% of the total fish caught) since 1989. The Committee, therefore, recommends the full implementation of the moratorium on FAD fishing by all surface fisheries in the Gulf of Guinea.

This assessment indicated that the stock has declined due to the large catches made since around the mid-1990s to around or below the level that produces the MSY, 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. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendation [Recs. 01-01, 02-01, 03-01] and other countries were to maintain recent catch levels, then the total catch could exceed 100,000 t. Thus, if the Commission wants to ensure a rebuilt stock, it is highly recommended that catch levels of around 90,000 t or lower be maintained at least for the near future.

The Committee expresses its appreciation for the effort made by the Commission in establishing the Statistical Document Program for bigeye and hopes that the data to be submitted to the Secretariat will be useful to

[1] Available at the time of the assessment.

improve estimates of unreported catches. The Committee also appreciates the initiatives to reduce the IUU activities taken by several fishing authorities. These efforts are very helpful in identifying and reducing the unreported catches in the Atlantic and will make the catch limit regulation more effective, and thus will contribute to reduce uncertainties in the bigeye stock assessment. As far as the IUU catches are concerned, they are almost disappearing as shown in **BET-Figure 3** according to the available estimates. Nevertheless, the Committee expressed concern that unreported catches may have been under-estimated.

ATLANTIC BIGEYE TUNA SUMMARY	
Maximum Sustainable Yield (likely range[1])	93,000 t - 114,000 t
Current (2003) Yield [2]	85,000 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:	- 3.2 kg minimum size [Rec. 79-1] - Limits on numbers of vessels [Recs. 98-03, 02-01, 03-01]. - Catch limits for those who reported 1999 catch in 2000 was larger than 2,100 t [Rec. 02-01]. - Moratorium on FAD fishing for all surface fleets, Nov 1 to Jan 31, in eastern tropical area. Observers on board are required during the moratorium [Rec. 99-01].

[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 Atlantic bigeye tuna by major area, gear and flag 1979-2003

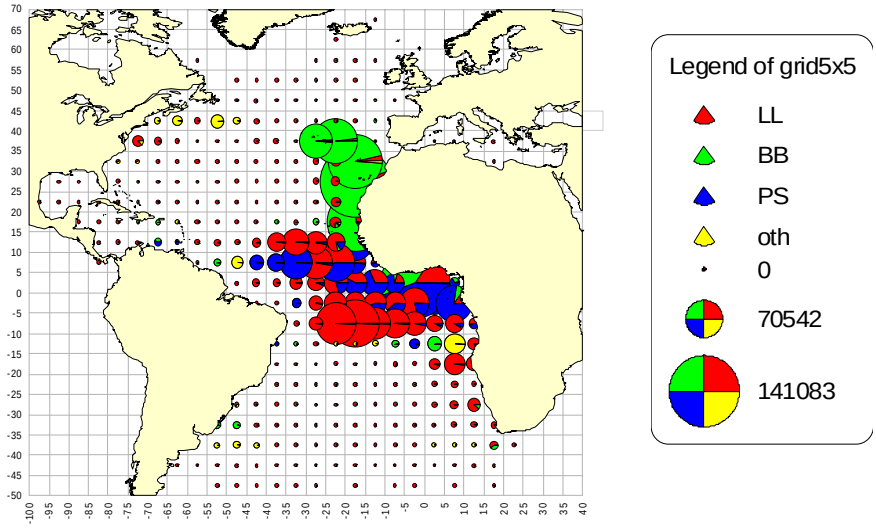
	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL	45975	63596	67753	73493	59370	71052	78215	65396	55976	65796	78068	84337	94795	97758	110060	129512	123155	119114	105639	109879	121169	102415	95715	75835	85088
Bait boat	9591	12349	10124	6922	9796	11439	17651	15618	12631	9710	12672	18106	17750	16248	16467	20290	25552	18959	18639	21263	22360	12311	16870	11639	9932
Longline	27560	41677	41608	51805	33757	43303	52595	39942	35570	47758	58389	56537	61556	62359	62871	78296	74816	74900	68251	71825	76513	70976	55162	46509	51606
Other Surf.	481	366	365	290	163	247	415	550	626	469	636	287	434	604	648	974	561	353	536	429	1373	1219	1623	1495	1313
Purse seine	8343	9204	15656	14476	15654	16063	7554	9286	7148	7859	6371	9407	15055	18547	30074	29952	22226	24902	18213	16362	20923	17909	22060	16192	22237
Argentina	0	0	0	0	0	0	100	41	72	50	17	78	22	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	0	0	24	17	18	18	6	11	11
Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benin	0	0	40	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	0	--
Brazil	782	698	505	776	521	656	419	873	756	946	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455
Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	--
Canada	0	0	0	0	0	0	0	11	144	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182
Cape Verde	45	27	72	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	0	--
China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890
Chinese Taipei	2486	2561	1887	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	19541
Congo	0	5	0	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	0	0	0	0	0	0	--
Cuba	2300	1385	711	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16
Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0
EC.España	5419	8430	10010	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524	10969
EC.France	7308	6283	8020	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940
EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	--
EC.Poland	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
EC.Portugal	3483	3706	3086	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3313	1498	1605	2590	1655
France -St. P.M.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0
Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	0	--
Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	87	10	0	0	0	184	150	121	0	0
Ghana	238	332	780	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	7431	13252	11460	5586	14095	5893	4816
Grenada	0	0	0	0	0	0	0	0	0	0	0	0	65	25	20	10	10	0	1	0	0	0	0	0	0
Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	--
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	--
Japan	12150	20922	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24411	18056	15435	18909
Korea, Republic of	8022	10235	12274	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	--
Liberia	0	0	0	0	0	0	0	0	0	0	206	16	13	42	65	53	57	57	57	57	57	57	57	57	57
Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	508	1085	500	400	400	400	400	400	400	31	593	593
Maroc	414	387	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7	4
NEI 1	0	0	0	338	1141	157	0	0	85	20	93	785	751	1462	2787	2321	2008	3822	1910	1685	3697	2285	3024	2248	7229
NEI-other	0	0	0	0	46	369	354	758	1406	2155	4650	5856	8982	6151	4378	9000	10697	11862	16569	24896	24060	15092	8470	531	--
Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274	215
Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879	3203 *
Norway	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panama	513	4518	2500	2844	2732	3165	4461	5173	5616	3847	3157	5258	7447	9991	10438	13234	9927	4777	2098	1252	579	952	89	63	--
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855
Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	38	4	8	91	0	0	0
S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0
Senegal	0	0	0	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	407
Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162	0
Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0
South Africa	19	422	381	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	41	41	225	167	304	99
St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103
UK-Sta. Helena	8	9	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5	--
Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2

** Catch estimated by SCRS as no species composition correction had been made . The figure reported by Netherlands Antilles is 1387t*

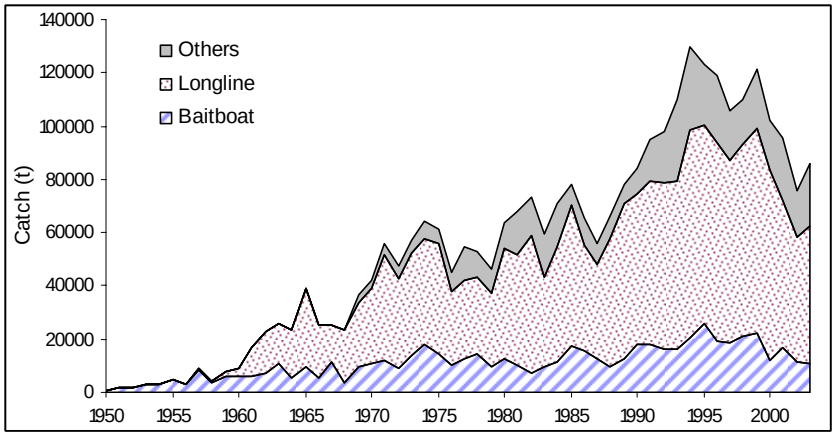
BET-Table 1. Estimated catches (t) of Atlantic bigeye tuna by major area, gear and flag 1979-2003

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Togo	0	0	0	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	0	--
Trinidad and Tobago	0	0	0	0	191	41	22	0	0	1	19	57	263	0	3	29	27	37	36	24	19	5	11	30	6
U.S.A.	212	202	158	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	484
U.S.S.R.	2229	2813	2832	635	352	1233	870	1071	1887	1077	424	95	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	0	0
Uruguay	0	0	86	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	51	67	43
Venezuela	347	661	1684	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457	189	274	222	140	226	708	629	516

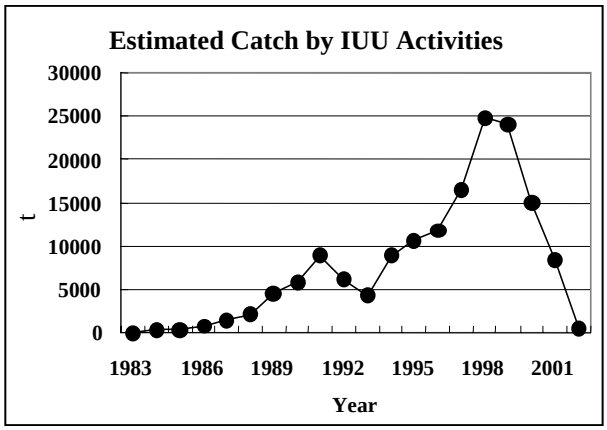
Shaded cells represent changes made after the assessment (Jun/04). 2003 data were not used in the assessment.
Dashes indicate that no report was received or estimate made.
NEI-1 estimates are based on scientific data. 'NEI-other' estimates are based on the comparison between trade statistics and reported catches, and flag and ocean of catch is uncertain.



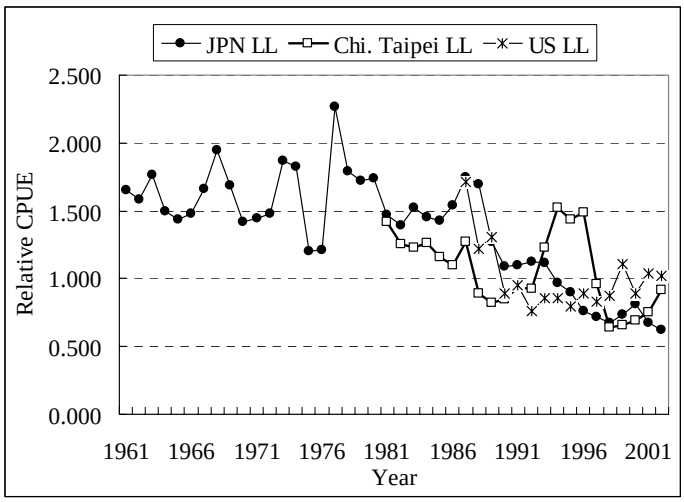
BET-Fig. 1. Geographical distribution of bigeye catches (1950-2002) by major tuna fishery.



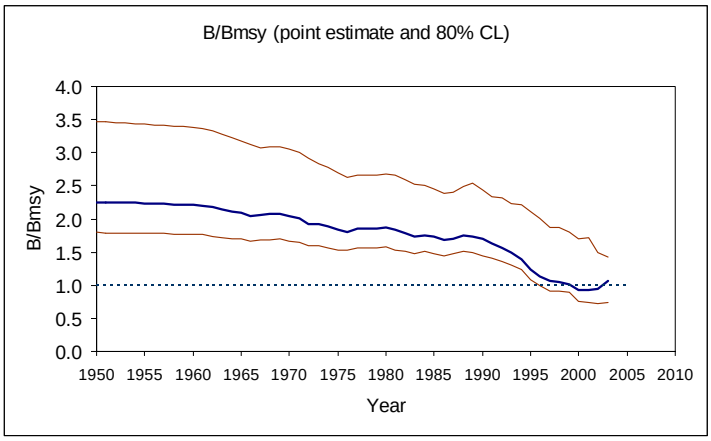
BET-Fig. 2. Trend of bigeye catches (1950-2003) by major tuna fishery.



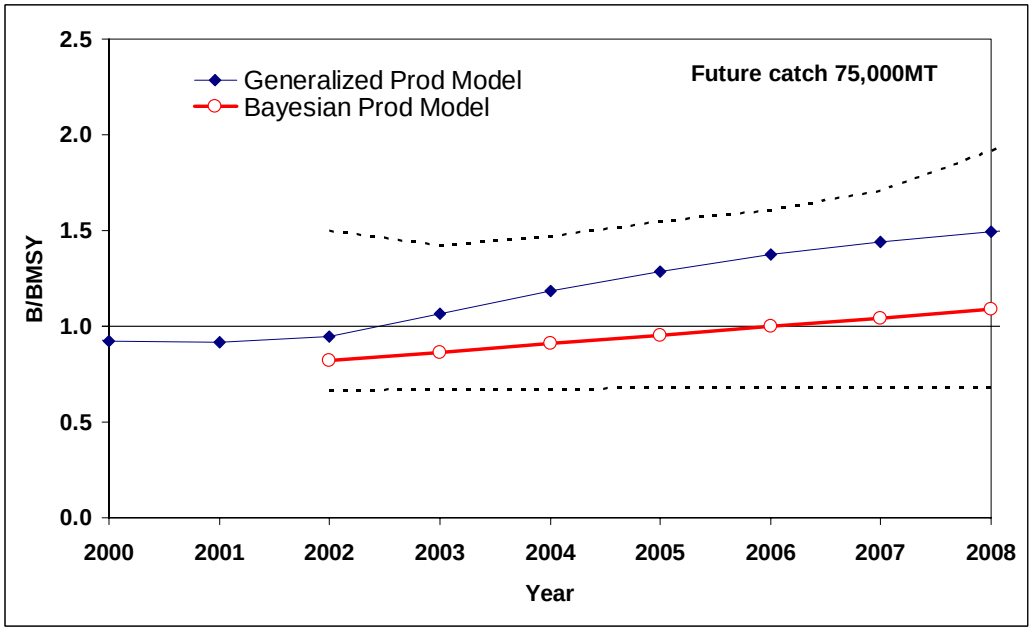
BET-Fig. 3. Bigeye catches (1983-2002) from IUU activities estimated by comparing Japanese import statistics with reported catches.

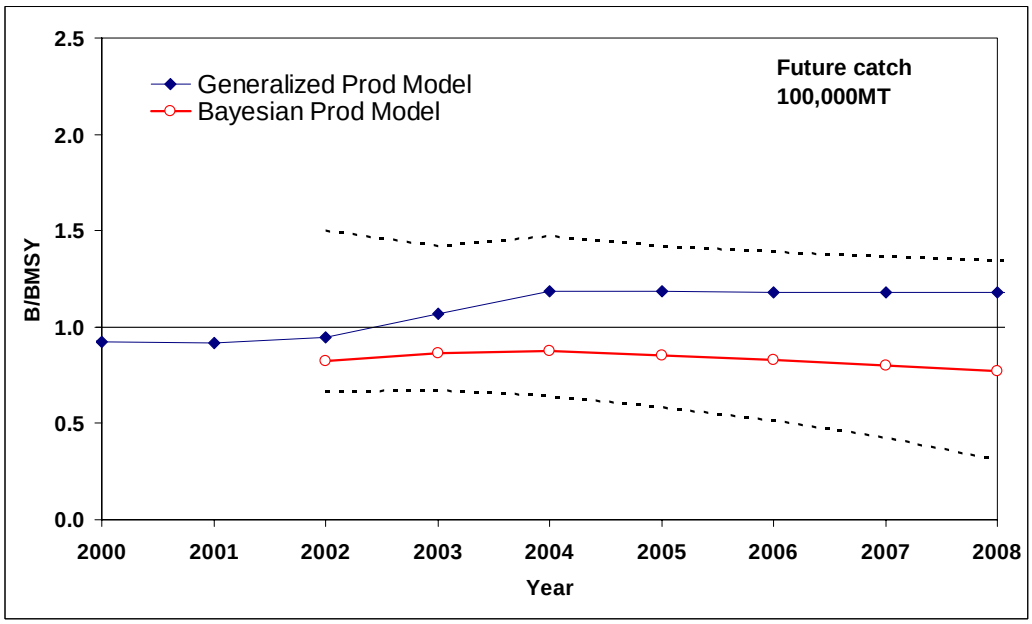


BET-Fig. 4. Abundance indices in number of fish. All ages are aggregated.

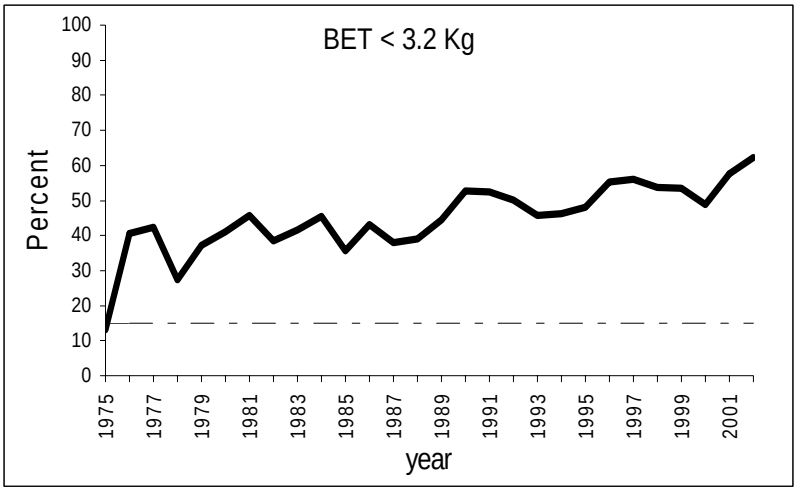


BET-Fig. 5. Trajectory of the biomass modeled in production model analyses (thick line). The upper and lower lines denote 80% confidence intervals.

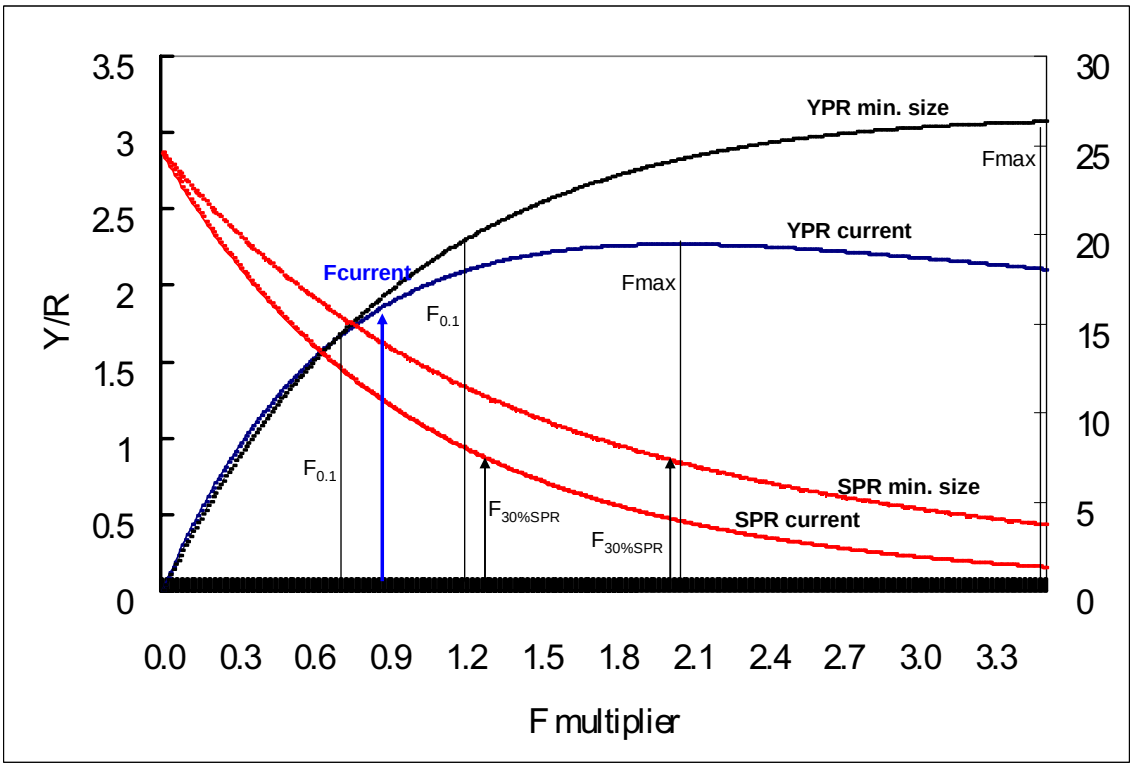




BET-Fig. 6. Future projections from production model results. Constant catches of 75,000 t (top) and 100,000 t (bottom) are assumed after 2003. Dashed lines are 80% confidence intervals from generalized surplus production models (ASPIC).



BET-Fig. 7. Proportion of undersized fish (<3.2 kg) based on the number of fish caught.



BET-Figure 8. Yield-per-recruit (Y/R) and spawner-per-recruit results for bigeye using two different selectivity profiles (the current selectivity --lower curves-- and one that assumes full implementation of a 3.2kg minimum size --upper curves--). The x-axis represents multipliers of the current fishing mortality. Vertical lines identify the relative fishing mortality levels that correspond to various biological reference points.

8.3 SKJ – SKIPJACK TUNA

The last skipjack stock assessment was carried out in 1999. Nevertheless, this report includes the latest data available on the catches and the fisheries.

SKJ-1. Biology

Skipjack tuna is a cosmopolitan species forming schools in the tropical and subtropical waters of the three oceans. Skipjack spawn opportunistically throughout the year in vast areas of the Atlantic Ocean. The size at first maturity is about 45 cm for males and about 42 cm for females in the East Atlantic, while in the west sexual maturity is reached at around 51 cm for females and 52 cm for males. Skipjack growth is seasonal, with substantial differences according to the latitude. There remains considerable uncertainty about the variability of the growth parameters between areas. It is therefore a priority to gain more knowledge on the growth schemes of this species.

Skipjack is a species that is often associated with floating objects, both natural objects or fish aggregating devices (FADs) that have been used extensively since the early 1990s by purse seiners and baitboats (during the 1991 to 2003 period, about 55% of skipjack were caught with FADs). The concept of viscosity (low interchange between areas) could be appropriate for the skipjack stocks. A stock qualified as “viscous”can have the following characteristics:

- It may be possible to observe a decline in abundance for a local segment of the stock;
- Over-fishing of that component may have little, if any, repercussion on the abundance of the stock in other areas;
- Only a minor proportion of fish may make large-scale migrations.

The increasing use of fish aggregating devices could have changed the behavior of the schools and the migrations of this species. It is noted that, in effect, the free schools of mixed species were much more common prior to the introduction of FADs than now. These possible behavioral changes (“ecological trap” concept) may lead to changes in the biological parameters of this species as a result of the changes in the availability of food, predation and fishing mortality. Skipjack caught with FADs are usually found associated with other species. The typical catch with floating objects is comprised of about 63% skipjack, 20% small yellowfin, and 17% juvenile bigeye and other small tunas.

A comparison of size distributions of skipjack between periods prior to and after the introduction of FADs show that, in the East Atlantic, there has been an increase in the proportion of small fish in the catches, as well as a decline in the total catch in recent years in some areas.

The Committee reviewed the current stock structure hypothesis that consists of two separate management units, one in the East Atlantic and another in the West Atlantic, separated at 30^{o}W. The boundary of 30^{o}W was established when the fisheries were coastal, whereas in recent years the East Atlantic fisheries have extended towards the west, surpassing this longitude, and showing the presence of juvenile skipjack tuna along the Equator, west of 30^{o}W, following the drift of the FADs. This implies the potential existence of a certain degree of mixing **(SKJ-Figure 1).**

Nevertheless, taking into account the large distances betweenthe east and west areas of the ocean, various environmental constraints, the existence of a spawning area in the East Atlantic as well as in the northern zone of the Brazilian fishery, and the lack of additional evidence (e.g. transatlantic migrations in the tagging data), the hypothesis of separate East and West Atlantic stock is maintained as the most plausible alternative.

On the other hand, in taking into account the biological characteristics of the species and the different fishing areas, smaller management units could be considered.

SKJ-2. Description of the fisheries

Skipjack are caught almost exclusively by surface gears in the entire Atlantic Ocean, although minor amounts of skipjack are taken by longline as by-catch (see **Figure 1** for the catch distribution). Reported catches are

considered to be somewhat under-estimated, due to the discards of small-sized tunas, which include skipjack, by the purse seine fleets fishing under objects (about 0.06 t per ton of skipjack landed according to a preliminary estimate) and by some baitboat fleets in the equatorial area of the East Atlantic.

Total Atlantic catches in 2003 amounted to 147,500 t (**SKJ-Table 1, SKJ-Figure 2**).

As concerns the East Atlantic, the skipjack fishery underwent important changes in the early 1990s, with the introduction of artificial floating objects (FADs), with the subsequent expansion of the purse seine fishery towards the west (30°W), in latitudes close to the Equator, following the drift of the FADs, the introduction of these FADs in the Ghanaian purse seine and baitboat fisheries (1992), and the development of a fishing technique (whose main target species is bigeye) in which the baitboat is used as the floating object, fixing the school (comprised of bigeye, yellowfin and skipjack) during the entire fishing season in waters off Senegal, Mauritania and the Canary Islands (1992). All these changes have resulted in an increase in the exploitable biomass of the skipjack stock (due to the expansion of the fishing area) and in its catchability. At present, the most important fisheries are the purse seine fisheries, mainly those of EC-Spain, EC-France, the NEI fleet, Ghana and Netherlands Antilles, followed by the baitboat fisheries (Ghana, EC-Spain and EC-France). In 2003, catches in the East Atlantic reached 123,400 t, a 33% increase as compared to 2002 (92,900 t) **(SKJ-Figure 3)**.

The most important fishery in the West Atlantic is the Brazilian baitboat fishery. As concerns the purse seine fisheries, whose catches are considerably less than those taken by baitboat, catches were only made by the Venezuelan fleet. Catches in the West Atlantic in 2003 amounted to 24,000 t, 12% more than in 2002 (21,400 t) **(SKJ-Figure 4)**.

There is no information available on the effective fishing effort exerted on skipjack tuna in the east, particularly after the introduction of fishing with artificial floating objects. Considering vessel carrying capacity as a measure of nominal effort, in the East Atlantic Ocean, the total carrying capacity of the baitboat fleets remained relatively stable between 1972 and 2003. On the other hand, purse seine carrying capacity showed an increasing trend until 1983, followed by a spectacular decline in 1984, due to the shift of a part of the fleet to the Indian Ocean. Since 1991, this carrying capacity of the purse seine fleet has declined gradually until 1997, before stablizing at about 32,000 t. Afer having reached a maximum of 36,000 t in 2001, this index has stablized at about 30,000 t in recent years **(SKJ-Figure 5).**

The increase in the efficiency of the fleet due to introduction of technological improvements on board the vessels, the development of fishing with floating objects, etc., as described by the Working Group on Abundance Indices in the Tropical Tuna Surface Fisheries (Miami, 1998), have resulted in an increase in the efficiency of the different fleets which is not well quantified. Preliminary analyses estimated an average annual increase of 5% in the efficiency of all the fleets for the period considered (1969-1998). Therefore, fishing effort expressed in number of fishing days is not a precise measure of effective fishing effort on skipjack, even though this type of information should be taken into consideration.

Fishing effort of Brazilian baitboats decreased by half between 1985 and 1996, whereas an increase in effort was observed between 1997 and 1998. From 1999 to 2003 it remained at the level of 1998. In spite of some analyses presented on the standardization of some fisheries (e.g., Brazil), the Committee was unable to evaluate the catch and effort pattern of the majority of the skipjack fisheries in 2004, although this is planned for a next assessment.

The fluctuation in the overall size of the area exploited by a fishery is an important component in the assessment of the eastern stock. The number of $1^{o}x1^{o}$ squares in which the purse seine fishery caught skipjack in the East Atlantic has shown an increasing trend since the end of the early 1970s **(SKJ-Figure 6)**. However, the expansion of the fishing grounds was not continuous throughout the years. It seems that skipjack catches are very much related to the number of $1^{o}x1^{o}$ squares exploited. In the absence of other measures of fishing effort, the number of squares exploited could be considered as an alternative measure.

SKJ-3. State of the stocks

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

The state of the Atlantic skipjack stock(s), as well as the stocks of this species in other oceans, show a series of characteristics that make it extremely difficult to conduct an assessment using current models. Among these characteristics, the most noteworthy are:

- the continuous recruitment throughout the year, but heterogeneous in time and area, making it impossible to identify and monitor the individual cohorts;

- apparent variable growth between areas, which makes it difficult to interpret the size distributions and their conversion to ages;

- exploitation by many and diverse fishing fleets (baitboat, purse seine), having distinct and changing catchabilities, which makes it difficult to estimate the effective effort exerted on the stock in the East Atlantic.

For these reasons, no standardized assessments have been able to be carried out on the Atlantic skipjack stocks. Notwithstanding, some estimates were made, by means of different indices of the fishery and some exploratory runs were conducted using a new development of the generalized production model.

Eastern stock

Standardized catch rates are not available. However, an analysis was made, for the 1969-2002 period, of the different indices of the purse seine fishery that could provide valuable information on the state of the stock. The indices analyzed were: catches, catch per day fishing, number of sets per fishing day, positive sets, catch by $1^{o}x1^{o}$ squares exploited **(SKJ-Figure 7)**, average weight, Grainger and Garcia index (annual growth rate of catches with respect to the average catch of the previous three years). For the majority of the indices, the trends were divergent, depending on the area, which may indicate the viscosity of the skipjack stock, with limited mixing rates between areas. In general, the development of the catches (with stable nominal effort), the average weights, and the catch per positive set showed a possible scenario of local over-fishing in the Equatorial area of maximum fishing concentration on FADs, even though the last index could be biased due to an increase in purse seine catchability. Other indices, such as the number of sets per fishing day or the catch by area fished, could also show similar biases. In other areas, particularly in the Senegalese area where there is a predominance of fishing on free schools, the indices showed, on the contrary, a different development (no trend, and by inference, a stable stock status).

The Grainger and García index is a gross indicator of stock status under the hypothesis that the skipjack fisheries in the East Atlantic have supported increasing effort over time. When this index shows negative values it can be interpreted as a sign that catches are too high. However, the Group expressed doubts about the validity of applying this conclusion to the entire eastern stock. The Committee was informed that since the Madeira Working Group carried out the stock assessment of skipjack, a scientific paper has been published on this topic. Because this method presupposes that fishing effort increased during this period, the changes over time in the relative rate of catch increase (RRCI) was broken down into two historical periods (data before 1984 in one hand and data from 1990 to 1999, on the other hand (see Grainger and García index, revised); **SKJ-Figure 8**); the period from 1985 to 1989 was not used in the analysis because fishing effort decreased due to the partial shift of European Community purse seiners to the Indian Ocean in the second half of the 1980s. Notice that the last period began in the early 1990s with the massive use of FADs fishing operations. In keeping to the spirit of reserve expressed by the Committee concerning the total eastern stock, the state of potential over-exploitation occurred in 1994-1995.

A new, non-equilibrium production model was presented based on a generalized model. A run of the fit of this model showed a possible decline in the yield of the stock following the introduction of FADs. However, the MSY estimates are not considered robust enough to be utilized as a measure of the state of the stock. In the same way, the model estimated a possible generalized increase in the efficiency of the fishing gears of about 5% annually for this species.
Because of the difficulties to assign ages to the skipjack catches, the estimates of the values of natural mortality by age and obtaining indices of abundance (especially for the eastern stock), no catch-by-age matrices were developed and, consequently, no analytical assessment methods (VPA type) were applied.

Western stock

Standardized abundance indices up to 1998 were available from the Brazilian baitboat fishery and the Venezuelan purse seine fishery **(SKJ-Figure 9)**, and in both cases the indices seem to show a stable stock status.

SKJ-4. Outlook

Uncertainties in the underlying assumptions for the analyses prevent the extracting of definitive conclusions regarding the state of the stock. However, the results suggest that there may be over-exploitation within the FAD fisheries, although it was not clear to what extent this applies to the entire stock.

The Committee could not determine if the effect of the FADs on the resource is only at the local level or if it had a broader impact, affecting the biology and behavior of the species. Under this supposition, maintaining high concentrations of FADs would reduce the productivity of the overall stock. However, since 1997, and due to the implementation of a voluntary Protection Plan for Atlantic tunas, agreed upon by the Spanish and French boat owners in the usual areas of fishing with objects, which later resulted in a Commission regulation on the surface fleets that practice this type of fishing, there has been a reduction in the skipjack catches associated with FADs. Maintaining this closure could have a positive effect on the resource.

SKJ-5. Effects of current regulations

There is currently no specific regulation in effect for skipjack tuna. However, the French and Spanish boat owners voluntarily applied a moratorium for the period of November 1997 through January 1998, and November 1998 through January 1999. The moratorium, which was implemented in order to protect juvenile bigeye tuna, has had an influence on the skipjack catches made with FADs. Since 1999, a similar moratorium was applied, recommended by the Commission, and is still in force.

The average purse seine skipjack catches during the months from November to January by the fleets that applied the moratoria were reduced by 64% compared to the average catches between the 1993-1996 period (before the moratoria) and those corresponding to the 1998-2002 period. For the entire period in which the moratoria have been in effect (1998-2002), the average annual skipjack catches by the purse seine fleets that applied the moratoria decreased by 41%, which is equivalent to 42,000 t per year. However, this decrease is likely a combined result of the decrease in effort and the moratorium impact; this is supported by the observation that the mean annual catch by boats has decreased only 18% between the two periods.

SKJ-6. Management recommendations

No management recommendations were proposed.

ATLANTIC SKIPJACK TUNA SUMMARY		
	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2003) Yield	123,420 t	24,053 t
Current Replacement Yield	Not estimated	Not estimated
Relative Biomass (B_{2003}/B_{MSY})	Not estimated	Not estimated
Relative Fishing Mortality: F_{2003}/F_{MSY}	Not estimated	Not estimated
Management measures in effect	None	None

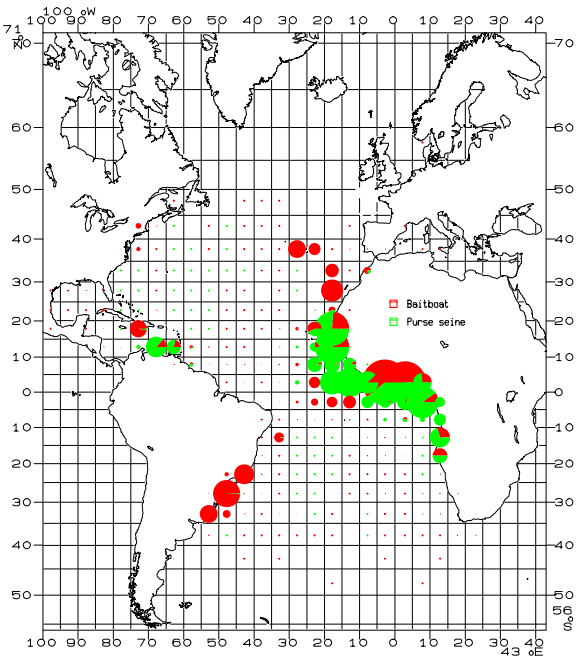
SKJ -Table 1. Estimated catches (t) of Atlantic skipjack by major area, gear and flag 1979-2003

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL		89696	111358	131061	154909	135038	126826	118713	122172	114566	139962	116120	138659	203175	152815	180929	164435	151249	142118	141079	145869	161465	138752	148998	114559	147478
	AT.E	83119	98774	107941	122368	102669	91230	78441	90021	90402	116226	89738	112549	169771	122660	147708	134486	129390	114557	109367	116790	134159	109457	117591	93002	123420
	AT.W	6565	12573	23073	32520	31839	35596	40272	32151	24164	23736	26382	26110	33404	30155	33221	29949	21859	27561	31712	29079	27306	29295	31407	21440	24053
	UNCL	12	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	5
AT.E	Bait boat	44645	38134	38918	44488	34873	28085	29868	30009	38803	48015	41000	36569	41612	35660	31656	37817	33691	32047	38624	42012	41403	30548	44437	24074	32652
	Longline	0	0	22	2	62	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	33	79
	Other Surf.	1508	3906	2528	3054	2242	1328	219	1640	1040	1332	1469	1178	1890	1449	1028	311	308	323	138	930	288	1162	403	255	181
	Purse seine	36966	56734	66473	74824	65492	61795	48348	58353	50553	66875	47260	74802	126264	85548	115022	96348	95388	82180	70558	73762	92425	77699	72698	68634	90509
	Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
AT.W	Bait boat	4365	9351	17999	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737	21366
	Longline	1	1	9	23	8	25	24	8	6	9	25	23	33	29	20	16	33	19	12	14	9	12	17	76	27
	Other Surf.	710	149	410	390	653	842	567	1657	518	355	600	600	871	764	710	1577	2023	452	556	514	480	465	951	511	363
	Purse seine	1489	3072	4654	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296
	Trawl	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
UNCL	Longline	12	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5
	Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	--
AT.E	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0	--
	Angola	3628	3482	2532	2257	318	46	131	56	80	30	85	69	66	41	13	7	3	15	52	2	32	14	14	14	14
	Benin	8	30	60	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	0	--
	Bulgaria	0	0	0	0	7	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	0
	Cape Verde	998	2094	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	334	334
	Cayman Islands	0	289	1800	30	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	4	0	0	0	0	0
	Chinese Taipei	0	0	0	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	23	27
	Congo	0	1250	200	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	0	0	0	0	0	0	--
	Cuba	100	196	198	189	135	310	246	569	81	206	331	86	0	0	7	0	0	0	0	0	0	0	0	0	--
	EC.España	18748	26384	35458	38016	28934	46659	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25441	44832
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	--
	EC.France	18602	25767	26926	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637	19899
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	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	0	0	102
	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	4	29
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Portugal	3074	1954	2825	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	51	26	0	59	76	21	101	0	0
	Ghana	4299	5812	7858	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	27667	34150	43460	29950	43340	31887	32766
	Japan	14686	12304	12935	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0	0
	Korea, Republic of	12017	6718	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Maroc	1863	5001	3017	3956	2532	885	1015	1222	1041	428	295	1197	254	559	312	248	5024	684	4513	2486	858	1199	268	281	524
	NEI-1	0	0	0	1560	3383	927	590	540	791	2994	2263	10516	6054	6941	9482	6521	6146	10220	4901	6749	7701	7128	8121	8544	7696
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	12084 *
	Norway	0	0	0	0	0	0	0	0	581	738	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panama	1750	1735	144	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1560	281	342	--
	Rumania	0	8	0	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0	0
	S. Tomé e Príncipe	34	33	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0	--
	Senegal	0	0	0	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1046	733
	South Africa	2	48	110	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0	2
	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	1	0
	U.S.A.	2073	2608	2800	79	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.	1161	2991	1750	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.Sta. Helena	76	70	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63
	Venezuela	0	0	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

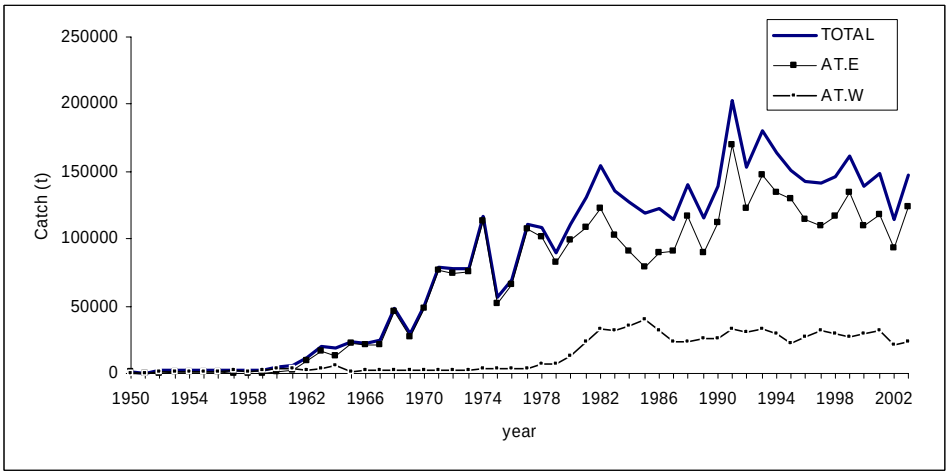
* Catch estimated by SCRS. As no species composition correction had been made .The figure reported by Netherlands Antilles is 11100 t

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AT.W	Argentina	0	17	1	137	243	505	101	138	90	7	111	106	272	123	50	1	0	0	0	0	0	0	0	0	--
	Barbados	0	0	78	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0	--
	Brazil	2065	6071	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416
	Canada	0	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Chinese Taipei	0	0	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	1	2	1	0	1	16	13
	Colombia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	--
	Cuba	2000	2255	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	--
	Dominica	0	0	0	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51
	Dominican Republic	87	59	71	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	0	--
	EC.España	1052	0	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0	--
	EC.France	86	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	4	1	0	3
	Ghana	0	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Grenada	4	8	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	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	0	0	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Mexico	0	1	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	0	2	3	11	4	6
	Netherlands Antilles	40	40	40	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	0	0	--
	Panama	161	1026	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	17	28	29	27	20	66	56	53	37	42	57	37	68	97	264	92
	Sta. Lucia	41	40	37	38	35	64	53	76	60	53	38	37	51	39	53	86	72	38	100	263	153	216	151	106	132
	Trinidad and Tobago	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	--
	U.S.A.	1029	981	2753	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	88	78
	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	0	0
	Venezuela	0	1890	4900	12645	12778	16526	10712	5690	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6870	2554	3247
UNCL	Chinese Taipei	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5
	Korea, Republic of	2	4	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	--

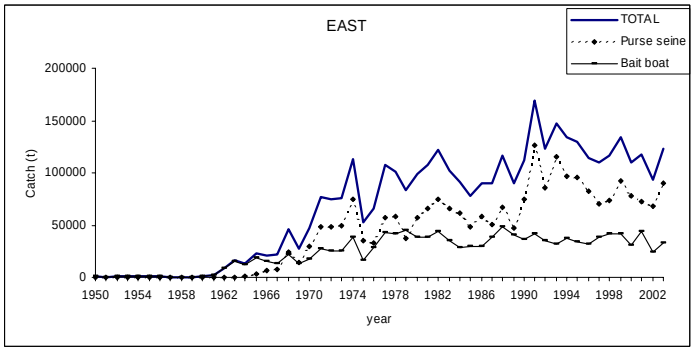
Dashes indicate that no report was received nor estimate made.



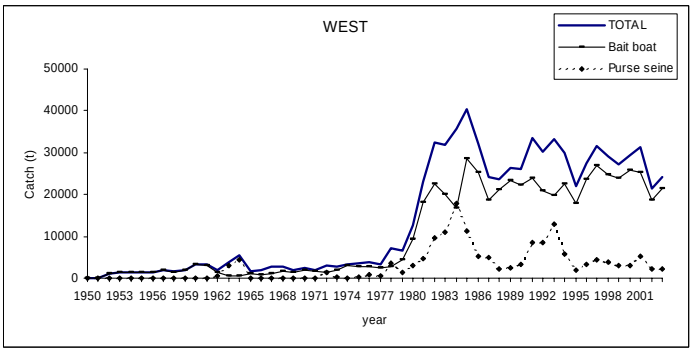
SKJ-Fig. 1. Distribution of reported skipjack surface catches (1950-2000) by 5x5 area and by gear (dark = baitboat; light = purse seine).



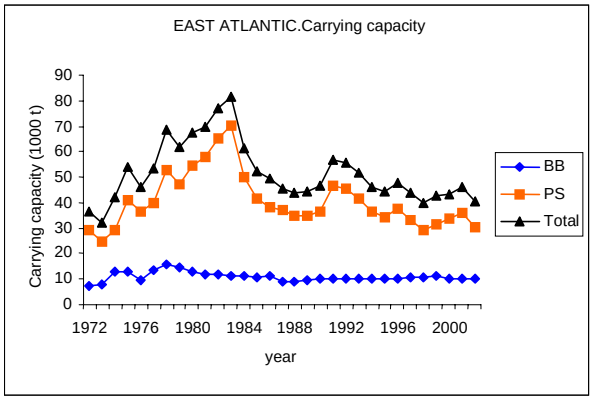
SKJ-Fig. 2. Total eastern and western Atlantic skipjack landings (1950-2003).



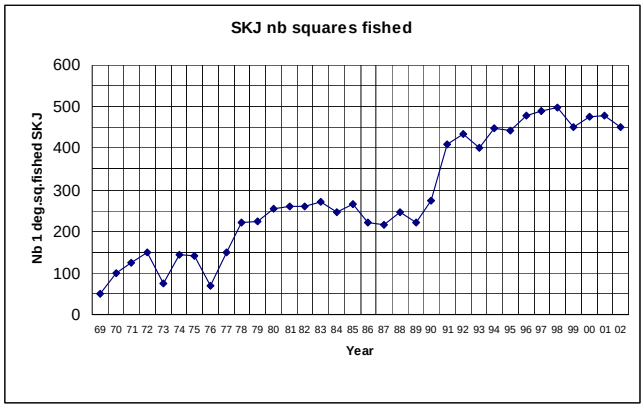
SKJ-Fig. 3. Reported landings of skipjack in the eastern Atlantic, by major gear (1950-2003).



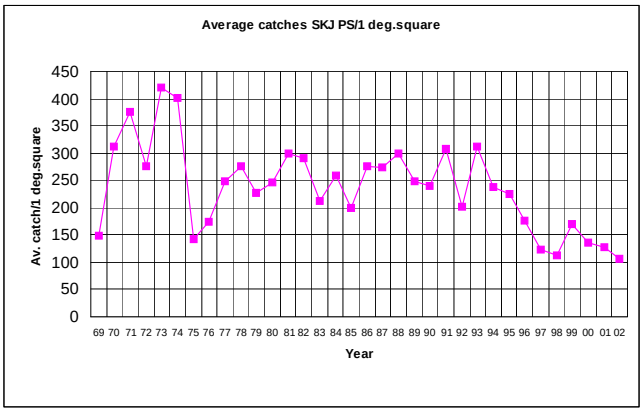
SKJ-Fig. 4. Reported landings of skipjack in the western Atlantic, by major gear (1950-2003).



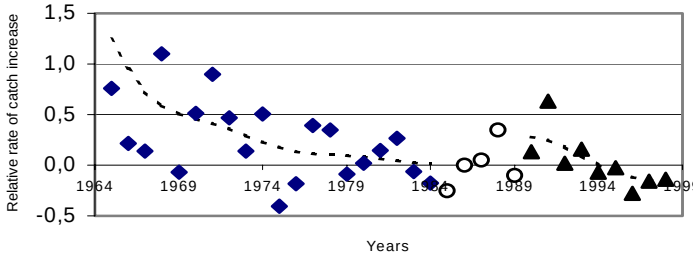
SKJ-Fig. 5. Carrying capacity (in t) of purse seiners and baitboats in the eastern Atlantic (1969-2002).



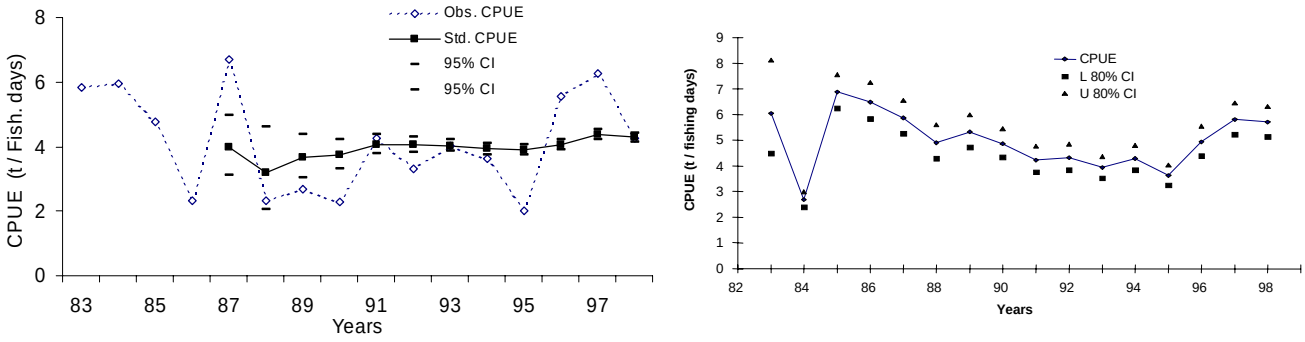
SKJ-Fig. 6 Number of 1x1 degree areas where skipjack catches were reported in the eastern Atlantic purse seine fisheries (1969-2002).



SKJ-Fig. 7. Average skipjack catch per 1x1 degree area (where catches were reported) by the eastern Atlantic purse seine fishery (1969-2002).



SKJ-Fig. 8. Changes over time in Grainger and Garcia index (RRCI revised to account for the assumption concerning the increase in fishing effort) for eastern Atlantic skipjack for the two main historical periods of the fishery. Years that correspond to major changes in the fishery were not used and are represented by empty circles.



SKJ-Fig. 9. Left: Venezuelan purse seiner CPUEs: estimated values by GLM (continuous line) and raw values (dotted line). Right: Brazilian baitboat CPUE estimated by GLM delta-lognormal standardization.

8.4 ALB – ALBACORE

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

ALB-1. Biology

Albacore is a temperate tuna widely distributed throughout the Atlantic Ocean and Mediterranean Sea. On the basis of the biological information available, for assessment purposes the existence of three stocks is assumed: northern and southern Atlantic stocks (separated at 5ºN) and a Mediterranean stock (**ALB-Figure 1**).

Albacore spawning areas in the Atlantic are found in subtropical western areas of both hemispheres and throughout the Mediterranean Sea. Spawning takes places during austral and boreal spring-summer. Maturity is considered to occur at about 90 cm FL (age 5) in the Atlantic, and at smaller size (62 cm, age 2) in the Mediterranean. Until this age they are mainly found in surface waters, where they are targeted by surface gears. Some adult albacore are also caught using surface gears but, as a result of their deeper distribution, they are mainly caught using longlines. Young albacore are also caught by longline in temperate waters.

ALB-2. Description of fisheries

North Atlantic

The northern stock is exploited by surface and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). Traditional surface fisheries include Spanish trolling and baitboats, used mainly in the Bay of Biscay and adjacent waters in the northeastern Atlantic along with the Canary Islands baitboat fishery and some Spanish and Portuguese baitboats around the Azores Islands. New surface fishing gears, driftnets and pair pelagic/mid-water trawling, were introduced in 1987 in the Bay of Biscay and adjacent waters by EC-France. EC-Ireland and EC-United Kingdom joined the driftnet fishery at the beginning of the 1990s. In 1998 Ireland initiated experimental fishing trials using trolling and pelagic trawling. These surface fisheries mainly target juveniles and sub-adults (50 cm to 90 cm FL). Following an EC ban, the driftnet fishery stopped its activity in 2002. A longline fleet from Chinese Taipei targets sub-adult and adult albacore (60-120 cm) in the central and western North Atlantic. Other fleets make minor catches and in most cases albacore constitute a component of the by-catch of longliners**.**

The total catch in the North Atlantic has shown a downward trend since the mid-1960s, largely due to a reduction of fishing effort by traditional surface and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). After stabilization in the 1990s, mainly due to the increased effort and catch by new surface fisheries since 1987 and a peak in 1999 at 34,840 t, catches decreased in the 2001-2002. Catches in 2003 were 25,516 t, an increase with reference to 2001-2002, in particular for surface fisheries.

South Atlantic

In the last five years, more than 92% of the total annual South Atlantic albacore landings were 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 fisheries operate seasonally, from October to May, when albacore are available in coastal waters. The longline fleets contain 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. The Chinese Taipei fleet expends substantial effort in the South Atlantic and the albacore catch (both directed and by-catch) by this fleet is about 56% of the global catch of South Atlantic albacore. In 2003, South African baitboats recorded their lowest annual catch since 1983, due to a combination of unfavorable exchange rates (making albacore fishing economically unviable) and the unavailability of albacore in near-shore waters. Brazilian longline albacore catches have declined slightly in 2003 compared with 2002 due to a small reduction in the number of longline freezer vessels. Other albacore by-catches of note were made by Japanese, Spanish, South African and Namibian long liners.

Surface and longline catches remained relatively constant at around 8,000 t and 21,000 t, respectively, since 1995-2003 (**ALB-Table 1**; **ALB-Figure 2**). This is due, in part, to the implementation of management regulations by some countries in response to the 1994 ICCAT Resolution.

Mediterranean

The Mediterranean catches are highly uncertain. Reported catches have fluctuated between 2,000 t and 5,600 t since 1984, reaching a maximum of 7,415 t in 2003, the highest ever recorded. (**ALB-Table 1** and **ALB-Figure 2**). Catches in the Mediterranean, were mainly by EC-Italy that reported the emergence of a significant fishery in the southern Mediterranean Sea.

ALB-3. State of stocks

The Committee noted the considerable uncertainty that continues to remain in the catch-at-size data for the North and South stocks, and the profound impact this has had on attempts to complete a satisfactory assessment of northern albacore. The Committee assessed the status of the South Atlantic albacore stock after a review of the Task I and Task II data available. In respect of the North Atlantic, however, the Committee concluded that it was not appropriate to proceed with a VPA assessment based on the 2003 catch-at-age until the catch-at-size to catch-at-age transformation is reviewed and validated. No attempt was made to analyze the status of the Mediterranean stock.

North Atlantic

The Committee carried out an initial analysis of the state of the northern stock using a model (VPA) essentially the same as that used in previous assessments. However revisions to catch-at-size data, provided to the Secretariat during and shortly before the assessment, altered the historical data series. The impacts of these revisions are such that the Committee concluded that it was not appropriate to proceed with an assessment based on the 2003 catch-at-age. Consequently, the Committee's opinion of the current state of the northern albacore stock is based primarily on the last assessment conducted in 2000 together with observations of CPUE and catch data provided to the Committee since then. The results, obtained in 2000, showed consistency with those from previous assessments.

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, none the less 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, the Committee noted 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**).

South Atlantic

In 2003, an age-structured production model (ASPM), using the same specifications as in 2000, was used 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. Outlook

North Atlantic

In terms of yield per recruit, the VPA assessment carried out in 2000 indicates that the fishing intensity is at, or below, the fully exploited level (**ALB-Figure 5**). Concerning MSY-related quantities, the Committee recalls that they are highly dependent on the specific choice of stock-recruitment relationship. The Committee believed that using a particular form of stock-recruitment relationship that allows recruitment to increase with spawning stock size provided a reasonable view of reality. This hypothesis together with the results of the VPA assessment conducted in 2000 indicate that the spawning stock biomass (B_{1999}) for the northern stock (29,000 t) was about 30% below the biomass associated with MSY (42,300 t) and that current F (2000) was about 10% above F_{MSY}. However, an alternative model allowing for more stable recruitment values in the range of observed SSB values would provide a lower estimate of SSB at MSY, below the current value.

South Atlantic

Catches of albacore in the South Atlantic in 2001 and 2002 were above replacement yield, and were below estimates of MSY in 2003. Nevertheless, both the 2000 and 2003 albacore assessments estimated that the stock is above B_{MSY}. There is now greater confidence in these estimates of MSY and therefore there is justification to base a TAC recommendation on MSY instead of replacement yield estimates from the ASPM as in 2000. This results from the Committee's view that current stock status is somewhat above B_{MSY} and catch of this level, on average, would be expected to reduce the stock further towards B_{MSY}. Recent estimates of high recruitment could allow for some temporary increase in adult stock abundance under a 31,000 t catch, but this result is uncertain **(ALB-Figure 7)**.

Mediterranean

Given the lack of an assessment, the implications of the rapid increase in landings are unknown.

ALB-5. Effects of current regulations

North Atlantic

Since 2001, the Commission established a total allowable catch (TAC) of 34,500 t for this stock. In 2003 the Commission extended this TAC up to 2006. The Committee noted that reported catches for 2001, 2002 and 2003 have been below the TAC. A 1998 Recommendation that limits fishing capacity to the average of 1993-1995 also remains in force. The Committee 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). In 2003 the Commission extended this TAC to 2004. The Committee noted that reported catches have not exceeded the TAC in 2003. Also the total catch by Chinese Taipei, South Africa, Brazil and Namibia (26,620 t) did not exceed the 27,500 t catch limit of parties actively fishing for southern albacore, as stipulated by resolution 02-06. (It should be noted that sufficient capacity exists within the fisheries to exceed the TAC as was done in 2000, 2001, and 2002.) Japan adhered to its by-catch limit of 4% of the total

catch of bigeye tuna in the Atlantic Ocean, as stipulated by Resolution [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-6. Management recommendations

North Atlantic

No VPA assessment of the North Atlantic albacore stock was possible in 2003 because of uncertainties associated with the catch-at-age. In 2000, the Committee recommended 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) in the period 2001-2002. The 2000 Committee further noted that should the Commission wish the Spawning Stock Biomass to begin increasing towards the level estimated to support MSY, then catches in 2001 and 2002 should not exceed 31,000 t. The 2003 Committee reiterates its previous advice and extends it until the next assessment.

South

Recent catches of albacore in the South Atlantic are in the vicinity of the current and recent estimates of MSY (30,915 t). Both the 2000 and the 2003 albacore assessments estimated that the stock is above B_{MSY} (2003 estimates $B_{current}/B_{MSY} = 1.66$, $F_{current}/F_{MSY} = 0.62$). The Committee recommends that in order to maintain SSB in the near future the catch should not exceed 31,000 t for the next 3 to 5 years.

Mediterranean

There were no management recommendations for the Mediterranean stock. However the Committee recommends to the Commission that reliable data be provided on catch, effort and size for Mediterranean albacore. The Committee also recommends that an effort be made to recover historical data. Improvements to these basic inputs are essential before a stock assessment of Mediterranean albacore can be attempted.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY

	North Atlantic[1]	**South Atlantic**[2]	**Mediterranean**
Current (2003) Yield	25,516 t[5]	27,811 t	7,415 t
Maximum Sustainable Yield	32,600 t (32,400-33,100)	30,915 t (26,333-30,915)	Unknown
Replacement Yield (2003)	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.

ALB-Table 1. Estimated catches (t) of albacore by major area, gear and flag 1979-2003

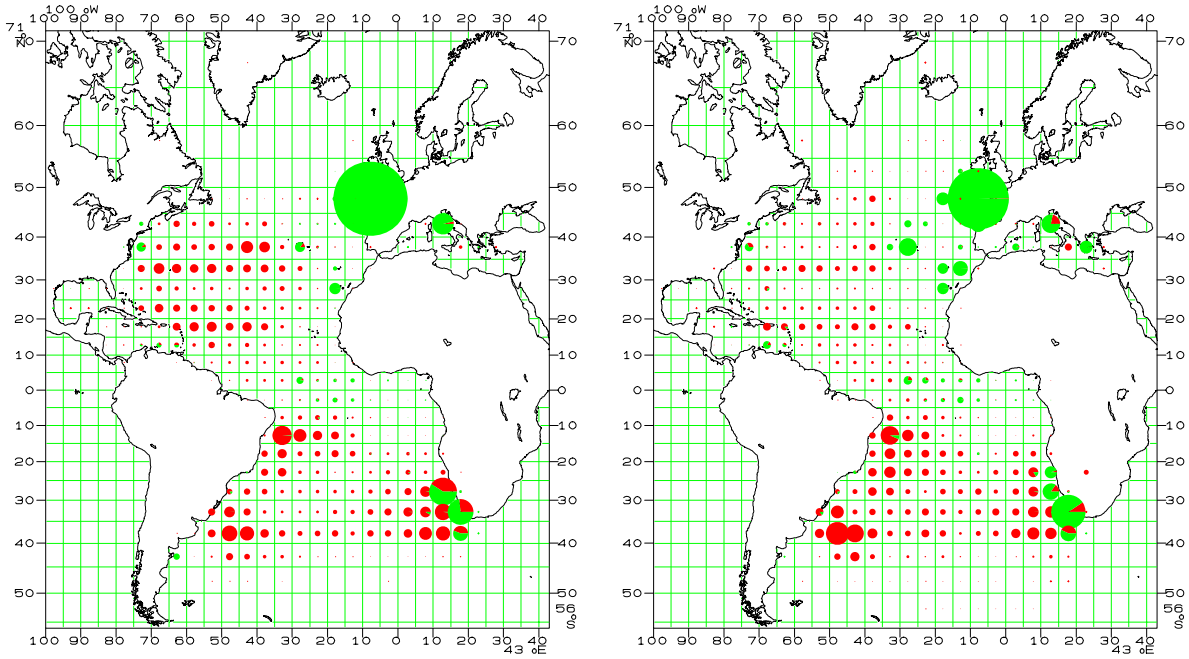
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL			74826	62137	60071	73617	67643	59842	76052	88554	82738	68048	63342	67167	56342	69598	73078	71614	67512	60352	59439	58880	67295	71409	70204	60004	60742
	AT.N		51365	38707	34531	42673	51490	41829	40826	47554	38115	33878	32070	36557	27938	30815	38063	35036	38295	28780	28988	25587	34840	33754	25186	22617	25516
	AT.S		22628	22930	24040	29672	14918	14599	31097	37288	40630	30107	27212	28714	25866	35918	32516	34733	27231	27898	27802	30487	27553	29259	34489	31706	27811
	MEDI		833	500	1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	2130	1349	1587	3125	2541	2698	4851	5577	4866	5608	7415
	UNCL		0	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	73	0
Landings	AT.N	Bait boat	15764	16170	13410	15857	21108	8305	12589	15202	18756	16752	15374	18625	8985	12449	15646	11967	16411	11337	9820	7562	8781	12113	6099	6639	7918
		Longline	12207	9451	9819	13206	16863	19709	17413	21232	7296	3013	2228	2683	5304	3103	7020	7196	4776	4620	4044	3875	6621	6606	5939	6147	7379
		Other Surf.	62	10	523	694	367	2231	108	213	343	994	1662	3865	3999	5173	7279	7506	3555	3337	4378	6846	7646	6119	3089	376	924
		Purse seine	0	16	0	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	118	211
		Trawl	0	0	1	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331	3836
		Troll	23332	13059	10778	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5249
	AT.S	Bait boat	53	1346	1721	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712	6973
		Longline	21843	20671	20426	25255	11941	9834	22672	29815	30964	21828	19407	21590	21859	26519	23650	24224	19718	20472	19447	19699	20588	22275	23728	21632	20500
		Other Surf.	544	449	89	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	127	0	73	58	377	323	82
		Purse seine	188	464	1804	1349	699	365	182	244	948	185	0	4	416	2516	1448	1079	412	257	118	435	183	53	25	39	256
	MEDI	Bait boat	0	0	900	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0
		Longline	0	0	0	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	3706	4248
		Other Surf.	833	500	600	700	700	1716	2973	3552	3782	3879	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4265	2689	2193	1755	3166
		Purse seine	0	0	0	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	0	1	0
		Troll	0	0	0	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	18	0
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0
		Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Discards	AT.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	0
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5	5
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
		Canada	0	0	0	0	0	0	0	1	21	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56
		Cape Verde	0	0	0	0	10	10	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	14	8	20	0	0	21	16	57	196	155
		Chinese Taipei	6973	7090	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557
		Cuba	0	31	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1	--
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	0	--
		EC.España	29630	25202	20819	25478	29557	15685	20672	24387	28206	27557	25424	25792	17233	18176	18380	16998	20197	16323	17294	13285	15364	15965	9177	8952	12530
		EC.France	9320	3955	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4289	3641
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755
		EC.Portugal	149	79	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0
		France-St. Pierre et Miquelo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	--
		Grenada *	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46
		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	1219	1036	1740	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	680	1090	698	781
		Korea, Republic of	2997	797	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0	--
		Mexico	0	2	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Panama	425	193	177	494	357	2551	601	525	44	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	0	0	4	0	0	0	0
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	0	--
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	300	1555
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	3	2	10
		Trinidad and Tobago	0	0	0	0	268	194	318	0	0	0	0	4	0	247	0	0	0	0	2	1	1	2	11	9	--------
		U.S.A.	0	22	472	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	480	448
		U.S.S.R.	59	0	51	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	0	0	1	0	2	2	2	0	0
		Venezuela	593	300	331	137	823	1076	467	172	26	137	41	95	319	205	246	282	279	315	49	107	91	1374	349	162	424
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	0

* The CARICOM representative indicated that these reported values are not valid, owing to a problem of species mis-identification /

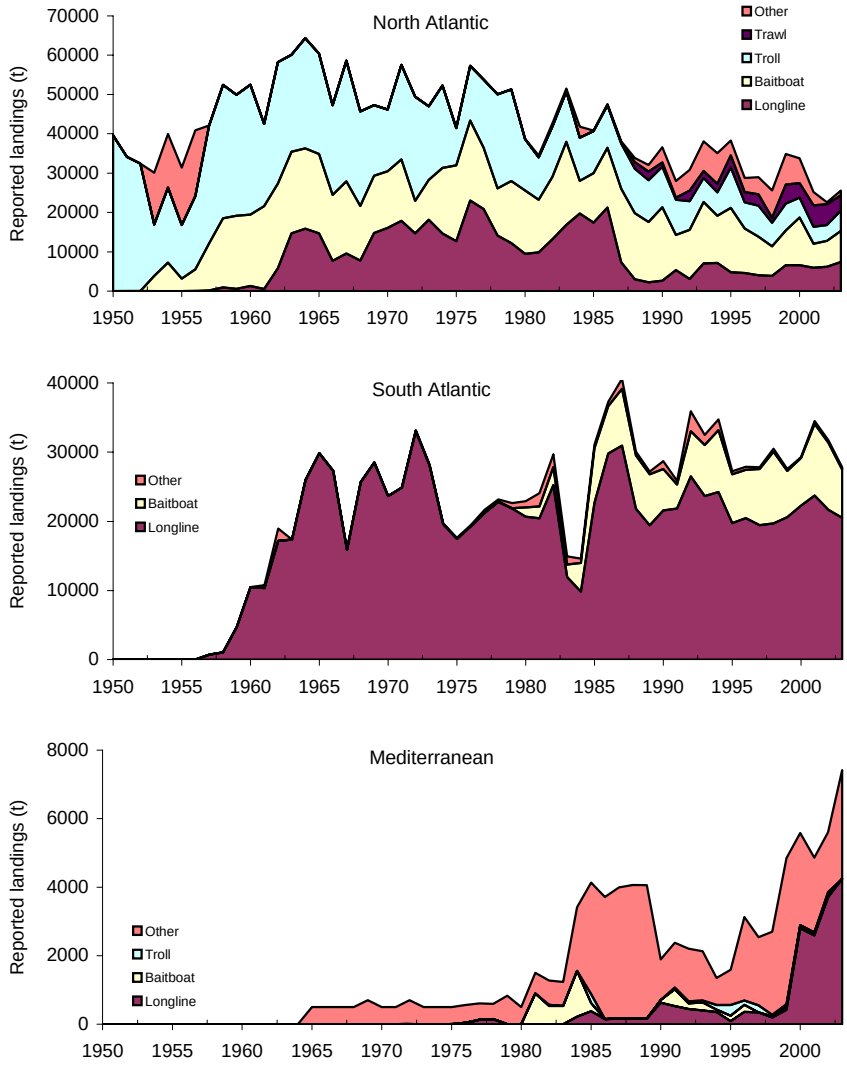
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Landings	AT.S	Argentina	0	4	2	7	55	209	153	356	469	344	354	151	60	306	0	2	0	0	0	0	0	0	0	0	--
		Belize (Obs. by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0	--
		Brazil	515	476	276	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	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	39	89	26	30	26
		Chinese Taipei	20340	18710	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351
		Cuba	0	27	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0	--
		EC.España	0	0	889	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	573	836	376
		EC.France	172	457	912	947	372	7	18	35	100	0	0	0	50	449	564	129	82	190	38	40	13	23	16	18	63
		EC.Portugal	0	0	0	0	0	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415
		Honduras (Obs. by Sta. Hele	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0	--
		Japan	105	333	558	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	547	322	209	309
		Korea, Republic of	878	803	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0	--
		Maroc	0	0	0	113	0	0	0	0	41	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	0	0	4	8	122	68	55	63	41	5	27	0	2	10	14	--
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	950	982	1199	1429	1162	2418	3419	2962	3152
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	192	0	2	0	0	0
		Panama	125	167	129	210	0	0	0	280	924	0	0	0	240	129	168	213	12	22	0	3	14	0	0	0	--
		Philippines	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
		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	480	1850	2320	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469
		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	27	0
		Sta. Helena	2	4	7	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2	--
		U.S.A.	11	0	2	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2
		U.S.S.R.	0	99	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	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	135	111	--
Landings	MEDI	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30
		EC.España	0	0	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	475	404	380	126	284	152	200	209	1
		EC.France	0	0	0	0	0	141	250	20	60	31	31	121	140	11	64	23	3	0	5	5	0	0	0	1	0
		EC.Greece	0	0	0	0	0	0	0	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	472
		EC.Italy	833	500	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912
		EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	2	--
		Ex. Yugoslavia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0
	UNCL	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	*
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	160	281	159	133	110	180	50	50	50	0	0	0	0
		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	0
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	382	210	363	289	369	58	58	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	2819	5662	18	0

* Morocco reported 81t of albacore which were omitted from the table in error.

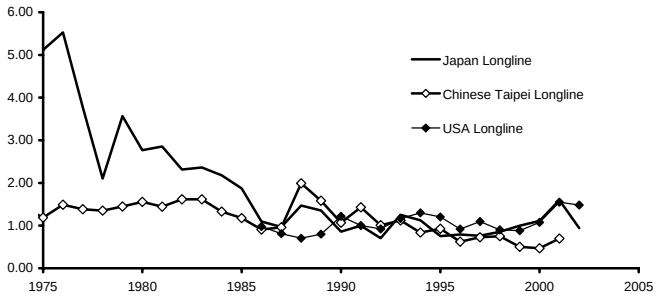
Dashes indicate that no report was received or estimate made

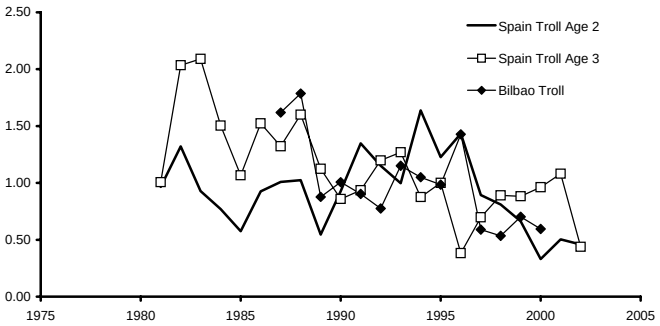


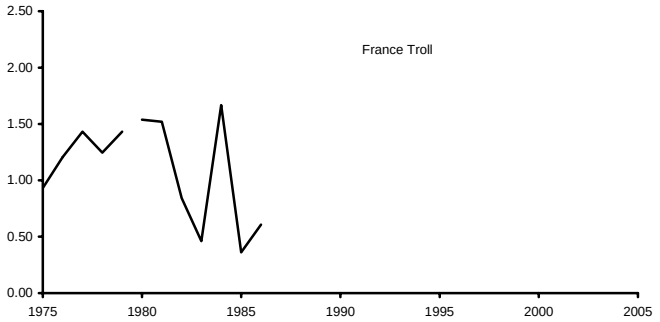
ALB-Fig. 1. Geographical distribution of annual albacore catches in 1980-1989 (left) and 1990-2000 (right). Dark symbols represent longline and lighter symbols represent surface gears.

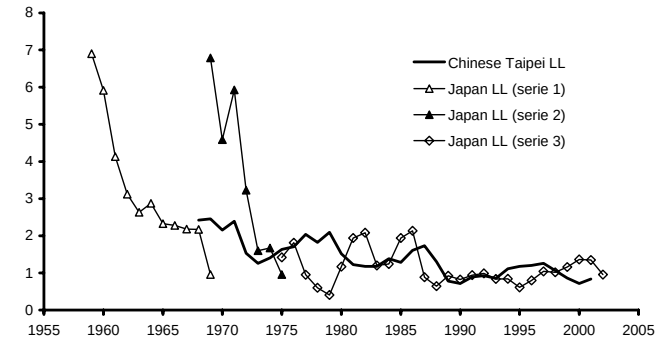


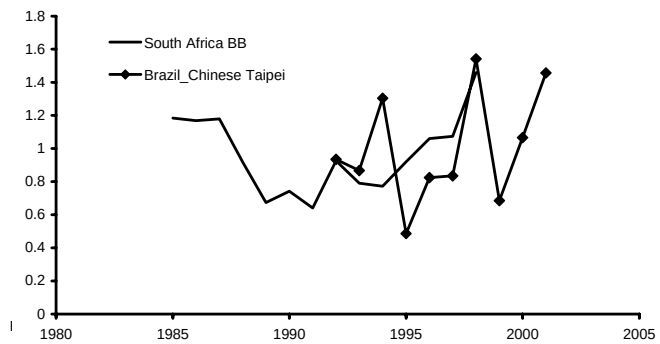
ALB-Fig. 2. Albacore landings (t) by stock and major gear types, 1950-2003. Data from the Mediterranean Sea are highly uncertain and provisional in recent years.



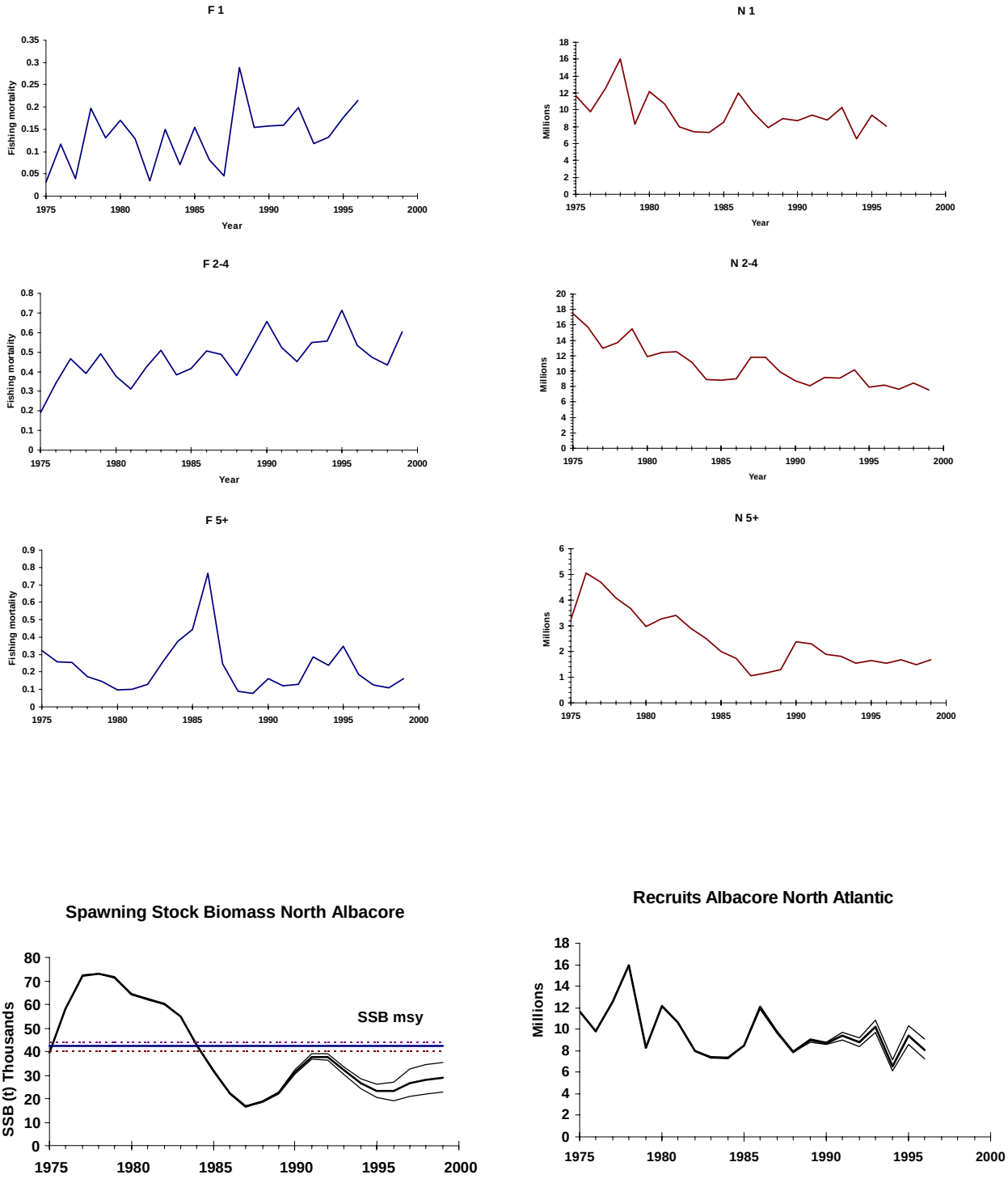




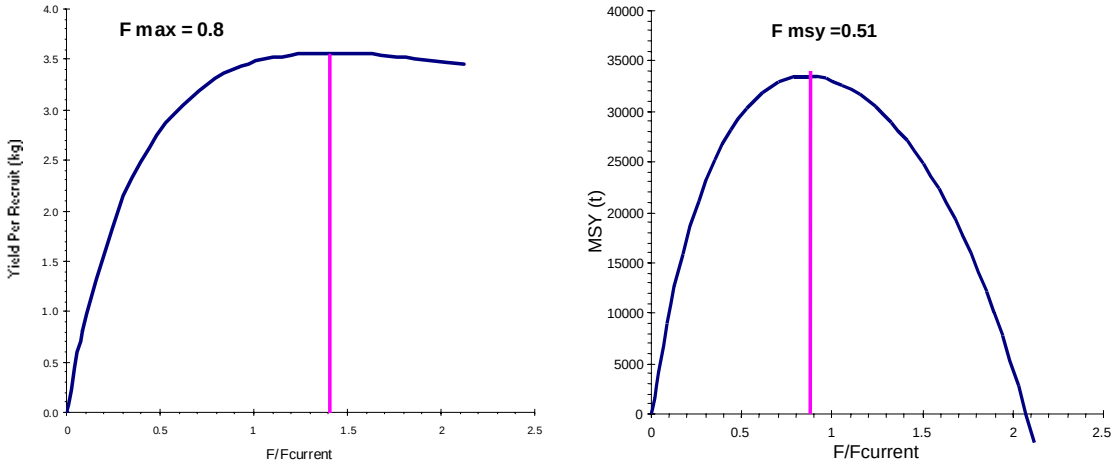




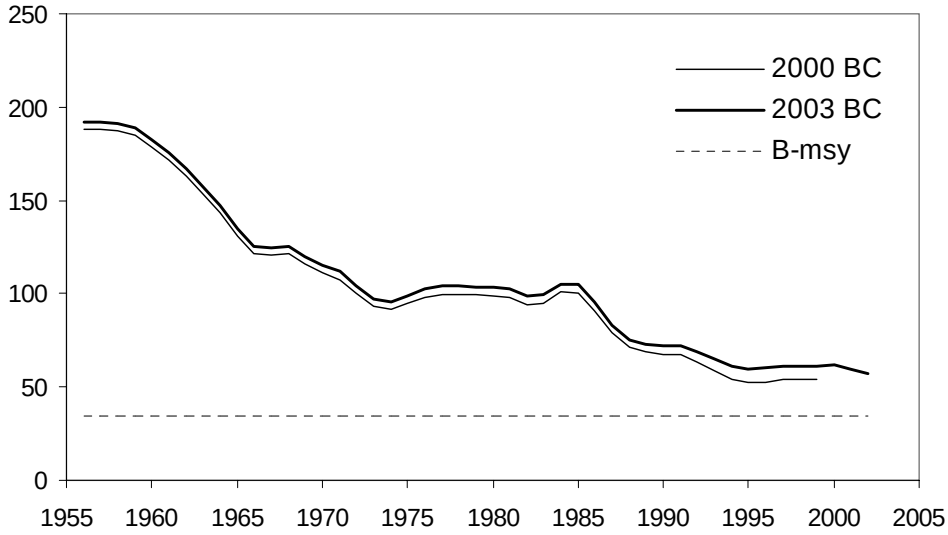
ALB-Fig. 3. CPUE series for North (top 3 panels) and South Atlantic (bottom 2 panels) albacore (scaled to the means).



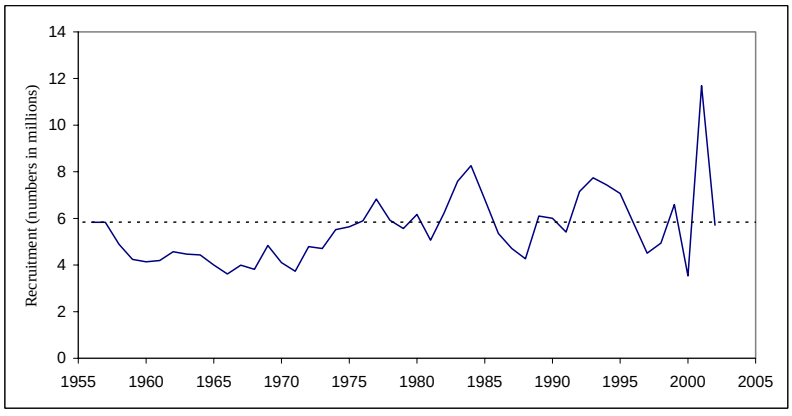
ALB-Fig. 4. North Atlantic albacore Base Case VPA estimates (2000 assessment) of fishing mortality rates (F) and numbers of fish by age-groups (top 6 panels), and spawning stock biomass and recruits with 80% confidence limits (bottom panels).



ALB-Fig. 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-Fig. 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.



ALB-Figure 7. Time series of recruitment (1-year old) for the Reference Case SASPM assessment for the South Atlantic albacore stock (dashed line is the estimated pre-exploitation recruitment).

8.5 BFT – ATLANTIC BLUEFIN TUNA

In 1998, the Commission adopted a 20-year Rebuilding Program for the western Atlantic bluefin management area [Rec. 98-07] aimed at rebuilding to the stock size that will produce MSY (B_{MSY}) by 2018 with a 50% or greater probability. The Program states that the TAC for the west would only be adjusted from the 2,500 t level adopted for 2003-2004 if SCRS advises that (a) a catch of 2,700 t or more has a 50% or greater probability of rebuilding or (b) a catch of 2,300 t or less is necessary to have a 50% or greater probability of rebuilding. According to the Program, the MSY rebuilding target can be adjusted according to advice from SCRS. In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 t, effective beginning in 2003 [Rec. 02-07].

The Commission also recommended in 1998 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea should be reduced to 32,000 t in 1999 and 29,500 t in the year 2000. This recommendation entered into force in August 1999 with exceptions noted for Morocco and Libya. Subsequently, the Commission recommended in 2000 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea in 2001 for China, Croatia, EC, Japan, Korea, Tunisia, Morocco, Libya, non-Contracting Parties, Entities or Fishing Entities be limited to specific levels totaling 32,143 t [Rec. 00-09]. This recommendation entered into force in June 2001. In 2002, the Commission fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Rec. 02-08]. The Committee conducted assessments on East Atlantic and Mediterranean bluefin tuna in 2002 for the first time since 1998. An assessment was not completed in 2000 because of uncertainties in the basic catch data primarily in the Mediterranean. Uncertainties remain in 2002 and 2003 and are a central issue in the east plus Mediterranean assessment. For this reason, a data exploratory meeting was held in June 2004 (see SCRS/2004/013). In 2002, the Commission also recommended several actions to improve data collection of bluefin tuna put into cages for farming [Rec. 02-10]. Although this recommendation concerns all Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities whose flag vessels transfer bluefin tuna into cages and/or under whose jurisdiction are located the farms, only one country fulfilled this recommendation at the date of the SCRS meeting.

There has been an accumulation of evidence on bluefin tuna mixing in the last few years through the collection of tagging data and its examination through the modeling of mixing scenarios for evaluating their effect on management. However, the origin of fish older than one year still remains unknown. Mixing results were reviewed in 2001 by the Workshop on Bluefin Tuna Mixing. This research led to a long-term plan for modeling finer scale spatial mixing and to short-term strategies for assessment to assist the advice for management. The data and research were reviewed again in 2002. Progress was made on both fronts and is discussed later in this Executive Summary. The Commission, at its 2002 Meeting in Bilbao, called for a *Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies* [Rec. 02-11] which met in 2003 and again in 2004. In response to the recommendations from these meetings, the Committee is developing a revised proposal for initiating a coordinated Bluefin Tuna Research Program, to address priority research and data needs for providing scientific advice to the Commission related to revised management procedures for Bluefin. The recommendations of the SCRS in regards to the Bluefin Tuna Research Program are reported in the section on general recommendations to the Commission (Section 16.6).

It should be noted that the perception of the importance of mixing differs depending upon whether management advice is being provided for the east (plus Mediterranean) or for the west. This arises quite naturally because the east stock is much larger than the west stock. Because of this, both the nature and extent of mixing could be perceived important in the success of the West Rebuilding Program. However, the most important uncertainty for providing management advice for the east is the uncertainty in the catch data that is being taken. Therefore, this Executive Summary balances those two concerns in providing advice.

No full stock assessments were conducted in 2003 or 2004, and as such the sections “Status of the stock” and “Outlook” were not changed. “Management Recommendations” were, also, not changed, except that additional comments on data limitations were included in the “Management Recommendations” section for the eastern Atlantic and Mediterranean (Section BFTE-6).

BFT-1. Biology

Present fisheries for Atlantic bluefin tuna are distributed from the Gulf of Mexico to Newfoundland in the West Atlantic, from roughly the Canary Islands to south of Iceland in the East Atlantic, and throughout the Mediterranean Sea. Historically, catches of bluefin were made from a broad geographic range in the Atlantic and

Mediterranean **(BFT-Figure 1)**. In 1982, the Commission established a line for separating the eastern and western Atlantic management units based on discontinuities in the distribution of catches at that time in the Atlantic and supported by limited biological knowledge. However, the overall distribution of the catch in the 1990s is much more continuous across the North Atlantic than was seen in previous decades. Tagging evidence indicates that movement of bluefin across the current east/west management boundary in the Atlantic does occur, that movements can be extensive (including transatlantic) and complex, that there are areas of concentration of electronically tagged fish (released in the west) in the central North Atlantic just east of the management boundary, and that fisheries for bluefin tuna have developed in this area in the last decade. At least some of these fish have moved from west of the current boundary. Complementary studies, which might show east to west movement, are less advanced. The composition and natal origin of these fish in the central North Atlantic area are not known. Nevertheless, it is clear that the current boundary does not depict our present understanding of the biological distribution and biological stock structure of Atlantic bluefin tuna. Note, however, that the current boundary is a *management* boundary and its effectiveness for management is a different issue.

Atlantic bluefin tuna can grow to over 300 cm and reach more than 650 kg. The oldest age considered reliable is 20 years, based on an estimated age at tagging of 2 years and about 18 years at liberty, although it is believed that bluefin tuna may live to older ages. Bluefin tuna are, thus, characterized by a late age at maturity (thus, a large number of juvenile classes) and a long life span, which make it well adapted to variations in recruitment success, but more vulnerable to fishing pressure than rapid growth species such as tropical tuna species. Bluefin tuna in the West Atlantic generally reach a larger maximum size compared to bluefin caught in the East Atlantic. Bluefin in the west are assumed to first spawn at age 8 compared to ages 4 to 5 in the east. Distribution expands with age; large bluefin are adapted for migration to colder waters. Bluefin tuna are opportunistic feeders, with fish, squid, and crustaceans common in their diet. In the West Atlantic, bluefin tuna are thought to spawn from mid-April into June in the Gulf of Mexico and in the Florida Straits. Juveniles are thought to occur in the summer over the continental shelf, primarily from about 35°N to 41°N and offshore of that area in the winter. In the East Atlantic, bluefin tuna generally spawn from late May to July depending on the spawning area, primarily in the Mediterranean, with highest concentrations of larvae around the Balearic Islands, Tyrrhenian Sea, and central and eastern Mediterranean where the sea-surface temperature of the water is about 24°C. Sexually mature fishes have also been recently observed in May and June in the eastern Mediterranean (between Cyprus and Turkey).

BLUEFIN TUNA - WEST

BFTW-2. Description of the fisheries

One of the most noteworthy changes in the fisheries since 1998 was that a substantial amount of additional catch that was not in accordance with Commission's recommended allocation of catch, was recorded through the Bluefin Tuna Statistical Document system. The reported total catches (landings and discards exclusive of estimated unreported catch) of western Atlantic bluefin tuna in 2001, 2002, and 2003 are estimated as 2,718 t, 3,187 t and 2,146 t, respectively **(BFT-Table 1; BFT-Figure 2)**. The 2002 catches were the highest since 1981; however the 2003 catches were the lowest since 1994. The Japanese longline fishery catches in the West Atlantic decreased in from 575 t in 2002 to 71 t in 2003. This decrease resulted from the adjustments made by Japan for previous quota overages and due to the use of fishing years (rather than calendar years) to manage this fishery. The Canadian reported landings (exclusive of discards) for 2003 (557 t), decreased from the 2002 level of 604 t. The estimate of Canadian dead discards in 2003 was 14t, which was a decrease from the 2002 estimate of 37 t. Reported catches of U.S. fisheries in 2002 and 2003 were 1,882 t and 1,481, respectively. The estimates of U.S. dead discards for 2003 were higher than the dead discards presented for 2002. Mexico reported 29 t in 2000, 10 t in 2001, 12 t in 2002, and 22 t in 2003, all higher than all reported catches since the early 1980s. Notably, Cuba has reported 74 t in 2002, whereas they had no reported catches since 1978. Cuba and a number of other countries have yet to report catches for 2003.

BFTW-3. State of the stock

The assessment results (**BFT-Figure 3**) are similar to those from previous assessments. They indicate that the spawning stock biomass (SSB) declined steadily from 1970 (the first year in the assessment time series) through the late 1980s, before leveling off at about 20% of the level in 1975 (which has been a reference year used in previous assessments). A steady decline in SSB since 1997 is estimated and leaves SSB in 2001 at 13% of the 1975 level. The assessment also indicates that the fishing mortality rate during 2001 on the spawning stock

biomass (SSB) is the highest level in the series. Estimates of recruitment of age 1 fish have been generally lower since 1976. However, recruitment of age 1 fish in two recent years (1995 and 1998) is estimated to be comparable in size to some of the year-classes produced in the first half of the 1970s.

While the large decline in SSB since the early 1970s is clear from the assessment, the potential for rebuilding is less clear. Key issues are the reasons for relatively poor recruitment since 1976, and the outlook for recruitment in the future. One school of thought is that recruitment has been poor because the SSB has been low. If so, recruitment should improve to historical levels if SSB is rebuilt. Another school of thought is that the ecosystem changed such that it is less favorable for recruitment. If so, recruitment may not improve even if SSB increases. Therefore, the Committee considered two recruitment scenarios as described below (BFTW-4. Outlook). For both scenarios, the assessment indicates that the fishing mortality on the western Atlantic bluefin resource exceeds F_{MSY} and the SSB is below B_{MSY} (thus over-fished according to the Convention's objective of maintaining stocks at the MSY-biomass level) (See Summary Table).

BFTW-4. Outlook

In general, the outlook for bluefin tuna in the West Atlantic is similar to the outlook reported based on the 2000 western Atlantic bluefin tuna assessment session. The assessment and projection results for the present assessment are somewhat less optimistic than in 2000 but the confidence in the strength of the 1994 year-class has increased. Therefore, the increases associated with different levels of future catch projected for the short-term are smaller but are estimated more confidently. It should be noted that the 1995 year-class was estimated to be strong in 2000 but it is now estimated to only of average strength.

As noted by the previous assessment session, western Atlantic bluefin tuna catches have not varied very much since 1983 (the range over this period is 2,106 to 3,011 t), and the estimated spawning stock size (SSB measured as the biomass of fish age 8+) has been relatively stable, notwithstanding the indication of a decline in the most recent years. Thus, over an extended period of time, catches around recent levels have maintained stock size at about the same level, in spite of several past assessments that predicted the stock would either decline or grow if the current catch was maintained. This observation highlights the challenge of predicting the outlook for this stock.

In order to provide advice relative to rebuilding the western Atlantic bluefin resource, the Committee conducted projections for two scenarios about future recruitment, which reflect the two schools of thought discussed in Section BFTW-3. One scenario assumed that future average recruitment will approximate the average estimated recruitment (at age 1) since 1976, unless spawning stock size declines to low levels (such as the current level estimated in the assessment, but generally lower than estimates during most of the assessment history). The second scenario allowed average recruitment to increase with spawning stock size up to a maximum level no greater than the average estimated recruitment for 1970 to 1974. These scenarios are referred to as the low recruitment and high recruitment scenarios, respectively. The low and high recruitment scenarios implied that the B_{MSY} (expressed in SSB) is 42% and 183% of the biomass in 1975, respectively. With the current information the Committee could not determine which recruitment scenario is more likely, but both are plausible. Therefore, management strategies should be chosen to be reasonably robust to this uncertainty.

The results of projections for both recruitment scenarios are given in **BFTW-Figure 4** for several catch levels and **BFTW-Figure 5** for 2,500 t only. The results are summarized in the table below.

The projections for the low recruitment scenario estimated that a constant catch of 3,000 t per year has an 83% probability of allowing rebuilding to the associated SSB_{MSY} by 2018. A constant catch of 2,500 t per year has a 35% probability of allowing rebuilding to the 1975 SSB by 2018.

The results of projections based on the high recruitment scenario estimated that a constant catch of 2,500 t per year has a 60% probability of allowing rebuilding to the 1975 level of SSB, and there is a 20% chance of rebuilding SSB to SSB_{MSY} by 2018. If the low recruitment scenario is valid, the TAC could be increased to at least 3000 t without violating the Commission's rebuilding plan. If the high recruitment scenario is valid, the TAC should be decreased to less than 1,500 t to comply with the plan.

Probability of achieving target biomass in 2018				
	Low Recruitment Scenario		*High Recruitment Scenario*	
Catch (t)	SSB_{1975}	SSB_{MSY}	SSB_{1975}	SSB_{MSY}
500 t	95%	100%	98%	73%
1000 t	89%	100%	96%	62%
1500 t	77%	100%	87%	47%
2000 t	60%	99%	75%	30%
2300 t	45%	98%	66%	24%
2500 t	35%	97%	60%	20%
2700 t	26%	95%	52%	17%
3000 t	14%	83%	38%	11%
5000 t	0%	1%	2%	0%

The estimate of SSB_{MSY} for the high recruitment scenario is critical to inferences regarding the probability of achieving rebuilding under different future levels of catch, and also less well determined by the data than SSB_{MSY} for the low recruitment scenario. In particular, the estimates of SSB_{MSY} based on the high recruitment scenario are substantially larger than the largest spawning stock size included in the assessment. This extrapolation considerably increases the uncertainty associated with these estimates of SSB_{MSY}. Previous meetings have used SSB_{1975} as a rebuilding target in the context of interpreting projections. Arguably SSB_{1975} is appropriate as a target level for interpreting the implications of projections based on the high recruitment scenario. Under such a target level for the high recruitment scenario, a TAC of 2,700 t has an estimated probability of reaching the rebuilding level of about 50%.

The Committee cautioned that these conclusions 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 (this factor is considered further in Section Responses to Commission in 2002 SCRS Report). Furthermore, the projected increases in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment. A sensitivity test in which the estimates of the below average1996 and the strong 1997 year-classes were excluded from the analysis gave somewhat less optimistic results in terms of the estimated probabilities of recovery by 2018. However, these projections still predicted increases in spawning biomass for both recruitment scenarios, except for extreme increases in catch.

BFTW-5. Effects of current regulations

The first regulatory measure for a scientific monitoring level was adopted for western Atlantic bluefin catches in 1981. Since then, monitoring levels have been changed in various years. Until 1987, both estimated catches and landings were below or equal to the level of the catch limits. However, from 1988 to 1997, estimated landings were very close to the level of the limits and, for some years, exceeded the limit by a maximum of 100 t. Estimated catches (including discards) were higher than the limits every year during this period (by about 200 to 300 t) with the exceptions of 1992 and 1997. The estimated catches exceeded the 2,500 t limit in 2000 by 165 t, by 218 t in 2001, and by 715 t in 2002. It should be pointed out that for compliance purposes, some countries are using fishing years that do not correspond to calendar years, while the catches discussed here are in calendar years. Also, according to the ICCAT regulatory measure, the amount of catch that exceeded quota or was left over from the quota can be carried over to succeeding years. Hence, the catch limit set for each year could have been adjusted accordingly. It should also be pointed out that the excess of the catch limits in most recent years is due to some new fisheries that operated without a quota (see Section BFTW-2).

For the West Atlantic, a size limit of 6.4 kg with 15 percent allowance, in number of fish, has been in effect since 1975. In addition, a prohibition on the taking and landing bluefin tuna less than 30 kg (or 115 cm) with an 8% tolerance, by weight on a national basis, became effective in 1992. It is noted that, since 1992, the proportion of undersized fish for all catches combined has been below the allowance level (e.g., 1% and 3% <115cm in 2000 and 2001, respectively).

In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 t, effective beginning in 2003 [Rec. 02-07]. The reported 2003 catches were 2,146 t.

BFTW-6. Management recommendations

The Committee's management recommendation for the western Atlantic bluefin tuna management area is directed at the Rebuilding Program adopted by the Commission in 1998. The essence of the Program is to rebuild with 50% probability by 2018 to the spawning biomass level associated with MSY. In light of the uncertainty in the assessment, the choice between recruitment scenarios and rebuilding targets, and assumptions about mixing, the weight of scientific opinion within the Committee favored no change from the current TAC of 2,500 t per year.

Projections based on the low recruitment scenario indicate that the TAC could be increased without violating the Rebuilding Program, assuming that relatively large recruitment estimates for some recent year-classes are realistic. The high levels of recruitment estimated for some recent year-classes are consistent with a higher biomass level as a rebuilding target. In previous assessment sessions, the spawning biomass level in 1975 was considered a useful rebuilding target. The 1975 biomass is more than twice the MSY spawning biomass level associated with the low recruitment scenario. The projections indicate a 35-60% probability of rebuilding to the 1975 spawning biomass level for a catch of 2,500 t per year, depending on the recruitment scenario assumed. It seems likely that a recruitment scenario corresponding to a SSB_{MSY} equal to the level in 1975 would indicate a probability of rebuilding by 2018 for a catch of 2,500 t per year within the range of 35-60%.

The MSY spawning biomass associated with the high recruitment scenario, which is nearly twice the 1975 level, is unlikely to be reached by 2018 if the recent level of catch (and TAC) is maintained. However, the Committee does not recommend the sharp reduction in TAC that would be necessary to comply with the rebuilding Program based on the high recruitment scenario because of:

a uncertainty about which recruitment scenario is most appropriate,
b recognition that for the high recruitment scenario the spawning biomass associated with MSY is not well determined (because estimation leads to extrapolation beyond biomass levels included within the current assessment), and
c the generally positive outlook for the resource according to the current assessment regardless of the recruitment scenario assumed.

As emphasized in previous assessments, mixing across management unit boundaries of fish of western and eastern origin could be important for management of the resource in both areas. In particular, the condition of the eastern Atlantic stock and fishery could adversely affect recovery in the West Atlantic, which was also noted in the Committee's 1998, 2000, and 2001 reports. Therefore, the Committee stressed the importance of continuing efforts to manage the fisheries in both the East and West Atlantic according to the Commission's objectives. Further recommendations concerning the issue of mixing are included in the SCRS response to the request of the Commission.

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

Current (2003) Catch[1] (including discards)	2,146 t	
Short-term Sustainable Yield	Probably >3,000 t	
Maximum Sustainable Yield (MSY)	3,500 (3,300-3,700)[2]	7,200 (5,900-9,500)[3]
Relative Spawning Stock Biomass		
$B_{2001}B_{1975}$	0.13 (0.07-0.20)[2]	0.13 (0.07-0.20)[3]
$B_{2001}B_{MSY}$	0.31 (0.20-0.47)[2]	0.06 (0.03-0.10)[3]
Relative Fishing Mortality		
F_{2001}/F_{MSY}	2.35 (1.72-3.24)[2]	4.64 (3.63-6.00)[3]
$F_{2001}/F_{0.1}$	4.87	
F_{2001}/F_{max}	2.35	
Management measures	- No landing of fish <6.4 kg, with a 15% tolerance, in number [Rec. 74-01, Rec. 98-07] - Limit catches <115 cm (30 kg) to no more than 8% by weight [Rec. 98-07] - TAC of 2,700 t from 2003 including dead discards [Rec. 02-07].	

1 These estimates do not include any unreported catches that might have occurred.
2 Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "low recruitment" scenario at high spawning levels.
3 Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "high recruitment" scenario at high spawning levels.

BLUEFIN TUNA - EAST

BFTE-2. Description of the fisheries

The East Atlantic bluefin fisheries (including the Mediterranean) are characterized by a variety of vessel types and fishing gears with landing sites located in many countries. Therefore, the landing statistics are difficult to obtain, particularly for the Mediterranean. Historical statistics show there were important catches since more than ten centuries ago, with catches of more than 10,000 t in the past and an average of about 30,000 t in the 1950-1965 period. (**BFT-Table 1** and **BFT-Figure 2**). Certain fisheries, such as the traps (which in the long-term caught about 15,000 t on average), go back to ancient times. Other fisheries, such as the Mediterranean purse seine fishery, mainly emerged in the 1960s. Based on estimates of 1995-2000 catches, the most important catches were from: longline, traps and baitboat for the East Atlantic; and from purse seine and longline for the Mediterranean; the purse seine fleet accounts for 60-80% of the Mediterranean catch. Additionally, it is suspected that large quantities of undersized fish are caught but not reported.

In 2002, the stock assessment did not include 2001 data as they were incomplete. In 2002, landings for the East Atlantic and the Mediterranean amounted to 33,111 t, which is less than 1998 (39,097 t), but within the range of the 1999-2001 years (32,454 t, 33,752 t and 34, 557 t, respectively). The 2002 reported catch remains, however, incomplete and if the missing value was approximated to the last reported catch; the 2002 catch would be similar or slightly higher than the 2001 level. In 2003, the reported catch at the time of the meeting reached 28,365 t, but several important fishing countries had not reported Task I. If these missing catches were approximately at their last reported levels, then the total catch in 2003 would be around 32,500 t. Based on the knowledge of the fisheries and the exceptionally good fishing conditions in 2003, especially in the Mediterranean, the Committee was surprised by such a low value. This clearly reinforces the skepticism of scientists regarding the veracity of basic fishery statistics for the East Atlantic and Mediterranean bluefin tuna stock.

Economic gains in Atlantic bluefin tuna farming have led the private sector to invest in this relatively new culture system. The interest over the past few years has increased remarkably as reflected by the increased number of farming units established throughout the Mediterranean Sea and new license applications being submitted to the relevant national authorities. Fattened bluefin tuna are mostly provided by Mediterranean purse seiners and to a much lesser extent by traps. The transfer of live fish from the seine to the towing cages is done in the open sea (generally where the catch has occurred), simply by joining both nets. There was a general agreement within the Committee that bluefin tuna farming operations in the Mediterranean Sea significantly affected bluefin tuna data collection, and consequently the stock assessment procedure. The difficulties to estimate size composition of the catch are, for instance, encountered by all countries having purse seine fleets involved in farming operations.

The Committee is concerned about the introduction in 2003 of new gears such as purse seines and pelagic trawls that are replacing albacore driftnets in the Bay of Biscay that could be targeting or increasing by-catch of juvenile bluefin in this area.

BFTE-3. State of the stock

The Committee notes that basic catch statistics are still undergoing revisions by the reporting agencies and, also, the Committee suspects that there was over-reporting between 1993 and 1997 and that there has been increased under reporting in the last few years, especially since 1998. Additionally, although there have been improvements to most of the available CPUE indices, the CPUE and size data are not available for important Mediterranean fisheries. Thus, the Committee does not have confidence in assessments based upon these data. Nevertheless, the Committee's best determination of the state of the stock is that which was developed in the 2002 assessment at the Commission's request.

An assessment was done in 2002 with similar specifications to those used in the previous assessment in 1998, but using alternative scenarios. The scenarios included two trials using catches as reported to ICCAT (but using two alternative modeling constraints). These were trials 5 and 9. A third trial was also tested in which catches were assumed to be over-reported in 1994-1997, and under-reported, subsequently (Trial 12). The Committee evaluated these different analyses but, due to the low quality of the data used, it had no basis to assign preference to any one of the sets of outputs. Therefore, no "Base Case" assessment was defined for the eastern stock. Results of this assessment are similar to the results obtained in 1998 in terms of trends, but are more optimistic in terms of current depletion. The new assessment indicates that the SSB in 2000 was about 86% of the 1970

level (first year of data in the assessment), while the ratio of the 1997/1970 SSB estimated in the 1998 assessment was 47%. This difference is due primarily to the new and updated CPUE indices used in the 2002 assessment, as well as recent increased recruitment (1995-1996; **BFT-Figure 6**).

The assessment indicates two peaks in spawning biomass and an increase in fishing mortality rates, especially for older fish after 1993 **(BFT-Figure 6)**. There appears to have been a general trend of increasing recruitment in the early 1980s followed by a period without trend **(BFT-Figure 6)**.

The 2000 level of fishing mortality was almost 2.5 times higher than that which maximizes yield per recruit. Estimates in recent years should be judged with caution since such VPA estimates are generally imprecise.

The Committee recognizes that many of the inputs to the assessment are uncertain. These include doubts about the historical catches (mainly in recent years), the absences of size composition for many fisheries, and the unknown adequacy of available CPUE indices as measures of overall stock abundance. These uncertainties make it easier to interpret trends in relative abundance rather than absolute levels of the stock.

BFTE-4 Outlook

Since the Committee was unable to identify adequate assumptions about the relationship between stock size and recruitment, projections were made assuming that future recruitment would vary around recent (1980-1997) levels without a trend. This was the same option used in the 1998 stock assessment. It should be noted that incomplete catch data from the period prior to 1970 might indicate that there have been periods in the past with very different levels of recruitment from that at present. Therefore, one should be cautious when making long-term projections, especially if spawning stock biomass falls below historically observed levels.

Long-term projections were made for the East Atlantic at levels of fishing mortality approximately equal to the value estimated for 2000. The Committee conducted projections using the three trial assessment scenarios presented above. The table below summarizes projection results for the three trials that use the current selection pattern and current fishing mortality rate.

	Trial 5	*Trial 9*	*Trial 12*
$Yield_{long\text{-}term}$	24,649	23,543	24,294
$Yield_{long\text{-}term}/Yield_{2000}$	0.69	0.66	0.59
$SSB_{long\text{-}term}/SSB_{2000}$	0.43	0.38	0.36

The results of these projections were similar to those obtained in the 1996 and 1998 assessments. These results suggest that current catch levels cannot be sustained in the long-term under the current selectivity pattern and current fishing mortality rate for the stock. The Committee recognizes that zero fishing mortality on juvenile bluefin is an impracticable objective. If either total fishing mortality or the mortality of small fish could be reduced substantially, then projections by the Committee indicated that current or even higher yields (perhaps more than 50,000 t) could be sustained.

The Committee continues to be concerned about the intensity of fishing pressure on small fish. This contributes substantially to growth over-fishing, and it seriously reduces the long-term potential yield from the resource. Additionally, the recent abrupt increase of catches of large fish since 1994 is of grave concern.

BFTE-5. Effect of current regulations

A regulatory recommendation stating that Contracting Parties should limit the fishing mortality to recent levels came into force in 1975 for one year and was extended indefinitely in 1982 for the East Atlantic. Fishing mortality rates have exceeded that of 1974 levels in most years **(BFT-Figure 6)**.

The Commission recommended in 1998 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea should be reduced to 32,000 t in 1999 and 29,500 t in the year 2000 [Rec. 98-05]. This recommendation entered into force in August 1999 with exceptions noted for Morocco and Libya. Catches were 32,454 t in 1999 and 33,752 t in 2000 (including SCRS estimates of unreported catches from the Bluefin Statistical Document Program (**BFT-Table 1**).

In 1975, a minimum size of 6.4 kg with a 15% tolerance, in number of fish, was recommended for the entire Atlantic (including the Mediterranean, [Rec. 74-01]). The 6.4 kg size regulation had been poorly enforced for the East Atlantic and Mediterranean fisheries. Subsequently the Commission established a minimum size with no tolerance of 1.8 kg (prohibition of retention, landing and sale). This was amended by the Commission to 3.2 kg in 1998, to be implemented in 1999 [Rec. 98-04]. The available data indicate that 36% of the number of fish in the Mediterranean catch was less than 3.2 kg in 2000 and 40% less than 6.4 kg. In the East Atlantic it was 2% and 29%, respectively. While it is known that catches of age 0 fish are still occurring, the Committee does not have sufficient catch-at-size data to fully evaluate this. Clearly catches of age 0 fish are under-reported.

Also, the recent use of smaller bluefin for tuna farming is a reason for concern to the Committee. Additionally, compliance with minimum sizes in these situations is difficult to evaluate.

There is a regulation that entered into force on 1 June 1994 that prohibits large pelagic longliners of more than 24 m in length from fishing in the Mediterranean during the months of June and July [Rec. 93-07 and Ref. 02-08]. The objective of this regulation is to limit fishing mortality. Various measures taken by ICCAT to curb IUU fishing activities (such as market-related measures, monitoring transfer of catches of IUU, etc.) appear to be having some positive effects as seen in the decline in bluefin tuna imports to the Japanese market from IUU fishing vessels.

In 1999 the prohibition of purse seine fishing in the Mediterranean (except for the Adriatic) was amended to include the period from 16 July through 15 August. Additionally, purse seining in the Adriatic was prohibited for the month of May. This regulation was modified in 2002, so that prohibition of purse seiner fishing now only applies from 16 July through 15 August for the whole Mediterranean Sea [Rec. 02-08]. This prohibition was designed to protect juveniles. The Committee has not yet been able to evaluate the effect of these new measures. However, reservations on the effects of this system were expressed. It seems, however, that the previous closure (for the month of mid-July through mid-August in the Mediterranean) was being adhered to. In 1997 the Commission prohibited the use of airplanes or helicopters supporting fishing operations in the Mediterranean in the month of June.

High catch of small individuals still occurs and the Committee recommends that every effort be made so that the current measures on the size limit of 6.4 kg are adhered to. Reduction of fishing on juveniles could contribute substantially to increases in both biomass and yield (Section BFTE-4 Outlook). The Committee reiterated that effective measures be taken to implement Recommendation [Rec. 02-08], avoiding catches of age 0 and 1 fish.

In 2002, the Commission recommended new measures. One new measure fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Rec. 02-08]. Also, the Commission modified the minimum size tolerance from 3.2 kg to 4.8 kg for the Mediterranean. The tolerance between the 3.2 kg and 6.4 kg limits for the East Atlantic and the 4.8 kg and 6.4 kg limits for the Mediterranean was also modified and reduced to 10% [Rec. 02-08].

BFTE-6. Management recommendations

The Committee continues to be strongly concerned about the quality of the catch, effort and catch-at-size data available to conduct quantitative assessments for East Atlantic (and Mediterranean) bluefin tuna now and in the future. Unless this situation improves, the quality of the advice that the Committee can provide will continue to deteriorate. Indeed, the present East Atlantic assessment was limited due to these uncertainties, particularly the uncertainty in catches. For example:

a) The assessment was only conducted using reported landings through the year 2000, due to the lack of reports for 2001;
b) The Committee conducted assessments based on reported landings and upon an alternative catch scenario in which landings were assumed to be both under- and over-reported since 1993 in reaction to management. The Committee has limited confidence that either the reported catches or the alternative scenario represent the true level; and
c) It has been noted that the practice of fish fattening has become increasingly prevalent in the Mediterranean and this practice has probably led to deterioration in the collection of catch statistics.

Because of the above limitations, the Committee is unwilling to make definitive management recommendations.

The Committee noted these same concerns in 2000 and determined that, given these issues, an assessment was not warranted at that time. While an assessment was conducted in 2002 and reviewed in 2003, the Committee does not believe that these data issues have been substantially resolved.

Following these repetitive concerns, a data exploratory workshop held in 2004 (SCRS/2004/013). The main problems identified by the group relate to: (i) probable misreporting of Task I data (especially after the TAC implementation), (ii) the low proportion of size samples (used to build Task II data), (iii) the very large amount of substitutions to estimate the size composition of the various fleets for which no size samples are available (most of them being problematic) and (iv) high uncertainties in the ageing of older age-classes. Consequently, the working group concluded that the uncertainties in catch data (especially in size composition) are so numerous that it is not defensible to assess the East Atlantic and Mediterranean stock using methods that assume that the catch-at-size(age) is known exactly (e.g., VPA). For the 2005 assessment, the Bluefin Tuna Species Group should explore the use of simpler assessment methods that do not use size/age data. For the medium-term (after the 2005 assessment), the Species Group should consider using methods that are better suited to handle these uncertainties (e.g., so-called statistical models).

The Committee is concerned about the status of East Atlantic (including Mediterranean) bluefin tuna resources in the light of assessment results; the historically high reported catches made in 1994-1997 (in excess of 46,000 t 1994-97; and in excess of 50,000 t in 1996), and possible under-reporting since 1998. Analyses suggest that at current levels of recruitment and the present level of large- and small-fish fisheries, catch levels of 26,000 t or more are not sustainable over the long-term (see Section BFTE-4 Outlook). Because of the lack of confidence in the input data and in the assessment results, the Committee is not in a position to give or suggest any strong management recommendations for the short or medium term. The Committee can only offer advice about long-term consequences of maintaining current catches. The Committee thinks that long-term sustainable yield is probably lower than current catches because of high fishing mortality rates.

Because there are big differences between the size of the western and eastern Atlantic bluefin tuna stocks, mixing is likely to influence these two management units differently (see Responses to the Commission section in the 2002 SCRS Report).

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY[1]	
Current (2001) Yield [2,3]	34,557 t
2001 Replacement Yield	Not estimated
Maximum Sustainable Yield	Not estimated
Relative biomass SSB_{2000}/SSB_{1970}	0.80
Relative numbers $N_{8+,2000}/N_{8+,1970}$	0.70
Relative fishing mortality F_{2000}/F_{max}	2.4
Management Measures:	– Fishing mortality not to exceed circa 1975 level [Rec. 74-01]. – No spotter planes/helicopters in Med. In June [Rec. 96-02]. – No longlining in Med. in June- July by vessels >24m [Rec. 02-08]. – No purse seining 16 July-15 August in the Mediterranean Sea [Rec. 02-08]. – No landing, retaining aboard or selling of fish <4.8 kg in the Mediterranean Sea [Rec. 02-08]. – No landing of fish <6.4 kg, with a 10% tolerance in number of individuals [Rec. 02-08]. - TACs are fixed to 32,000 t for the 2003-2006 years [Rec. 02-08]. - No use of driftnets for pelagic fisheries in the Mediterranean Sea [Rec. 03-04].

[1] Summary statistics are based on three runs (Trials 5, 9 and 12 in the 2002 Detailed Report) that represent alternative model formulations

[2] One of the assessment runs examined used an alternative catch scenario with hypothetical levels of mis-reporting. Under that scenario, the 2000 yield was 40,214 t.

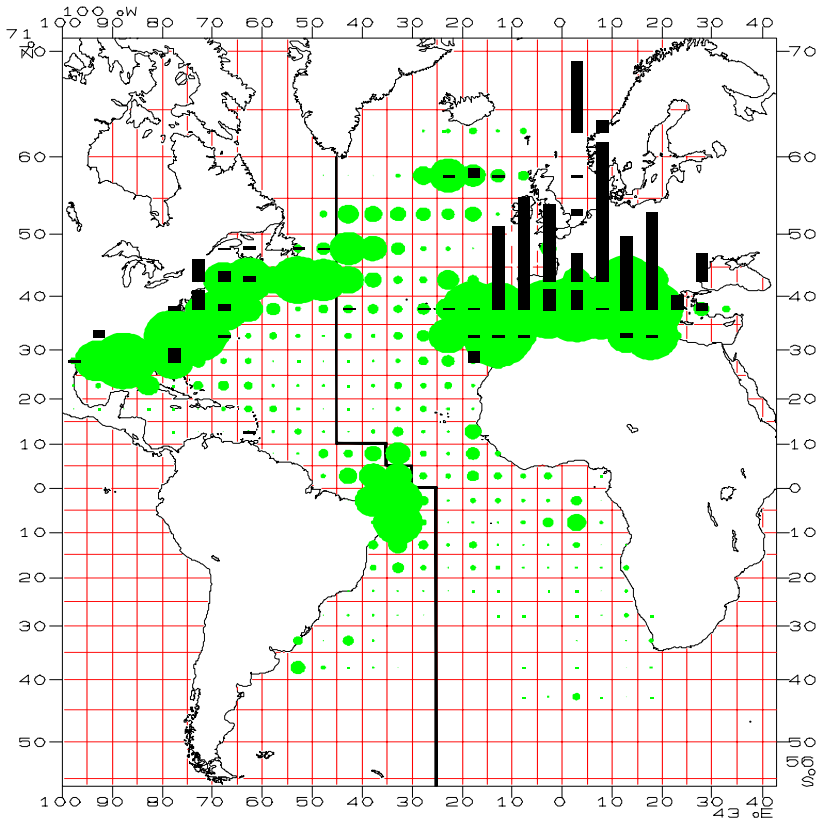
[3] 2002 and 2003 catches are not included in this summary table because reports are incomplete.

BFT-Table 1. Estimated catches (landinds and discards, t) of Atlantic bluefin tuna by major area, gear and flag 1979-2003

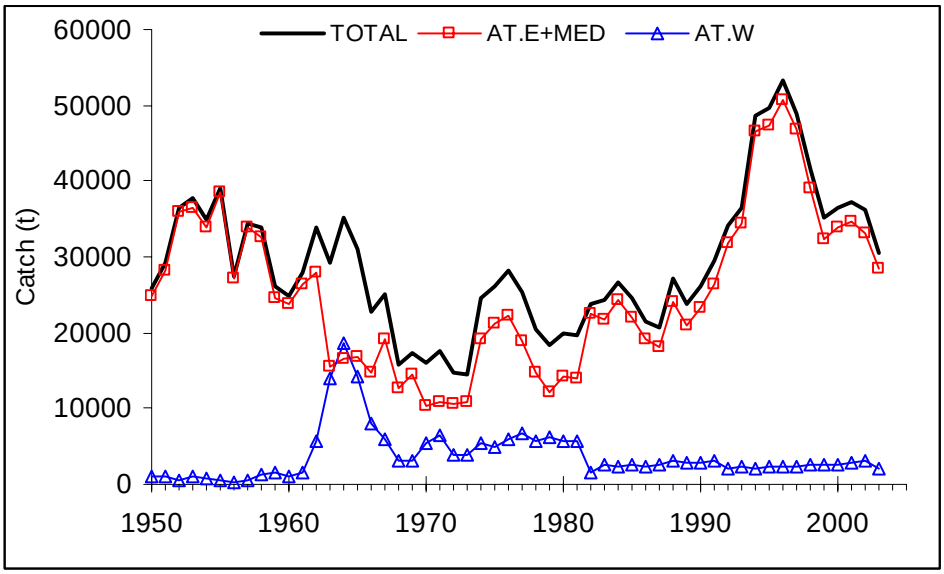
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 *
		TOTAL	18478	19904	19616	23820	24202	26717	24647	21373	20789	27128	23818	26045	29420	34012	36579	48577	49716	53163	48988	41688	35116	36417	37274	36298	30513
		AT.E+MED	12223	14103	13845	22375	21660	24425	21962	19051	18196	24117	20951	23247	26428	31897	34268	46471	47290	50762	46758	39097	32454	33752	34557	33111	28365
		AT.W	6255	5801	5771	1445	2542	2292	2685	2322	2592	3011	2867	2798	2992	2115	2311	2106	2426	2401	2230	2591	2662	2665	2718	3187	2144
		UNCL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Landings	AT.E+MED	Bait boat	2128	1874	1653	1010	3032	4647	2644	2253	2128	2682	2683	2018	1796	1624	4048	2285	3299	5362	3542	2787	1590	2014	2426	2568	1371
		Longline	970	1255	917	4255	3606	2734	1763	1448	1703	2396	1974	2522	6066	6416	5059	9224	12867	12959	10206	7049	6484	7052	7052	5180	4642
		Other Surf.	230	640	941	551	808	1960	3352	3666	3119	3344	3596	1474	1544	2451	2602	3845	1598	1470	1168	2272	3380	1577	1657	1691	3398
		Purse seine	6369	8978	8795	12786	10746	10302	11305	9621	8857	11198	9450	11304	13291	18269	19321	26026	24046	26344	25006	21608	15636	17341	17324	18340	15260
		Hand line / Rod and Reel	1176	105	93	100	194	275	508	323	436	839	459	1553	738	951	1237	2257	3556	2105	2468	1252	1652	2032	1334	1688	1473
		Traps	1350	1251	1446	3673	3274	4507	2390	1740	1953	3658	2789	4376	2993	2186	2001	2834	1924	2522	4367	4129	3711	3735	4763	3644	2223
	AT.W	Bait boat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Longline	3691	3972	3879	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	727	188
		Other Surf.	196	131	133	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	110	140
		Purse seine	1381	758	910	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265
		Hand line / Rod and Reel	956	893	808	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2035	1401
		Traps	31	47	41	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84
	UNCL	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	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
Discards	AT.W	Longline	0	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	73	51	57	50	113	38	79	66
BFT	AT.W	Other Surf.	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	0	0
BFT	AT.W	Sport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	0	0	0	0
Landings	AT.E+MED	Algerie	150	190	220	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	--
		Cape Verde	0	0	0	0	10	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	0	0	97	137	93	49	85	103	80	68	39	19
		Chinese Taipei	3	5	6	16	2	0	0	0	0	0	0	0	0	0	334	729	502	472	504	456	249	313	633	666	445
		Croatia	0	0	0	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139
		EC.Cyprus	0	10	10	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79
		EC.Denmark	1	0	3	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0	--
		EC.España	3656	2468	2601	3813	5257	7547	5090	3577	3654	5995	5210	5379	3664	4532	7096	5878	8426	8762	8047	5800	5363	6246	5867	6304	4649
		EC.France	1853	1961	2503	5028	4060	4202	5920	3838	4863	6504	4894	5223	5185	8270	8094	12179	10329	9690	8470	7713	6741	7321	6748	6565	6498
		EC.Germany, Fed. Rep.	1	0	2	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	0	0	5	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21	52	22	8	15	3
		EC.Italy	4020	6272	6017	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973
		EC.Malta	23	24	32	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255
		EC.Portugal	35	24	17	41	174	34	29	193	163	48	3	27	395	358	208	668	481	473	749	377	487	502	468	186	63
		EC.Sweden	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	12	0	0	0	0
		Ex. Yugoslavia	756	573	376	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0	0	0	0	0	0	0	0	0
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	104	118	0	--
		Guinée Conakry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	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	0	0	2	27	0	0	1	--
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	--
		Japan	729	999	615	3534	3286	2550	1426	1080	1180	1427	965	1636	3066	3473	3277	2611	4784	4106	3090	3556	3071	3031	2577	2926	3173
		Korea, Republic of	1	0	0	0	3	0	77	0	0	0	0	0	0	0	0	688	663	683	613	66	0	6	1	0	--
		Libya	424	398	271	310	270	274	300	300	300	300	84	328	370	737	635	1422	1540	1388	1029	1331	1195	1549	1940	--	--
		Maroc	208	161	179	993	366	175	98	344	472	577	746	1557	1456	767	494	1812	1713	1621	2603	2430	2227	2923	3008	2986	2557
		NEI-1	0	0	0	1	0	25	3	172	183	638	763	415	1754	1349	0	0	0	0	0	0	0	0	0	0	--
		NEI-2	0	0	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	0	--
		NEI (Combined fleets BF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	--
		NEI other	0	0	0	0	0	0	0	0	0	0	0	0	85	144	223	495	828	242	1274	891	140	17	0	0	--
		Namibia	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

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 *
		Norway	60	282	161	50	1	243	0	31	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
		Panama	14	117	48	12	0	17	22	11	76	67	0	74	287	484	467	1500	1517	3400	491	0	13	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	2	0
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	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	0
		Tunisie	262	228	218	298	293	307	369	315	456	624	661	406	1366	1195	2132	2503	1897	2393	2200	1745	2352	2184	2493	2528	791
		Turkey	27	391	565	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	3300
		U.S.A.	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0	0
	AT.W	Argentina	0	0	0	0	0	0	6	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	--
		Brazil	10	2	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0
		Canada	245	324	425	291	433	264	142	73	83	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557
		Chinese Taipei	49	15	7	11	2	3	3	3	0	0	0	0	0	0	0	0	0	0	2	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	0	0	74	--
		France- St. Pierre et Miq.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	1
		Japan	3621	3936	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575	71
		Korea, Republic of	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		Mexico	22	10	20	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12	22
		NEI-1	0	0	0	14	1	0	0	0	0	0	30	24	23	17	0	0	0	0	0	0	0	0	0	0	--
		NEI-other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	429	270	49	0	--
		Panama	10	9	14	12	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	1	3	2	14	14	14	2	43	9	3	0	0	0	0	0	0	0
		Trinidad and Tobago	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		U.S.A.	2297	1505	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1840	1428
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	1	0
		Uruguay	0	0	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	--
	UNCL	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	1
		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
Discards	AT.W	Canada	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14
		Japan	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
		U.S.A.	0	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	77	51	44	39	67	25	42	52

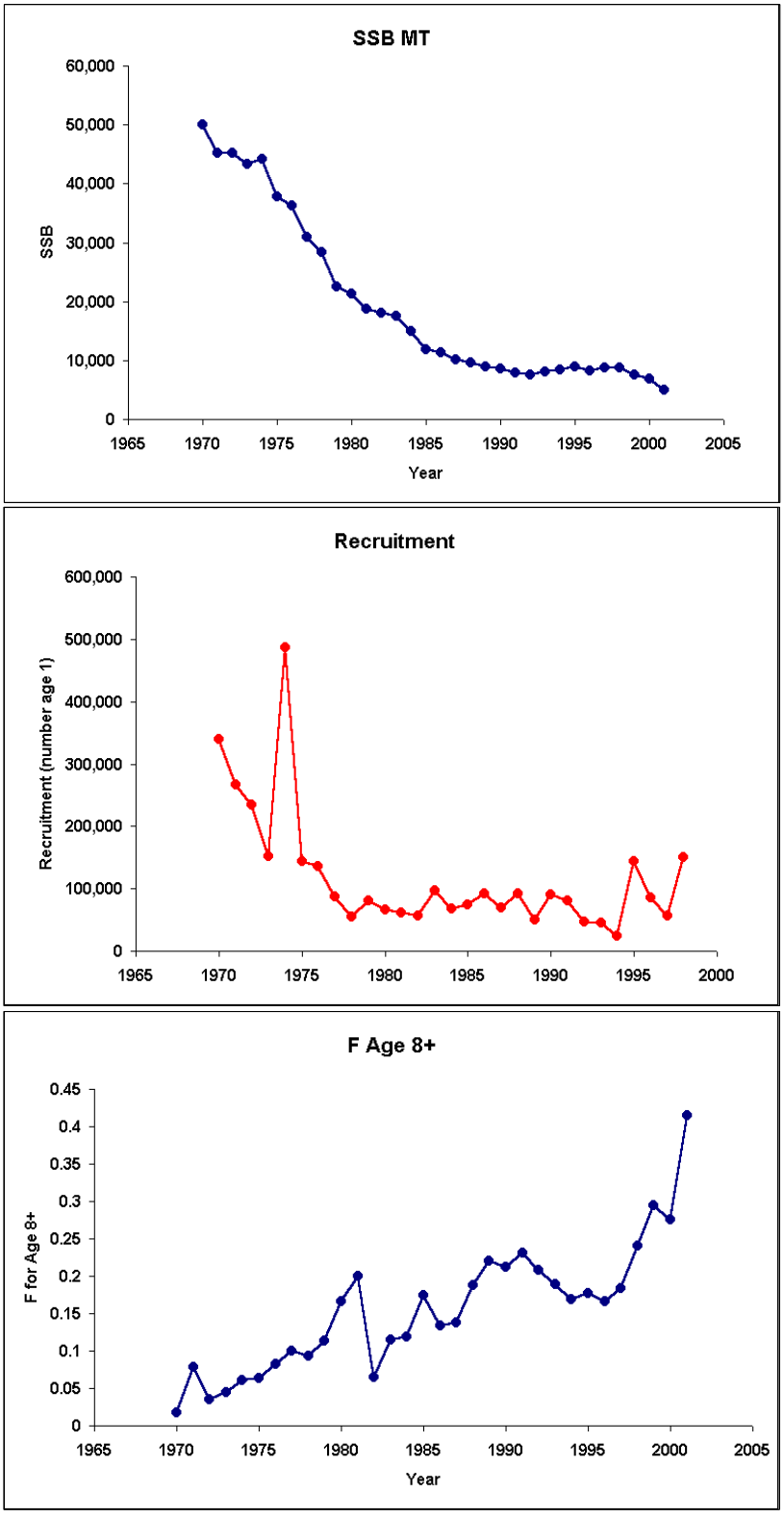
* Dashes indicate that no reports were received. Also, the 2003 data are provisional and are likely to increase



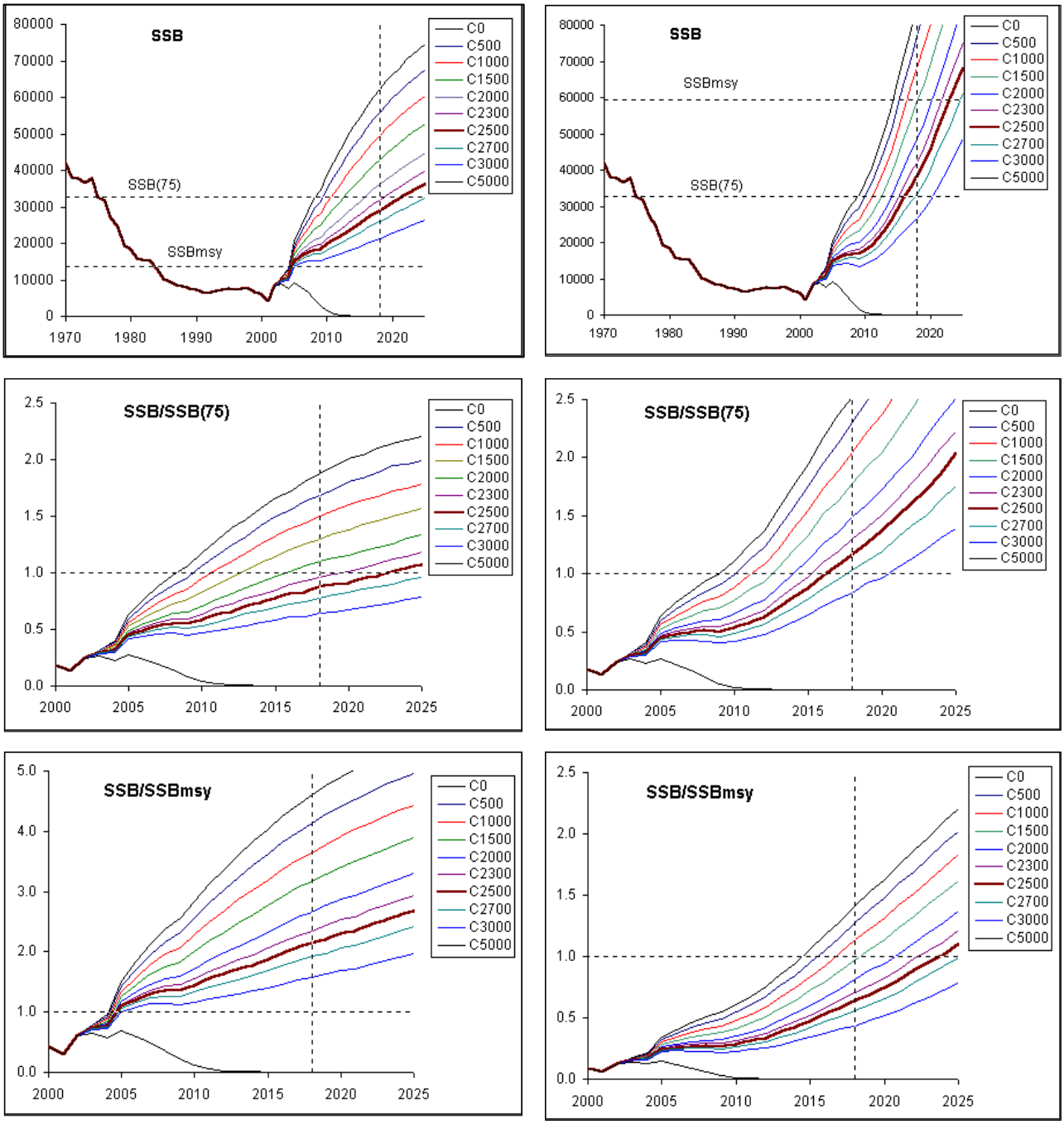
BFT-Fig. 1. Distribution of Atlantic bluefin catches by longline (circles) and surface gears (bars) for the period 1950-1999.



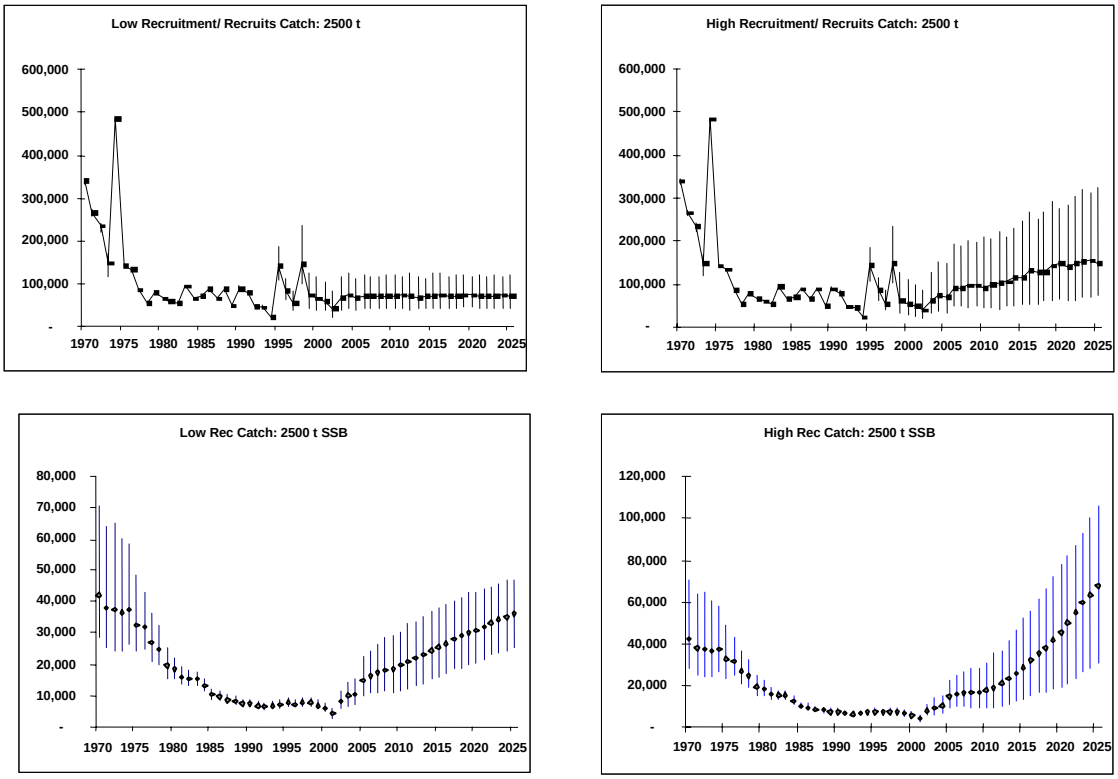
BFT-Fig. 2. Atlantic bluefin catches (in t, including discards) by region. Approximately 6% and 15% of the Task I data have not been reported yet for 2002 and 2003, respectively.



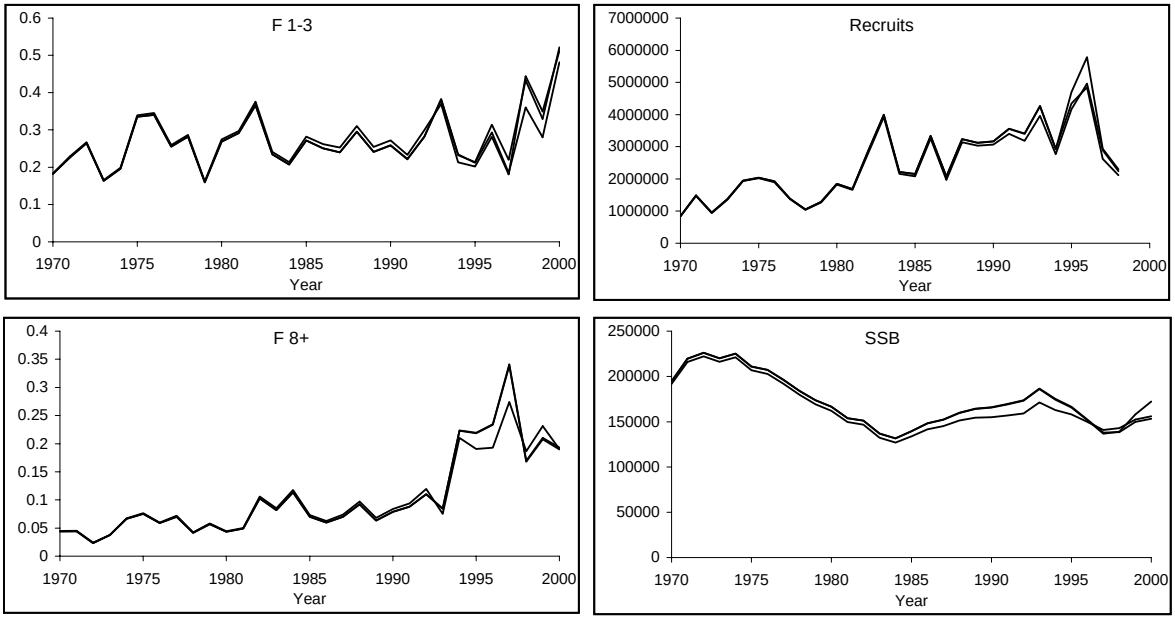
BFT-Fig 3. West Atlantic bluefin tuna spawning biomass (t), recruitment (numbers) and fishing mortality rates for fish of age 8+, estimated by the Base Case VPA run.



BFT-Fig. 4 Western Atlantic bluefin tuna: Median projections of spawning stock biomass (SSB) for the Base Case assessment under various levels of constant catch, expressed in absolute terms, relative to 1975 levels and relative to B_{MSY} for the low (left) and high (right) recruitment scenarios.



BFT-Fig. 5. West Atlantic bluefin tuna: Projection results with 80% confidence intervals for the Base Case **Low Recruitment** Scenario (left plates) and **High Recruitment** Scenario (right plates) for west Atlantic bluefin (with 2,500 t constant annual catches) for recruitment and spawning stock biomass (SSB).



BFT- Fig. 6. East Atlantic and Mediterranean bluefin tuna: Estimates of fishing mortality rates (average for ages 1-3 and 8+), recruitment and spawning stock biomass (SSB) obtained by three models for the eastern stock.

8.6 BUM - BLUE MARLIN

No new blue marlin assessments have been conducted since 2000.

BUM-1. Biology

Blue marlin are found throughout tropical and temperate waters of the Atlantic Ocean and adjacent seas, and range from Canada to Argentina on the western side, and from the Azores to South Africa on the eastern side **(BUM-Figure 1)**. Blue marlin are large apex predators with an average weight of about 100-175 kg. Blue marlin have an extensive geographical range, migratory patterns that include transatlantic as well as trans-Equatorial movements, and are generally considered to be a rare and solitary species relative to the schooling scombrids. Blue marlin spawn in tropical and subtropical waters in the warmer months of the year, and can be sexually mature by ages 2-4 in some areas. There has not been an Atlantic-wide study of the spawning activity of this species. Non-spawning adults can also be found in colder, temperate waters. Young blue marlin are one of the fastest, if not the fastest growing of all teleosts, reaching from 30-45 kg by age 1. Females grow faster and reach a much larger maximum size than males.

Blue marlin feed on a wide variety of fish and squid, but show a dietary preference for scombrids. They are found predominately in the open ocean near the upper reaches of the water column although this species can range down to or below the mixed layer. For this reason, they are caught most frequently as a by-catch by the offshore longline fisheries that target tropical or temperate tunas using gears intended to fish shallow. However, significant by-catch landings are also made by offshore longline fisheries that target swordfish and bigeye tuna using gear intended to fish deep.

Prior to 1995, the stock hypothesis for assessment purposes has historically been a North Atlantic and South Atlantic stock (divided at 5°N), and a total Atlantic stock. However, the 1995 SCRS recognized the increased importance of the single Atlantic hypothesis for blue marlin. More recently (1996), the Committee reviewed and discussed new data on genetic mitochondria DNA analysis, as well as tag release-recapture data, and concluded that these data were most consistent with a single (total) Atlantic hypothesis. Additionally, the Committee concluded that the North/South separation is arbitrary for this tropical species (as with white marlin). The Fourth Billfish Workshop reviewed all available data on stock structure and concluded that the single Atlantic hypothesis should be used as the management unit for Atlantic blue marlin.

BUM-2. Description of the fisheries

The fisheries for Atlantic blue marlin are characterized by many different participants. The major landings of blue marlin are incidental to the large offshore longline fisheries that have targeted tuna and swordfish, including Brazil, Cuba, Japan, Korea, Chinese Taipei, and others. Other major fisheries are the directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, and many other countries and entities in the Caribbean Sea and off the West coast of Africa. Other directed fisheries include artisanal fisheries in the Caribbean Sea and off West Africa. Development and geographical expansion of other longline fisheries that take blue marlin in the West Atlantic, Caribbean Sea, and East and South Atlantic by various countries have been reported. Tropical purse seine fisheries also have an incidental catch of blue marlin, mainly from sets associated with floating objects. For 2001 and thereafter, the United States implemented time area closures that were intended to reduce interactions between longline fishing and unintended catch including blue marlin.

Landings for the total Atlantic first developed in the early 1960s, reached a peak of over 9,000 t in 1963, declined to the range of about 2,000-3,000 t during the period 1967-1977, and have fluctuated with an increasing trend over the period 1978-1996, and a decreasing trend thereafter **(BUM-Table 1 and BUM-Figure 2)**. The 2003 reported catches for Blue marlin (1,951 t) are incomplete and may represent a substantial underestimate of the real catch, because of the lack of reports from some of the fleets that have historically landed large numbers of this species. The general trends in catches have followed the intensity of the offshore longline fisheries, however, recent reported catches in the coastal gillnet fisheries have become important.

The Committee notes that some blue marlin are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish.

Recently some large catches of unclassified billfish have been reported to the Committee. The 2001-2003 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries.

BUM-3. State of the stock

The 1996 blue marlin assessment indicated that in the mid-1990s biomass was about 25% of B_{MSY}, that fishing mortality was about three times F_{MSY}, and that over-fishing had been occurring for about three decades. MSY was estimated to be near 4,500 t.

An assessment was carried out in 2000 using similar methods to the previous assessment, but with data sets that had been revised extensively in response to concerns raised since the 1996 assessment. The assessment might reflect a retrospective pattern wherein improvement in estimated biomass ratios result in estimated lower productivity. The results from the 2000 assessment were not adjusted for retrospective patterns and were slightly more optimistic than the 1996 assessment. These results suggest that the total Atlantic stock is approximately 40% of B_{MSY} and that over-fishing has taken place in the last 10-15 years **(BUM-Figures 3 and 4)**. But this assessment also suggests a less productive stock than previously estimated, with an MSY of about 2,000 t, and a current fishing mortality that is about four times higher than F_{MSY}.

For the assessment, the Committee considered a range of models and data sets, including cases in which much of the historical data were disregarded or down-weighted. While the sensitivity analyses were not meant to quantify possible biases, the Committee notes that many of the sensitivity runs provided more optimistic results than those reported above, with stock estimates somewhat closer to B_{MSY} levels. However, most of the sensitivity results were within the range of uncertainty reported for the assessment. Thus, there is uncertainty in the assessment related to the historical data that is not well quantified. The Committee notes that the historical catch and effective fishing effort data must be validated and focused research be conducted before such uncertainties can be reduced. To address these uncertainties would require a substantial research investment in historical data validation efforts and in biological investigations of the habitat requirements of blue marlin.

BUM-4. Outlook

As noted, there is uncertainty in the assessment related to the historical data that is not well quantified. However, given that the 2000 assessment estimated that over-fishing was still occurring and that productivity (MSY and a stock's capacity to replenish) was lower than previously estimated, it is expected that landings in excess of estimated replacement yield would result in further stock decline.

BUM-5. Effect of current regulations

0(paragraph deleted)

Recommendation [Rec. 97-09] requires to "Reduce, starting in 1998, blue marlin and white marlin landings by at least 25% for each species from 1996 landings, such reduction to be accomplished by the end of 1999." Recommendations [Rec. 00-13], [Rec. 01-10] and finally [Rec. 02-13] placed additional catch restrictions for blue 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 50% of the 1996 or 1999 landing levels, whichever is greater" and also, "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".

The following are the Atlantic-wide blue marlin reported (Task I) landings for the recent period, for longline and purse seine vessels:

	1996	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*
LL	3,257	3477	2468	2276	2127	1614	1202	1652
PS	96	82	80	83	79	0*	0*	0*
Total	3,353	3559	2548	2359	2206	1614	1202	1652

* Reported landing are likely to be under-estimates of the total catch.

However, because the last stock assessment was conducted in 2000, it is too early to evaluate the effect of this recommendation on the stock. Some countries already acted on these recommendations but no data are yet available to evaluate the effect of this last recommendation on the stock status of blue marlin.

In 2000, the Commission recommended that a blue marlin minimum size be established by recreational fisheries, (e.g., 251 cm LJFL). The Committee does not expect to have enough new information to provide an assessment of the effect of these recent regulations until 2006.

BUM-6. Management recommendations

Management recommendations here are the same as those made in 2003. No additional assessment information became available in 2004 to modify these recommendations. The current assessment indicates that the stock is unlikely to recover if the landings contemplated by the 1996 Commission recommendation continue into the future. While there is additional uncertainty in stock status and replacement yield estimates not reflected in bootstrap results, these uncertainties can only be addressed through substantial investment in research into habitat requirements of blue marlin and further verification of historical data. The Committee recommends that the Commission take steps to reduce the catch of blue marlin as much as possible. Steps such as release of live fish from fishing gear, reductions in fleet-wide effort, a better estimation of dead discards, and establishment of time area closures, along with scientific observer sampling for verification could be considered.

The Commission should consider that future evaluations of management measures relative to the recovery of the blue marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of blue marlin, and additional years of data are available. The Committee therefore recommends the next blue marlin assessment not be held before 2006.

ATLANTIC BLUE MARLIN SUMMARY[1]

	Total Atlantic
Maximum Sustainable Yield (MSY)	~ 2,000 t (~ 1,000 ~ 2,400 t)[2]
2002 Yield	2,494 t
2003 Yield[4]	1,951 t
1999 Replacement Yield	~ 1,200 t (~ 840 - 1,600 t)[2]
Relative Biomass (B_{2000}/B_{MSY})	~ 0.4 (~ 0.25 - 0.6)[2]
Relative Fishing Mortality (F_{1999}/F_{MSY})	4.0 (~ 2.5 - 6.0)[2]
Management Measures in Effect	- Reduced pelagic longline and purse seine landings to 50% of 1996 or 1999 levels, whichever is greater [Recs. 00-13[3], 01-10[3] and 02-13].

[1] Assessment results are uncertain. Uncertainty in these estimates is not fully quantified by bootstrapping.
[2] Approximate 80% CI from bootstrap for ASPIC model.
[3] These measures did not take effect until mid-2001.
[4] Reported Task I value, which is likely to be a substantial underestimate of the total catch.

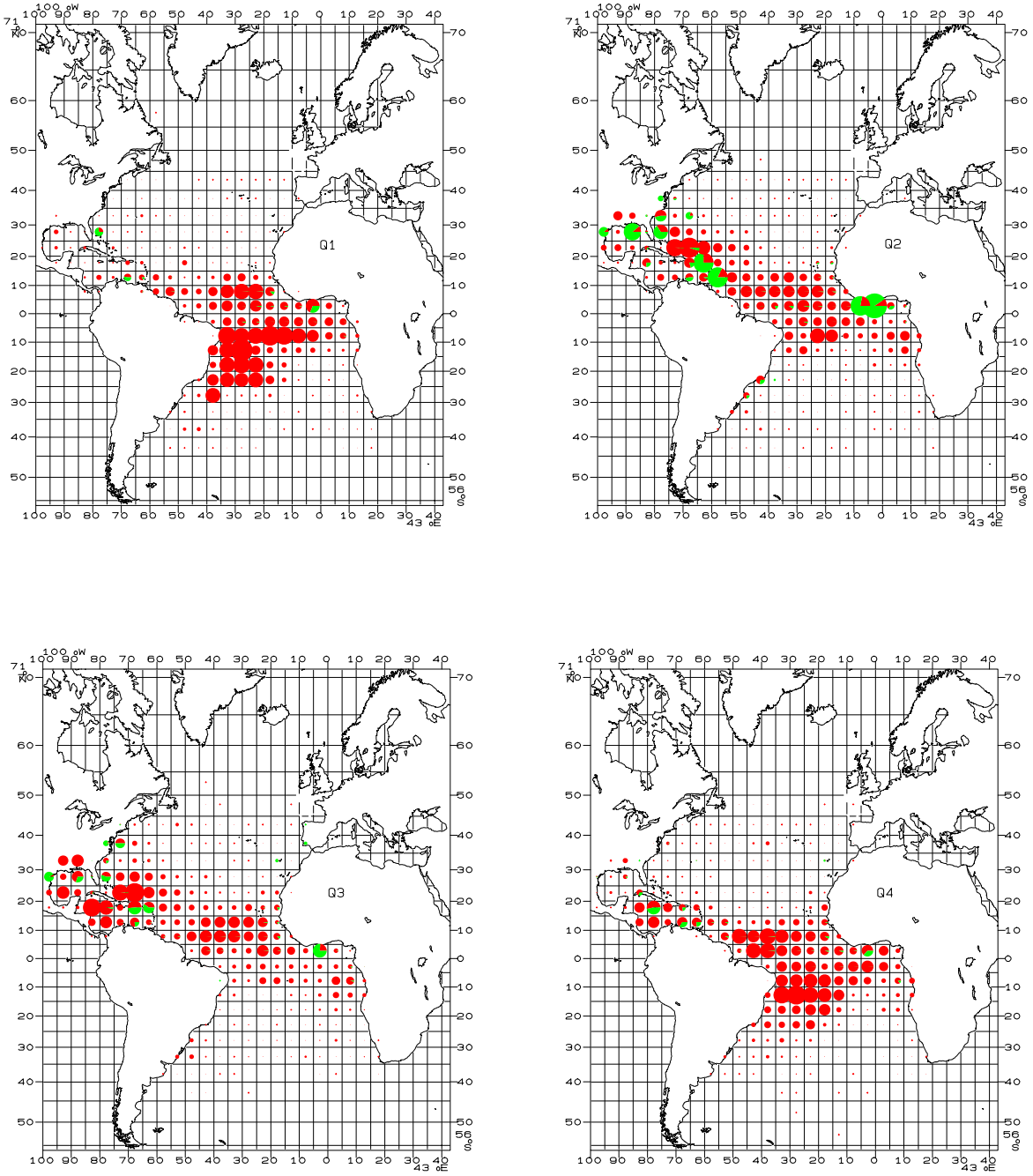
BUM-Table 1. Estimated catches (landinds and discards, t) of Atlantic blue marlin by major area, gear and flag 1979-2003

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		TOTAL	1527	1848	2032	2708	2130	2748	3311	1993	2053	2736	4214	4520	4128	2952	3001	3946	3802	4445	4866	3868	3761	3413	3326	2494	1951
		AT.N	897	1085	1296	1650	1214	1378	1566	1069	836	909	1540	1943	1411	1086	1057	1510	1446	1742	1711	1489	1248	999	549	514	640
		AT.S	504	619	567	884	749	1252	1623	789	1085	1690	2530	2378	2580	1750	1798	2303	2230	2607	3073	2299	2430	2335	2776	1975	1311
		UNCL	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	1	4	
Landings	AT.N	Longline	480	643	792	1162	809	920	1223	695	327	415	1009	1597	981	629	600	1065	925	1266	1227	950	752	642	329	389	451
		Other Surf.	0	0	0	1	2	1	0	0	0	22	100	13	29	26	24	59	84	72	189	332	237	77	70	57	74
		Sport	299	301	300	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17	19
		Unclass.	118	140	204	188	204	251	174	160	190	162	97	123	196	202	193	153	208	142	142	100	140	184	106	2	77
	AT.S	Longline	490	498	430	822	533	975	1362	661	964	1530	2017	1958	2280	1473	1415	1643	1565	1991	2250	1517	1524	1485	1285	899	1201
		Other Surf.	13	119	135	60	216	276	260	127	121	159	512	418	237	208	382	658	663	605	718	634	904	850	1491	1076	109
		Sport	1	2	2	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	0	0
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	62	69	0	0	0	0	35	146	0	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
		Other Surf.	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	0	0	0
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37	18
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11	0
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Landings	AT.N	Barbados	51	73	117	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	0	--
		Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0
		Canada	0	0	0	0	0	0	0	0	1	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	41	48	41	51	79	133	9	31	15	17
		Chinese Taipei	51	160	98	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	48	64
		Cuba	156	162	178	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34	--
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	0	--
		EC.España	0	0	0	0	0	3	4	1	0	8	7	2	1	7	7	6	1	22	5	6	3	25	8	1	6
		EC.Portugal	0	0	0	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1	31
		Grenada	0	1	1	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	--
		Japan	68	193	332	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	420	153	123	163
		Korea, Republic of	67	48	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	0	0	0	0	0	--
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	0	--
		Netherlands Antilles	50	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	0	--
		Panama	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	--
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	38	0	0	0
		Senegal	0	0	0	0	0	0	0	0	0	0	1	1	5	0	0	5	5	5	0	0	0	0	0	0	0
		St. Vincent and Grena	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	0	1	0	0	0	0	15	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	10	5	0	18
		Trinidad and Tobago	0	0	0	0	3	8	3	17	2	0	28	4	6	4	3	27	46	21	81	70	33	55	17	16	--
		U.S.A.	312	313	342	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19
		U.S.S.R.	0	0	0	0	0	0	0	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.Bermuda	2	4	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	2	2	2	2
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	15	5	0	0	0	0	0	0	0	0	0	0	--

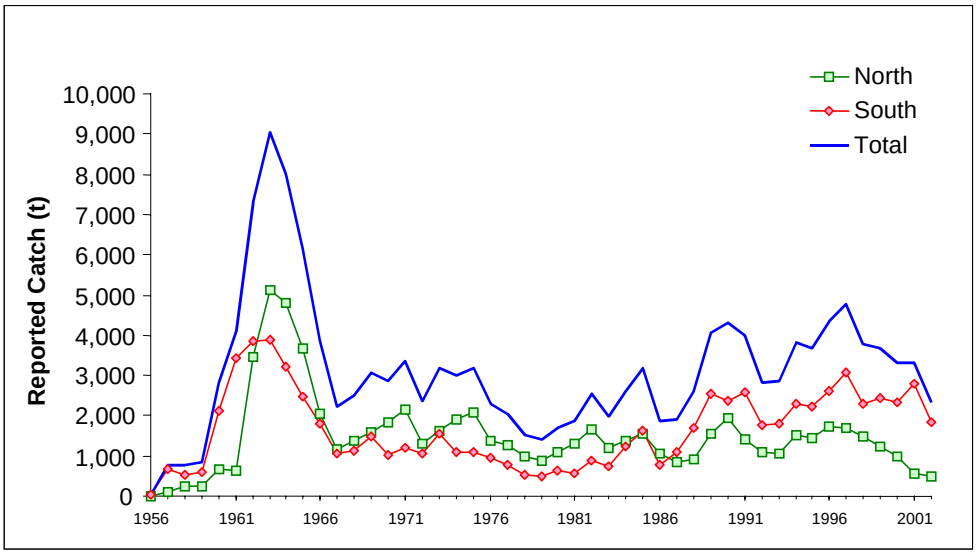
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		Venezuela	134	81	106	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	28	72	76	84
	AT.S	Benin	0	0	6	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	0	--
		Brazil *	34	23	28	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	25	21	27	41	68	15	61	73	72
		Chinese Taipei	139	129	104	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	255
		Cuba	180	187	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	0	--
		Côte D'Ivoire	0	0	0	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109
		EC.España	0	0	0	0	0	0	0	0	0	0	15	0	6	23	18	21	38	88	71	82	109	116	86	27	6
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	0	0	0	0	0	0	0
		Ghana	0	119	129	52	216	166	150	16	5	7	430	324	126	123	236	441	472	422	491	447	624	639	1295	999	--
		Japan	66	115	136	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	181	155	290
		Korea, Republic of	78	46	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	0	--
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	0	0	0	0	0	--
		Panama	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	--
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	0	0	0	0
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	0	--
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0
		St. Vincent and Grena	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
		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	--
		U.S.S.R.	0	0	1	0	0	0	7	16	22	32	5	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	0	0	23	0	0	0	0	--
	UNCL	EC-France + España	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	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	0	0
		St. Vincent and Grena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Discards	AT.N	U.S.A.	0	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49	19
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	0	0
	UNCL	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	1	0	0

Dashes indicate that no report was received or estimate made

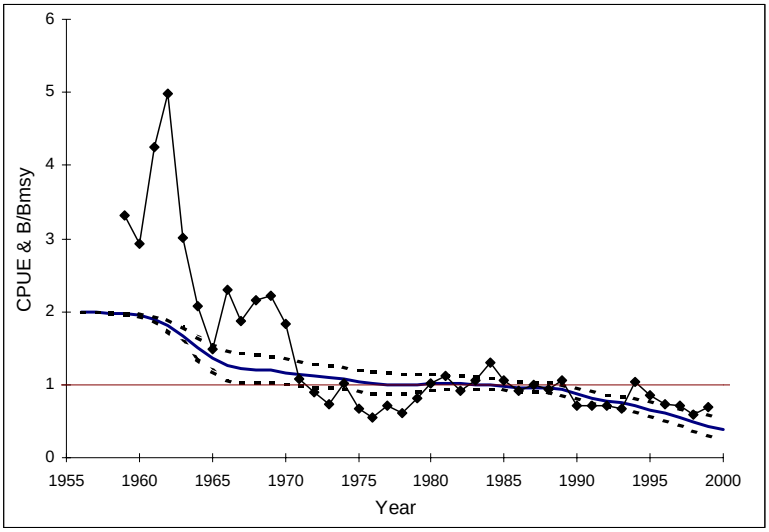
* Includes live discards.



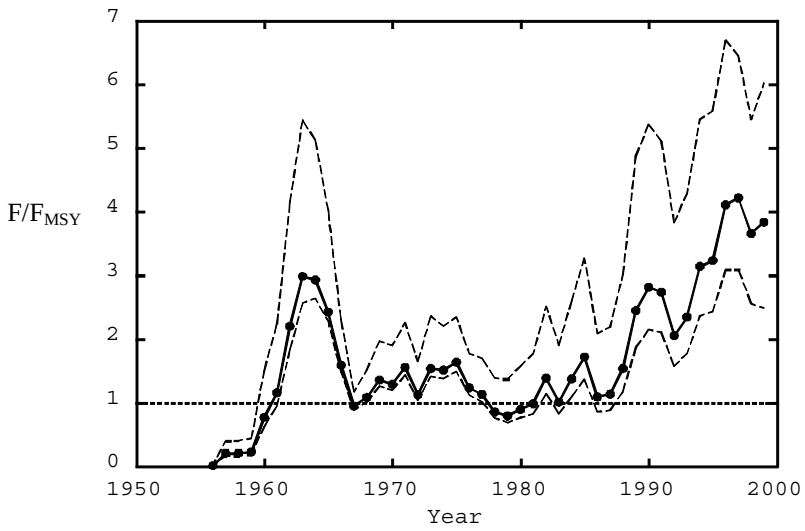
BUM-Fig. 1. Geographical distributions of reported catches (landings+discards) of blue marlin by quarter, combined all years (1956-2000). Heavy- and light-shaded areas correspond to longline and other gears, respectively.



BUM-Fig. 2. Estimated catches (including landings and dead discards in t) of blue marlin in the Atlantic by region. The 2003 catch reported to ICCAT is preliminary and is not included in this figure.



BUM-Fig. 3. Composite CPUE series (symbols) used in the blue marlin assessment compared to model-estimated median relative biomass (solid lines) from bootstrap results (80% confidence bounds shown by dotted lines).



BUM-Fig. 4. Estimated median relative fishing mortality trajectory for Atlantic blue marlin (center, dark line) with approximate 80% confidence range (light lines) obtained from bootstrapping.

8.7 WHM - WHITE MARLIN

The 2000 assessment for the Atlantic white marlin stock concluded that the stock was over-fished but acknowledged that there was significant uncertainty in the evaluation of stock status. It is difficult that in the space of two years such uncertainty could be reduced, however, at the request of the Commission, an assessment was conducted for the Atlantic stock of white marlin in May 2002. The assessment used the most recent information on the biology and fisheries for white marlin and the data on catch and relative abundance indices up to 2000, the most recent year for which there are estimates.

WHM-1. Biology

White marlin are found throughout tropical and temperate waters of the Atlantic Ocean and adjacent seas **(WHM-Figure 1)**. Unlike blue marlin and sailfish, white marlin occur only in the Atlantic Ocean. Their average size in the catch is about 20-30 kg. And although they are generally considered to be a rare and solitary species relative to the schooling scombrids, they are known to occur in small groups consisting of several individuals. Little is known about the age and growth and reproductive biology of white marlin and, with few exceptions, there are no quantitative estimates of population parameters for this species that can be used in stock assessments. Although white marlin reportedly spawn in warm waters in the spring in the western north Atlantic and the summer in the western south Atlantic there has not been an Atlantic-wide study of the spawning behavior for this species. Non spawning adults are found in colder temperate waters during the summer. They are considered to be very fast growing, and have a lifespan of at least 17 to 18 years. Female white marlin grow faster and reach a larger maximum size than males. White marlin are generally considered piscivorus, but also have been known to consume squid. They are found predominately in the open ocean near the upper reaches of the ocean mixed layer.

As with blue marlin, initially the SCRS considered two stock hypotheses for white marlin assessments, first that there are two stocks, a North and South Atlantic stock (divided at 5^{o}N), and second that there is a single (total) Atlantic stock. More recently (1996), the Committee reviewed and discussed new data on genetic mitochondria DNA analysis, as well as tag release-recapture data, and concluded that these data were most consistent with a total Atlantic hypothesis. A further review in 2000, at the Fourth Billfish Workshop, concluded that the single Atlantic hypothesis should be used as the management unit for Atlantic white marlin.

WHM-2. Description of the fisheries

The fisheries for Atlantic white marlin are characterized by the presence of many different participants. The major landings of white marlin are incidental to the large offshore longline fisheries that have targeted tuna and swordfish, including Brazil, Cuba, Japan, Korea, Chinese Taipei, and others. Other major fisheries are the directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, and many other countries and entities in the Caribbean Sea and off the west coast of Africa. Other directed fisheries include artisanal fisheries in the Caribbean Sea and off West Africa. Development and geographical expansion of other longline fisheries that incidentally take white marlin in the West Atlantic, Caribbean Sea, and East and South Atlantic by various countries have been reported. Tropical purse seine fisheries also have an incidental catch of white marlin, mainly from sets associated with floating objects. Other incidental catches are also expected to occur in other fisheries from which reports are not available. For 2001 and thereafter, the United States implemented time area closures that were intended to reduce interactions between longline fishing and unintended catch including white marlin.

Landings for the total Atlantic first developed in the early 1960s, reached a peak of almost 5,000 t in 1965, declined to about 1,000 t per year during the period 1977-1982, and fluctuated between 1,000 to 2,000 t through 1999.Catches have been less than 1000 tons since 2000 **(WHM-Table 1)**. The 2003 reported catches, which are likely to be incomplete, were 571 t. More than half of these catches come from a single fishery. Landings for the North Atlantic generally show a trend similar to that of the total Atlantic and have mainly followed those of the offshore longline fisheries **(WHM Figure 2)**.

The Committee notes that some white marlin are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish.

Recently some large catches of unclassified billfish have been reported to the Committee. The 2001-2003 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries. In the 2002 assessment, significant improvements were made in the historical estimates of catch for the EC purse seine, the U.S. recreational and Japanese longline catches. These studies, however, have identified that recent catch estimates may be more uncertain than previously thought, because discards are not generally reported in logbooks. Additionally, changes in the economic importance of this species or changes in the fishing gear may have led to change in the reporting of catches by some fleets.

WHM-3. State of the stock

The data available for white marlin, in spite of significant improvements in the relative abundance estimates made available during the last two assessments and the current assessment, is not informative enough to provide an estimate of stock status with high certainty. For consistency with the last assessment, the results presented in 2002 (continuity case) are largely based on treatment of data and assumptions that closely resemble the analyses made in 2000. The previous two white marlin assessments, made in 1996 and 2000, indicated that biomass of white marlin has been below B_{MSY} for more than two decades, thus that the stock has been over-fished for many years. The 2000 assessment estimated that biomass in the late 1990s was about 15% of B_{MSY}, and that fishing mortality was increasing and reaching more than five times F_{MSY} (**WHM-Figure 3**). The MSY estimates of 2,200 t made in 1996 were reduced to 1,300 t in the 2000 assessment. The assessment results presented are similar to those obtained in 2000; they suggest that the total Atlantic stock in 2000 remains over-fished and continues to suffer over-fishing (**WHM-Figure 4**).

Available relative abundance indices suggest similar trends in abundance in the last twenty years; however, the abundance trends for the early part of the fishery are more uncertain and reflect changes that cannot be easily explained by the available population models. To evaluate the uncertainty and sensitivity of the assessment to data and model inputs, the Committee considered alternative models and data set combinations. While the range of sensitivity analyses were not meant to quantify possible biases, the Committee used them to qualitatively characterize the range of uncertainty in the estimates of stock status **(WHM-Figure 5)**. Many of the sensitivity results were within the range of uncertainty estimated for the assessment presented but some produced more optimistic views of the status of the stock. The uncertainty in the estimates of population parameters remains large and not well quantified; the calculated uncertainty underestimates the real uncertainty on these parameters.

The Committee notes that in order to properly quantify and reduce this uncertainty improvements must be made in the estimates of historical and recent catch, abundance indices and on the biology of white marlin. Such improvements will require a substantial research investment in estimating effective fishing effort, historical data validation, and biological investigations of the age, growth, reproduction and habitat requirements of white marlin.

WHM-4. Outlook

In 2000 and 2001 [Rec. 00-13] and [Rec. 01-10], the Commission recommended that purse seine and longline fisheries limit landings of white marlins to 33% of the larger of either 1996 or 1999 levels. The Committee has interpreted these Recommendations as a maximum limit for landings for 2002 and beyond at 600 t based on the landings estimates used in the current assessment. While the stock status evaluations are uncertain, projections indicated that the apparent intent of the Recommendations has, in the short term, some potential for stabilizing the stock biomass near current levels. The projections also indicated that lower catch levels would provide greater potential for increasing stock biomass.

WHM-5. Effect of current regulations

Recommendation [Rec. 97-09] requires to “Reduce, starting in 1998, blue marlin and white marlin landings by at least 25% for each species from 1996 landings, such reduction to be accomplished by the end of 1999.” Recommendations [Rec. 00-13], [Rec. 01-10] and finally [Rec. 02-13] placed additional catch restrictions for white marlin. The last one established that “the annual amount of white marlin that can be harvested by pelagic longline and purse seine vessels and retained for landing must be no more than 33% of the 1996 or 1999

landing levels, whichever is greater. 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".

The following are the Atlantic-wide white marlin reported (Task I) landings for the recent period, for longline and purse seine vessel vessels:

	1996	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*
LL	1,174	908	885	924	852	575	671	513
PS	7	7	9	8	7	0*	0*	0*
Total	1,181	915	894	932	858	575	671	513

* Reported landings are likely to be under-estimates of the total catch.

However, because 2000 is the last year of data used for the last stock assessment, it is too early to evaluate the effect of this recommendation on the stock. Some countries already acted on these Recommendations but no data are yet available to evaluate the effect of this last recommendation on stock status of white marlin.

The Committee does not expect to have enough new information to provide an assessment of the effect of these recent regulations until at least 2006.

WHM-6. Management recommendations

Management recommendations here are the same as those made in 2003. While there is substantial uncertainty in stock status and replacement yield, these uncertainties can only be addressed through research into habitat requirements of white marlins, studies on post-release survival rates of released fish, further verification of historical fishery data and validation, and development of models for abundance estimation and stock assessment. The Committee suggests that the Commission makes substantial investment on these research areas because the stock would benefit from a more accurate stock assessment.

The Committee suggests that the Commission take steps to make sure that the reductions in catch contemplated by the Commission are complied with and monitored so that proper evaluation of its benefits can be carried out in the future. The Committee therefore recommends continuing to improve observer programs so that better estimates of catch and dead discards of white marlin are obtained. In the absence of yet observing a population signal resulting from the most recent management measures, if the Commission wishes to improve the potential for increasing stock size of white marlin, future catches might be reduced beyond the level apparently intended by its most recent recommendations. However, the Commission should note that more definitive advice should be available after several years of data become available.

The Commission should consider that future evaluations of management measures relative to the recovery of the white marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of white marlin, and additional years of data are available. The Committee therefore suggests that the next white marlin assessment not be held before 2006.

ATLANTIC WHITE MARLIN SUMMARY[1]				
	Likely value	*Continuity case[2] estimate (80% conf. limit)*	*Retrospective adjusted estimate[3]*	*Range of sensitivity[4] estimates*
Maximum Sustainable Yield	Below 2000 Yield	964 t (849-1070)		323-1,320 t
2002 Yield	822 t	--		--
2003 Yield[5]	571 t	--		--
2001 Replacement Yield	Below 2000 Yield	222 t (101-416)	371 t	102-602 t
Relative Biomass (B_{2001}/B_{MSY})	<1 (Over-fished)	0.12 (0.06-0.25)	0.22	0.12-1.76
Relative Fishing Mortality (F_{2000}/F_{MSY})	>1 (Over-fishing)	8.28 (4.5-15.8)	5.05	0.80-10.30
Management Measures in Effect:	- In 2001 and 2002, PS and LL fisheries limit landings to 33% of max (1996, 1999) level. [Rec. 00-13], [Rec. 01-10] and [Rec. 02-13].			

[1] Assessment results are highly uncertain.
[2] The data used are not sufficiently informative to choose a "best case". For consistency, the continuity case presented here is based on data and assumptions that closely resemble the analyses made in 2000. Confidence limits from bootstrapping are conditional on this model-data set and thus may underestimate the real uncertainty.
[3] These results are for the continuity case except that they were adjusted for retrospective biases.
[4] The sensitivity analyses made were not chosen in a systematic way; the range is presented only for qualitative guidance.
[5] Reported Task I value for 2003, which is likely an underestimate of total catch.

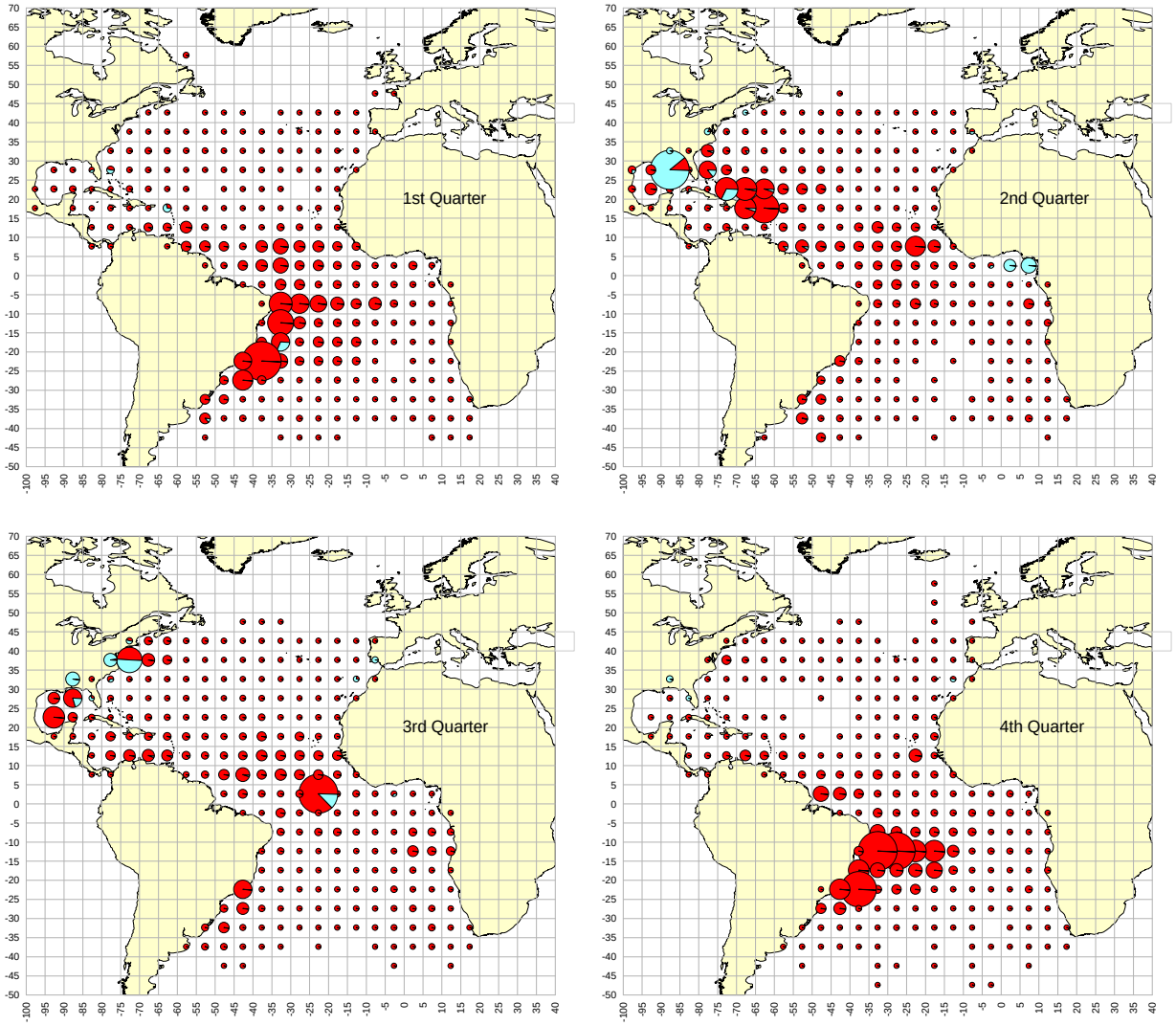
WHM-Table 1. Estimated catches (landinds and discards, t) of Atlantic white marlin by major area, gear and flag 1979-2003

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		TOTAL	1039	976	1241	1100	1772	1200	1727	1611	1491	1352	1805	1626	1589	1437	1523	1965	1577	1708	1094	1069	1025	935	642	822	571
		AT.N	482	521	750	605	1280	653	860	905	587	406	368	393	235	610	565	657	617	628	407	385	382	350	290	265	191
		AT.S	534	428	460	463	461	525	844	680	879	921	1409	1196	1343	817	946	1297	951	1073	676	676	634	579	351	557	381
		UNCL	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	8	7	1	0	0
Landings	AT.N	Longline	370	403	671	548	1196	570	788	812	433	167	234	251	105	466	436	528	451	514	316	333	301	282	247	209	163
		Other Surf.	0	0	0	0	0	0	0	0	0	24	0	0	4	3	4	12	5	2	3	13	18	0	7	17	10
		Sport	111	112	72	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6	1
		Unclass.	1	6	7	12	5	17	29	61	54	126	11	40	17	32	30	45	43	28	46	0	0	26	15	0	0
	AT.S	Longline	530	419	340	442	308	471	825	654	870	832	1333	1152	1320	803	923	1295	945	660	589	552	623	570	328	488	378
		Other Surf.	4	9	120	21	153	54	15	22	9	89	68	31	17	14	22	1	2	3	5	8	11	9	23	69	3
		Sport	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	0	0	0	0	0	0	0
		Unclass.	0	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	45	115	0	0	0	0	0
	UNCL	Longline	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
		Other Surf.	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	0	0
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29	16
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	117	11	39	17	24	29	26	43	15	41	33	25	25	0	0	--
		Brazil	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
		Canada	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	6	7	10	20	1	7	4	2
		Chinese Taipei	62	105	174	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	61	11
		Cuba	68	70	189	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7	--
		EC.España	0	0	0	0	0	9	14	0	0	61	12	4	8	18	15	25	10	75	71	65	88	118	43	4	19
		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	5
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	8	0
		Japan	42	99	118	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	14	11	21
		Korea, Republic of	16	18	49	12	6	18	147	37	2	2	82	39	1	9	4	23	3	7	2	0	0	0	0	0	--
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	8	0	5	6	11	18	44	15	15
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	0	0	0	0	0	--
		Panama	1	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	0	0	4	0	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	44
		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	2	5	--
		U.S.A.	110	116	78	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6	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	0
		UK.Bermuda	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
		Vemezuela	183	113	142	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	13	72	110	55
	AT.S	Argentina	0	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	0	0	0	0	0	0	--
		Belize (Observed by Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	--
		Brazil *	133	58	100	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	--
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	4	5	10	1	13	19	6
		Chinese Taipei	155	145	136	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	93
		Cuba	205	212	116	45	112	153	216	192	62	24	22	6	10	10	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	1	2	1	5	1	2	2	3
		EC.España	0	0	0	0	0	0	0	0	0	1	1	0	9	4	8	0	18	32	3	4	45	68	18	2	3
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	0	0

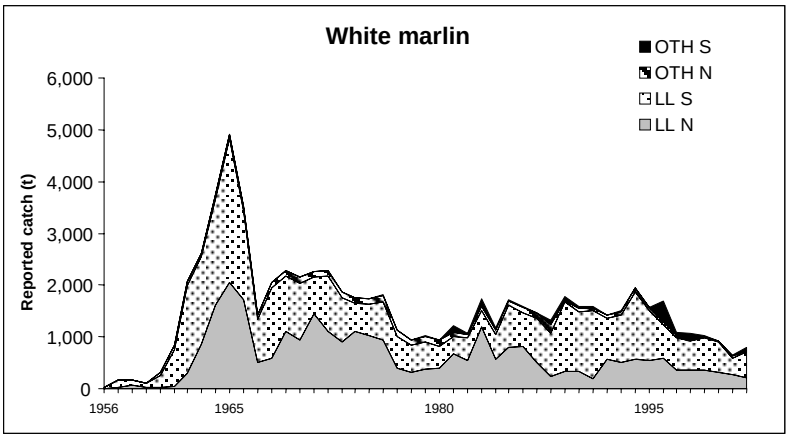
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		Ghana	0	6	45	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2	--
		Honduras (obs. by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		Japan	15	7	25	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	42	6	10
		Korea, Republic of	24	0	36	57	9	44	225	34	25	17	53	42	56	1	4	20	20	52	18	0	0	0	0	0	--
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	0	0	0	0	0	--
		Panama	2	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	0	1	8	0	0	0	0
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	--
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
		U.S.S.R.	0	0	1	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	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	0	0	0	0	--
	UNCL	EC-France + España	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	0	0
		Honduras (obs. by 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	--
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	--
Discards	AT.N	U.S.A.	0	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33	16
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	0	0
	UNCL	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	1	0	0

Dashes indicate that no report was received or estimate made

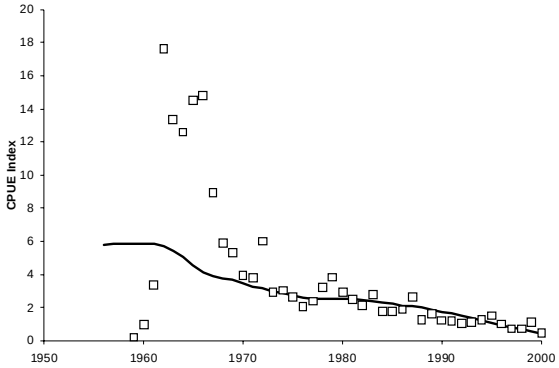
* Includes live discards.



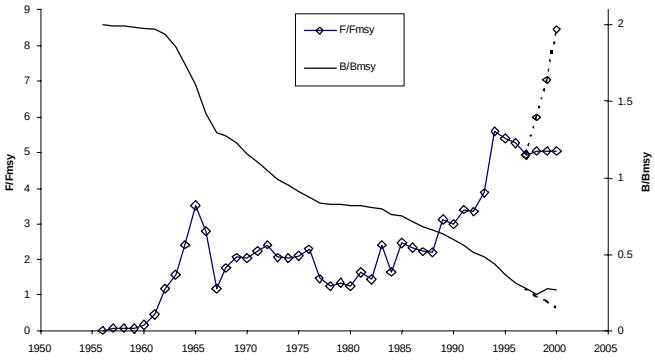
WHM- Figure 1. Geographical distributions of reported catches (landings+discards) of white marlin by quarter, combined for all years (1956-2000). Heavy- and light-shaded areas correspond to longline and other gears, respectively.



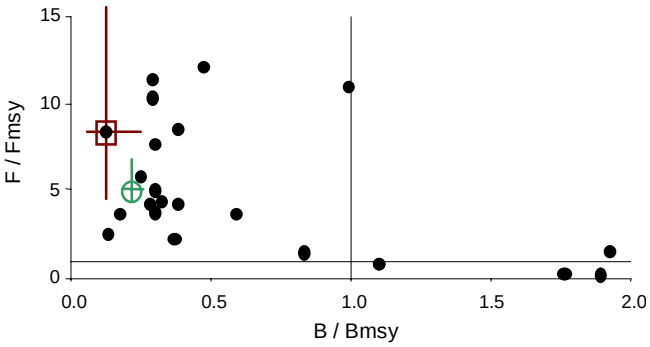
WHM-Figure 2. Reported catch of white marlin (Task I) for North and South Atlantic for longline (LL) gear and for all other gears (OTH) combined for the South (S) and North. (N) Atlantic. The 2003 catch reported to ICCAT is preliminary and is not included in the figure.



WHM-Figure 3. Fit of the ASPIC production model (line) to the continuity case for white marlin. Also shown the combined abundance index (symbols).



WHM-Figure 4. Estimated biomass ratio B_{2000}/B_{MSY} (solid line, no symbols) and fishing mortality ratio F_{2000}/F_{MSY} (solid line with symbols) from the production model fitted to the continuity case for white marlin. Ratios of last three years have been adjusted for retrospective pattern. Broken lines show unadjusted ratios. Note that scales are different for each ratio.



WHM-Figure 5. Summary of assessment results for continuity case and sensitivity runs. Plots of current fishing mortality ratio (F_{2000}/F_{MSY}) as a function of current biomass ratio (B_{2000}/B_{MSY}). Symbols represent continuity case unadjusted (square) and adjusted for retrospective patterns (empty circle). Solid lines represent bootstrap 80% confidence bounds. Broken lines represent ratios of one.

8.8 SAI - SAILFISH/SPEARFISH

No new sailfish or spearfish assessments were conducted in 2003.

SAI-1. Biology

Sailfish *(Istiophorus platypterus)* and longbill spearfish *(Tetrapturus pfluegeri)* have a pan-tropical distribution (**SAI-Figure 1**). Although sailfish have highest concentrations in coastal waters (more than any other istiophorid), they are still found in oceanic waters. Spearfish are most abundant in offshore waters. No transatlantic movements have been recorded, suggesting a lack of mixing between east and west. Although sailfish and spearfish are generally considered to be rare and solitary species relative to the schooling scombrids, sailfish are the most common Atlantic istiophorid and are known to occur along tropical coastal waters in small groups consisting of at least a dozen individuals. Spearfish are generally the rarest Atlantic istiophorid. The Mediterranean spearfish *(Tetrapturus belone)* is the most common istiophorid in the Mediterranean and is widely distributed within it, with the exclusion of the northern Adriatic Sea. The biology of this species appears quite similar to the other Atlantic species. Another species, shortbill spearfish *(Tetrapturus angustirostris)* has been recently reported in the Mediterranean, but its presence seems incidental.

Sailfish and spearfish are generally considered piscivorus, but also consume cephalopods. They are found predominately in the upper reaches of the water column and are caught as a by-catch of the offshore longline fisheries and as a directed catch of coastal fisheries. In coastal waters, artisanal fisheries use many types of shallow water gear to target sailfish.

Sailfish and spearfish are considered to be fast growing species compared to other teleosts. Female sailfish grow faster and reach a larger maximum size than males. Sailfish spawn in tropical and subtropical waters. Little is known about other aspects of spearfish life history.

Historically, ICCAT considered Atlantic sailfish/spearfish as separate eastern and western management units (**SAI-Figure 1**). This separation into two management units was based on the life history information on sailfish, the more abundant and more coastal of the two species. Data on morphology and tag release/recapture of sailfish suggests a lack of mixing between east and west. The Committee re-evaluated the stock structure of Atlantic sailfish based on the results of a genetic investigation submitted to the 2001 SCRS. The study failed to find differences, but this did not necessarily mean a lack of structure, as a very small exchange rate between east and west could produce these results. Therefore, the Committee determined that there was no basis for changing the current stock boundary at this time. However, this issue should be reviewed as more data become available.

SAI-2. Description of the fisheries

The fisheries in the West and East Atlantic for sailfish/spearfish are both characterized by participants from many different countries. For example, the recent major catches (landings plus dead discarded catch) of sailfish in both the West and East Atlantic result from the coastal fisheries. This view was reaffirmed to the Committee by a recent study on the catches of billfish made off West Africa. In the West Atlantic, the primary artisanal fisheries are from many countries in the Caribbean Sea, whereas in the East Atlantic major artisanal fisheries are off West Africa. Directed recreational fisheries for sailfish occur in the West Atlantic and the Caribbean Sea. Directed recreational fisheries for sailfish in the East Atlantic also exist off West Africa.

Catches of sailfish/spearfish for the total Atlantic which first developed in the early 1960s are presented in **SAI-Table 1** and **SAI-Figure 2,** respectively**.** The Committee continues to recognize that uncertainties in the catch data still persist, particularly in the East Atlantic and Caribbean Sea. However, new catch data are becoming available from some of these fisheries. The 2001-2003 catch data are preliminary, particularly because of the lack of reports from some of the fishing fleets that have historically landed large numbers of sailfish/spearfish **SAI-Table 1**. The reported catches of sailfish/spearfish (Task I) for 2003 are 1,310 t for the west and 416 t for the east. The overall trend in Atlantic catches is very much governed by the large catches from coastal fisheries off West Africa. Recently, catches from the west are larger than those from the east. However this may be partially due to recent lack of reporting from some of the coastal fisheries off West Africa that in the past had reported large catches. The Committee notes that some sailfish/spearfish are likely to have been caught by IUU fleets. Unfortunately there is no information on billfish equivalent to that available from market statistics for bigeye tuna or bluefin tuna that can be used to estimate IUU catches of billfish.

Recently, some large catches of unclassified billfish have been reported to the Committee. The 2001-2003 reported catch of unclassified billfish was 12% of the reported catch of all billfish. For some fisheries this percentage is much greater. The Committee recommends that every effort be made to report catches by species for all fisheries.

The 2001 SCRS decided to separate the combined catches of sailfish and spearfish, reported by the pelagic longliners, using the Japanese data (1994-2000), which reported these two species separately. Together with the information of previous studies, the ratio of these two species was calculated by quarter and by 5^{o}x5^{o} areas. Using these ratios, pelagic longline combined catch data were separated by two species. The catch of sailfish and spearfish thus estimated are given in **SAI-Table 2, SAI-Figure 3** and **SAI-Table 3, SAI-Figure 4**, respectively. Data for 2002 and 2003 only include information as reported by national fisheries, and were not estimated by the Committee.

The Committee felt that significant progress was achieved in the last assessment by separating the catches of these two species. The tentative catches of sailfish "only" (**SAI-Tables 2, SAI-Figure 3**) and spearfish "only" (**SAI-Table 3 and SAI-Figure 4**) show different historical trends than the composite catches. However, the work was carried out during the ICCAT Species Group session under a time constraint and should be considered preliminary until detailed evaluation of this process can be completed. Thus, the Committee felt it was premature to adopt these separated catch figures as official ICCAT estimates (i.e., Task I data).

Little is known about the spearfish fishery in the Mediterranean, because this species is a by-catch of some other fisheries (usually, the longline fishery, the driftnet fishery and, more rarely, the tuna traps) targeting large pelagic species. The traditional harpoon fishery, in the Strait of Messina, carries out the only targeted fishery. According to the information available, the catches of Mediterranean spearfish seem to be slowly growing in the last ten years, possibly due to the increasing interest of the markets, better reporting rates or increased availability of spearfish and may have reached 100 t in the year 2000. National reports of landings of Mediterranean spearfish are generally lacking but some catches have been specifically reported since 2002.

SAI-3. State of the stocks

All initial assessments of Atlantic sailfish were done on aggregate data on sailfish and spearfish obtained from the offshore longline fleets. The 1991 assessment for western Atlantic sailfish/spearfish (1992 SCRS) concluded that the composite stock was at least fully exploited and that fishing mortality had stabilized since the 1980s at around the level that would produce MSY. The 1994 assessment for the eastern Atlantic sailfish/spearfish stock (1995 SCRS) concluded that there were signs of over-fishing for this composite stock because estimated biomass was below the level that would produce MSY and estimated fishing mortality was greater than the level that would produce MSY. Both of these assessments had considerable uncertainties especially because of the inability of separating spearfish and sailfish catches from the offshore longline fleets and because of the limited number of reliable abundance indices for the early part of the history of the fishery and for the coastal eastern Atlantic fisheries.

The last assessments were conducted in 2001 for the eastern and western Atlantic sailfish stocks based on sailfish/spearfish composite catches (**SAI-Table 1**) and sailfish "only" catches (**SAI-Table 2)** for the period 1956-2000. The assessments tried to address the shortcomings of the previous assessments by improving the list of abundance indices and by separating the catch of sailfish from that of spearfish in the offshore longline fleets. Considerable progress was made on obtaining new or more reliable abundance indices. The new separation of sailfish/spearfish allowed assessments to be attempted on sailfish "only" data. However, considerable uncertainties remain relating to both catches and catch rates that can only be addressed by substantial research investment in historical data validation and in investigations of the habitat requirements of sailfish.

All quantitative assessment models used in 2001 produced unsatisfactory fits. The biomass dynamic models were unable to satisfactorily explain the observed patterns in the abundance indices and catch. It will be necessary to apply population models that can better account for these dynamics in order to provide improved assessment advice.

At present, abundance indices represent the most reliable information and indication of changes in biomass for the stocks of sailfish "only" or sailfish/spearfish. Abundance indices for the eastern stock may be less reliable

than those for the western stock. The differences in the indices between the early and later part of the fishery should not be ignored and should be considered to represent an indication of a decrease in the size of these stocks.

For the western Atlantic stock recent catch levels for sailfish/spearfish combined seem sustainable because over the last two decades both CPUE and catch have remained relatively constant (**SAI-Figures 2 and 5**). For the combined sailfish/spearfish western stock, it is not known whether the current catch level is below, or at maximum sustainable yield. For this same stock, tentative catches of sailfish "only" have averaged about 700 t over the past two decades and the abundance indices have remained relatively stable for the same period (**SAI-Figures 3 and 5**). New analyses do not provide any information on the MSY or other stock benchmarks for the western Atlantic composite or sailfish "only" stock.

In the eastern Atlantic, abundance indices (**SAI-Figure 6)** for sailfish "only" from coastal fisheries have decreased over recent times and so have total estimated tentative catches of sailfish "only" (**SAI-Figure 3)**. In contrast, abundance indices for the Japanese longline fishery **(SAI-Figure 6)** have been rather constant since the mid-1970s but there is concern on the status of this stock, because of the decreases in abundance indices and estimated catches from coastal fisheries.

In summary, although the 2001 attempts at quantitatively assessing the status of these two stocks (eastern and western sailfish) proved to be unsatisfactory, there are 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.

No assessments have ever been conducted on longbill or Mediterranean spearfish because of the lack of reliable catch or abundance index data.

SAI-4. Outlook

The SCRS noted that the methods for splitting sailfish/spearfish in the offshore longline catches are tentative and are subject to other possible methods in future analyses. Therefore, the results could change in the future. Based on the methods applied and considering these limitations, 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.

For the western sailfish stock, CPUE was highest in the late 1960s and decreased to lower levels by about 1980, after which CPUE remained relatively stable. Over the past two decades, the estimated catch of western sailfish has averaged about 700 t per year **(SAI-Table 2)**. From these observations, the Committee considers that the current catch level is sustainable.

For the eastern Atlantic sailfish, recent reported catches have been in decline, as have the available coastal abundance indices **(SAI-Figure 3)**. These patterns could suggest possible further decreases in biomass that, if unchecked, could result in the need for increasingly stringent management actions in the future.

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 2003. 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 West Atlantic sailfish "only" catches should not exceed current levels. For the East Atlantic, sailfish "only" 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 catches, particularly for the most recent years, the lack of sufficient reports by species, and evaluations of the new methods used to split the sailfish and spearfish catch and to index abundance. The Committee recommends all countries landing sailfish/spearfish or having dead discards, report these data to the ICCAT Secretariat. The Committee should consider the possibility of a spearfish "only" assessment in the future.

ATLANTIC SAILFISH "ONLY" SUMMARY

	West Atlantic	**East Atlantic**
Maximum Sustainable Yield (MSY)	Not estimated	Not estimated
Recent Yield (2000)[1]	506 t[2]	969 t[2]
2000 Replacement Yield	~ 600 t	Not estimated
Management Measures in Effect	None	None

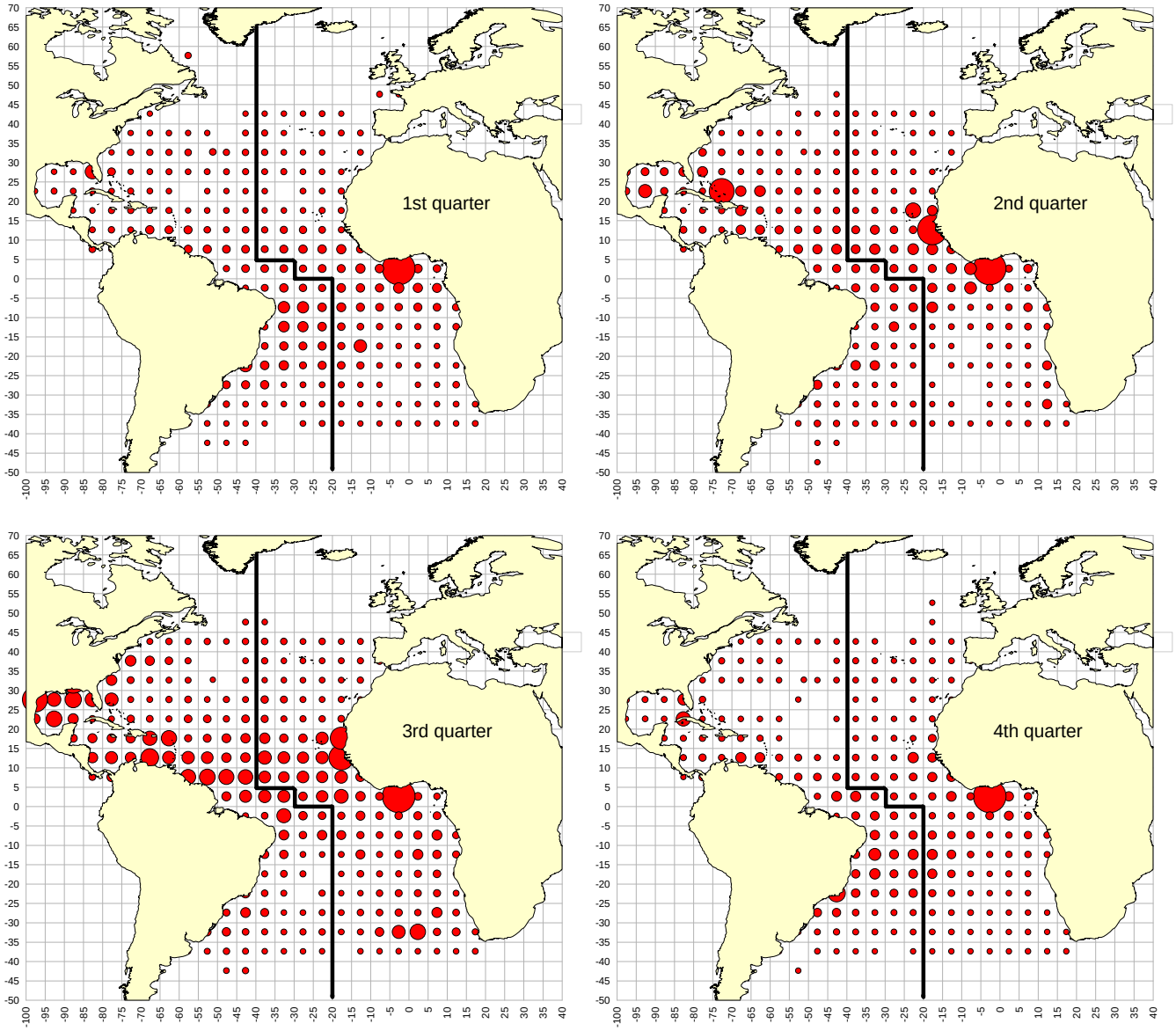
[1] Estimated yield includes that carried over from previous years.
[2] Recent yield (2000) was estimated during the 2001 sailfish assessment. To estimate the 2001, 2002 and 2003 yield, catches of sailfish and spearfish would have to be separated. A separation similar to the one conducted in the 2001 assessment has not yet been conducted.

SAI-Table 1. Estimated catches (landinds and discards, t) of Atlantic sailfish and spearfish (*T. Plfluegeri + T. Belone*) tuna by major area, gear and flag 1979-2003

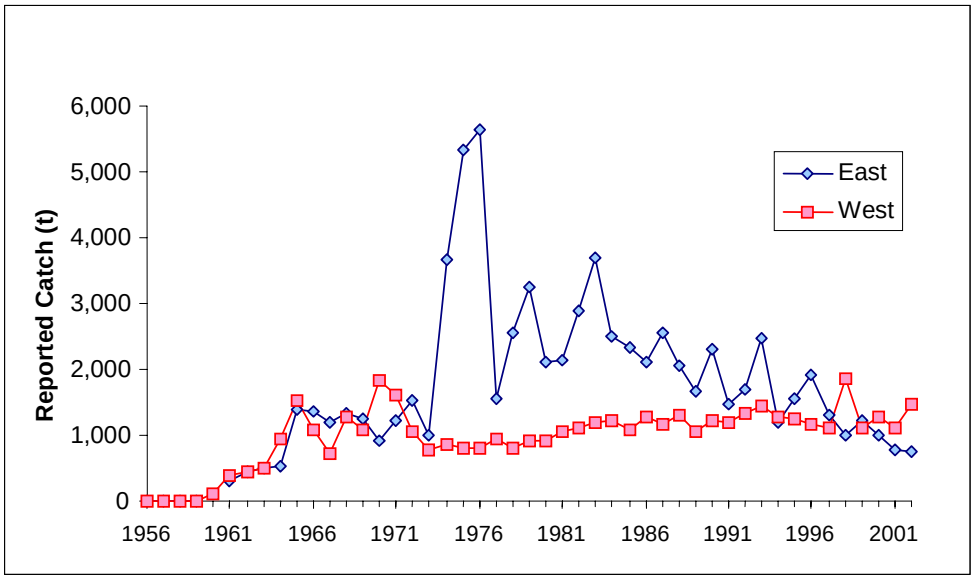
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		TOTAL SAI+SPF+MSP	*4394*	*3276*	*3503*	*4321*	*5195*	*3935*	*3649*	*3692*	*4059*	*3624*	*3006*	*3914*	*2785*	*3137*	*4108*	*2608*	*2932*	*3182*	*2499*	*2976*	*2501*	*2487*	*2015*	*2794*	*1835*
		Total SAI	*4159*	*3006*	*3187*	*3995*	*4883*	*3713*	*3421*	*3386*	*3737*	*3358*	*2729*	*3540*	*2678*	*3045*	*3923*	*2471*	*2815*	*3089*	*2399*	*2856*	*2324*	*2296*	*1901*	*2665*	*1645*
		TOTAL SPF	*235*	*270*	*316*	*326*	*312*	*222*	*228*	*306*	*322*	*266*	*277*	*374*	*107*	*92*	*185*	*136*	*117*	*93*	*100*	*120*	*177*	*192*	*114*	*79*	*87*
		TOTAL MSP	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*104*
SAI		AT.E	3256	2099	2131	2876	3687	2492	2328	2105	2566	2064	1664	2314	1482	1706	2473	1206	1559	1927	1292	995	1209	1004	777	950	402
		AT.W	903	907	1056	1119	1196	1221	1093	1281	1171	1294	1065	1225	1197	1339	1450	1265	1256	1162	1107	1860	1115	1291	1122	1685	1237
		UNCL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	5
Landings	AT.E	Longline	83	151	202	309	270	224	148	140	112	126	152	153	57	51	523	178	240	164	213	198	265	165	159	349	278
		Other Surf.	3066	1623	1432	1999	2911	2107	1940	1394	1870	1401	1067	1143	734	717	1040	718	657	596	385	535	537	433	618	600	124
		Sport	107	325	497	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407	0	0	0
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	184	200	77	83	75	636	139	0	0	0	0	0	0
	AT.W	Longline	378	360	408	471	320	512	506	489	451	558	417	382	241	371	657	552	386	346	226	1031	452	766	801	1264	848
		Other Surf.	84	97	0	95	50	53	68	43	45	54	44	224	72	156	131	196	224	362	282	349	245	205	64	88	94
		Sport	350	368	561	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103	53
		Unclass.	91	82	87	78	91	120	206	252	142	154	194	290	449	443	367	272	260	145	182	176	174	189	189	222	238
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	5
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	AT.E	Belize (Obs.by Sta. Hele	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	0	0	36	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	0	0	--
		Cape Verde	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		China, People's Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	5	9	4	5	11	4
		Chinese Taipei	19	5	12	67	20	8	9	1	0	0	7	13	0	0	420	101	155	65	150	117	178	120	0	124	73
		Cuba	40	79	79	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533	0	0	0	0	0	0	--
		Côte D'Ivoire	0	0	0	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121
		EC-France + España	375	432	504	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98	0	0	0
		EC.España	0	0	0	10	0	4	7	9	0	28	14	0	9	2	30	7	13	25	26	18	19	8	148	188	183
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	11	3	8	7
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	7	0	0	0	1	0	0
		Ghana	2691	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529	--
		Japan	19	33	50	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	17	13
		Korea, Republic of	5	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	0	0	0	0	0	--
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	15	10	10	10	0	0	0	0	0	--
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0	0	--
		Senegal	107	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	0	0	0
		St. Vincent and Grenadir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	3	1	0	0	0	0	0	0	0
		U.S.S.R.	0	0	37	0	0	0	0	2	5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	AT.W	Aruba	30	30	30	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10	0	0	--
		Barbados	0	0	0	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44	0	0	--
		Brazil	201	231	64	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	598	412	547	585
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	9	4	3	1	0
		Chinese Taipei	18	36	81	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22	0	70	26
		Cuba	151	119	134	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	0	0	0	0	0	0	--
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		Dominican Republic	0	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	0	0	--
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	6	7	5	3	36	3	15	20	6	14	277	471	196
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2	12
		Grenada	40	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171
		Japan	20	22	44	135	22	34	38	28	6	22	22	25	73	1	2	8	2	4	17	3	10	8	3	3	7
		Korea, Republic of	19	51	41	19	0	52	72	14	1	0	17	25	0	3	0	8	8	22	8	0	0	0	0	0	--
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	19	0	9	646	40	118	36	34	45
		NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	30	30	0	0	0	0	0	--
		Netherlands Antilles	21	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	0	0	--
		Panama	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
		St. Vincent and Grenadir	0	0	0	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	0	0	131	3
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Trinidad and Tobago	0	0	0	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	0	4	3	7	6	--
		U.S.A.	308	308	533	452	734	495	282	462	454	451	324	242	343	294	202	179	345	231	349	267	163	76	58	103	53
		Venezuela	93	58	72	57	119	81	81	77	80	22	24	24	65	71	206	162	103	165	185	258	179	93	126	159	133
	UNCL	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	5
		St. Vincent and Grenadir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	0
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5
	UNCL	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			1979	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
SPF		TOTAL	235	270	316	326	312	222	228	306	322	266	277	374	107	92	185	136	117	93	100	120	177	192	114	79	87
		AT.E	235	270	316	326	312	222	228	252	247	256	270	373	107	92	120	134	107	85	99	111	144	103	28	21	14
		AT.W	0	0	0	0	0	0	0	54	75	10	7	1	0	0	65	2	10	8	1	9	33	89	86	58	73
Landings	AT.E	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	36	29	26	31	25	63	43	28	21	14
		Other Surf.	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60	0	0	0
	AT.W	Longline	0	0	0	0	0	0	0	54	75	10	7	1	0	0	65	2	4	5	1	9	33	89	86	58	73
		Sport	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
		Unclass.	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
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0
Landings	AT.E	China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
		EC-France + España	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60	0	0	0
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	3	1	1	1	30	14	8	7	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
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	26	25	30	22	33	29	20	14	14
	AT.W	Brazil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	56	39	3
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	22	50	22	5	25
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	1	8	11	11	3	14	41
		Mexico	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
		Trinidad and Tobago	0	0	0	0	0	0	0	54	75	10	7	1	0	0	62	0	0	0	0	0	0	0	0	0	--
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	4	0	3
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	0	0
MSP		TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	104
Landing	Medi	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		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	50	103
		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

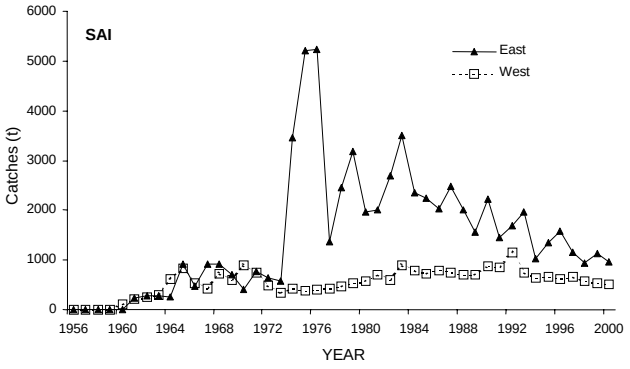
Dashes indicate that no report was received or estimate made



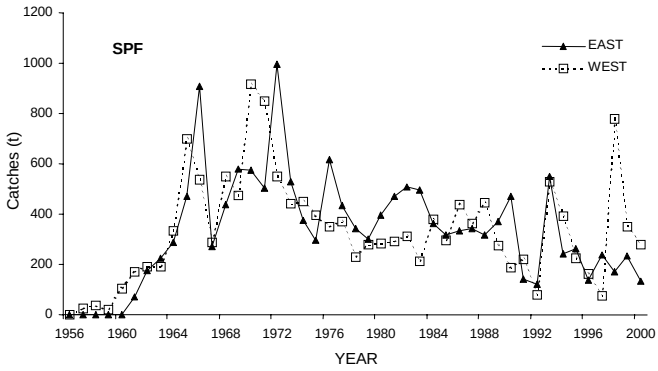
SAI-Fig.1. Geographic distributions of sailfish/spearfish catches, by quarter, combined for all years 1950-2000. The vertical lines indicate the east/west limit that separates the sailfish stocks.



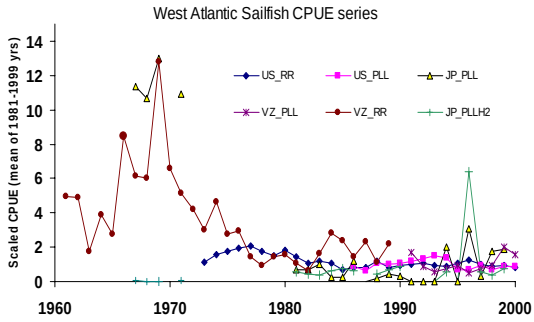
SAI-Fig. 2. Evolution of estimated sailfish/spearfish catches in the Atlantic (landings and dead discards, reported and carried over) in the ICCAT Task I database during 1956-2002 for the east and west stocks. The 2003 catch reported to ICCAT is preliminary and is not included in this figure.

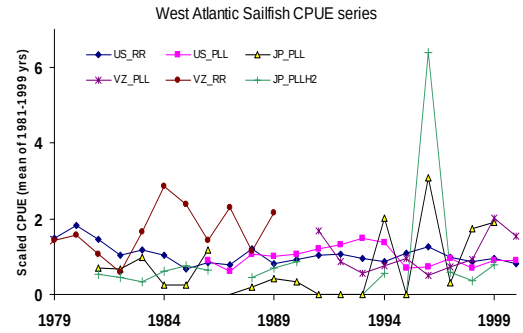


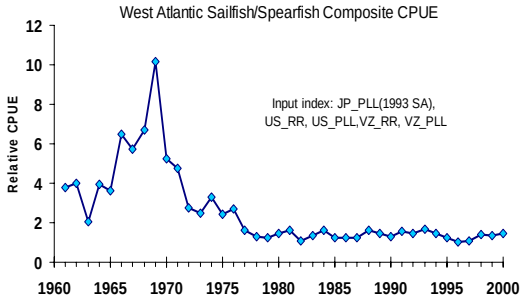
SAI-Fig. 3. Estimated sailfish "only" catches based on the new procedure for splitting combined SAI/SPF catches from 1956-2000.



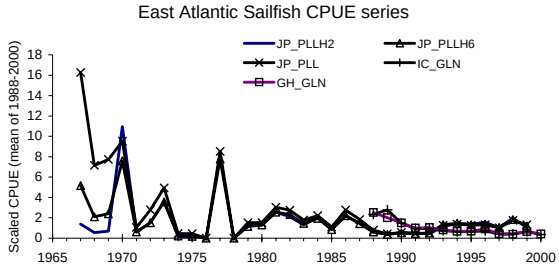
SAI-Fig. 4. Estimated spearfish "only" catches in the Atlantic based on the new procedure for splitting combined SAI/SPF catches from 1956-2000.

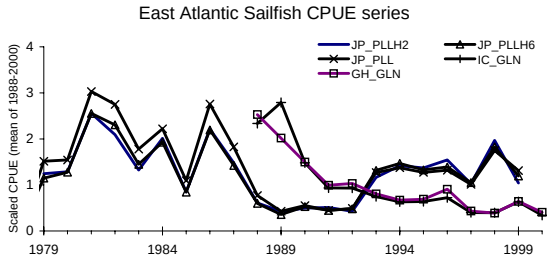






SAI-Fig 5. Available standardized CPUE for western Atlantic sailfish for the periods 1967-2000 (upper), and for the period 1979-2000 (middle). The time series represented are from two different standardization treatments for the Japanese longline data (JP_PLL and JP_PLLH2), as well from the Venezuelan recreational (VZ_RR) and longline fisheries (VZ_PLL), and the United States recreational (US_RR) and longline (US_PLL) fisheries. The bottom plate represents a sailfish/spearfish composite CPUE series that included the Japanese, United States and Venezuela time series.





SAI-Fig 6. Available standardized catch rates for eastern Atlantic sailfish for the period 1967-2000 (upper) and for the period 1979-2000 (lower). The time series represented are from three different standardized treatments of the Japanese longline data (JP_PLLH2, JP_PLL, and JP_PLLH6), as well from the Ghanaian gillnet (GH_GLN) and Côte d'Ivoire gillnet (IC_GLN).

8.9 SWO-ATL-ATLANTIC SWORDFISH

No new assessment was conducted in 2003 or 2004. The most recent assessment was in 2002, at which catch and effort through 2001 were considered.

SWO-ATL-1. Biology

Swordfish are distributed widely in the Atlantic Ocean and Mediterranean Sea, and range from Canada to Argentina on the western side, and from Norway to South Africa on the eastern side **(SWO-Figure 1)**. The management units for assessment purposes are a separate Mediterranean group, and North and South Atlantic groups. These stock units are generally supported by recent genetic analyses. However, the precise boundaries between stocks are uncertain, and mixing is expected to be high in the boundary zones. Therefore there is uncertainty as to how closely the management units used correspond to the biological stock units. Hence, it is important to have effective management measures throughout the Atlantic and Mediterranean.

Swordfish are characterized by having dimorphic growth, where females show faster growth rates and attain larger sizes than males. Young swordfish grow very rapidly, reaching about 130 cm LJFL (lower jaw-fork length) by age 2. Swordfish are difficult to age, but 53% of females are considered mature by age 5, at a length of about 180 cm. Known spawning areas are located in the warm tropical and subtropical waters, where swordfish spawns throughout the year in different localized areas displaying a regular seasonal pattern.

These large pelagic fishes feed on a wide variety of prey including groundfish, pelagics, deep-water fish and cephalopods. It is believed that swordfish feed throughout the water column and show extensive diel migration. Swordfish are typically caught on pelagic longlines at night when they feed in surface waters. They are found in the colder waters during summer months in either hemisphere and all year in the subtropical and tropical areas.

SWO-ATL-2. Description of the fisheries

Directed longline fisheries from EC-Spain, the United States and Canada have operated since the late 1950s or early 1960s, and harpoon fisheries have existed 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 in their tuna fisheries.

As a result of ICCAT and domestic regulatory recommendations, there are three recent developments in the fisheries of some nations: (1) Starting in February 2000 and ending in December 2003, Japanese vessels fishing in the North Atlantic were required to discard all swordfish as the Japanese block quota had been reached; (2) For 2001 and thereafter, U.S. pelagic longline fishing was prohibited or restricted in five areas and times to reduce incidental catches including juvenile swordfish; and (3) The Canadian directed swordfish longline fishery has finished at the end of August from 1999-2000 due to reduced quota. The season was extended to November in 2002 and 2003 due to the introduction of an Individual Transferable Quota system, which remained in place for 2003. A further change in the fishery has resulted from changes in technology, i.e., there has been a change in the type or style of longline gear used by many European longline vessels that have gone from the traditional multifilament to monofilament gear. One concern of all these developments is the effect on the data available, its continuity and complexity and therefore its interpretation.

The SCRS scientists believe that ICCAT Task I landings data provide minimum estimates because of unreported catch of swordfish made in association with illegal, unreported and unregulated (IUU) fishing activities. However, the amount of NEI swordfish catch by IUU vessels has not been estimated.

Total Atlantic. The total Atlantic estimated catch of swordfish (North and South, including discards) reached an historical high of 38,624 t in 1995, 13% higher than the previous peak catch of 34,098 t in 1989 **(SWO-Table 1** and **SWO-Figure 2**). The 2003 reported catch was 21,868 t. A substantial number of countries have reported their 2003 catches, however because of unknown IUU catches and the preliminary nature of these reports, this value should be considered provisional and subject to revision.

North Atlantic. For the past decade, the North Atlantic estimated catch (landings plus discards) has averaged about 12,600 t **(SWO-Table 1** and **SWO-Figure 2)**, although the 2003 landings plus discards were reduced to 11,028 t in response to ICCAT regulatory Recommendations. In 2003, there has been a 46% decrease in reported catches (including discards) 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 the United States, EC-Spain, EC-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates for swordfish.

South Atlantic. The South Atlantic estimated catch (landings plus discards) was relatively low (generally less than 5,000 t) before 1980. Since then, landings increased continuously through the 1980s and the early 1990s to a peak of 21,780 t in 1995 (levels that match the peak of North Atlantic harvest). The 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. Then the estimated landings decreased to 13,835 t by 1998 (36% reduction). The reduction in catch following the peak in 1995 was in response to the regulations, and partly due to a shift to other oceans and to a shift in target species. In 2002, the 13,946 t reported catches were somewhat lower than the 2001 level. The reported 2003 catch is 10,919 t, but should be considered provisional and probably an underestimate.

Discards. Only the U.S. (1991-2003), Canada (1997-2003), and Japan (2000-2003) report positive estimates of dead discards. Japan (2000) also reported live releases. EC-Spain reports zero dead discards. Both the U.S. and Canada used scientific observer data to estimate dead discards. The Japanese estimates in 2000-2003 are based on radio reports and logbooks.

SWO-ATL-3. State of the Stocks

No new assessment was conducted in 2003 or 2004; the most recent assessment of North and South Atlantic swordfish stocks was conducted in 2002. In that assessment, updated CPUE and catch data through 2001 were examined. Sex and age-specific (North Atlantic) and biomass standardized catch rates (North and South Atlantic) from the various fleets were updated. The updated North Atlantic CPUE data showed similar trends to previous years, and also showed signs of improvement in stock status since 1998. In particular, the recruitment index (1997-2001) and the catch at age used in the 2002 North Atlantic assessment showed signs of substantially improved recruitment (age 1), which has manifested in several age classes and the biomass index. The updated recruitment index also showed a high value in 1999 and 2000. These improvements in recruitment already manifested in several age classes and in the biomass index of some fisheries, and have allowed for increases in spawning biomass and a more optimistic outlook. The CPUE patterns in the South Atlantic by fleet showed contradictory patterns. Lack of important CPUE information from some fleets fishing in the South Atlantic prevented the Committee from reconciling these conflicts.

North Atlantic

In 2002, the status of the North Atlantic swordfish resource was again assessed using both non-equilibrium stock production models and sequential population analyses (SPA) based on catch **(SWO-Table 1)** and CPUE data through 2001. The current Base Case assessment indicated that the North Atlantic swordfish biomass had improved due to strong recruitment since 1997 (1996 year-class), combined with recent reductions in reported catch, especially compared to the peak catch values of 1987 **(SWO-Figure 3).** In particular, strong recruitment since 1997 manifested in several age classes and was evident in the catch rates from several fleets. The strong recruitments of the late 1990s promoted improvement in spawning stock biomass and should result in further improvement, if these year-classes are not heavily harvested. The pattern of decline in stock size followed by stabilization and rebuilding was reflected in the CPUEs for several fisheries. An updated estimate of maximum sustainable yield from production model analyses is 14,340 t (with estimates ranging from 11,500 to 15,500 t). Since 1997, North Atlantic swordfish catches have been below 14,340 t **(SWO-Figure 4)**; preliminary estimates (reported plus carried over) of catches in 2001, 2002, and 2003 were about 9,980, 9,550, and 11,020 t, but the most recent years are provisional and probably underestimates.

The biomass at the beginning of 2002 was estimated to be 94% (range: 75 to 124%) of the biomass needed to produce MSY. The 2001 fishing mortality rate was estimated to be 0.75 times the fishing mortality rate at MSY (range: 0.54 to 1.06). The replacement yield for the year 2003 was estimated to be about the MSY level. As the

TAC for North Atlantic swordfish for 2002 was 10,400 t, it was considered likely that biomass would increase further under those catch levels. The TAC set for 2003-2005 is 14,000 t [Rec. 02-02].

Overall, the sequential population analysis conducted for North Atlantic swordfish in 2002 was consistent with the stock production model results, particularly in terms of the trends in population trajectories. The SPA point estimates for age 1 gradually increased in the early 1980s, shifting to a somewhat higher level from 1985 to 1989 **(SWO-Figure 5)**. Subsequently, the abundance of age 1 shifted back to a lower level between 1990 and 1996 and then increased to the highest levels of the time series in 1999 and 2000. The trends for ages 2, 3 and 4 are similar with the appropriate time lags, but the pattern is less pronounced. The estimated abundance of older (5+) fish declined to about one-third of the numbers in 1978, but increased somewhat after 1998. The estimated fishing mortality rate generally increased for all ages until 1996, after which they decreased sharply. The fishing mortality rate during the last three years averaged about 0.38/year for age 5+. Given this fishing mortality pattern, the spawning biomass likely will increase to a level exceeding 30% of the maximum at equilibrium, largely owing to the very large recruitments estimated for 1997-2000.

South Atlantic

The Committee noted that reported total catches have been reduced since 1995, as was recommended by the SCRS. Previously the Committee expressed serious concern about the trends in stock biomass of South Atlantic swordfish based on the pattern of rapid increases in catch before 1995 that could result in rapid stock depletion, and in declining CPUE trends of some by-catch fisheries.

Standardized CPUE series were available for three fleets, the targeted fishery of EC-Spain, and the by-catch fisheries of Chinese Taipei and Japan **(SWO-Figure 6)**. There was considerable conflict in trends among the three CPUE series and it is unclear which, if any, of the series tracks total biomass. It was noted that there was little overlap in fishing area among the three fleets, and that the three CPUE trends could track different components (or cohorts) of the population. To address this possibility, an age-structured production model was run as a sensitivity test. For the base case production model, the Committee selected the by-catch CPUE series combined using a simple unweighted mean and the targeted CPUE series.

Due to some inconsistencies in the available CPUE trends reliable stock assessment results could not be obtained.

SWO-ATL-4. Outlook

North Atlantic

For the North Atlantic swordfish stock, the Base Case surplus production model showed that the swordfish biomass had increased from the 1997 low and the 2002 biomass is estimated to be near the level that would produce maximum sustainable yield due to strong recruitment and lower catches during this period. If total catch from 2003 and beyond, including discards and overages, was less than MSY, there would be a greater than 50% chance that the population would reach B_{MSY} within the recovery program plan time-frame agreed by the Commission. Lower catches or high recruitments would both enhance the probability of achieving the recovery plan goal **(SWO-Figure 7)**.

The high recruitment levels observed in recent years (age 1 in 1997-2001) have resulted in a more optimistic outlook than previous projections since the recent year-classes were not heavily harvested. The updated indices examined in 2002 and 2003 confirmed that a positive effect of this strong recruitment has manifested in older ages and in the biomass indices of several fisheries. Given that recent (2002-2003) reported catch has been below estimated replacement yield, the north Atlantic swordfish biomass may have already achieved the B_{MSY} level.

South Atlantic

Given the history of expansion of the longline fisheries and the apparent stability in at least one target fishery, the Committee recommends that catch should remain at about the same level of the past few years before the assessment to maintain the stock at about the then current abundance.

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 2003 (**Table 1**, see footnote).

Canada, Chinese Taipei, Japan, South Africa, EC-Spain, 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 were about 9,000 t and the estimated discards were about 600 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 10,600 t and the estimated discards were about 460 t. Reports for year 2003 are considered provisional and subject to change.

The total allowable catch in the South Atlantic in 2002 was 14,620 t. The reported landings for 2002 were about 13,660 t and reported discards were 1 t. The total allowable catch in the South Atlantic in 2003 was 15,631 t. The reported landings for 2003 were about 10,900 t and reported discards were <1 t. Reports for year 2003 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 2003.

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 has been at a high level in recent years.

Other implications

The Committee expressed concern about the uncertainties of the stock structure of Atlantic swordfish and the possibility that these assumed stocks do not exactly reflect the geographical distribution of the respective stocks.

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.

For 2001 and thereafter, the United States introduced time and area closures in the North Atlantic to protect small swordfish and other species caught incidentally by longline. These closures have reduced the catches attributed to the United States, and may also have redistributed the fleet. These concerns were reiterated upon examination of the results of updated (though 2003) CPUE analysis from the US fleet. The effects on the CPUE data are unknown, although analyses conducted to examine this impact did not reveal a measurable effect on catch rates in 2001.

SWO-ATL-6. Management recommendations

North Atlantic

Since the assessment in 1999, the Committee has noted to the Commission that there has been high recruitment since 1997, and the 2001 data were consistent with this observation (1996-2000 cohorts). It should be noted that this high recruitment is now being observed in several fisheries, and has manifested in several age classes. This high recruitment, in combination with the actions the Commission has taken to reduce catch, has resulted in an increase in the North Atlantic stock size. Based on the results of the 2002 assessment taking into account this recent high recruitment, if the Commission desires to rebuild the North Atlantic swordfish stock to biomass levels that would support MSY levels within 10 years (through 2009) with a probability of slightly greater than 50%, then the catch (including discards) could be maintained at 14,000 t for 2003-2009. At 15,000 t the stock trajectory declines. The Committee noted that positive signs in recent recruitment may be in part due to environmental influence, and it is unknown if this influence will be positive or negative in the future. Additionally, the current regulations can produce difficulties in estimation of CPUE trends for some fleets. Noting the uncertainties inherent in the assessment, the Committee warned against large catch increases over the current TAC. Moderate catch increases (e.g., to levels below the estimated MSY) would not only guard against potential biases in the assessment, but would also provide stability for the stock and fisheries.

South Atlantic

There is considerable uncertainty in the data for the south Atlantic assessment. So much so, that the contradictory CPUE trends from the target and by-catch fisheries caused no reliable result from the base case production model and therefore reliable estimates of MSY and biomass trends could not be calculated. On the one hand, the recent trend for the target CPUE was very stable; on the other hand, the signal from the by-catch fisheries showed a sharp decline in recent years. The Committee was unable to determine which is indicative of South Atlantic swordfish stock abundance. Lack of information from some of important South Atlantic fishing fleets prevents the Committee from reconciling these conflicts.

The Committee noted that there had been considerable expansion of the fleets and charter activities targeting swordfish in the South Atlantic since the implementation of catch limit regulatory recommendations, and remains concerned that CPUE data from these new fishing activities were not made available. However, this history of expansion of the fishery is consistent with the stable CPUE for the target fishery considered by the stock assessment session. Given this evolution of the fishery, and the apparent stability in at least one target fishery as a result of recent catch reductions, the Committee recommends that catch should remain at about the same level of the past few years (14-15,000 t). More quantitative and reliable advice is unlikely to be achieved in the absence of CPUE data from some of the major fleets fishing in the South Atlantic.

ATLANTIC SWORDFISH SUMMARY

	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,340 t (11,580-15,530)[4]	Not estimated
Current (2003) Yield[2]	11,028 t	10,919 t
Current (2002) Replacement Yield[3]	about MSY	Not estimated
Relative Biomass (B_{2002}/B_{MSY})	0.94 (0.75 - 1.24)	Not estimated
Relative Fishing Mortality		
F_{2001}/F_{MSY}[1]	0.75 (0.54 - 1.06)	Not estimated
F_{2000}/F_{max}	1.08	Not estimated
$F_{2000}/F_{0.1}$	2.05	Not estimated
$F_{2000}/F_{30\%SPR}$	2.01	Not estimated
Management Measures in Effect	Country-specific TACs [Rec. 02-02]; 125/119 cm LJFL minimum size.	TAC target [Ref. 02-03]; 125/119 cm LJFL minimum size [Rec. 02-02].

[1] Base Case production model results based on catch data 1950-2001.
[2] Provisional and subject to revision, see footnote on SWO-ATL-Table 1.
[3] For next fishing year.
[4] 80% confidence intervals are shown.

SWO-ATL -Table 1. Estimated catches (landinds and discards, t) of Atlantic swordfish by major area, gear and flag 1979-2003

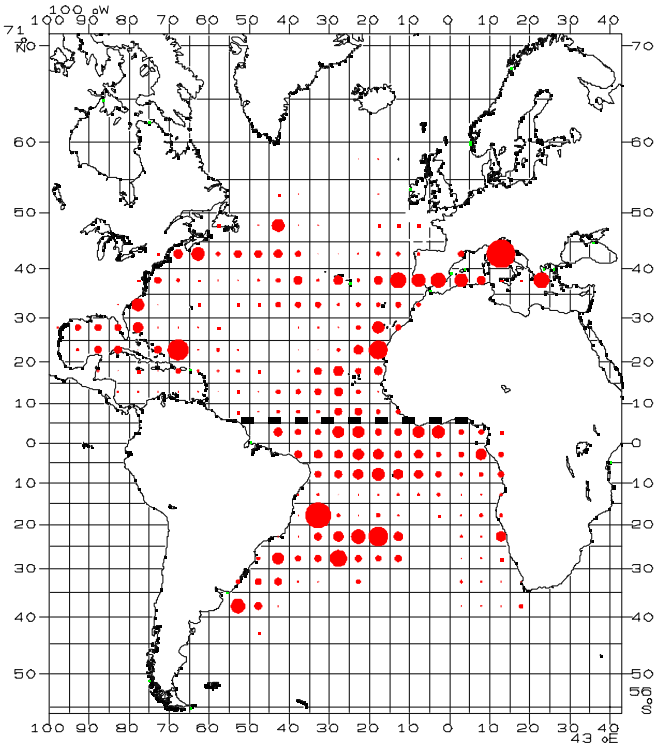
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
TOTAL ATLANTIC			15231	18881	15155	19662	19929	21930	23969	24380	26266	32469	34098	32796	28647	29027	32659	35104	38624	33324	31432	26031	26897	26932	24889	23445	21946
		AT.N	11937	13558	11180	13215	14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16717	15475	16844	15172	12997	12195	11590	11424	9985	9552	11028
		AT.S *	3294	5323	3975	6447	5402	9139	9586	5894	6030	12956	16848	17124	13713	13633	15942	19629	21780	18152	18435	13835	15306	15508	14868	13893	10919
		UNCL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	0
Landings	AT.N	Longline	11177	12831	10549	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8401	8632	9928
		Other Surf.	760	727	631	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	687	385	642
	AT.S	Longline	3265	5179	3938	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13649	14752	15348	14161	13495	10860
		Other Surf.	29	144	37	103	95	219	723	943	584	552	450	419	426	460	395	2264	974	352	175	176	548	158	706	398	59
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	1122	892	527	454
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	4
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0
Landings	AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10	10
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0
		Canada	2970	1885	561	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285
		China, P. R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316
		Chinese Taipei	338	134	182	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257 **
		Cuba	128	278	227	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	--
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
		EC.España	2582	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586
		EC.France	0	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	0
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12
		EC.Poland	0	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.Portugal	29	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0	--
		France - St. Pierre et Miq.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	3
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	--
		Grenada	0	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	--
		Japan	542	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0
		Korea, Republic of	303	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	--
		Liberia	0	5	38	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	0	--
		Maroc	208	136	124	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32
		NEI	0	0	12	0	0	0	0	14	3	207	302	714	43	35	111	0	0	0	0	0	0	0	0	0	--
		Panama	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	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	0	1	4	44
		Senegal	0	0	0	0	0	0	0	0	0	0	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	--
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	--
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	0	0	7
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		Trinidad and Tobago	0	0	0	0	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92	--
		U.S.A.	4619	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2524
		U.S.S.R.	10	21	0	69	0	16	13	18	4	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	1	5	5	3	3	2	0	0
		Venezuela	182	192	24	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45
Discards	AT.N	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	583	578	239	102
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	293	263	277

*Historical revisions reflecting conversion to whole weight for some fleets are expected in the future.

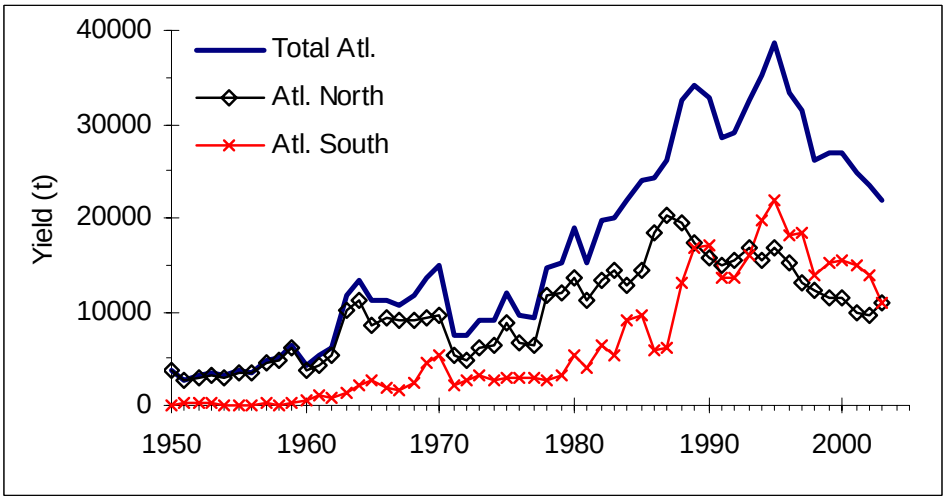
			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
	AT.S	Angola	0	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	--	
		Argentina	0	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	0	0	5	0	--	
		Belize (Obs. by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	--	
		Benin	0	0	18	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	--	
		Brazil	521	1582	655	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	
		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	--	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	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	29	534	344	200	423	353	
		Chinese Taipei	1292	702	528	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	**
		Cuba	272	316	147	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	--	
		Côte D'Ivoire	0	0	0	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	
		EC-France + España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	
		EC.España	0	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	--	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	
		Ghana	0	110	5	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	--	
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	--	
		Honduras (Obs. by Sta. Hele	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	--	
		Japan	782	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	788	694	900	959	
		Korea, Republic of	303	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	--	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	0	0	0	--	
		NEI	0	0	0	0	0	0	0	0	0	0	856	439	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	0	730	469	751	504	191	
		Nigeria	0	0	0	0	83	69	0	0	0	0	0	0	0	3	0	857	0	9	0	0	0	0	0	0	--	
		Panama	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	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	0	6	1	8	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	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	6	0	
		South Africa	28	31	9	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	169	76	230	397	500	280	
		Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	--	
		Togo	0	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	0	0	0	0	0	0	--	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	396	160	179	142	43	200	20	
		U.S.S.R.	70	154	40	26	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	--	
Discards	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	
	UNCL	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	22	0	0	
Discards	UNCL	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	15	0	0	

** Later reported as 236 t for north and 1050 t for south.

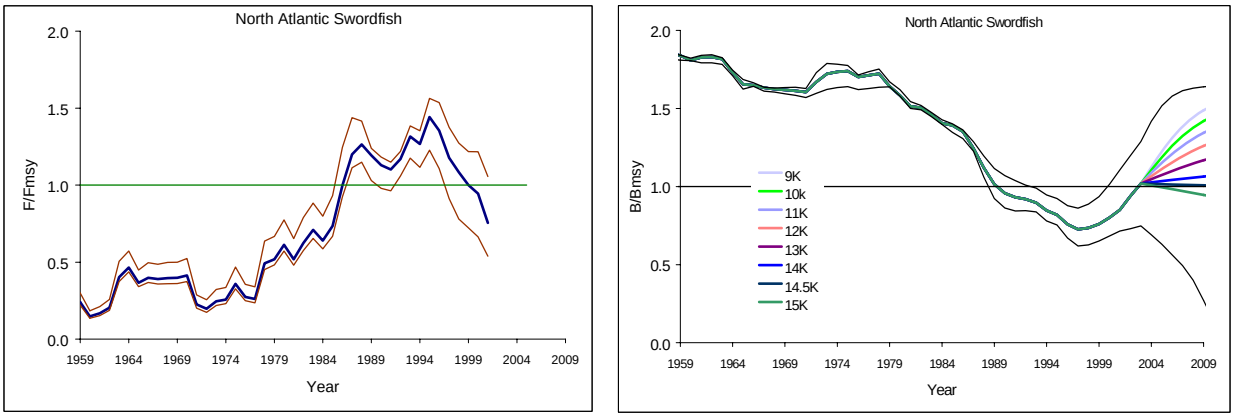
Dashes indicate that no reports were received. Also, the 2003 data are provisional and are likely to increase.



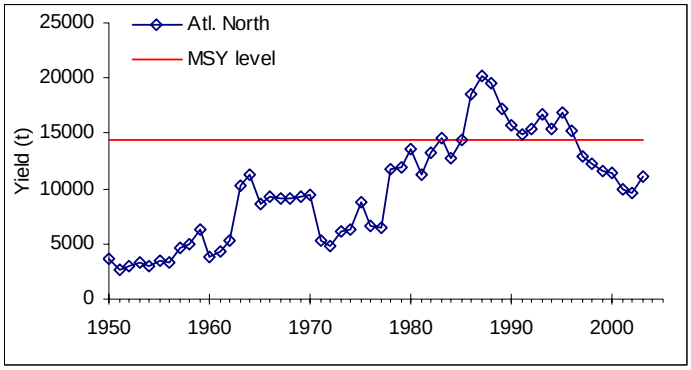
SWO-ATL-Fig. 1. Geographical distribution of swordfish longline catches in 1997. The dashed line at 5° is the assumed boundary between North and South management units.



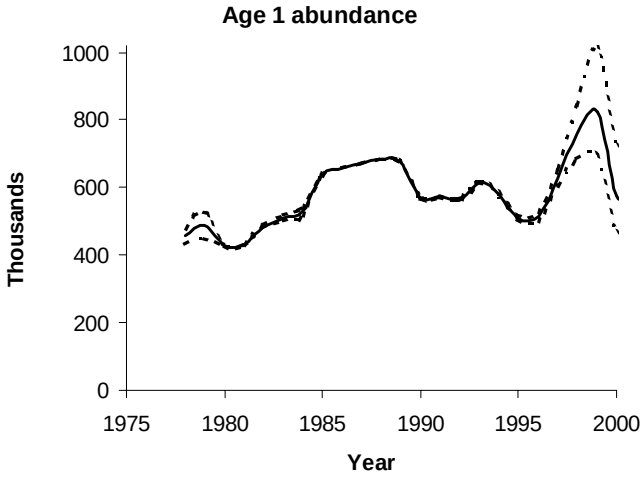
SWO-ATL Fig 2. Reported catches of Atlantic swordfish (in t, including discards) for 1950-2003.



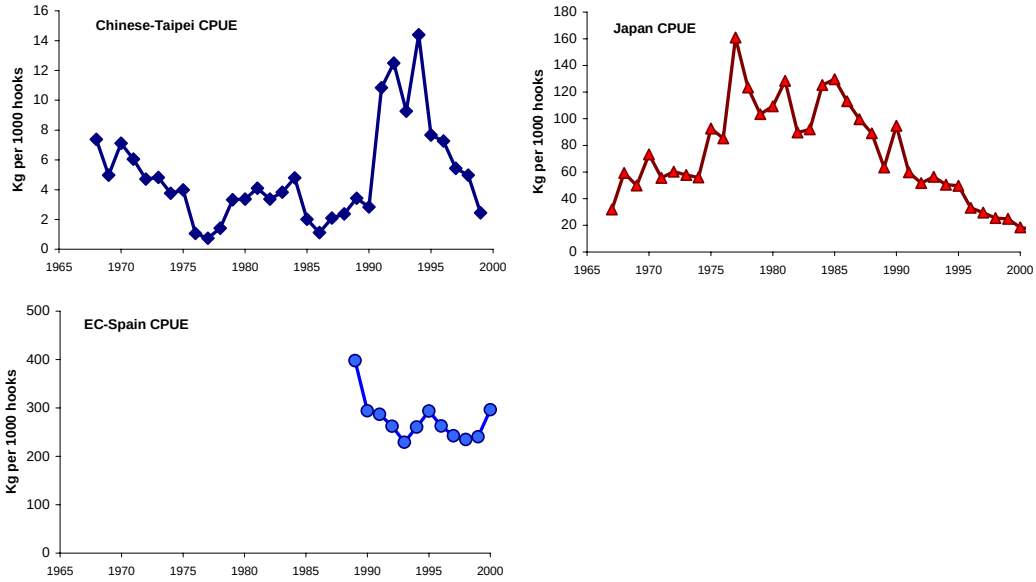
SWO-ATL-Fig 3. North Atlantic swordfish assessment results. Left panel: Estimated fishing mortality rate relative to F_{MSY} (F/F_{MSY}) for the period 1959-2001 (median with 80% confidence bounds based on bootstrapping are shown). Right panel: Estimated biomass relative to biomass at MSY (B/B_{MSY}) for the period 1959-2002, followed by 7-year projected B/B_{MSY} under the constant catch scenarios listed. Upper and lower lines represent approximate 80% confidence ranges. For the catch projection period (2002-2009), the upper line is the upper 80% confidence bound for the 9K (9,000 t) projection and the lower line is the 80% confidence bound for the 15K (15,000 t) projection.



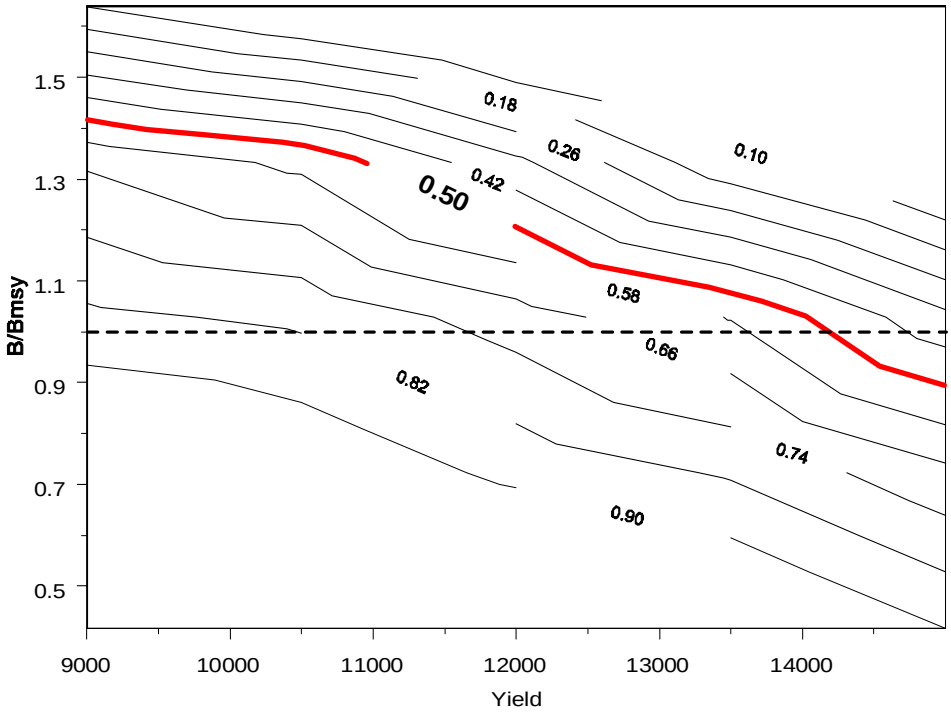
SWO-ATL Fig 4. Annual yield (t) for North Atlantic swordfish relative to the estimated MSY level.



SWO-ATL-Fig 5. Sequential population analysis estimates (numbers of fish) of North Atlantic recruitment (using input data from 1978-2000) with 80% bootstrap confidence limits (dashed lines).



SWO-ATL-Fig 6. Standardized biomass catch rates for South Atlantic swordfish presented at the 2002 meeting, showing contradictory patterns.



SWO-ATL-Fig 7. Estimated probability of the North Atlantic stock at or above the indicated Biomass ratio (B/B_{MSY}) by 2009, if yield (landings and discards) were held constant at the tonnages indicated from 2003 to the end of the projection period.

8.10 SWO-MED – MEDITERRANEAN SWORDFISH

No new assessment was conducted in 2003 or 2004. The most recent assessment was conducted in 2002, making use of catch and effort information through 2001.

SWO-MED-1. Biology

Swordfish is a cosmopolitan species found in the Atlantic Ocean and the Mediterranean Sea. Several recent genetic studies suggest that Mediterranean swordfish form a unique stock that is reproductively isolated from the Atlantic stocks. Several fisheries and biological studies suggest that there is limited movement from the Mediterranean to areas immediately adjacent in the North Atlantic. Genetic studies have confirmed this pattern.

Swordfish feed mainly in the pelagic zone and its prey is comprised mostly of cephalopods and pelagic fish species. Spawning occurs in the central Mediterranean Sea and around the Balearic Islands and probably in other locations. Swordfish are sequential spawners and in the Mediterranean, reproduction occurs during the spring-summer months. Young swordfish grow very rapidly, reaching more than 80 cm by the end of their first year of life. Females grow faster than males and reach a larger maximum size. Female swordfish may first reach sexual maturity in their third year of life at a length of about 125 cm, and half of all females are mature by the time they reach 140 cm. Age at first maturity is substantially younger than that assumed for females of the Atlantic stocks (age 5). Males may first reach maturity one year earlier. ;

SWO-MED-2. Description of the fisheries

Mediterranean swordfish fisheries are characterized by high catch levels (around 14,000 t annually in the last decade; **Table 1**), similar to those of the North Atlantic. The Mediterranean is a much smaller body of water compared to the North Atlantic. However, the potential reproductive area in the Mediterranean is probably relatively larger than that in the Atlantic. Further, the productivity of the Mediterranean Sea is thought to be very high.

Swordfish fishing has been carried out in the Mediterranean using harpoons and driftnets (drifting gillnets) at least since Roman times. Information on Italian catches for the period 1950 to 1970 were provided by FAO and substituted the zero catch reports that appeared in the ICCAT database. Currently, swordfish fishing is carried out all over the Mediterranean Sea. The biggest producers of swordfish in the Mediterranean Sea in the recent years (1997-2002) were Italy (42%), Morocco (22%), EC-Greece (12%), and EC-Spain (9%). Also, Algeria, Cyprus, Malta, Tunisia, and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, Libya, and EC-Portugal. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Israel, Lebanon, Egypt, Monaco and Syria, but the data are not reported to ICCAT or FAO.

In recent years, the main fishing gears used are surface longline and gillnet. Most of the above-mentioned countries operate longline fisheries, and in 2001 large-scale driftnet fisheries were mostly limited to Italy (>4,000 t) and Morocco (>2,000 t). There are also other countries known to be fishing with driftnets that do not report their catches. Swordfish are also caught with harpoons and traps, but trap gears are not used for targeting swordfish. Since the beginning of 2002 driftnet fishing has been banned in EC countries and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean.

Mediterranean total swordfish landings showed an upward trend from 1965-72, 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. The catch reduction observed in 2002 was mostly attributed to the driftnet ban established in EC countries.

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

SWO-MED-3. State of the stocks

Both production modeling and age-based VPA indicated the presence of a stable situation in terms of recruitment, and total and spawning biomass (**SWO-MED-Figures 2, 3**). These findings suggest that the current exploitation pattern and level of exploitation are 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 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 3 years old represent 50-70% of the total yearly catches.

SWO-MED-4. Outlook

Assessment results indicated the presence of a stable recruitment pattern and suggested that the current exploitation pattern and level of exploitation are sustainable, at least in the short-term. Average catch over the past decade has been about 14,000 t per year (**SWO-MED-Table 1, SWO-MED-Figure 1**). The Committee expects that annual catches of about this magnitude will keep the stock at about the present level, at least over the short-term.

SWO-MED-5. Effects of current regulations

Although ICCAT has no specific regulatory measures for Mediterranean swordfish fisheries, several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems. The EC introduced a driftnet ban in 2002 and in 2003 ICCAT adopted a recommendation for a general ban of this gear in the Mediterranean [Rec. 03-04]. The Committee reviewed the various measures taken by member countries and noted the difficulties in implementing some of the management measures, particularly that of minimum size.

SWO-MED-6. Management recommendations

Assessment results indicated the presence of a stable recruitment pattern and suggested that the current exploitation pattern and level of exploitation are sustainable, as long as the stock does not decline. Mostly because of the lack of historical data, the Committee cannot determine stock status relative to MSY benchmarks. Given the uncertainties in the assessment, the Committee recommends that the current levels of exploitation not be exceeded, under the current exploitation patterns.

The percentage of juveniles in the catches is relatively high (**SWO-MED-Figure 4**), as happens with several Mediterranean fisheries, and a reduction of their catches would improve the yield and spawning biomass per recruit. In the past, adoption of a minimum landing size regulation of 120 cm may have resulted in under-reporting of juvenile catches and appeared not to be practical in all situations, considering the low size-selectivity of the fishing gears used. Alternative methods for reducing juvenile catches, such as time and/or area closures, are mentioned in the 2001 SCRS Report (Section 15.4) and their applicability should be further investigated.

In addition, given the uncertainty of the location of the boundary between the Mediterranean and North Atlantic stocks, it is important to identify the biological origin of those catches reported at or near the boundary so that the resulting knowledge can be considered in the management of the North Atlantic and/or Mediterranean stocks. The Committee continues to recommend that the Commission ensure that reliable data be provided on catch effort and size for Mediterranean swordfish. Improvements to these basic inputs to the stock assessment are essential to improve future estimates.

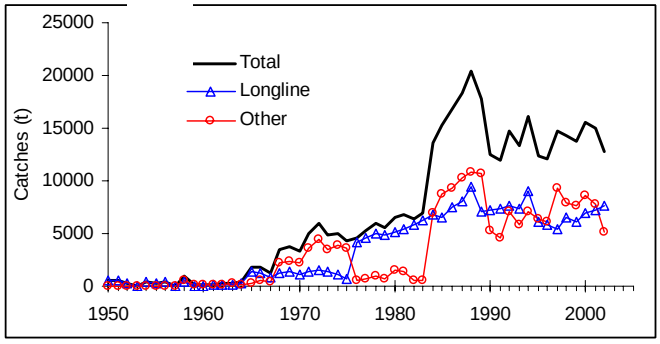
MEDITERRANEAN SWORDFISH SUMMARY	
Maximum Sustainable Yield	Not estimated
Current (2002) Yield[1]	12803 t
Current (2002) Replacement Yield	~15,000 t
Relative Biomass (B_{2002}/B_{MSY})	Not estimated
Relative Fishing Mortality	
F_{2001}/F_{MSY}	Not estimated
F_{2001}/F_{max}	2.7
$F_{2001}/F_{0.1}$	4.7
$F_{2001}/F_{30\%SPR}$	3.3
Management measures in effect	No ICCAT regulations; national closed areas, minimum size and effort controls.

[1] The 2003 reported catch is considered incomplete and too provisional to use in this table.

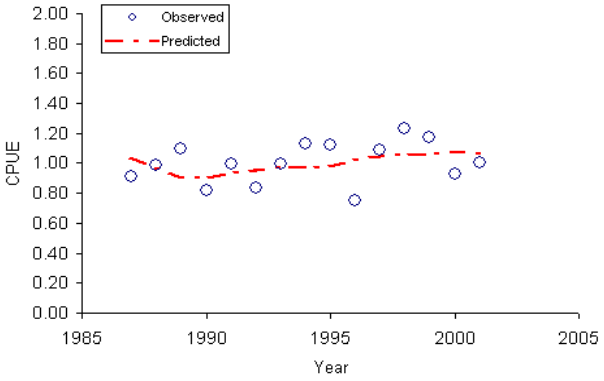
SWO-MED Table 1. Estimated catches (t) of Mediterranean swordfish 1979-2003

	1979	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
TOTAL	5547	6579	6813	6343	6896	13666	15292	16765	18320	20365	17762	12441	11997	14709	13265	16082	12430	12053	14693	14369	13699	15570	15005	12803	13469
Longline	4877	5115	5418	5770	6313	6749	6493	7505	8007	9476	7065	7184	7393	7631	7377	8985	6084	5884	5389	6496	6097	6961	7179	7696	9288
Other Surf.	670	1464	1395	573	583	6917	8799	9260	10313	10889	10697	5257	4604	7078	5888	7097	6346	6169	9304	7873	7602	8609	7826	5107	4181
Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	0	--
Algerie	521	650	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	--
Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	0	0
Croatia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	0	0
EC.Cyprus	98	72	78	103	28	63	71	154	84	121	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47
EC.España	800	750	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	306
EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	*
EC.Greece	0	0	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1420
EC.Italy	3930	4143	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	6725	5286	6104	6104	6312	7515	6388	3539	8395
EC.Malta	151	222	192	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	257	*
EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1
Japan	3	1	0	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	4	0	0	0	0
Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	0	--
Maroc	0	0	0	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300
NEI_2	0	728	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	--
Tunisie	0	0	7	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	*
Turkey	44	13	70	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	373	360	360	*

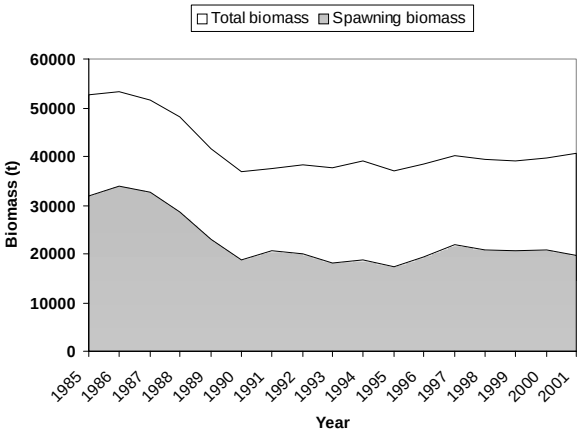
The following catches were later reported for 2003: EC-France = 32 t; EC-Malta = 163 t; Tunisia = 288 t; Turkey = 350 t.
Dashes indicate that no reports were received. Also, the 2003 data are provisional and are likely to increase.



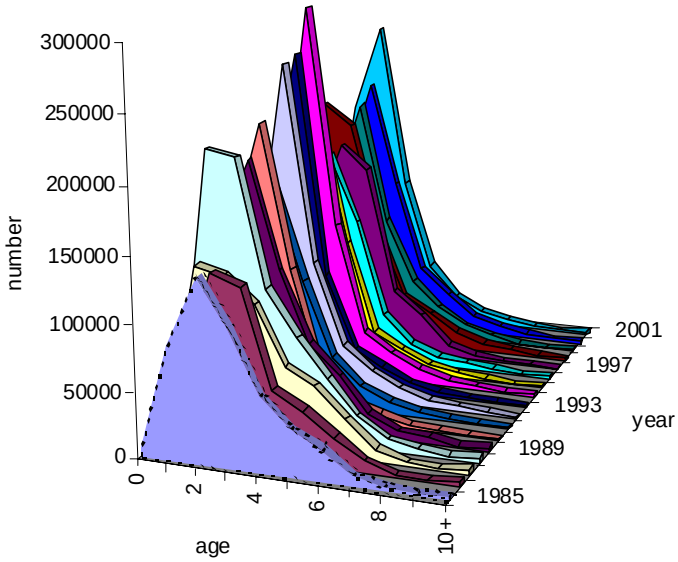
SWO-MED-Fig. 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2002.



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



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

8.11 SBF – SOUTHERN BLUEFIN TUNA

A stock assessment and review of fisheries indicators was conducted by the CCSBT Stock Assessment Group during 2004, the results of which are summarized below. This report also updates the description of fisheries and state of stock, and provides fishery and catch information

1. Biology

Southern bluefin tuna (*Thunnus maccoyii*) are found throughout the southern hemisphere, mainly in waters between 30° and 50°S, but only rarely in the eastern Pacific. The only known breeding area is in the Indian Ocean, southeast of Java, Indonesia. Spawning takes place from September to April in warm waters south of Java and juvenile southern bluefin tuna migrate south down the west coast of Australia. During the summer months (December-April), they tend to congregate near the surface in the coastal waters off the southern coast of Australia and spend their winters in deeper, temperate oceanic waters. Results from recaptured conventional and archival tags show that young southern bluefin tuna migrate seasonally between the south coast of Australia and the central Indian Ocean. After age 5, southern bluefin tuna are seldom found in nearshore surface waters, and extend their distribution over the southern circumpolar area throughout the Pacific, Indian and Atlantic Oceans.

Southern bluefin tuna can attain a length of over 2 m and a weight of over 200 kg. Direct ageing using otoliths indicates that a significant number of fish bigger than 160 cm are older than 25 years, and the maximum age obtained from otolith readings has been 42 years. Analysis of tag returns and otoliths indicate that, in comparison with the 1960s, the growth rate has increased since about 1980 as the stock has been reduced. There is some uncertainty about the size and age when southern bluefin tuna mature, but available data indicate that they do not mature younger than 8 years (155 cm fork length). Southern bluefin tuna exhibit age-specific natural mortality, with M being higher for young fish and lower for old fish.

Given that southern bluefin tuna have only one known spawning ground, and that no morphological differences have been found between fish from different areas, southern bluefin tuna are considered to constitute a single stock for management purposes.

2. Description of fisheries

Historically, the southern bluefin tuna stock has been exploited by Australian and Japanese fisheries for more than 50 years, with total catches peaking at 81,605 t in 1961 **(SBF-Figure 1)**. The current (2003) total catch is about 14,024 t (preliminary data), continuing a declining trend in total catches from a recent peak of 19,529 t in 1999, 16,026 t in 2001 and 15,212 t in 2002. Over the period 1952-2003, 79% of the catch has been made by longline and 21% using surface gears, primarily purse seine and pole and line **(SBF-Figure 1)**. The proportion of the catch made by the surface fishery peaked at 50% in 1982, dropped to 11-12% in 1992 and 1993 and increased again to average 30% since 1996. (**SBF-Table 1** and **SBF-Figure 1**). The Japanese longline fishery (taking older fish) recorded its peak catch of 77,927 t in 1961 and the Australian surface fishery catches of young fish peaked at 21,501 t in 1982 **(SBF-Figure 3)**. New Zealand, Fishing Entity of Chinese Taipei and Indonesia have also exploited southern bluefin tuna since the 1970s-1980s, and Korea started a fishery in 1991.

73% of the southern bluefin tuna catch has been made in the Indian Ocean, 21% in the Pacific Ocean and 6% in the Atlantic Ocean **(SBF-Figure 2)**. The Atlantic Ocean catch has varied widely between 400 and 8,200 t since 1968 **(SBF-Table 1** and **SBF-Figure 2)**, averaging about 1,000 t over the past two decades, and reflecting shifts in longline effort between the Atlantic and Indian Oceans. Fishing in the Atlantic occurs primarily off the southern tip of South Africa **(SBF-Figure 4)**.

3. Summary of stock status

SBF-Figure 5 depicts trends in Japanese longline catch rates for juvenile, maturing and mature southern bluefin tuna. **SBF-Figure 6** shows changes in the size composition of Japanese longline catches from 2000 to 2004.

Southern bluefin tuna assessments were updated at the 5th Meeting of the CCSBT Stock Assessment Group in Korea in 2004. Current assessments suggest the southern bluefin tuna spawning biomass is at a low fraction of

its original biomass, and well below the 1980 biomass. The stock is estimated to be well below the level that produces maximum sustainable yield. Rebuilding the spawning stock biomass would almost certainly increase sustainable yield and provide security against unforeseen environmental events.

Recruitments in the last decade are estimated to be well below the levels over the period 1950-1980. Assessments estimate stable recruitment in the 1990s but very low recruitments in 1999 or 2000. Analyses of fishery indicators provide evidence of a markedly lower recruitment from 1999-2001. Indicators also show that the Indonesian longline fishery on spawning fish catches fewer older individuals **(SBF-Figure 7)**. One plausible interpretation is that the spawning stock has declined in average age and may have declined significantly in abundance. This is in contrast to assessment model results which indicate that the spawning stock has been largely stable over the last decade and increased slightly over the last four years.

Projections with 15,000 t annual catch provide highly variable results depending upon assessment assumptions and suggest the stock is more likely to decline with the CCSBT MP Conditioning Model (an integrated statistical assessment model used in testing management procedures, see **SBF-Figure 8**), while ADAPT shows roughly equal probability of decline or increase. Given all the evidence, the probability of further stock decline under current catch levels is now judged to be greater than in 2001, when an increase or decline under current catches were considered equally likely **(SBF-Figure 9)**.

4. Current management measures

Southern bluefin tuna have been managed by means of quota limits agreed at tri-partite meetings between Australia, Japan and New Zealand from 1985 through to the establishment of the CCSBT in 1994. The global quota was reduced several times after the initial level of 38,650 t for the 1984-1985 season. The combined quota for these three countries was maintained at 11,750 t from the 1989-1990 through to 2002-2003. Following the increase in membership of the CCSBT (Korea and the Fishing Entity of Chinese Taipei joined in 2001 and 2002, respectively), the CCSBT agreed to the following national catch limits for 2003-2004:

Japan	6,065 t
Australia	5,265 t
Republic of Korea	1,140 t
Fishing Entity of Chinese Taipei	1,140 t
New Zealand	420 t
Total	14,030 t

An additional catch limit of 900 t has also been implemented for cooperating non-members, including 50 t for the Philippines (which was recently admitted as a cooperating non-member) and 800 t for Indonesia.

The CCSBT has also implemented a Trade Information Scheme (TIS) for southern bluefin tuna. This requires all members of the CCSBT to ensure that all imports of southern bluefin tuna are be accompanied by a completed CCSBT TIS Document, endorsed by an authorized competent authority in the exporting country, and including details of the name of fishing vessel, gear type, area of catch, dates, etc. Shipments not accompanied by this form must be denied entry by the member countries. Completed forms are lodged with the CCSBT Secretariat and are used to maintain a database for monitoring catches and trade. As markets for southern bluefin tuna are now developing outside CCSBT member countries, the TIS scheme was recently amended to require the document to be issued for all exports, and to include the country of destination,

At its annual meeting in October 2003, the CCSBT agreed to establish a list of vessels over 24 meters in length which are approved to fish for southern bluefin tuna, to be completed by 1 July 2004. The list will include vessels from CCSBT members and cooperating non-members. Members and cooperating non-members are required to refuse the import of southern bluefin tuna caught by large-scale fishing vessels not on the list.

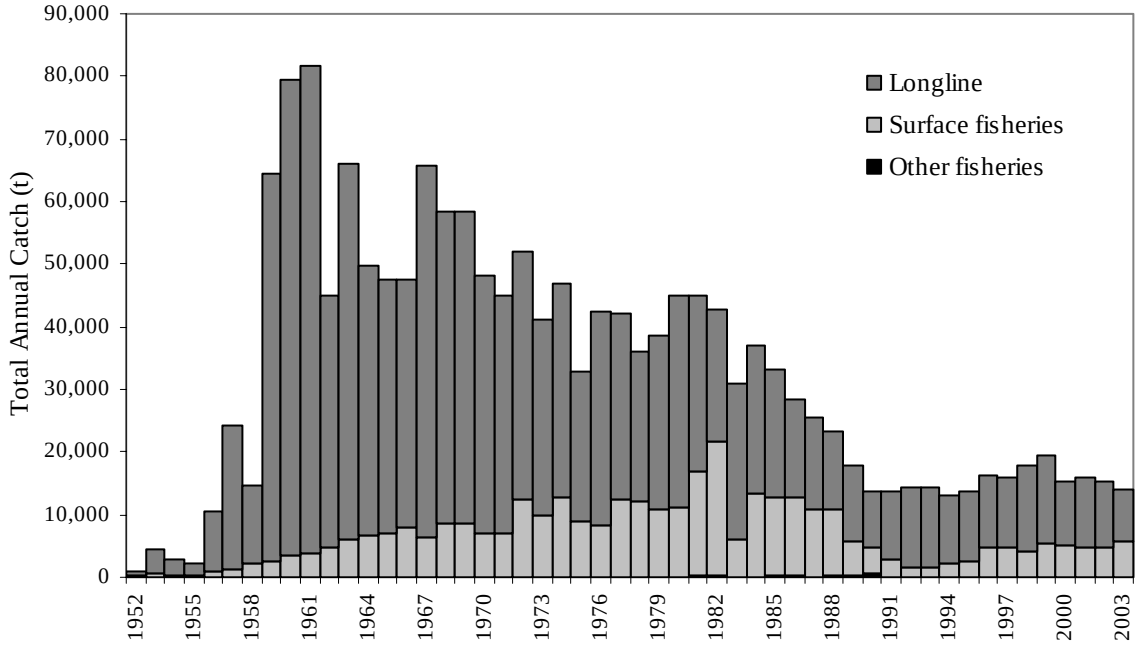
SOUTHERN BLUEFIN TUNA SUMMARY
(global stock)

Maximum Sustainable Yield	Not estimated
Current (2003) Yield	14,024 t (preliminary)
Current Replacement Yield	Less than 16,000 t
Relative Biomass	SSB_{2004}/SSB_{1980} 0.14 - 0.59 SSB_{2004} / SSB_{K} 0.03 - 0.14
Current Management Measures	Global quota of 14,030 t (Australia, Chinese Taipei, Korea, Japan, New Zealand). 900 t provision for cooperating non-members.

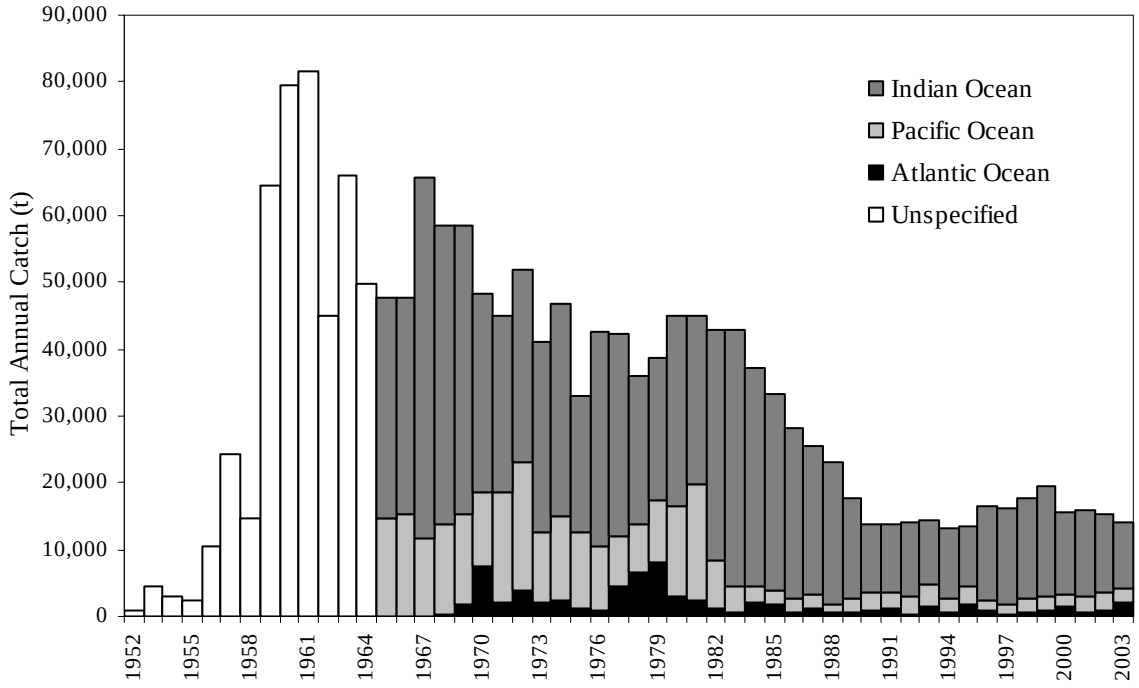
SBT-Table 1. Atlantic Ocean, Indian Ocean, Pacific Ocean and global southern bluefin tuna catch (t) by gear, area and flag.

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ATLANTIC TOTAL	8231	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2078
- CATCH BY GEAR																									
Longline	8231	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2078
- CATCH BY FLAG																									
Japan	8231	3086	2365	1104	573	2082	1733	434	1228	573	493	987	1080	253	1425	420	1237	1015	189	649	689	1203	327	909	1992
Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	7	24	0	0	47	100	242	90	116	0
Chinese Taipei	0	0	35	9	30	1	95	216	102	28	19	17	233	46	108	56	584	24	89	42	30	24	223	16	86
INDIAN TOTAL	21206	28463	25299	34347	38315	32492	29520	25735	22379	21354	15020	10400	10109	11329	9631	10430	9264	13812	14160	15137	16405	12084	13072	11571	9717
- CATCH BY GEAR																									
Longline	13649	20602	17355	15139	21522	19192	16864	13165	11489	10530	9281	5781	7146	9664	8077	8319	6629	9064	9343	10942	11059	6953	8304	6887	3931
Purse Seine	111	107	420	5489	5083	4339	5179	6342	5411	2820	1626	2511	1034	22	536	1269	1840	3099	2991	3555	5325	5132	4767	4683	5787
Pole and Line	7446	7754	7524	13708	11698	8960	7410	6147	5393	7770	3794	1803	1823	1639	1018	841	795	1649	1826	640	22	0	0	0	0
Gill Net	0	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0
- CATCH BY FLAG																									
Australia	7557	7860	7944	19198	16781	13299	12589	12489	10805	10590	5438	4335	3876	4568	4513	4246	3362	4893	4910	4353	5448	5147	4792	4693	5808
Japan	13587	20526	17284	14966	21391	18935	16780	12938	10946	9754	7536	4383	4137	4238	2869	4132	3684	4248	4500	5838	5126	3370	4453	3153	1949
Korea	0	0	0	0	0	0	0	0	0	0	0	0	15	41	12	130	341	1320	1424	1749	1361	893	754	630	254
Chinese Taipei	53	64	56	173	131	243	146	298	608	828	1376	1160	1227	1176	850	963	848	1442	783	1397	1483	1424	1357	1121	1041
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	80	17	43	79	65
Indonesia	5	5	1	2	5	11	3	7	14	180	568	517	759	1232	1370	904	829	1614	2210	1324	2504	1203	1632	1691	555
Other	4	7	14	9	7	3	2	3	7	2	103	4	97	73	17	54	201	295	333	471	403	31	41	203	45
PACIFIC TOTAL	9236	13506	17405	7327	3963	2516	1977	1934	1866	1189	2310	2466	2269	2588	3101	2241	2528	1504	1638	1901	2304	1917	2314	2601	2229
- CATCH BY GEAR																									
Longline	6010	10041	8333	4719	2916	2312	1883	1810	1791	1095	2157	2183	2233	2503	3082	2234	2505	1460	1579	1857	2300	1917	2314	2601	2228
Purse Seine	1986	1929	6332	1342	790	105	0	34	0	0	0	0	0	0	0	0	0	22	7	29	0	0	0	0	0
Pole and Line	1240	1405	2567	961	125	6	0	8	16	0	13	0	0	33	0	3	0	10	16	0	0	0	0	0	0
Troll	0	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0
Handline	0	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0
- CATCH BY FLAG																									
Australia	3226	3335	8899	2303	914	112	0	42	16	1	680	251	613	680	860	454	1145	236	406	543	104	110	61	19	14
Japan	6010	10041	8332	4719	2916	2312	1883	1810	1791	1095	1193	1686	1260	1630	2024	1510	946	1129	898	1013	1740	1427	1894	2130	1821
New Zealand	0	130	173	305	132	93	94	82	59	94	437	529	164	279	217	277	436	139	334	337	461	380	358	450	389
Korea	0	0	0	0	0	0	0	0	0	0	0	0	232	0	0	0	0	0	0	0	0	0	1	0	0
Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	2
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
GLOBAL TOTAL	38673	45054	45104	42788	42881	37090	33325	28319	25575	23145	17843	13870	13691	14217	14344	13154	13637	16356	16076	17776	19529	15472	16026	15212	14024
- CATCH BY GEAR																									
Longline	27890	33729	28088	20971	25042	23586	20575	15625	14609	12227	11950	8968	10692	12467	12770	11036	10979	11564	11200	13537	14177	10339	11259	10528	8237
Purse Seine	2097	2036	6752	6831	5872	4444	5179	6376	5411	2820	1626	2511	1034	22	536	1269	1840	3121	2998	3584	5325	5132	4767	4683	5787
Pole and Line	8686	9159	10091	14670	11823	8967	7410	6155	5409	7770	3807	1803	1823	1673	1018	844	795	1659	1843	640	22	0	0	0	0
Troll	0	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0
Handline	0	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0
Gill Net	0	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0

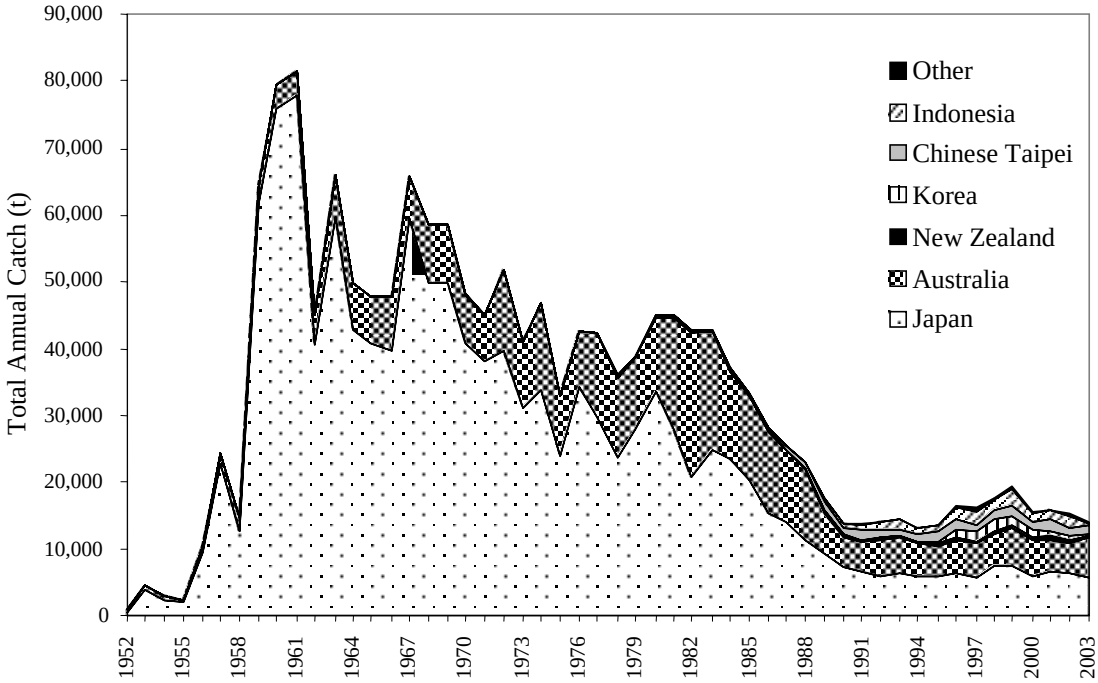
Catches for 2002 and 2003 are preliminary. Catches for Indonesia, the "other" flags, and for gears not listed (e.g. minor line) have been assigned to the longline category.
Catches have been assigned to the Indian Ocean where location information was not available. This includes catches from Indonesia, Other, Philippines (pre-2000 only), Chinese Taipei (pre-1981 only).
Source: CCSBT Database and Report of the Ninth Meeting of the CCSBT Scientific Committee.



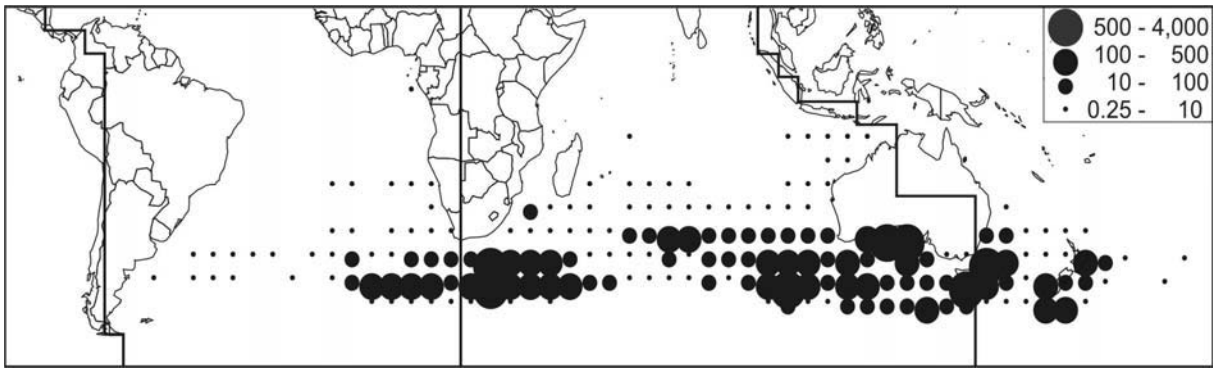
SBF-Figure 1. Global southern bluefin tuna catches by fishing gear (t), 1952 to 2003.



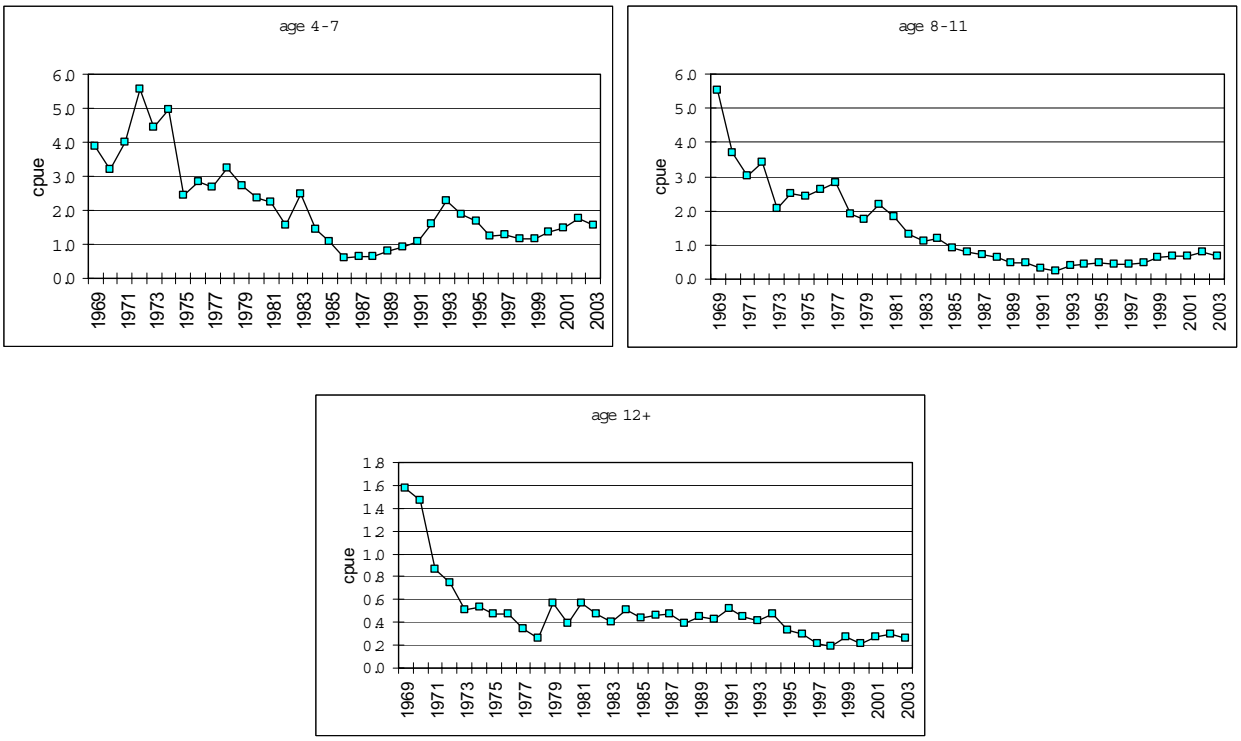
SBF-Figure 2. Southern bluefin tuna catches by ocean (t), 1952 to 2003.



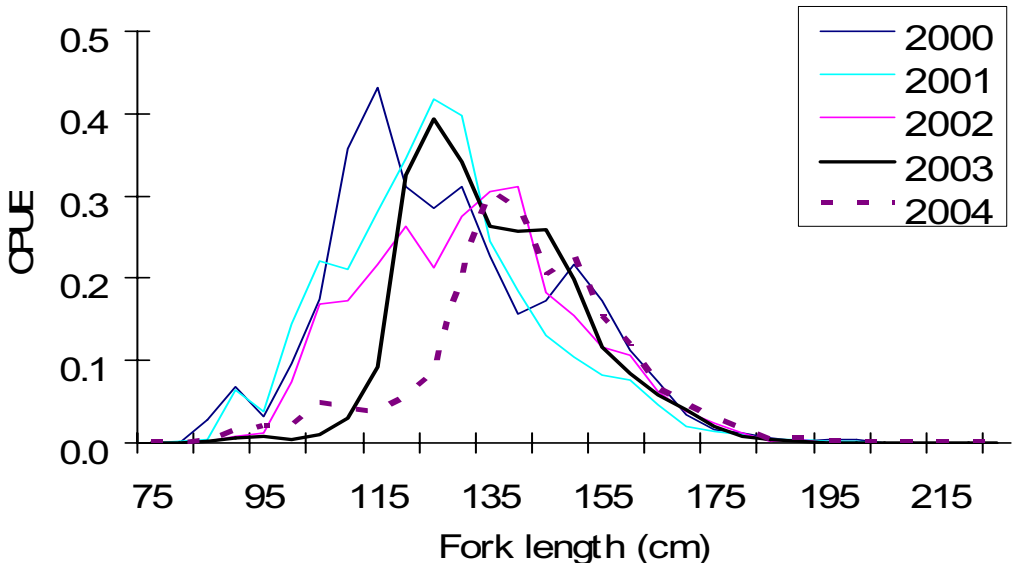
SBF-Figure 3. Total annual southern bluefin tuna catch (t) by flag, 1952-2003.



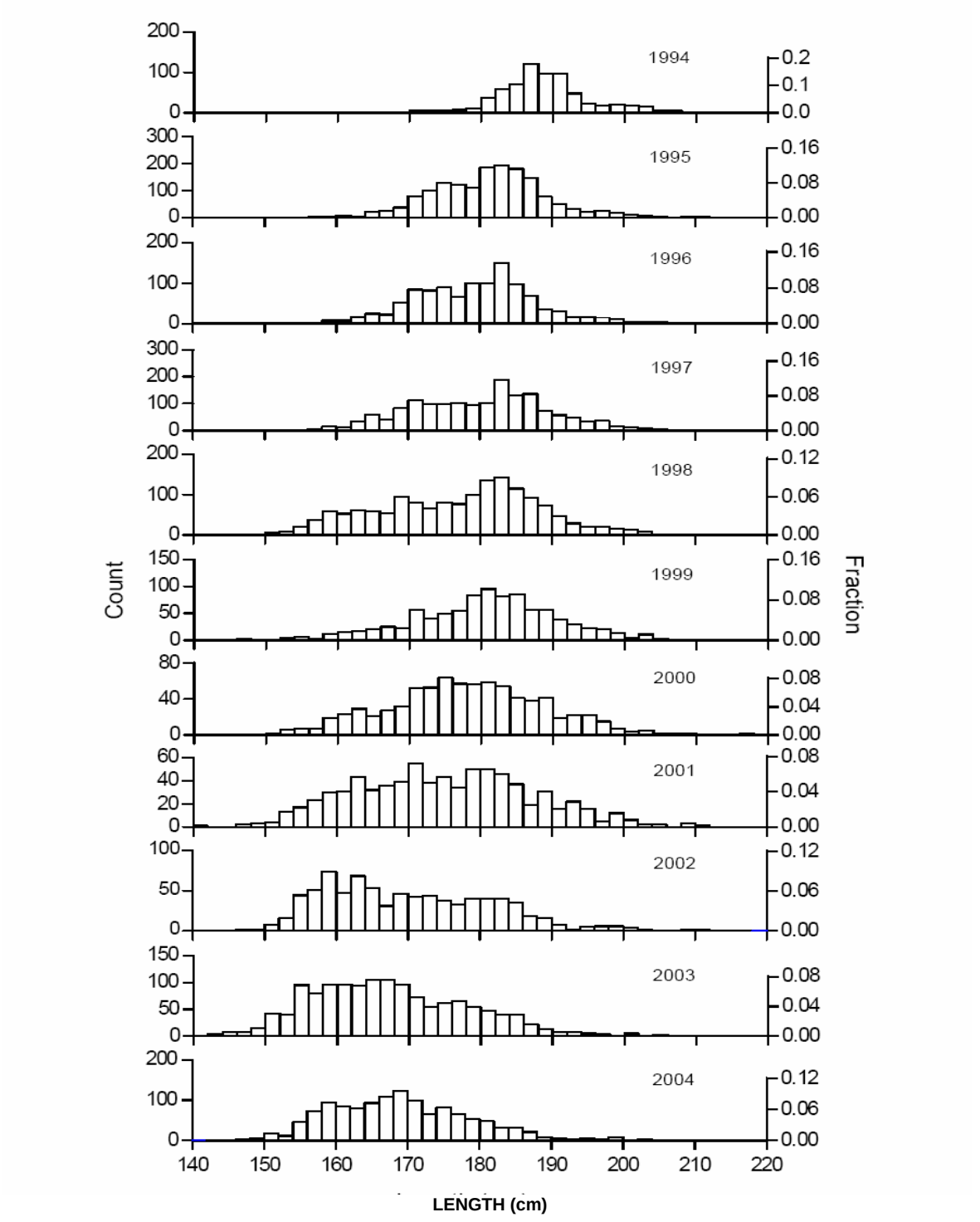
SBF-Figure 4. Geographic distribution of average annual southern bluefin tuna catches (t) by CCSBT members from 1983 to 2003 per 5° block by oceanic region. Block catches of less than 0.25 tons are not shown. Oceanic region divisions used in dividing the data for Figure 2 are shown.



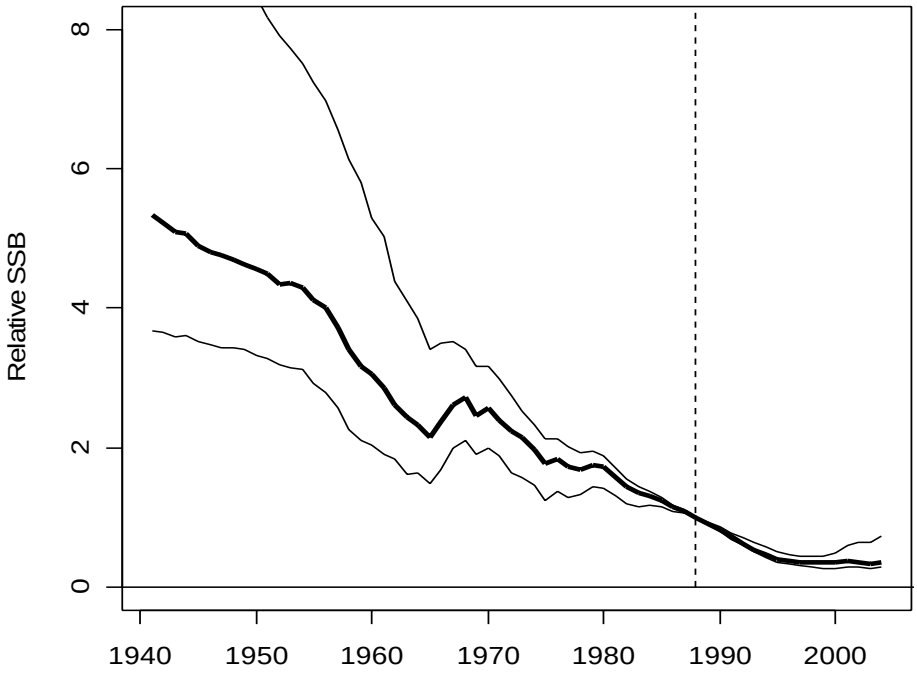
SBF-Figure 5. Trends in nominal catch rates of juvenile (age 4-7), maturing (age 8-11) and mature (age 12+) SBT (numbers per 1000 hooks) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9.



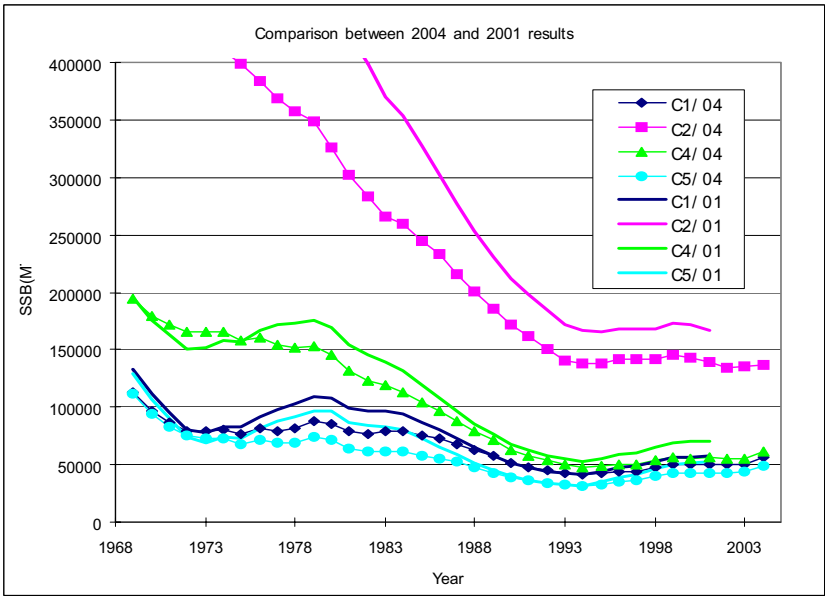
SBF-Figure 6. Changes in size composition of nominal CPUE in June in CCSBT Statistical area 4 from Japanese Real Time Monitoring Program data from 2000-2005.



SBF-Figure 7. Length frequency (in 2 cm intervals) of Indonesian SBT catches during the spawning season (July 1 of the previous year to June 30 of the given year).



SBF-Figure 8. SBT biomass trends (5th, Median and 95th percentiles) from one of the assessments presented at the CCSBT 5th Stock Assessment Group meeting (based on the CCSBT MP Conditioning Model), expressed relative to 1988 (indicated by the dashed line).



SBF-Figure 9. SBT spawner biomass trajectories from another of the assessments presented at the CCSBT 5th Stock Assessment Group meeting (ADAPT VPA) estimates of SSB for different assessment year (2004 and 2001) and plus group options (C1, C2, C4, and C5). (2004 results with markers and 2001 results without markers).

8.12 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

Very little is currently known about the biology of small tunas. In fact, scientific studies on these species have been rarely undertaken. This was largely because many of these species are considered to have little economic importance to the Atlantic tuna fleets, and because of difficulties in sampling landings from artisanal fisheries, which constitute a high proportion of the fisheries exploiting small tuna resources. The exceptions are some stocks of Spanish and king mackerel, such as those found in U.S. and Brazilian waters. The large industrial fleets often discard small tuna catches at sea or sell them in local markets, especially in Africa. The amount caught is rarely reported in logbooks. Nevertheless, in 2004 some new information has been presented to the GFCM-ICCAT and Small tuna species group of ICCAT.

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean, the Mediterranean Sea, and the Black Sea. They are often found in large schools with other small sized tunas or related species in coastal and offshore 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.

Recent studies indicate that some species of small tunas (e.g., *Auxis* spp.), could have an important role in large yellowfin diet. This was observed in the Pacific Ocean and also in Atlantic tropical waters, where large quantities of frigate tuna were found in the stomach contents of large yellowfin.

A recent report on bonito (*Sarda sarda*) caught in Turkish waters presents the fork length composition and the length-weight relationship of this species, caught by purse seines during the migration from the Black Sea to the Mediterranean Sea.

Some new information about bonito catch composition has been presented for the Tyrrhenian Sea and Straits of Sicily.

Regarding reproduction, new coastal spawning areas have been described in the southwestern Mediterranean. Data suggested a spawning peak in June. It has been stated that bonito is a multiple spawner with an indeterminate fecundity. Furthermore, new estimates of annual, batch and relative fecundity were presented. In the eastern tropical Atlantic, the size-at-first-maturity is about 38 cm FL for Atlantic bonito.

Some preliminary information on age and growth of juvenile bonito was reported.

For Atlantic Black Skipjack (*Euthynnus alletteratus*), new information on size distribution and length-weight relationship from Turkish waters and northern coast of Cyprus was reported. Some preliminary information on age and growth of juvenile of black skipjack was also presented. Data suggested a spawning peak in July. In the eastern tropical Atlantic, the size-at-first-maturity is about 42 cm FL for this species.

Regarding Bullet tuna (*A. rochei*) in South Western Mediterranean information was submitted on biological parameters such as growth, gonadosomatic index, sex-ratio-by-size, length-weight relationships and weight

conversion factors. More recent information on reproduction of bullet tuna suggests that this species is a multiple spawner, spawning along coastal areas in early summer. In the eastern tropical Atlantic, the size-at-first-maturity is about 30 cm FL for *Auxis* spp.

Recent studies on blackfin tuna (*Thunnus atlanticus*) caught off northeastern Brazil report length-weight and TL-FL relationships, sex ratio and size-at-first maturity. The population is dominated by males, which showed larger average sizes than the females. The females reach first maturity at a total length of 51 cm.

In addition, new length to weight conversions for Wahoo (*Acanthocybium solandri*) in the north West Atlantic were presented.

At present no new information is available for the rest of species of 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, either as target species or as by-catch, by purse seiners, mid-water trawlers (i.e., pelagic fisheries of West Africa-Mauritania), handlines and small scale gillnets. Unknown quantities of small tuna also comprise the incidental catches of some longline fisheries. Some U.S. sport fisheries target Spanish and king mackerels on a seasonal basis.

Historical landings of small tunas for the period 1978 to 2002 are shown in **SMT-Table 1**. This table does not include species reported as "mixed" or "unidentified", as was the case in some previous years as these categories include large tuna species. There are over ten 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 at about 139,412 t in 1988 **(SMT-Figure 1)**. Landings reported for the period 1989-1995 decreased to about 87,941 t, and then an oscillation in the values in the following years up to 2001 is observed, when the catch reached 84,093 t. This decrease seems to be related to unreported catches, as these species usually comprise part of the by-catch, and are often discarded, and do not reflect the real catch.

A preliminary estimate for the total nominal landings of small tunas in 2002 is 90,880 t. The Committee noted the relative importance of small tuna fisheries in the Mediterranean Sea, which account for 33% of the total reported catch in the period 1978-2002.

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.

Since 1991, tropical purse seiners operating around artificial flotsam (fish aggregating devices) may have led to an increase in fishing mortality of small tropical tuna species. These species usually comprise part of the by-catch, sometimes discarded, but the majority of these catches are now being monitored and a species composition breakdown has now become available **(SMT-Figure 3; SMT-Figure 4)**.

Despite recent improvements in statistical reporting 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 confusion regarding species identification.

SMT-3. State of the stocks

There is little information available to determine the stock structure of many small tunas 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 Committee meetings.

Age-structured stock assessments of Spanish mackerel and king mackerel are carried out for the coastal areas of the southeastern United States and the Gulf of Mexico. These assessments indicated that the stocks of Atlantic Spanish mackerel and king mackerel in the Gulf of Mexico were over-exploited. Reductions in fishing mortality were considered necessary, and hence a number of regulations (commercial trip limits, seasonal and

area quotas, and recreational bag limits) have been implemented in order to allow the stocks to recover to levels that could provide high average long-term yields and to provide adequate safeguards against recruitment failure. Improvement in stock status has been observed in the Gulf of Mexico Spanish mackerel and king mackerel and these stocks are no longer considered over-fished mainly due to the management actions taken.

The United States has recently developed a Fishery Management Plan for dolphin fish and wahoo fisheries operating in the U.S. EEZ with the aim of maintaining these stocks at or above MSY levels and assessments of these stocks will take place in the future.

Current information does not generally allow for an evaluation of stock status by the Committee for most of the species. Most stocks, however, probably do not have an ocean-wide distribution. For this reason, the majority of the stocks can be managed at the regional or sub-regional level.

SMT-4. Outlook

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

A CARICOM scientific meeting, held in June 2003, examined data on Wahoo collected from sampling of the commercial fisheries in several CARICOM countries in the Eastern Caribbean, and also data on Spanish mackerel collected from the commercial fisheries in Trinidad and Tobago. The report of these investigations will be made available to ICCAT in the near future.

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 reiterates its previous recommendation that studies should be conducted to determine the state of these stocks and the best way to manage them. Such studies are probably best carried out at the local or sub-regional level.

In light of this, a research proposal, aimed at improving the data collection and understanding of the biology of small tuna in the Mediterranean region, was presented at the GFCM-ICCAT meeting in 2004. The GFCM meeting endorsed the aims of the proposal, particularly those intended to address the research gaps currently existing for the Mediterranean area. The GFCM meeting also indicated the need to engage the participation of other interested bodies such as ICCAT and FAO. Given the growing importance of these fisheries to countries within the Mediterranean, the GFCM considered it timely to present the proposal to potential sponsors.

SMT-5. Effects of current regulations

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

SMT-6. Management recommendations

No recommendations were presented due to the lack of data and analyses.

SMT-Table 1. Estimated landings (in t) of small tuna in 1979-2003, by region and flag.

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
BLF ***Total***		1205	1175	1973	1941	1738	1908	1403	2822	3462	3322	2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2358	4034	4756	1297
T. atlanticus	Brazil	173	181	85	89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1
	Cuba	0	0	721	622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0	--
	Dominica	0	0	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42
	Dominican Republic	105	125	124	144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0	--
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0
	EC.France	770	740	761	842	809	821	755	729	669	816	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0
	Grenada	95	68	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0	--
	Liberia	0	0	0	0	0	0	0	0	0	229	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	0	0	12	0	10
	NEI -1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	--
	Netherlands Antilles	55	55	55	55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0
	Sta. Lucia	0	0	0	0	0	0	0	0	2	1	1	17	14	13	16	82	47	35	40	100	41	45	108	96	169
	U.S.A.	0	0	139	41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	334	413
	UK.Bermuda	7	6	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9
	Venezuela	0	0	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1902	1210	319
BLT ***Total***		0	0	0	0	0	0	0	2	0	357	723	3634	2206	814	394	177	100	0	0	28	579	1230	1577	950	359
A. rochei	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468	128
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Turkey*	0	0	0	0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316	*
	U.S.A.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.S.R.	0	0	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0
	Data for Turkey are uncertain and may be subject to change in the future																									
BON ***Total***			31115	38927	41106	42386	21907	24905	21320	29712	46382	29721	28591	33561	21816	30036	20356	22181	24585	24511	38293	34266	26995	27186	30885	4257
S. sarda	ATL	6485	12568	10760	12169	6840	6849	6946	5892	7395	22354	17766	6844	8306	6914	4587	5823	5652	7390	10433	8563	6096	5023	4949	7995	1526
	MEDI	13486	18547	28167	28937	35546	15058	17959	15428	22317	24028	11955	21747	25255	14902	25449	14533	16529	17195	14078	29730	28170	21972	22236	22890	2731
ATL	Angola	251	377	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118	--
	Argentina	1288	2600	846	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	138	0	0	0	0	0	0	0	--
	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2
	Benin	13	19	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Brazil	0	0	0	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0
	Bulgaria	0	75	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Cuba	0	0	0	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0	--
	EC.España	717	220	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23
	EC.Estonia	0	0	0	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0
	EC.France	500	508	502	587	547	569	492	431	331	395	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0
	EC.Greece	4	0	1	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	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	--
	EC.Lithuania	0	0	0	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	793	--
	EC.Poland	32	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0
	EC.Portugal	6	13	31	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40
	EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	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	58	--
	Georgia	0	0	0	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Germany Democratic Rep.	0	288	440	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ghana	0	77	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grenada	53	52	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	14	16	7	10	10	0
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	--
	Maroc	196	312	477	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928
	Mexico	174	271	408	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	0	0	0	0	0	0
	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	0
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	--
	Rumania	0	64	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441	461
	Senegal	159	140	1327	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441	0
	Sierra Leone	0	57	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	11	245	44	--
	South Africa	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15

SMT-Table 1. Estimated landings (in t) of small tuna in 1979-2003, by region and flag.

			1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
		Sta. Lucia	0	0	0	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0
		Togo	0	0	0	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0	--
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	452	--
		U.S.A.	502	198	333	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44
		U.S.S.R.	2125	6433	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	1385	985	0	0	25	0	0	0	342	2786	1918	1114	399	231	656	--
		Uruguay	16	3	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	--
		Venezuela	443	861	833	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13
	MEDI	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	--
		Algerie	515	640	740	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	--
		Bulgaria	1	13	191	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35	--
		Croatia	0	0	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	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	0	0	14	0	10	10
		EC.España	713	480	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544
		EC.France	0	0	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27	--
		EC.Greece	712	809	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	--
		EC.Italy	1403	1180	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091
		EC.Malta	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0	0
		Egypt	10	3	2	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	--
		Ex. Yugoslavia	29	72	39	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0	--
		Maroc	155	62	309	71	92	75	57	51	127	108	28	69	69	31	25	93	37	67	45	39	120	115	5	61	85
		NEI -2	0	295	274	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	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	--
		Tunisie	865	700	381	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	--
		Turkey	9082	14292	23174	23397	29034	7220	12281	10756	16793	17613	4667	14387	19151	8654	19000	8944	10284	10284	7810	24000	17900	12000	13460	13460	*
		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	0
		Yugoslavia Fed. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	45	0	3	2	6	10	12	12	14	17	17	0	0

Shaded cells were later informed by Turkey as the following values.

																1992	***1993***	***1994***	***1995***	***1996***	***1997***	***1998***	***1999***	***2000***	***2001***	***2002***	***2003***
																8863	*19548*	*10093*	*8944*	*10284*	*7810*	*24000*	*17900*	*12000*	*13460*	*6286*	*6000*
BOP	***Total***		492	698	1448	584	38	49	133	87	564	1482	1116	457	588	600	601	775	640	2136	476	159	844	1193	984	917	726
O. unicolor		ATL	464	698	1448	584	38	49	124	86	538	1474	1109	420	487	424	349	599	525	2004	249	29	627	1048	830	780	706
		MEDI	28	0	0	0	0	0	9	1	26	8	7	37	101	176	252	176	115	132	227	130	217	145	154	137	20
	ATL	Benin	1	1	2	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0	--
		EC.Portugal	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		Maroc	373	596	968	483	0	0	83	33	487	1422	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780	706
		Mauritania	90	101	478	99	37	40	40	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	--
	MEDI	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	87	135	198	153	92	119	224	128	216	135	145	128	--
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0	--
		Maroc	28	0	0	0	0	0	9	1	26	8	7	37	14	1	14	23	23	13	3	2	1	10	9	9	20
BRS	***Total***		3722	5617	5841	6019	6632	8129	3501	6549	6212	9510	10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	3269
S. brasiliensis		Brazil	1191	2826	3466	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	--
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	388
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472	--
		Venezuela	2531	2791	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	--
CER	***Total***		586	604	628	687	677	680	574	500	392	219	234	225	375	390	450	490	429	279	250	250	0	3	5	1	2
S. regalis		Dominican Republic	86	104	106	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0
		EC.France	500	500	522	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	0	0	0	0	0
		St. Vincent and Grenadines	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
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	1	2
FRI	***Total***		12575	20912	15913	25240	21690	25903	22876	20306	23407	25151	21416	23333	15425	8027	11210	10477	9861	17808	16513	14440	12608	12299	14457	15474	4049
A. thazard		ATL	8868	16960	12235	19197	15870	19566	17636	15249	19667	19025	15029	14973	8854	3126	8183	5354	5560	11899	13449	12160	10548	9613	10223	10375	1845
		MEDI	3707	3952	3678	6043	5820	6337	5240	5057	3740	6126	6387	8360	6571	4901	3027	5123	4301	5909	3064	2280	2060	2686	4234	5099	2204
	ATL	Angola	357	256	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38	--
		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	25	37	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	--
		Brazil	0	0	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860
		Bulgaria	0	3	3	0	7	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	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	206	--

SMT-Table 1. Estimated landings (in t) of small tuna in 1979-2003, by region and flag.

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC-France + España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768	--
	EC.España	1211	6260	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0	--
	EC.France	0	0	0	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	--
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Portugal	0	0	0	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4
	France + C. Ivoire + Senegal	0	0	1856	1984	2800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Germany Democratic Rep.	0	0	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Ghana	4286	7566	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maroc	694	968	1267	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184
	NEI -1	0	0	0	0	333	46	0	0	17	381	155	237	1	4	32	68	62	180	120	309	491	291	420	186	--
	Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	--
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	243	57	118	341	327	240	91	0	0	0	0	0	--
	Rumania	0	0	0	0	0	0	0	51	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	3249	1441	220	505	456	46	500	761	477	0	0	300	50
	S. Tomé e Príncipe	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0	--
	Senegal	0	0	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0	--
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	245	0	0	--
	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	U.S.S.R.	450	694	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	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	0	0	36	48	0	43	--
	Venezuela	1845	1176	944	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	444	32	113
MEDI	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481	--
	Croatia	0	0	0	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0
	EC.España	1771	2120	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0	--
	EC.Greece	0	0	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	--
	EC.Italy	1342	1376	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463
	EC.Malta	11	18	4	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0	--
	Ex. Yugoslavia	17	19	14	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0	--
	Maroc	73	10	14	77	57	52	48	175	178	811	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246
	Tunisie	493	409	237	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	26	87	38	7	2292	932	--
	Yugoslavia Fed. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	13	1	0	0	2	6	6	6	7	8	8	0	--
KGM *Total*		11450	15656	18513	18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12439	14462	13868	14916	17775	19712	12809	13558	12473	11149	12825	10685
S.cavalla	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	--
	Brazil	848	1598	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311
	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	0	0	36	35	2	0	--
	Dominican Republic	0	0	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226	--
	Grenada	73	25	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5	--
	Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	--
	Mexico	2249	1946	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	0	0	0	0	0	--
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	9	1	1	0
	Trinidad and Tobago	0	0	0	0	20	43	11	38	82	752	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457	--
	U.S.A.	6292	10726	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	6081	6983
	Venezuela	1988	1361	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	--
KGX *Total*		197	214	339	283	20	485	22	149	261	491	105	131	225	356	301	508	512	824	156	251	1	229	48	0	15
Scomb. spp	Barbados	0	0	0	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	0	0	0	0	0	0	0
	Brazil	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
	Colombia	54	73	160	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	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	236	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	--
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	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	0
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0	0	44	48	0	--
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SMT-Table 1. Estimated landings (in t) of small tuna in 1979-2003, by region and flag.

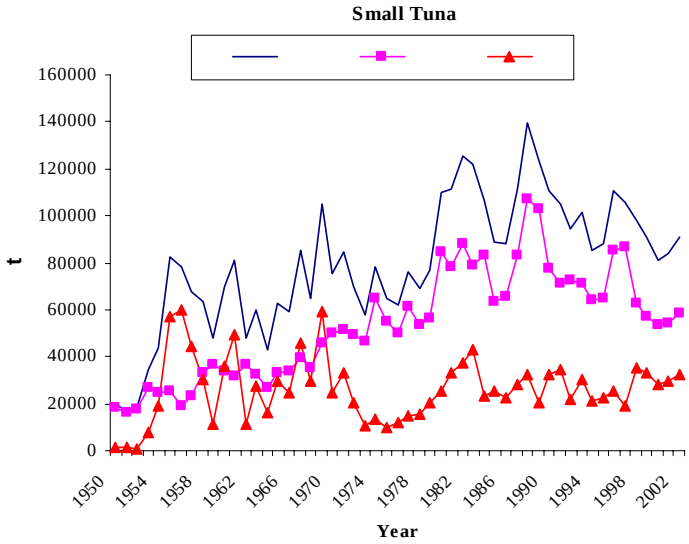
		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	0	53	84	86	134	106	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	15
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0	--
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0
	Trinidad and Tobago	143	141	179	203	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	0	0	94	90	0	0	0	0	0	0	0	0	0	0	--
LTA ***Total***		14673	19214	13847	15839	22214	20625	12896	8809	19741	25135	29855	14359	10910	21554	13682	11607	12026	14786	14147	14511	13340	13740	12994	16840	10390
E. alletteratus	ATL	11803	16440	12401	13359	20653	18975	10856	6643	17317	22730	27820	11742	8587	19798	12416	10402	10124	12667	12543	11597	10465	10446	10131	14198	10365
	MEDI	2870	2774	1446	2480	1561	1650	2040	2166	2424	2405	2035	2617	2323	1756	1266	1205	1902	2119	1604	2914	2875	3294	2863	2642	25
ATL	Angola	646	1328	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	--
	Argentina	0	0	0	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	--
	Benin	16	24	40	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69	--
	Brazil	0	0	45	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	--
	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	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	0	128	236	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	108	--
	Cuba	0	131	53	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0	--
	Côte D'Ivoire	57	177	0	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	--
	EC-France + España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681	--
	EC.España	4	485	7	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	--
	EC.France	0	0	1098	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	696	631	610	613	--
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	38	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	0	0	65	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Poland	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Portugal	5	121	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173
	Germany Democratic Rep.	0	0	0	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ghana	5547	4134	3287	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541
	Israel	0	227	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Maroc	289	16	19	26	19	15	447	47	108	49	14	367	57	370	44	43	230	588	195	189	67	101	87	308	76
	Mauritania	50	31	86	77	54	60	60	50	50	50	50	50	4	0	0	0	0	0	0	0	0	0	0	0	--
	NEI -1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33	--
	Panama	2	58	36	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	--
	Rumania	17	9	12	291	216	266	126	81	7	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	617	306	265	189	96	49	0	88	0	0	0	74	13
	S. Tomé e Príncipe	0	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0	--
	Senegal	1697	2444	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1100	1094	1094	--
	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	1	0
	St. Vincent and Grenadines	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
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1	10	1
	U.S.A.	12	88	97	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1490
	U.S.S.R.	2184	6307	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.Bermuda	7	11	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4
	Venezuela	1270	721	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50
MEDI	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148	--
	Croatia	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0
	EC.Cyprus	17	17	22	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	16	19	19	19	--
	EC.España	993	800	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0
	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	--
	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	16	24
	EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0	--
	Ex. Yugoslavia	0	0	0	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	Israel	170	105	35	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119	--
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4	--
	Maroc	6	0	61	12	0	1	0	0	0	12	0	16	0	0	0	0	1	0	1	14	8	0	0	3	1
	NEI-2	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	--
	Palestenean (Gaza strip based)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	129	--
	Syrian Arab Republic	89	80	73	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	330	--
	Tunisie	1595	1772	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	--
	Turkey*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750	*

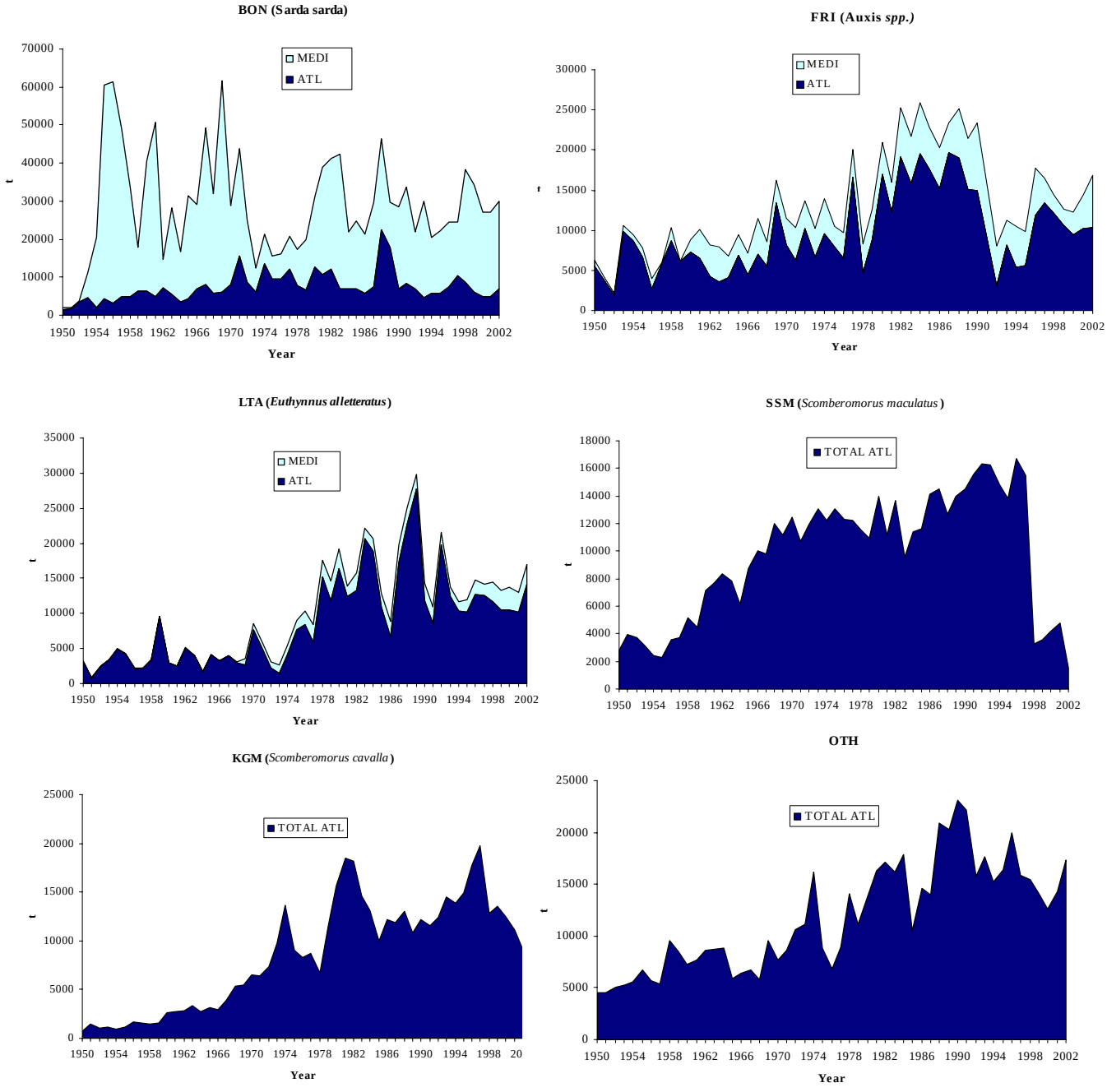
SMT-Table 1. Estimated landings (in t) of small tuna in 1979-2003, by region and flag.

		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
	Yugoslavia Fed. Rep.	0	0	0	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0	--
	Data for Turkey are uncertain and may be subject to change in the future																									
MAW *Total*		4167	4921	3156	5312	4716	4498	3989	3292	1799	3915	2934	5610	4025	1437	1775	1270	1264	1316	871	1108	727	748	727	1067	--
S.tritor	Angola	24	70	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Benin	23	35	60	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205	--
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0	--
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	298	--
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0
	Germany Democratic Rep.	0	0	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ghana	1569	4412	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	--
	Russian Federation	0	0	0	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	0	0	0	0	0	0	--
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	--
	Senegal	1112	404	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522	--
	U.S.S.R.	1439	0	0	602	1170	223	206	219	28	143	195	1240	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	0	0	0	21	0	42	--
SSM *Total*		10899	13945	11164	13633	9574	11362	11590	14117	14531	12712	13946	14500	15546	16346	16231	14777	13857	16725	15501	3241	3542	4168	4791	5110	4611
S. maculatus	Colombia	199	213	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0	--
	Cuba	400	578	657	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0	--
	Dominican Republic	415	479	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	--
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	--
	Grenada	0	1	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0
	Mexico	5751	5908	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	0	0	0	0	0	0
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27	0
	Trinidad and Tobago	1208	1337	939	1218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	U.S.A.	2926	5429	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	4660	4611
WAH *Total*		760	610	2920	2280	2366	2159	920	1151	1235	1612	1507	1470	1687	1807	2571	2104	2362	2515	3085	2483	2943	2020	2296	2253	1649
A. solandri	Antigua and Barbuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	--
	Aruba	115	115	115	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50	--
	Barbados	189	116	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0	43
	Benin	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--
	Brazil	69	1	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405
	Cape Verde	0	24	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	552	--
	Dominica	0	0	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10
	Dominican Republic	0	0	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35	--
	EC.España	0	0	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48
	Grenada	31	25	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44
	Netherlands Antilles	215	215	215	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230	--
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52	--
	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. Kitts and Nevis (Nevis based	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40
	Sta. Helena	7	10	12	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	0	0	0	0	0	0	--
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	118	1	0	0	0	0	1	1	1	2	1	9	--
	U.S.A.	0	0	0	0	0	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	846	787
	UK.Bermuda	33	46	24	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87
	Venezuela	100	57	77	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9

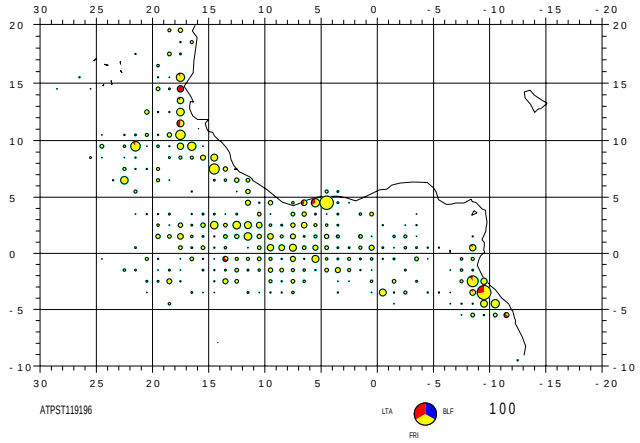
* Dashes indicate that no reports were received. Also, the 2003 data are provisional and are likely to increase.

SMT-Fig. 1. Estimated landings (t) of small tunas, all species combined, in the Atlantic and Mediterranean, 1950-2002. Data for recent years are incomplete. The continuous line represents the total, the line with squares represents the Atlantic and the line with triangles represents the Mediterranean.

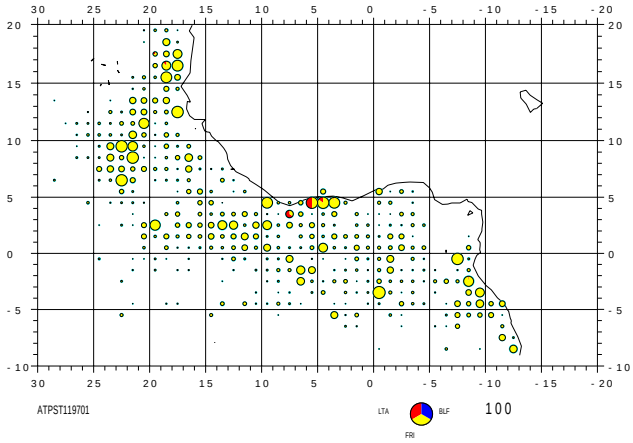




SMT-Fig. 2. Estimated landings (t) of the major small tuna species in the Atlantic and Mediterranean, 1950-2002. Data for recent years are incomplete.



SMT-Fig. 3. Catches of small tunas (FRI, LTA) from the European and associated purse seine fishery, 1991-1996 average.



SMT-Fig. 4. Catches of small tunas (FRI, LTA) from the European and associated purse seine fishery, 1997-2001 average.

8.13 Sharks

In response to the *2001 Resolution by ICCAT on Atlantic Sharks* [Ref. 01-11], The Sub-Committee on By-catch met on 14-18 June 2004 in Tokyo, Japan, to conduct stock assessments for blue shark (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*). This is a short summary of the Committee's findings based on the results of the assessments.

Pelagic sharks are caught by a variety of gears in the Atlantic Ocean, including longlines, gillnets, handlines, rod and reel, trawls, trolls, and harpoons, but they are mostly caught as by-catch (and sometimes targeted) in pelagic longline fisheries targeting tuna and swordfish. There are also recreational fisheries in some countries.

Tagging data on blue sharks from the northern Atlantic suggest that movement is restricted to within that hemisphere, with little or no connection to the Mediterranean or the southern Atlantic. The Committee carried out the analyses of blue and shortfin mako shark data under the assumption of separate North-South-Mediterranean stocks. More research is needed to give further support to these working hypotheses.

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. Reported catches are presented in **Table SHK-1**. In view of the very incomplete nature of the catch reporting to the Secretariat, the Committee attempted to construct a more accurate picture of shark catch and mortality in the Atlantic 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 an example catch history by major gear type. Although this might provide a somewhat more realistic picture of the catches of blue and mako sharks, this approximation was done with little guidance from scientists with expert knowledge about several important fleets which catch these species. The estimates thus obtained (**Table SHK-2**, **Figure SHK-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 reiterates previous recommendations for all Contracting and non-Contracting Parties to provide estimates of historical catches and dead discards of sharks from both by-catch and directed shark fisheries to the Secretariat. Both landed and dead discarded shark catch need to be monitored, especially considering that many sharks have been finned and not kept on board vessels.

Considering the limitations on the quantity and quality of the information available to the Committee, the following results should be considered as being very preliminary.

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, 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.

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.

Table SHK-1a. Nominal Catches of blue shark reported to ICCAT (landings and discards in t) by major gear and flag between 1978 and 2002.

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
ATL Total		*4*	*12*	*0*	*204*	*9*	*613*	*121*	*380*	*1162*	*1467*	*867*	*832*	*2348*	*3533*	*2343*	*7879*	*8310*	*8422*	*9036*	*36895*	*33211*	*34208*	*33462*	*34301*	*31357*
Landings	longline	0	0	0	0	0	0	0	0	0	0	0	0	1387	2265	1667	5749	7366	7501	7767	36279	32578	33790	32616	33415	31146
	others	4	12	0	204	9	613	121	380	1162	941	446	352	220	496	491	994	372	300	558	431	422	309	709	780	143
Discards	longline	0	0	0	0	0	0	0	0	0	526	421	480	741	772	184	1136	572	618	609	185	189	105	137	105	68
	others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	102	0	22	4	0	0	0
Landings	BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	27	0	0	0
	BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743	1103	0	179	1689	2173	1971
	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	276	12	11	5	54	18	0	5
	CAP-VERT	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.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	420
	EC-CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0
	EC-DENMARK	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	1	2	3	1	1	0	2	1	13
	EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29917	28137	29005	26046	25110	21037
	EC-FRANCE	4	12	0	0	9	8	14	39	50	67	91	79	130	187	276	322	350	266	278	213	163	0	395	207	109
	EC-IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	9	66	11
	EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602
	EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0	0	1	0	12	9	6
	JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2596	1589	1044	996	850	893	492	518	675
	MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
	NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2213
	PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	22	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	456	0
	SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	0	83	63
	TRINIDAD&TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	U.S.A	0	0	0	204	0	605	107	341	1112	874	355	271	87	308	215	680	29	23	283	211	255	217	291	42	0
	UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0
	URUGUAY	0	0	0	0	0	0	0	0	0	0	0	0	0	8	84	15	93	64	252	286	242	126	119	59	159
Discards	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0
	U.S.A	0	0	0	0	0	0	0	0	0	526	421	480	741	772	184	1136	572	618	710	185	195	101	137	106	68
	UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	8	0	0	0

Table SHK-1b. Nominal Catches of shortfin mako shark reported to ICCAT (landings and discards in t) by major gear and flag between 1978 and 2002.

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
ATL Total		*0*	*0*	*0*	*406*	*705*	*488*	*1131*	*3065*	*1344*	*501*	*819*	*688*	*486*	*538*	*511*	*1824*	*1352*	*2646*	*1680*	*5300*	*4105*	*3731*	*4366*	*4522*	*4792*
Landings	longline	0	0	0	21	92	120	202	118	48	39	24	18	218	328	235	1137	1017	1177	1421	5125	3941	3630	4044	4278	4527
	others	0	0	0	385	613	368	929	2947	1296	462	795	670	268	210	250	667	317	1440	259	175	165	100	322	244	266
Discards	longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	20	18	29	0	0	0	2	0	0	0
Landings	BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	190	0	27	219	409	226
	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	111	67	110	69	70	78	69	78
	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	45	23	27	19	74	126	306	22	208
	COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	10	9	15	0
	EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3777	3347	2895	2679	2921	2859
	EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	193	314	220	796	649	749	785	519	425	446	706	523	471
	EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1
	JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	248	0	0	0	0	0
	MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	16	0
	NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	459
	PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0
	SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	13	0	79	19
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
	TRINIDAD&TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	U.S.A	0	0	0	385	613	368	929	2947	1296	462	795	670	268	210	250	945	628	1703	465	408	148	69	292	395	413
	UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0
	URUGUAY	0	0	0	21	92	120	202	118	48	39	24	18	25	14	15	29	12	21	24	28	21	43	63	70	58
Discards	MEXICO	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
	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	20	18	28	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	2	0	0	0

Table SHK-2. Comparison between catches of Atlantic blue shark and shortfin mako reported to ICCAT and estimates of plausible historical catches made by the Committee.

	Shortfin mako		Blue shark		
Year	Reported	Re-estimated	Reported	Re-estimated[1]	Re-estimated[1]
1971		4213		30370	20862
1972		3597		30852	21834
1973		4502		38304	27535
1974		3848		31373	23245
1975		4767		41679	26886
1976		3667		35244	23076
1977		4266		40635	27276
1978	0	3895	4	32380	22235
1979	0	3032	12	25926	18391
1980	0	4336	0	34418	23714
1981	406	4091	204	38082	26770
1982	705	5621	9	50972	37154
1983	488	5095	613	47854	27356
1984	1131	5636	121	47260	29090
1985	3065	8867	380	58937	37872
1986	1344	7711	1162	65990	38589
1987	501	7275	1467	66854	35030
1988	819	7660	867	64643	43492
1989	688	6394	832	52222	41310
1990	486	5908	2348	53714	41571
1991	538	6311	3533	58188	45188
1992	511	5800	2343	54463	43735
1993	1824	7654	7879	63840	52411
1994	1352	7657	8310	64016	56078
1995	2646	10337	8422	66164	60465
1996	1680	7610	9036	63362	59537
1997	5300	6140	36895	56034	56034
1998	4105	6451	33211	51261	51261
1999	3731	5756	34208	53385	53385
2000	4366	6188	33462	53278	53278
2001	4522	8732	34301	50361	50361
2002	4792	8317	31357	44443	44443

[1] For blue shark two alternative methods were used to re-estimate historical catches.

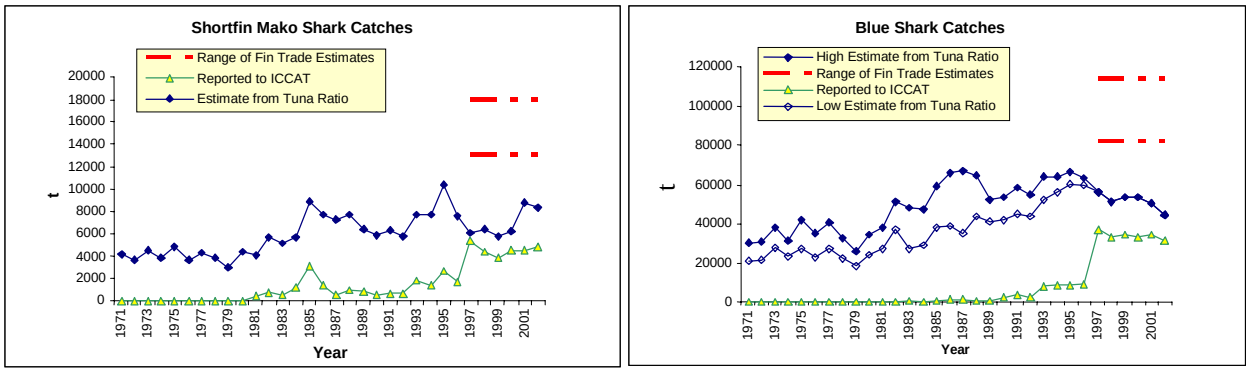


Figure SHK-1. Comparison of shark catch reported to ICCAT with estimates resulting from tuna to shark ratios and from fin trade data for shortfin mako (left) and blue sharks (right) in the Atlantic. An approximate range is also presented from a recent study of the Hong Kong shark fin trade.

9 Report of inter-sessional meetings

9.1 *BETYP Symposium*

The SCRS Chairman presented the Report of the ICCAT Bigeye Tuna Year Program Symposium. The Chairman informed the Committee that this Symposium, which was held in Madrid, Spain 8-9 March 2004, had been very successful, with many scientists participating and many scientific documents presented. It was noted that there had been consensus at the Symposium that further research on this species was needed.

The SCRS endorsed all the conclusions of the Report of the ICCAT Bigeye Tuna Year Program Symposium, which will be published in the ICCAT *Collective Volume of Scientific Papers, Vol. 57*.

9.2 Second World Meeting on Bigeye Tuna

The Secretariat presented the Report of the Second World Meeting on Bigeye Tuna, which was held in Madrid, Spain, 10-13 March 2004, in recognition of the importance of this stock in all the oceans and as a follow-up to the First World Bigeye Tuna Meeting which had been organized by IATTC in 1996. It was noted that 17 scientific documents had been presented to this meeting, and that these documents had been subjected to peer review. Those which the reviewers considered appropriate will be published in a special peer-reviewed issue of the ICCAT *Collective Volume of Scientific Papers*, and the rest would be published in the regular Collective Volume.

The SCRS endorsed the findings of the Second World Meeting on Bigeye Tuna, and agreed with the recommendation that a third World Bigeye Meeting should be held, preferably before the end of 2007, given the rapid developments in the bigeye tuna resources and fisheries. The Report of the Second World Meeting on Bigeye Tuna will be published in the *ICCAT Collective Volume of Scientific Papers, Vol. 57*.

9.3 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies

The Secretariat presented the Report of the 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies which was held in Marseille, France 17-20 May 2004. The Committee endorsed the outcome of the meeting, particularly with regard to the proposed research activities.

The Secretariat informed the Committee that Japan had extended an invitation to host a 3rd meeting of this Working Group in Japan in 2005. The Report of the 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies will be published in the ICCAT *Report for the Biennial Period, 2004-05, Part I (2004)-Vol. 1*.

9.4 7th Ad Hoc Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean

Dr. A. Di Natale presented the report of the 7th *Ad Hoc* Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean Sea, which was held in Malaga, Spain, 13-14 May 2004. Dr. Di Natale regretted that the primary aim of improving statistics on Mediterranean albacore had not been achieved at the meeting, but that 17 scientific papers had been presented which contributed to improving knowledge on the biology of Mediterranean small tuna species, bluefin tuna, swordfish and spearfish.

Mr. J. M. de la Serna drew the attention of the Committee to the research program on biology and fishing of small tuna in the Mediterranean which had been proposed by the *Ad Hoc* Joint GFCM-ICCAT Working Group [Appendix 4 to SCRS/2004/012 (SCI-028/2004)]. The SCRS endorsed the proposed program.

The report of the 7th *Ad Hoc* Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean Sea was adopted by the Committee and will be published in the ICCAT *Collective Volume of Scientific Papers, Vol. 58*.

9.5 Report of the ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna

The Report of the ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna was presented by Dr. J. M. Fromentin (EC-France). This meeting took place in Madrid, Spain, in June 2004. Dr.

Fromentin explained that this meeting had been held due to the problems with eastern Atlantic and Mediterranean data, which had rendered it impossible to carry out a reliable assessment of this stock. While further work was needed, progress had been made, and the Secretariat was currently undertaking a revision of the historical substitutions as had been requested by the participants. The Report of the ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna will be published in the ICCAT *Collective Volume of Scientific Papers, Vol. 58*.

9.6 Bigeye Tuna Stock Assessment Session

An assessment of the Atlantic bigeye tuna stock was held in Madrid, Spain, 10-13 March 2004. The report of this meeting will be published in the ICCAT *Collective Volume of Scientific Papers, Vol. 58*.

10 Reports of Special Research Programs

10.1 Bluefin Year Program (BYP)

Dr. Gerry Scott (Coordinator of the Bluefin Year Program for the West Atlantic), presented the Report for all the BYP activities carried out in 2003-2004, and the research plan and proposed expenditures for 2005.

The Report of the Bluefin Year Program is attached as **Appendix 5**, and the relevant recommendations can be found in Item 15 of this report.

10.2 Enhanced Research Program for Billfish

The Report of the Enhanced Research Program for Billfish, together with the proposed expenditures for 2005, was presented by the West Atlantic Coordinator, Dr. Eric Prince (USA). Dr. A. Kothias (Côte d'Ivoire) also gave a brief report (SCRS/2004/191) on the activities in 2003 in the East Atlantic on behalf of Dr. N'Goran Ya, the East Atlantic Coordinator, who was unable to attend the meeting. Dr. Kothias assured the Committee that any missing information in relation to the East Atlantic would be supplied by Dr. N'Goran as soon as possible.

The Report of the Enhanced Research Program for Billfish was adopted and is attached as **Appendix 6**.

10.3 Bigeye Tuna Year Program

The Secretariat informed the Committee that the Bigeye Tuna Year Program ended in March 2004, with the BETYP Symposium. A Report on the final activities of the program can be found in the Symposium Report and the BETYP Coordinator's report (SCRS/2004/010 and SCRS/2004/030, respectively).

The Secretariat explained that although approximately €97,859 remained in the program, €50,000 had already been committed for the costs of editing, publishing and distributing the BETYP and Second World Bigeye Meeting Reports (as special issues of the ICCAT *Collective Volume of Scientific Papers*), as well as for the final external audit of the accounts of the Program. In addition to the already-committed funds, a request for €11,000 had been received for deploying archival tags on bigeye tuna in the Canary Islands and endorsed by the Chairman of the SCRS.

Following the advice of the BETYP Coordination Committee, the Committee recommended that the Secretariat seek directions from the principal program donors (EC and Japan) on the use of the funds that will remain after the above expenses are made. The Committee recommended that the donors take into account the need for financing the completion of the Field Manual and a special fund to facilitate the payment of rewards for archival tags.

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

The Sub-Committee on Statistics met the week prior to the Plenary Session of the SCRS. The Convener, Dr. Pilar Pallarés, presented the report of that meeting. There was considerable discussion on the issue of electronic tagging rewards and in relation to the establishment of geographical boundaries of Task I areas. It was agreed that further work was needed on the latter, and that scientists would work in conjunction with the Secretariat during the course of the year.

The relevant recommendations of this Sub-Committee are listed under Item 15 of this report, and the Report of the Sub-Committee of Statistics is attached as **Appendix 7.**

12 Report of the Meeting of the Sub-Committee on By-catches

In the absence of Dr. Hedeiki Nakano, Convener of the Sub-Committee on By-catch, Dr. Gerry Scott presented the report, which is attached as **Appendix 8**.

Dr. Scott informed the Committee that the Sub-Committee on By-catch had held an inter-sessional meeting in Japan, 14-18 June 2004, in order to carry out a stock assessment of blue shark and short-fin mako shark, but pointed out that the data available to the group had been limited, and that more resources were needed if advances were to be made in the area of shark data collection.

The relevant recommendations from the Sub-Committee on By-catch are included in Item 15 of this Report.

13 Report of the Meeting of the Sub-Committee on Environment

The Report of the Sub-Committee on Environment, which is attached as **Appendix 9**, was presented by the Convener, Dr. Jean Marc Fromentin. During the meeting of the group, Dr. Francis Marsac gave a presentation of the GAO environmental database. The Committee commended Dr. Marsac on his presentation and agreed that this would be a very useful tool to be made available to ICCAT scientists and, if possible, it should be hosted on the ICCAT web site. The Executive Secretary assured the Committee that he was disposed to assisting the work of the scientists in any way possible, but that the legal implications, if any, of such hosting would have to be examined carefully before the Secretariat could make a firm commitment. The meeting of the Sub-Committee concluded with a discussion on the multi-specific and eco-system approach and the means of initiating this within the framework of the SCRS.

The relevant recommendations of this Sub-Committee are listed under Item 15 of this report.

14 Consideration of plans for future activities

14.1 Recommendations from the ad hoc Working Group on SCRS Organization

The Committee reviewed the report of the 2004 meeting of the Working Group **(Appendix 10)** and endorsed its recommendations, as reflected elsewhere in this report.

With regard to the organization of Species Group and SCRS meetings, the Committee supported efforts to make the work more efficient, provided such efforts were consistent with the need to adopt the report during the SCRS Plenary and as long as some flexibility was maintained in years with a heavy assessment workload. It was recommended that the amount spent making verbal summaries of the national reports (so-called "country reports") be shortened as much as possible.

The Committee Recommended that, each year, the SCRS Chairman send a letter similar to the model in Addendum 2 to Appendix 10 to all Contracting Parties that do not participate in the SCRS Plenary.

In relation to the discussion on the replacement of the scientific editor, the Executive Secretary paid tribute to the work of Dr. Julie Porter, for her excellent editorial and publication work and for her organizational capacitites, and regretted her decision to leave the Secretariat. The Committee seconded the words of the Executive Secretary.

The Committee noted that considerable progress had been made in the improvement of the SCRS organization. It was suggested that the Chairman of the SCRS examine the possibility of broadening the membership of the *ad hoc* Working Group to include other experts, but some delegations were of the opinion that too large a group would be counterproductive. It was clarified that while the intention was not to be exclusive, it was the small size of the working group which had allowed the group to make progress. It was further stressed that there was full transparency in relation to the conclusions of the group, and that all the advice made by the group was forwarded in a written report to the SCRS plenary, where there was opportunity for full discussion by all delegations. The

Chairman agreed that he was not in favor of enlarging the group too much, but noted that he would consider this matter next year.

14.2 Inter-sessional meetings proposed for 2005

The Committee discussed the meeting schedule and reached the following conclusions:

Meeting	*Notes*	*SCRS Recommendation*
Billfish Data Preparatory Meeting	To produce estimates of catches and relative abundance indices.	The Committee recommends that this be held in the first half of 2005. Brazil offered a tentative invitation to host this meeting.
BUM & WHM Assessments	To be assessed in 2005 according to [Rec. 02-13].	The Committee recommends that the assessments not be carried out before 200
ALB Data preparatory	Proposed by albacore group to examine size data and substitutions by fishery.	The Committee recommends that this meeting take place at least 2 months before the assessment.
ALB-North Assessment	To be assessed in 2005 according to [Rec. 03-06].	The Committee recommends that the assessment be carried out in 2006.
BFT (West & East+Med)	To be assessed in 2005 according to [Rec. 02-08] and [Rec. 03-08].	The Committee recommends that the assessment for the eastern stock be done using simple methods.
SWO stock Structure Workshop	Proposed by SWO group.	The Committee recommends that the workshop take place at the end of 2005 or beginning of 2006. EC-Greece hoped to be in a position to be able to host this meeting.
Tropical spp. Workshop	Proposed by tropical species groups to evaluate alternatives to 3.2 kg minimum size.	The Committee recommends that a multi-species evaluation of the minimum size be made in 2005.
BFT planning meeting	Proposed by BFT group to develop a research plan.	The Committee recommends that this meeting be held at least 2 months before the 3rd Meeting of the Integrated and Coordinated Management Strategies meeting.

The Committee again stressed the importance of regular participation in the working groups, at assessments and other studied of all Parties, Entities or Fishing Entities operating important fisheries.

14.3 Date and place of the next SCRS Meeting

It was agreed that the next meeting of the Standing Committee on Research and Statistics would be held in Madrid, 3-7 October 2005.

15 Recommendations

15.1 General recommendations to the Commission that have financial implications

15.1.1 Tropical tuna species

In response to the Recommendation by the Commission [Rec. 03-01] regarding the 3.2 kg minimum size for bigeye tuna, and due to the multi-specific nature of the surface fisheries operating in the East Atlantic, the Committee recommends that in 2005 a Working Group be held to evaluate measures to reduce mortality of juvenile tunas and to evaluate the overall impact of such measures on these fisheries.

The Committee noted with satisfaction the improvements in data from the Ghanaian purse seine and baitboat fisheries and recommends the continuation of assistance to improve these data.

15.1.2 Albacore

The Committee recommended that a Workshop be held prior to the 2005 assessment on albacore in order to prepare and review basic input information and investigate the uncertainties relating to the North Atlantic catch-at-age identified in the last assessment trial conducted in 2003.

15.1.3 Bluefin tuna

SCRS recommendation on bluefin assessment

Pursuant to the wishes of the Commission, the SCRS has scheduled an assessment of Atlantic Bluefin tuna for 2005, including western Atlantic, eastern Atlantic and Mediterranean components.

However, the Report of the 2004 ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna (SCRS/2004/013) concluded that the uncertainties in size data substitutions are so numerous that it is not defensible to assess the East Atlantic and Mediterranean stock using methods that assume that the catch-at-size(age) is known exactly (e.g., VPA). For the next assessment, the Bluefin Tuna Species Group will explore the use of simpler assessment methods that do not use size/age data.

Additionally, in the Report of the 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Management Strategies, the Commission's Working Group indicated that it would be elaborating a range of management options on which the SCRS might give advice at the 2005 Commission Meeting. This elaboration will occur early in 2005 and might include special consideration of the application and effectiveness of controls, such as time and area closures, additional measures to facilitate rebuilding of spawning fish, and the implications of fishing activities in the central Atlantic.

Also, the SCRS notes three fundamental aspects of the current assessment procedures: (1) basic catch-at-size and catch-per-unit-effort (CPUE) data do not change substantially from one assessment to the next, especially in the west; (2) long-term projections of assessment results have been shown to be less reliable than the assessment, itself; and (3) uncertainties about the extent and kind of mixing throughout the Atlantic and Mediterranean remain. It is unlikely that an assessment of data accumulated prior to the 2005 meeting will provide significant changes in current understanding of the status of Atlantic bluefin.

Therefore, the SCRS makes the following recommendation for the organization and conduct of the 2005 assessment:

> Emphasis should be placed on updating current assessments based on the catches, on catches at size and age, and on CPUEs. The Bluefin Working Group should update and estimate these indicators using existing methodologies, and examine the results to determine if it is likely that significant changes have occurred.
>
> Simple assessment approaches such as yield-per-recruit analyses and tagging results should be evaluated for the eastern Atlantic and Mediterranean stock.
>
> Additionally, simulation analyses should be conducted to evaluate the robustness and effectiveness of these procedures.
>
> In the case of the western Atlantic assessment, for continuity it may be required that the assessment analyses that have been used previously be updated. However, emphasis should be placed on actual updates and not on developing new methodologies. Additionally, the SCRS feels that quantitative long term projections of the assessment results may not be justified, given present data uncertainties and uncertainties in movements and mixing. Therefore, the SCRS should focus on shorter term qualitative advice about future conditions of the stock.
>
> The Working Group should be prepared to evaluate the management scenarios that might be defined by the Commission's Working Group to Develop Integrated and Coordinated Atlantic Bluefin Management Strategies at their 2005 meeting to the extent that data and time allow. Additionally, simulations should be explored to examine robustness of these evaluations to uncertainties in important factors such as mixing.

The SCRS recommends that an external expert be hired to Chair the 2005 assessment meeting, using ICCAT peer-review program funding. This will require preparation time for the chair, in addition to the actual time of the meeting.

Bluefin Year Program Research Plan for 2005

The Committee recommends that the Commission support the large-scale Bluefin Research Initiative in 2005 in order to further develop this plan

The Committee recommends expenditures of up to €50,000 to cover expenses associated with stock structure and maturity sampling, tagging and larval sampling in 2005.

15.1.4 Billfish

The Committee recommends continued funding of the Enhanced Research Program for Billfish (ERPB) as shown in **Appendix 6**.

The Committee recommends conducting the next assessment of marlins through a three-stage process:

1 Hold a preparatory assessment meeting in the first half of 2005 to produce estimates of catches and relative abundance indices, but will not attempt to obtain new estimates of population benchmarks. These relative abundance indices and estimated catches will be used to monitor recent changes in stock abundance for marlins and a preliminary evaluation of the success of the marlin rebuilding plan.

2 Participate in the Fourth International Billfish Symposium to be held in Avalon, California, November 2005 in order to collate the most up to date information on billfish biology and billfish fisheries.

3 Have a full assessment of blue and white marlin in 2006 when the information in age and growth and habitat will be available and when there will be a minimum of five extra years of data for each marlin stock.

15.1.5 Swordfish

The Committee recommends that a workshop on the topic of swordfish stock structure be held in 2006. The workshop shall be convened by the Mediterranean swordfish Rapporteur and assisted by the Secretariat.

15.1.6 Small tuna

The Committee endorses the research program on biology and fishing of small tuna in the Mediterranean Sea described in the Report of the 7th *Ad hoc* Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean Sea, and recommends that the concerned Contracting Parties support this effort.

15.1.7 Sub Committee on Statistics

Given the low response to the Survey on Statistic Collection System, the Committee reiterated the importance of the questionnaire to facilitate the work of the SCRS and it recommends that those countries which have not responded do so as soon as possible.

The Committee emphasizes the need for all Contracting Parties to submit Task I and II data by the deadline date set by the SCRS and using only the ICCAT official languages, coding systems, and standard procedures, and also recommends that Task I data submitted later than a week before the beginning of the SCRS species group meeting not be included in the catch statistics.

Regarding electronic tags the Committee recommends that the Secretariat facilitate advance payment of rewards for returned tags, and establish mechanism for the repayment of the used funds with each individual tagging entity.

The Committee recommends that Contracting Parties make a special effort to improve shark landings estimates by developing special projects with that specific goal and to make efforts to estimate historical catches by species.

The Committee recommends that all Contracting Parties implement the Statistical Document for swordfish, bigeye, and bluefin. Given the importance of correct identification of the origin of the catches, the Committee recommends that, where possible, information on the individual documents be submitted in electronic format. The Committee also agreed that requesting statistical documents on live imports would be helpful because these documents can provide very useful data.

The Committee recommends that the plans to publish an ICCAT Manual proceed quickly. In order to do this in a reasonable timeframe (i.e. two years), €50,000 are needed (€25,000 annually). The Committee recommends that the Secretariat actively seek donors to accomplish this (e.g., from special contributions to the Data Fund or from remaining funds in programs like the BETYP).

15.1.8 Sub Committee on By-catch

The Committee recommends that the Commission consider hiring a By-catch Coordinator at the Secretariat and to encourage Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities to enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics

Given that improvements in the ICCAT shark database can only be achieved if the Parties increase infrastructure investment into monitoring the overall catch composition and disposition of the overall catch of sharks and other by-catch species, the Committee recommends that, should the Commission wish improved advice on the status of these and other by-catch species, larger research investment should be made. This investment should include, as a minimum, participation in Working Group meetings by national scientists who have knowledge of the fleets impacting on these species.

The Committee recommends that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities continue to develop and conduct observer programs for their own fleets to collect accurate data on shark and other catches on species, including discards

15.1.9 Sub-Committee on Environment

The Committee recommends that the GAO environmental database of IRD be hosted on the ICCAT website, and that a group comprising the project-manager/designer, Dr. F. Marsac, the Convener of the Sub-Committee on Environment, and a member of the Secretariat resolve the legal questions relating to this hosting.

15.1.10 Ad Hoc Working Group on SCRS Organization

The Committee recommends that the Scientific Editor position be advertised and filled by a candidate with the required qualifications, following the same selection process used in the past.

The Committee recommends that the external peer review funds be used in 2005 to bring an independent scientist to chair the bluefin tuna stock assessment meeting. Sufficient funds should be made available to retain the expert's services for a period of 2-3 weeks.

15.1.11 SCRS Plenary

The Committee recommends that the budget for the SCRS Plenary meeting take into account the contracting of high-speed internet access facilities.

15.2 Other recommendations

15.2.1 Tropical tuna species

Statistics

The Committee recommends that the Secretariat continue its efforts to corroborate the reported statistics of tropical tunas (Task I and Task II) with other sources of catches (e.g. exploring the feasibility of obtaining the flag and ocean of origin of historical import statistics.

The Committee recommends that the size database be closely examined for internal consistency in collaboration with the national scientists, before the proposed workshop in 2005.

The Committee acknowledges the improvement of data on longline fisheries in the western Atlantic Ocean, and recommends the continuation of these efforts.

The available indices of abundance for tropical tunas are still limited. All Contracting Parties, Entities, or Fishing Entities conducting fisheries for these species should provide detailed information on fishing practices so that more indices can be developed and used in the assessment. In particular, the development of abundance indices for younger ages is strongly encouraged. The Committee also recommends the development of standardized indices for the new data from the Brazilian longline fisheries that catch tropical tunas.

Research

The Committee proposes to hold a workshop in 2005 that will respond to the Commission Recommendation [Ref. 03-01] regarding the 3.2 kg minimum size limit and alternative management measures. The proposed workshop will be held prior to the SCRS general meeting. The Committee suggests that the evaluation of alternative measures will concern not only bigeye tuna but should include other tropical tunas (yellowfin and skipjack tunas) due to the multi-species nature of the fishery, particularly the surface fisheries in the Gulf of Guinea. The workshop should address the likelihood of success of the different alternatives given the current operation of the surface fisheries, including the current moratorium on FAD operations. Specific recommendations of research for the 2005 workshop are provided in the Tropical Tunas Work Plan for 2005.

The Committee recommends that the 2005 workshop should begin by revising and analyzing the updated comprehensive tagging information of tropical tunas to provide estimates of natural mortality, in particular for the early ages. Additionally, the Committee recommends that the ratio of natural mortality and fishing mortality of juvenile tropical tunas be examined.

The Committee recommends a review of recent information on age and growth of skipjack tuna.

15.2.2 Sub Committee on Statistics

The Committee recommends the complete validation of the traditional tagging data by Contracting Parties and by non-Contracting Parties, Entities, and Fishing Entities, and species groups. Regarding the data set for sharks it is recommended that the Secretariat contact the entities responsible for the data to solve pending problems.

The Committee is concerned about the possibility of duplicate codes/tag numbers among countries with active tagging programs. The Committee recommends that all Contracting Parties should provide the Secretariat with all tag codes and tag types used in order to establish a protocol to avoid possible code duplications. The Secretariat should contact non-Contracting Parties and research institutes to request the same information.

Based on the good results of the Mediterranean historical data revision carried out by ICCAT Secretariat and FAO-FIDI, the Committee recommends that similar work be conducted to cover the Atlantic Ocean.

The Committee emphasizes the need to develop conversion factors for swordfish and bigeye for various product types and fleets as soon as possible.

The Committee recognizes the need to define Task I areas and recommends that the Secretariat work on the proposal presented this year, in conjunction with national scientists, and submit a new proposal to the next SCRS.

The Committee recommends making all working documents available only in electronic format (pdf format) through the Secretariat. Authors of working documents will be asked to provide only ten hard copies for consultation at the time of the meetings (instead of the current request of 80 copies).

The Committee recommends that each species group continue to report on where data deficiencies exist and make suggestions on how to improve data recording, in order to respond to the Recommendation [Ref. 03-21] by the Commission.

16 Responses to Commission's requests

16.1 Review of Japanese data on North Atlantic swordfish [Rec. 02-02]

In 2002, the Commission recommended that SCRS shall, in 2003 and 2004, review the Japanese swordfish catch, including discards. The Committee reviewed the swordfish catches reported by Japan, as outlined in Japan's Annual Report and estimated dead discards and live releases for 2000-2003 based on the logbook data, radio reports of fishing activities by Japanese longline fleet vessels and multiple sources of size frequency data, which were documented in SCRS/2004/186. The method for the estimation of discards and releases used in 2003 is the same one which was reviewed by the SCRS in 2002.

Japan reported landings of swordfish for the years 2000-2003 of 161, 0, 0, and 0 t from the North Atlantic management area, and 788, 694, 900 and 959 t from the South Atlantic management area, respectively. Japan also reported dead discards from the North Atlantic management area of 583, 578, 239, and 102 t for 2000-2003, respectively. The recent decrease in dead discards is mainly due to the decrease in fishing effort and to changes of the fishing grounds in the North Atlantic. The Committee noted that the 2003 landings and discard reports should be considered provisional and subject to a general upward revision, as additional logbook reports from Japanese vessels become available.

16.2 Alternative measures to protect juvenile bigeye tuna [Rec. 03-01]

The 2003 *Recommendation by ICCAT on Bigeye Tuna Conservation Measures* [Rec. 03-01] mandated the SCRS to "conduct an analysis of the effectiveness of the current minimum size recommendations and ... advise in 2004 on alternative measures for the protection of juvenile bigeye, taking into account the current moratorium."

Bigeye tuna are caught as part of a multi-specific fishery that includes yellowfin and skipjack. This is especially true for the surface fleets that are responsible for most of the catch of juvenile bigeye. Any measure thus taken in order to conserve or regulate catches on one species will have an impact on the catch of the others. In the case of the minimum size regulation for bigeye, the catch of skipjack, the primary target species of the purse seine fleet, will likely be affected. This multi-specific character also complicates the analysis of the potential impact or the realized effectiveness of single-species regulations.

The 1979 *Recommendation by ICCAT on a Bigeye Tuna Size Limit* [Rec. 79-01] established a 3.2 kg minimum size for Atlantic bigeye with a 15% tolerance in numbers of fish, with the objective of reinforcing a minimum size regulation for yellowfin. It must be noted that for bigeye, which is a relatively long-lived species, the size at first capture that would theoretically maximize yield-per-recruit is likely well above the 3.2 kg limit recommended by the regulation. This limit was established under very different conditions than the ones under which the fishery currently operates, was only proposed to strengthen the yellowfin minimum size regulation, and was not based on a scientific analysis. The complete implementation of this Recommendation could have reduced fishing mortality on juveniles, especially as the exploitation rate on the stock increased, thereby helping to avoid growth over fishing and, in the long term, to avoid recruitment over fishing. However its exact impact remains unknown and its potential result could only be established through detailed analyses of the fishery. Compliance with this measure has never been effectively achieved largely due to the characteristics of the purse seine gear and operations, the principal source of fishing effort on juveniles. For European purse seiners, the proportion of juveniles in the total catch in numbers has always remained high, independently of the total catch (**Figure 16.2.1**).

The size composition of the catches is the result of two related factors: the physical/technical characteristics of the gear, and the way in which it is deployed (when, where and how). Currently, it is not possible to alter the first factor for purse seiners. Therefore, a reduction in the purse seine fishing mortality of juvenile bigeye could occur from the implementation of measures that affect the way purse seine operations are conducted, e.g., through time-area closures where juveniles are found (as is intended by the moratorium). Furthermore, tropical tuna purse seine sets are multi-specific and any change in the way operations are conducted that could reduce the catch of juvenile bigeye would impact the catch of the other species, mainly skipjack.

In the current situation of Atlantic bigeye where reductions in fishing mortality, especially on juveniles, are recommended, and where the main component of juvenile fishing mortality comes from gears like purse seine, any measures based on catch or effort controls, such as the moratorium, are more effective for reducing mortality on juveniles. The implementation of such alternative management measures could improve the overall

exploitation pattern and consequently benefit the stock (**Figure 16.2.2**), but needs to be part of a complete management strategy for tropical tuna.

A number of possible alternative management measures could be envisaged, but ascertaining their direct and indirect effects is a complex task due to the multi-specific and multi-gear nature of this fishery. A number of biological parameters with a large impact on the results of such analyses remain highly uncertain. Of particular importance is the case of natural mortality by age. For example, natural mortality by age of tropical tuna greatly influences the relative importance of the mortality exerted on juveniles by purse seiners, but its value is not well determined.

A more complete answer to the request of the commission is very likely to require a directed effort from the Working Group. A possible way forward is the organization of a workshop devoted to addressing alternative measures for the protection of juvenile tropical tuna as proposed in the Work Plan attached as **Appendix 11**.

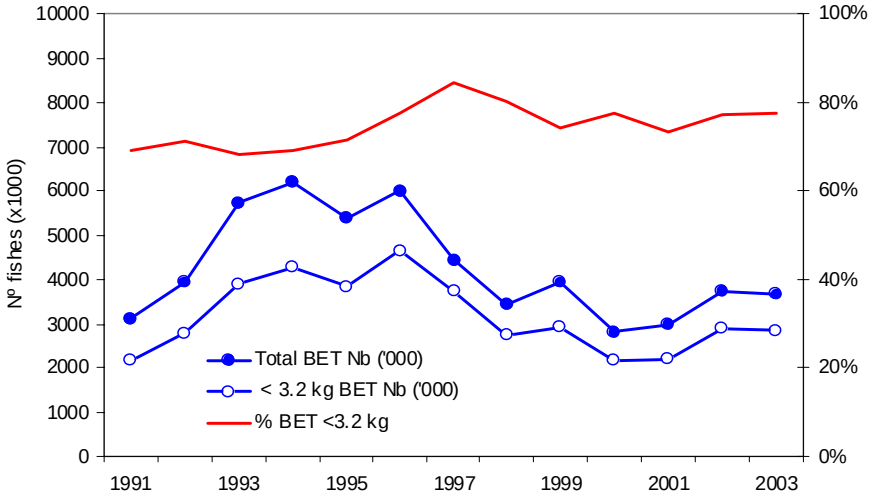


Figure 16.2.1. Numbers and proportion of juvenile bigeye tuna in the total catch of European purse seiners.

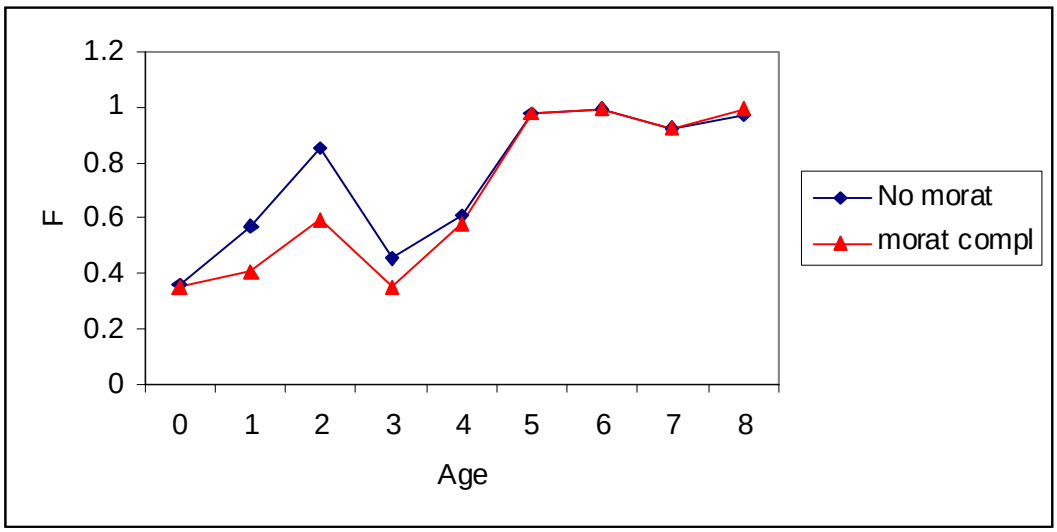


Figure 16.2.2. Effect of implementation of the moratorium on the reduction of juvenile fishing mortality. Upper line: without moratorium. Lower line: with moratorium.

16.3 Consideration of sampling programs for farmed bluefin

No new information was submitted to the SCRS on this subject. The Committee suggests that the terms "farming" and "fattening" be interpreted interchangeably in future considerations related to Recommendation [Rec. 03-09].

16.4 Data Fund [Res. 03-21]

Approximately €16,000 was made available for the Data Fund during 2004 before the SCRS Meeting. While no activities have been undertaken with these funds in 2004, the Committee endorses the protocol for use of the funds shown in **Addendum 1 to Appendix 10**.

16.5 Plan for port sampling [Res. 03-21]

Based on the discussions held by the Sub-Committee on Statistics, the Committee recommends that each species group evaluate data deficiencies and report on the need to conduct port sampling, and the required level of funding for this activity.

16.6 Enhanced research program for bluefin tuna (from Marseille meeting, May 2004)

In the Report of the 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Management Strategies, the Commission's Working Group (Marseille, France, 17-20 May 2004) agreed that the Bluefin Tuna Research Program proposed by the SCRS in 2003 (SCRS/2003/014) offered the prospect of a more coherent effort of harmonized and coordinated research. However, they recommended that the SCRS, at its 2004 Meeting, should re-examine this program with a view to identifying priority actions which could be undertaken, as well as a corresponding revised budget on a more modest level.

In order to respond to this request from the Working Group and the Commission, the SCRS makes the following recommendation:

The original Research Plan (SCRS/2003/014) grouped the research activities into four major categories: (I) Basic Data, including catch and effort statistics, reproductive biology and mortality; (II) Stock Structure, including tagging, spawning sites, biological markers and spatial distributions; (III) Environmental Variability; and (IV) Modeling, including Operational models, assessment models and management procedures. Given the Commission's desire (as expressed by the Working Group) for a more modest budget, the SCRS recommends that research over the short term be focused on research activities I, II and IV, in that activity III (Environmental Variability) is likely to require a longer term research effort.

In order to further prioritize within the remaining research activities (Basic Data, Stock Structure and Modeling) and to develop specific budget options for those activities, the SCRS recommends that a research planning meeting(s) be held during the next year. These discussions (in which there are sessions for each of the three major research activities) should include SCRS bluefin scientists and appropriate external experts invited by ICCAT to participate. Funds will be required to support the travel of the outside experts. Through this process, the SCRS will provide a revised Bluefin Research Plan for the consideration by the Commission in 2005.

The revised Bluefin Research Plan will provide prioritized research activities, within each of the three broad areas described above, that may result in reduced total funding requirements. However, the SCRS wishes to note that a coordinated research effort, even at a more modest level, will require a Coordinator. For example, the Coordinator would assure that ongoing and planned research by national laboratories is not duplicated. Absorption of coordination duties by either the Secretariat or National scientists will not be sufficient.

In order to facilitate the transfer from the low level BYP research activities to the Bluefin Research Plan, it is recommended that funding of €150,000 be provided to support the research planning and coordination tasks that are necessary.

16.7 Alternative to reduce catches of juveniles or dead discards of swordfish in the Atlantic

In 2001, the Commission resolved that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing entities should evaluate any long-term time-area closures implemented within the Convention Area for vessels flying their flag for the purpose of reducing the mortality of undersized swordfish and present such

evaluation in the form of a scientific paper to the SCRS for consideration [Res. 01-04]. The Commission also resolved that the purpose of such evaluation should be to determine if such time-area closures implemented by a Contracting Party and/or a Regional Fishery management organization may be as effective, or are likely to be more effective, in reducing the mortality of undersized swordfish caused by vessels flying its flag as the ICCAT minimum size requirement in effect for that Contracting Party at the time of such evaluation, if such requirement were fully complied with.

During the 2004 SCRS meeting, the committee reviewed a preliminary evaluation of the potential of time-area closures and minimum size regulations described in Document SCRS/2004/128. The effectiveness of the two measures in reducing the mortality of undersized swordfish due to fishing was evaluated by using simulation modeling and estimating the potential changes in the number and relative number of discards which could follow the adoption of a time-area closure or a minimum size regulation. The simulation-evaluation framework proposed for the analysis made use of a detailed population dynamics model and probabilistic analysis to describe the dynamics of North Atlantic swordfish and the fisheries which target it. The analysis mainly focused on the effects of those measures on the number of undersized fish caught in the US fishery. However, some general results associated with the fishing practices of all swordfish fisheries in the North Atlantic were also derived.

For constant catch quotas, the preliminary evaluation indicated that the adoption of a minimum size limit (MSL) could lead to higher fishing pressure on older fish. If no gear or fishery behavior changes take place, then the higher fishing pressure could also lead to higher catches of fish of illegal size which would be discarded. Thus, the potential of a MSL regulation to reduce the fishing mortality of undersized swordfish depends on the proportion of fish which survive once they have been thrown back to the sea as well as on secondary effects (not considered in the preliminary evaluation) which could reduce the overall capacity of the fleet. The effects of the MSL on the status of the stock depended on the factors described above as well as on the level of reduction in the size of mature fish population due to the additional fishing pressure on fish with size greater than the MSL. The adoption of an area closure (MPA) might lead to smaller increases in the fishing pressure on older fish since a portion of fish with size smaller than the MSL can be exploited (the fish which are outside the MPA). However, for the same reason, the MPA might fail to reduce the mortality in undersized swordfish. In addition, the analysis suggested that the adoption of a MSL together with a MPA could lead to greater reduction in the mortality of undersized swordfish than the adoption of either an MSL or MPA alone. The Committee noted that those predictions were in line with the outcome of previous considerations of the effects of area-time and minimum size regulations on the mortality of immature fish.

The Committee recommended additional evaluations of the assumptions made in the preliminary analysis are needed before stronger conclusions could be drawn relative to the conservation equivalency of the specific actions taken by the U.S. fleet. The Committee noted, however, that the restrictions placed on the U.S. fleet (MPA and MSL) in combination, have resulted in reduced catches and dead discards of juvenile swordfish by the U.S. fleet as documented in the U.S. Annual Report.

The Committee also noted that in recent years, there has been a higher level of recruitment (age 1 abundance) to the North Atlantic swordfish stock without a corresponding increase in the percentage of fish <125cm LJFL landed by some important fleets which do not make significant discards. This combination may have also contributed to a substantial reduction in the fishing mortality of juvenile swordfish. These observations suggest that at least some fleets have introduced changes in fishing operations which resulted in avoidance of small fish catch as a result of the ICCAT MSL and domestic controls. The simulations done in SCRS/2004/178 do not take into account such changes in fishing behavior and the Committee recommends that future evaluations be structured to account for such change, based on the available information, to provide improved advice on the effects of MSL, MPA, and other management controls designed to reduce fishing mortality on juvenile swordfish.

16.8 Bluefin tuna dead discards

The SCRS considered the Commission's Recommendation [Rec. 02-07] which stated that "Contracting Parties should review their methodology for estimating dead discards, make revisions in estimates of dead discards, as appropriate, and report to SCRS". This recommendation was made with reference to bluefin tuna.

It appeared unlikely that a single method for estimating dead discards would be appropriate for all contracting parties. Contracting Parties are however encouraged to continue to document this source of mortality which remains incomplete for many fisheries.

Finally, it was agreed that for the upcoming assessment of bluefin tuna, both Canada and the United States would table estimates of discards from both observers and logbook information to determine if the assessment results continue to be insensitive to the method of estimation of dead discards.

17 Other matters

The Committee asked the Secretariat to explain why there was no report available for the peer review of the bigeye stock assessment. The Secretariat explained that after multiple attempts to contact the external expert throughout the summer, it was apparent that the peer review report was not completed in time before the SCRS due to personal reasons. The Secretariat also explained that the receipt of the review report was required under the terms of reference of the program and, as such, it would not be possible to reimburse the expert for his travel expenses. The Committee requested that the Secretariat nevertheless contact the reviewer and encourage him to send a report for information purposes.

18 Adoption of report and closure

The Report of the SCRS was adopted by the Committee.

The SCRS Chairman thanked the participants, the interpreters and the Secretariat for their contribution to the success of the meeting, and adjourned the meeting of the 2004 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 data and research
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 (Blue shark and Mako shark)
9. Report of inter-sessional meetings
   9.1 BETYP Symposium
   9.2 2nd World Meeting on Bigeye Tuna
   9.3 2nd meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies
   9.4 7th Ad hoc Joint GFCM-ICCAT Meeting on Stocks of Large Pelagic Fishes in the Mediterranean
   9.5 Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna
   9.6 Bigeye Tuna Stock Assessment Session
10. Reports of Special Research Programs
    10.1 Bluefin Year Program (BYP)
    10.2 Enhanced Research Program for Billfish
    10.3 Bigeye Tuna Year Program (BETYP)
11. Report of the Meeting of the Sub-Committee on Statistics
12. Report of the Sub-Committee on By-catches
13. Report of the Sub-Committee on Environment
14. Consideration of plans for future activities
    14.1 Recommendations from the *ad hoc* Working Group on SCRS Organization
    14.3 Inter-sessional meetings proposed for 2005
    14.3 Date and place of the next meeting of the SCRS
15. Recommendations
    15.1 General recommendations to the Commission that have financial implications
    15.2 Other recommendations
16. Responses to Commission's requests
    16.1 Review of Japanese data on N. Atlantic swordfish [Rec. 02-02]
    16.2 Alternative measures to protect juvenile bigeye tuna [Rec. 03-01]
    16.3 Consideration of sampling programs for farmed bluefin [Rec. 03-09]
    16.4 Data fund [Res. 03-21]
    16.5 Plan for port sampling [Res. 03-21]
    16.6 Enhanced research program for bluefin tuna (from Marseille meeting, May 2004)
    16.7 Alternative to reduce catches of juveniles or dead discards of swordfish in the Atlantic
    16.8 Bluefin tuna dead discards
17. Other matters
18. Adoption of report and closure

Appendix 2

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Appendix 3

LIST OF SCRS DOCUMENTS

NUMBER	TITLE	AUTHOR	SUBJECT
SCRS/2004/010	2004 ICCAT Bigeye Tuna Year Program Symposium.	Anon.	
SCRS/2004/011	Report of the Second World Meeting on Bigeye Tuna.	Anon.	
SCRS/2004/012	Report of the 7th *Ad Hoc* Joint GFCM-ICCAT Meeting on Stocks of Large Pelagics Fishes in the Mediterranean.	Anon.	
SCRS/2004/013	Report of the 2004 ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna.2004 ICCAT East Atlantic Bluefin Data Preparatory Meeting.	Anon.	
SCRS/2004/014	Report of the 2004 ICCAT Shark Stock Assessment Session.	Anon.	
SCRS/2004/015	Report of the 2004 ICCAT Bigeye Stock Assessment Session.	Anon.	
SCRS/2004/027	Report on the 2003 moratorium on the use of fish aggregating devices (FADs) by surface fleets fishing of tuna in the Gulf of Guinea.	Anon.	BET
SCRS/2004/028	Progress of the ICCAT Enhanced Research Program for Billfish in the western Atlantic Ocean during 2004.	PRINCE, E.D.	BIL
SCRS/2004/030	General overview of the Bigeye Tuna Year Program (BETYP).	FISCH, G.	BET
SCRS/2004/031	Update of basic data on BETYP tagging recoveries in eastern tropical Atlantic, January 2004.	BARD, F.X.	BET
SCRS/2004/032	Movements of tropical tunas from the tuna associated baitboat fishery of Dakar and from BETYP and historical tagging operations in the Atlantic Ocean.	HALLIER, J-P.	BET
SCRS/2004/033	Análisis de los datos de marcado de patudo en las islas Canarias.	DELGADO DE MOLINA, A, J. Ariz, R. Delgado de Molina, J.C. Santana, P. Pallarés.	BET
SCRS/2004/034	Behavior of bigeye tuna in a baitboat fishery.	PEREIRA, J.G.	BET
SCRS/2004/035	Improvements in the Ghanaian tuna statistics collection system.	BANNERMAN, P., P. Pallarés, P. Kebe.	BET
SCRS/2004/036	Bigeye pop-up tagging results in Azorean waters.	ARRIZABALAGA, H., J.G. Pereira.	BET
SCRS/2004/037	Swimming behavior of adult bigeye tuna using pop-up tags in the central North Atlantic Ocean.	MATSUMOTO, M., H. Saito, N. Miyabe.	BET
SCRS/2004/038	Aggregation of bigeye tuna: Simulation of free-swimming schools versus schools with fish aggregating devices.	POWERS, J.E.	BET
SCRS/2004/039	Growth of bigeye tuna (*Thunnus obesus*) in the eastern Atlantic Ocean from tagging-recapture data and otolith readings.	HALLIER, J-P., B. Stequert, O. Maury, F.X. Bard.	BET
SCRS/2004/040	Genetic structure of bigeye tuna (Thunnus obesus) in the Atlantic Ocean.	MARTÍNEZ, P., R. Zardoya.	BET
SCRS/2004/041	FASST: A fully age-size and space-time structured statistical model for the assessment of tuna populations.	MAURY, O., B. Faugeras, V. Restrepo.	BET
SCRS/2004/050	A comparison of bigeye (*Thunnus obesus*) stocks and fisheries in the Atlantic, Indian and Pacific oceans.	FONTENEAU, A., J. Ariz, A. Delgado, P. Pallares, R. Pianet.	BET
SCRS/2004/051	The impact of hydrological conditions on the catch results of bigeye tuna in Polish longline fishing.	PELCZARSKI, W., M. Kędra.	BET
SCRS/2004/052	Development of the Canadian fishery for bigeye tuna (*Thunnus obesus*) from 1994 to 2002.	NEILSON, J.D., H.S. Stone, E.H. Carruthers.	BET
SCRS/2004/053	Preliminary analysis of the relationship between fork length, round weight and dressed weight and the relationship between round weight and dressed weight of bigeye tuna (*Thunnus obesus)* sampled from China tuna longlining fleet in central Atlantic Ocean.	LIMING, S, X. Liuxiong, C. Xinjun.	BET
SCRS/2004/054	Preliminary analysis of the biological characteristics of Bigeye tuna (*Thunnus obesus*) sampled from China tuna longlining fleet in central Atlantic Ocean.	LIMING, S, X. Liuxiong, C. Xinjun.	BET
SCRS/2004/055	Preliminary analysis of the relationship between bigeye tuna (*Thunnus obesus*) vertical distribution and the temperature, salinity in the central Atlantic Ocean.	LIMING, S, X. Liuxiong, C. Xinjun.	BET
SCRS/2004/057	Conventional and archival tagging of bigeye tuna (*Thunnus obesus*) in the eastern equatorial Pacific Ocean.	SCHAEFER, K.M., D.W. Fuller.	BET
SCRS/2004/058	A description of tag-recapture data for bigeye tuna (*Thunnus obesus*) in the western and central Pacific Ocean.	HAMPTON, J., P. Williams	BET
SCRS/2004/059	An overview of bigeye tuna (*Thunnus obesus*) growth studies and implications for age-structured stock assessment.	BROWN, C.	BET
SCRS/2004/060	How to model the size-dependent vertical behaviour of bigeye tuna (*Thunnus obesus*) in its environment?	MAURY, O.	BET
SCRS/2004/061	Tuna natural mortality as a function of their age: the bigeye tuna (*Thunnus obesus*) case.	FONTENEAU, A., P. Pallares	BET
SCRS/2004/062	Bigeye tuna (*Thunnus obesus*) behavior and physiology and their relevance to stock assessments and fishery biology.	BRILL, R., K.A. Bigelow, M.K. Musyl, K.A. Fritsches, E.J. Warrant.	BET

SCRS/2004/063	The development of an operational model and simulation procedure for testing uncertainties in the Atlantic bigeye (*Thunnus obesus*) stock assessment.	PALLARES, P., M. Soto, D.J. Die, D. Gaertner, I. Mosqueira, L. Kell.	BET
SCRS/2004/064	Status of ICCAT stock assessment of bigeye tuna (*Thunnus obesus*): Current and future perspective.	MIYABE, N., Y. Takeuchi, H. Okamoto, V. Restrepo.	BET
SCRS/2004/066	Assessment of bigeye tuna (*Thunnus obesus*) in the eastern Pacific Ocean.	HARLEY, S., M. Maunder, R.B. Deriso.	BET
SCRS/2004/067	Recent developments in fisheries, data collection and stock assessment for bigeye tuna (*Thunnus obesus*) in the western and central Pacific Ocean.	HAMPTON, J., A. Langley, P. Williams.	BET
SCRS/2004/068	Reproductive characteristics of swordfish (*Xiphias gladius*) caught in the south-western Mediterranean during 2003.	MACÍAS, D., A. Hattour, J.M. de la Serna, M.J. Gómez-Vives, D. Godoy.	SWO
SCRS/2004/069	Reproductive characteristics of Atlantic bonito (*Sarda sarda*) from the south-western Spanish Mediterranean.	MACÍAS, D., M.J. Gómez-Vives, S. García, J.M. Ortiz de Urbina.	SMT
SCRS/2004/070	Some reproductive aspects of bullet tuna (*Auxis rochei*) from the south-western Spanish Mediterranean.	MACÍAS, D., M.J. Gómez-Vives, J.M. de la Serna.	SMT
SCRS/2004/071	Preliminary standardized bluefin tuna (*Thunnus thynnus* L.) catch rates from the Spanish and Moroccan trap fisheries in the Straits of Gibraltar, 1998-2002.	DE LA SERNA, J.M., A. Srour, N. Abid, J.M. Ortiz de Urbina.	BFT
SCRS/2004/072	Investigations on Atlantic black skipjack (*Euthynnus alletteratus* Raf. 1810) in the eastern Mediterranean Sea.	KAHRAMAN, A.E.	SMT
SCRS/2004/073	Investigations on bonitos (*Sarda sarda*, 1793) on the southern Black Sea coast of Turkey.	ZENGİN, M., F. S. Karakulak, I.K. Oray.	SMT
SCRS/2004/074	Biological parameters of bullet tuna (*Auxis rochei*) observed in the Spanish Mediterranean fisheries.	LA SERNA, J.M., J.M. Ortiz de Urbina, E. Alot, S. García, P. Rioja.	SMT
SCRS/2004/075	Preliminary standardized bluefin tuna catch rates from Spanish artisanal fisheries in the Straits of Gibraltar.	ORTIZ DE URBINA, J.M., J. M. de la Serna, E. Rodríguez-Marín, E. Alot, P. Rioja.	BFT
SCRS/2004/076	Characterization of the bluefin tuna spawning habitat off the Balearic archipelago in relation to key hydrographic features and associated environmental conditions.	GARCÍA, A., F. Alemany, P. Velez-Belchí, J.L. López Jurado, D. Cortés, J.M. de la Serna, C. González Pola, J.M. Rodríguez, J. Jansá, T. Ramírez.	BFT
SCRS/2004/077	Mediterranean data available in ICCAT database.	ICCAT Secretariat.	STAT
SCRS/2004/078	A summary about the biology of Atlantic bonito, *Sarda sarda* (Block, 1793), in the western and central Mediterranean.	ORSI RELINI, L., F. Garibaldi, C. Cima, G. Palandri, L. Lanteri, M. Relini.	SMT
SCRS/2004/079	Size frequency composition of the Mediterranean spearfish catches in the Tyrrhenian Sea and in the Strait of Messina in 2003.	DI NATALE, A., A. Mangano, A. Celona, M. Valastro.	BIL
SCRS/2004/080	Catch, by-catch and indices of population status of blue shark (*Prionace glauca*) in the Canadian Atlantic.	CAMPANA, S., L. Marks, W. Joyce, N. Kohler.	BYC
SCRS/2004/081	Discrepancies between the ICCAT and FAO data bases for tuna catches in the Mediterranean	L. GARIBALDI and Kebe, P.	STAT
SCRS/2004/082	The Levantine Sea: A spawning ground for the bluefin tuna (*Thunnus thynnus* L.) .	KARAKULAK, S., I. Oray, A. Corriero, M. Deflorio, D. Spedicato, N. Santamaria, S. Desantis and G. De Metrio	BFT
SCRS/2004/083	Updated standardized catch rates of bluefin tuna (*Thunnus thynnus*) from the trap fishery in Tunisia.	HATTOUR, A., J.M. de la Serna, J.M. Ortiz de Urbina.	BFT
SCRS/2004/084	Concernant l'activité d'engraissement du thon rouge dans les eaux tunisiennes.	HATTOUR, A.	BFT
SCRS/2004/085	Les prises accessoires des madragues et des sennes tournantes tunisiennes.	HATTOUR, A., D. Macias, J.M. de la Serna.	BYC
SCRS/2004/086	Commentaires des prises de thon rouge a la madrague tunisienne de Sidi Daoud.	HATTOUR, A.	BFT
SCRS/2004/087	Preliminary study on age and growth of juveniles of *Sarda sarda*, Block and *Euthynnus alletteratus*, Rafisnesque caught by clupeoids purse seine in the southern Italian seas.	SANTAMARIA, N., M. Deflorio, G. De Metrio.	SMT
SCRS/2004/088	Contribution of a chapter on albacore tuna for the revised ICCAT Field Manual	ALONSO, C,., H. Arrizabalaga, and V. Restrepo	GEN
SCRS/2004/089	STOMAC: A database for storing information on stomach contents	POTIER M. , J-J. Lechauve , FX Bard , R. Sabatié and F. Ménard	TROP
SCRS/2004/090	Overview of East Atlantic bluefin tuna stock data availability and deficiencies.	ICCAT Secretariat	BFT
SCRS/2004/091	Results of the 2003 observer program on-board of the French purse seiner targeting Atlantic bluefin tuna in the Mediterranean Sea.	FROMENTIN, J-M., H. Farrugio.	BFT
SCRS/2004/092	Description of bluefin tuna targeted and non-targeted fisheries in the Bay of Biscay from 1990 to the present	RODRIGUEZ-MARIN E., C. Rodriguez-Cabello, S. Barreiro, and J.L. Cort	BFT
SCRS/2004/093	The effect of eastern Atlantic and Mediterranean bluefin tuna sampling error on the catch-at-age.	ARRIZABALAGA, H.	BFT
SCRS/2004/094	A tool for the graphic display of the geographic distribution of catch and effort data: Applications for the bluefin tuna stock structure issue.	NEILSON, J.D., G.A.P. Black.	BFT

SCRS/2004/095	Summary of Canadian bluefin tuna sampling activities supported by the ICCAT Bluefin Tuna Year Program.	SMITH, S.C; J. Neilson and EH Carruthers	BFT/BYP
SCRS/2004/096	Conversion of farmed bluefin tuna product weight to live weight of the fish.	TIČINA, V., L. Grubišić, I. Katavić, V. Franičević, V. E. Tičina, M. Ožić.	BFT
SCRS/2004/097	Determining bluefin tuna habitat through frontal features in the Mediterranean Sea.	ROYER, F., J-M. Fromentin, H. Farrugio, P. Gaspar.	BFT
SCRS/2004/098	Bluefin tuna (*Thunnus thynnus* L.) line fisheries in the Italian seas. Old and recent data.	DI NATALE, A., A. Mangano, C. Piccinetti, E. Ciavaglia, A. Celona.	BFT
SCRS/2004/099	Bluefin tuna (*Thunnus thynnus* L.) catch composition in the Tyrrhenian Sea and in the Straits of Sicily in 2002 and 2003.	DI NATALE, A., A. Mangano, A. Asaro, M. Bascone, A. Celona, M. Valastro.	BFT
SCRS/2004/100	Peer review report of the 2004 ICCAT pelagic shark assessment meeting.	SIMPFENDORFER, C.A.	BYC
SCRS/2004/101	Factors for conversion of fin weight into round weight for the blue shark (*Prionace glauca*).	SANTOS, M.N., A. Garcia.	BYC
SCRS/2004/102	Blue shark (*Prionace glauca*) length composition from the Venezuelan pelagic longline observer program in the north-western Atlantic: period 1994-2003.	AROCHA, F., R. Tavares, J. Silva, L. Marcano.	BYC
SCRS/2004/103	Reproductive and distribution parameters of the blue shark *Prionace glauca*, on the basis of on on-board observations at sea in the Atlantic, Indian and Pacific oceans.	MEJUTO, J., B. García-Cortés.	BYC
SCRS/2004/104	Tagging-recapture activities of large pelagic sharks carried out by Spain or in collaboration with the tagging programs of other countries.	MEJUTO, J., B. García-Cortés, A. Ramos-Cartelle.	BYC
SCRS/2004/105	Use of an age-structured model for the stock assessment of blue shark in the north Atlantic.	APOSTOLAKI, P., E. Cortés, E. Babcock, E. Brooks, L. Beerkircher.	BYC
SCRS/2004/106	Characteristics of blue, *Prionace glauca*, and shortfin mako, *Isurus oxyrinchus*, shark by-catch observed on pelagic longlines in the northwest Atlantic, 1992-2003.	BEERKIRCHER, L. R.	BYC
SCRS/2004/107	Longline-caught blue shark (*Prionacea glauca*): factors affecting numbers available for live release.	DIAZ, G.A., J.E. Serafy.	BYC
SCRS/2004/108	Indices of blue and mako shark abundance derived from U.S. Atlantic recreational fishery data.	SKOMAL, G., E.A. Babcock, E.K. Pikitch.	BYC
SCRS/2004/109	Surplus production model applied to the data for blue and mako sharks available at the 2001 ICCAT Bycatch Working Group and other published data.	BABCOCK E. A., E. Cortes.	BYC
SCRS/2004/110	Catch-free stock assessments with application to Goliath grouper (*Epinephelus itajara*) off southern Florida.	PORCH C.E., A.M. Eklund, G. P. Scott.	BYC
SCRS/2004/111	Standardized catch rates for blue shark and shortfin mako shark from the US pelagic logbook and US pelagic observer program, and US weighout landings.	BROOKS, E.N., M. Ortiz, L.K. Beerkircher, Y. Apostolaki, G.P. Scott.	BYC
SCRS/2004/112	A framework for estimating movement and fishing mortality rates of the blue shark, *Prionace glauca*, in the North Atlantic Ocean from tag-recapture data.	AIRES-DA-SILVA, A., I. Taylor, A.E. Punt, V.F. Gallucci, N.E. Kohler, P.A. Turner, R. Briggs, J.J. Hoey.	BYC
SCRS/2004/113	Report of observer program for Japanese tuna longline fishery in the Atlantic Ocean from August 2003 to January 2004	MATSUMOTO, T., H. Saito, N. Miyabe.	GEN
SCRS/2004/114	MOVEMENTS OF BLUEFIN TUNA (THUNNUS THYNNUS L.) TAGGED IN THE MEDITERRANEAN SEA WITH POP-UP SATELLITE TAGS.	DE METRIO, G., G.P. Arnold, J.M. de la Serna, J.L. Cort, B.A. Block, P. Megalofonou, M. Lutcavage, I. Oray, M. Deflorio	BFT
SCRS/2004/115	Quantités et tailles des requins capturés par la pêcherie de filet maillant dérivant en Côte d'Ivoire.	N'GORAN, Y. N., Y. Kouassi, B. Barrigah.	BYC
SCRS/2004/116	Estimation of shark catches by Japanese tuna longline vessels in the Atlantic Ocean.	MATSUNAGA, H., H. Nakano.	BYC
SCRS/2004/117	Summary of species composition and nominal CPUE of pelagic sharks based on observer data from the Japanese longline fishery in the Atlantic Ocean from 1995 to 2003.	SENBA, Y., H. Nakano.	BYC
SCRS/2004/118	Methods for using Japanese logbook data to construct catch and CPUE time series for blue shark (*Prionace glauca*) in the Atlantic Ocean.	CLARKE, S., H. Nakano, Y. Takeuchi.	BYC
SCRS/2004/119	Standardized CPUE for blue sharks caught by the Japanese longline fishery in the Atlantic Ocean, 1971-2003.	NAKANO, H., S. Clarke.	BYC
SCRS/2004/120	Trends in standardized CPUE for shortfin mako shark caught by the Japanese longline fishery in the Atlantic Ocean.	SENBA, Y., Y. Takeuchi.	BYC
SCRS/2004/121	Comparison of Japanese logbook and observer data for shortfin mako (*Isurus oxyrinchus*) in the Atlantic Ocean using Bayesian GLM methods.	CLARKE, S., H. Nakano, Y. Takeuchi.	BYC
SCRS/2004/122	Demographic analysis on Atlantic blue and shortfin mako sharks.	TAKEUCHI, Y., Y. Senba.	BYC
SCRS/2004/123	CPUE and associated data for blue shark from the Irish sport fishery.	FITZMAURICE, P., G. Keirse, P. Green, M. Clarke, M. Kenny.	BYC
SCRS/2004/124	Stock discrimination of the blue shark, based on Irish tagging data.	FITZMAURICE, P., P. Green, G. Kierse, M. Kenny, M. Clarke.	BYC
SCRS/2004/125	Synopsis of biological information available on blue shark, *Prionace glauca*, from the southwestern Atlantic Ocean.	HAZIN, F., R. Lessa.	BYC

SCRS/2004/126	Standardized CPUE from sharks and blue sharks caught by Chinese Taipei longline fishery in the South Atlantic Ocean.	LIU, K-M., W-P. Tsai, S-J. Joung.	BYC
SCRS/2004/127	Re-visiting benchmark estimates from the catch-free model applications to blue shark and shortfin mako shark.	BROOKS, E.N.	BYC
SCRS/2004/128	A preliminary evaluation of the effectiveness of minimum size regulations versus marine protected areas for North Atlantic swordfish stock.	APOSTOLAKI, P.	SWO
SCRS/2004/129	Developing Bayesian mark-recapture estimators of abundance, harvest rate and growth rate for Atlantic swordfish (*Xiphias gladius).*	CARRUTHERS, T., M. McAllister.	SWO
SCRS/2004/130	Standardized catch rates by sex and age for swordfish (*Xiphias gladius)* from the U.S. longline fleet 1981-2003.	ORTIZ, M.	SWO
SCRS/2004/131	Estimates of bigeye (*Thunnus obesus*) bycatch by the Spanish surface fleets in the Northeast Atlantic for 2002-2003.	V. ORTIZ DE ZÁRATE. V., I. Artetxe, C. Rodríguez-Cabello, I. Mosqueira, S. Barreiro.	BET
SCRS/2004/132	Standardized Japanese longline CPUE for bigeye tuna in the Atlantic Ocean up to 2003.	OKAMOTO, H., K. Satoh, N. Miyabe.	BET
SCRS/2004/133	Standardized catch rates for bigeye tuna (*Thunnus obesus*) from the pelagic longline fishery in the northwest Atlantic and the Gulf of Mexico.	ORTIZ, M.	BET
SCRS/2004/134	Datos estadísticos de la pesquería de túnidos de las Islas Canarias durante el periodo 1975 a 2003.	ARIZ, J., R. Delgado de Molina, J.C. Santana, A. Delgado de Molina.	BET
SCRS/2004/135	Estadísticas Españolas de la pesquería atunera tropical, en el Océano Atlántico, hasta 2003.	DELGADO DE MOLINA, A., P. Pallarés, J.C. Santana, R. Delgado de Molina, J. Ariz, R. Sarralde.	BET
SCRS/2004/136	Esfuerzo de la pesquería artesanal de túnidos de las Islas Canarias.	PALLARÉS, P., A. Delgado de Molina, J. Ariz, J.C Santana, R. Delgado de Molina.	BET
SCRS/2004/137	Standardized catch per unit effort of bigeye tune (*Thunnus obesus*) caught by Taiwanese longline fleets in the Atlantic Ocean.	HSU, C-C., H-H. Lee.	BET
SCRS/2004/138	Statistiques de la pêcherie thonière FIS durant la période 1991-2003.	PIANET, R., V. Norström, A. Hervé, N. N'Goran Ya, T. Diouf.	BET
SCRS/2004/139	Statistiques de la pêcherie thonière Europeenne et assimilée durant la période 1991-2003.	PIANET, R., P. Pallares, V. Norström, A. Hervé, A. Delgado, J. Ariz.	BET
SCRS/2004/140	Life history characteristics of *Makaira nigricans*, *Tetrapturus albidus*, and *Istiophorus platypterus* from the western central Atlantic.	AROCHA, F., L.A. Marcano.	BIL
SCRS/2004/141	Preliminary observations on gonad development, sexual maturity and fecundity estimates of white marlin (*Tetrapturus albidus*) from the western central Atlantic.	AROCHA, F., A. Bárrios, J. Silva, D.W. Lee.	BIL
SCRS/2004/142	The influence of the moon phase on the CPUEs for the Portuguese swordfish (*Xiphias gladius* L., 1758) fishery.	DOS SANTOS, M.N.	SWO
SCRS/2004/143	Metazoan parasitic infections of swordfish (X*iphias gladius* L., 1758) from the Mediterranean Sea and the Gibraltar area.	MATTIUCCI, S., V. Farina, L Mariniello, A. Garcia, M.N dos Santos, G. Nascetti.	SWO
SCRS/2004/144	Distribution of tuna larvae in the Eastern Mediterranean Sea: Preliminary results of the larval survey in 2004	ORAY, Isik K.	BFT
SCRS/2004/145	Compilation and analyses of Canadian conventional tagging data for swordfish (*Xiphias gladius*), 1961-2004.	SPERLING, A.T., J.D. Neilson, E.H. Carruthers and H.H. Stone.	SWO
SCRS/2004/146	Game fishing off Sao Paulo State Coast in Brazil (1996-2004).	DE AMORIM, A.F., B.O. da Silva.	BIL
SCRS/2004/147	Reproduction and stomach content analysis of sailfish *Istiophorus platypterus* off Rio de Janeiro State, RJ, Brazil.	PIMENTA, E.G., G. Lima, J.C.Cordeiro, M. Tardelli, A.F. Amorim.	BIL
SCRS/2004/148	Sustainable system for Istiophoridae and alike off northern Rio de Janeiro State, Brazil.	PIMENTA, E.G., G. Lima, J.C. Cordeiro, F.A. Amorim.	BIL
SCRS/2004/149	Tuna fishing analysis in the south and southeast of Brazil from 1971 to 2001.	ANUSKA-PEREIRA, M., A.F. Amorim, C.A. Arfelli.	TROP
SCRS/2004/150	Fishery biology of the yellowfin tuna, *Thunnus albacares*, in southern Brazil.	COSTA, F.E.S., F.M.S. Braga, A.F. Amorim, C.A. Arfelli.	YFT
SCRS/2004/151	An overview of the activity of the Spanish surface longline fleet catching swordfish (*Xiphias gladius*) during the year 2002, with special reference to the Atlantic Ocean.	MEJUTO, J.B. García-Cortés, J.M. de la Serna, A. Ramos-Cartelle	SWO
SCRS/2004/152	Visual acuity and olfactory sensitivity in the swordfish (*Xiphias Gladius*) for the detection of prey during field experiments using the surface longline gear with different bait types.	MEJUTO, J. U. Autón, M. Quintans.	SWO
SCRS/2004/153	Length-weight relationships and length-length conversions of tunas and swordfish in the northeast of Brazil.	LINS OLIVEIRA, J.E., J.A. Vasconcelos, P. Travassos, J.G. Junior, J.P. Aldatz.	GEN
SCRS/2004/154	Aspects of the dynamic population of blackfin tuna (*Thunnus atlanticus*, Lesson, 1831) caught in the northeast Brazil.	VIEIRA, K.R., J.E. Lins Oliveira, M.C. Barbalho, J.P. Aldatz.	SMT
SCRS/2004/155	Reproductive characteristics of blackfin tuna (*Thunnus altanticus*, Lesson, 1831) in northeast Brazil.	VIEIRA, K.R., J.E. Lins Oliveira, M.C. Barbalho, J.G. Junior.	SMT
SCRS/2004/156	The effect of environmental factors and of the fishermen strategy on the skipjack tuna (*Katsuwonus pelamis*) CPUE in the southwest Atlantic.	ANDRADE, H.A., A.L. Tozetto, J.A.T. Santos.	SKJ
SCRS/2004/157	Swordfish (*Xiphias gladius*) and blue shark (*Prionace glauca*) fishery and the dynamics of the fleet off southeastern Brazilian coast.	MAYER, F.P., H.A. Andrade.	SWO, BYC

SCRS/2004/158	Swordfish (*Xiphias gladius* L.) catch composition in the Tyrrhenian Sea and in the Straits of Sicily in 2002 and 2003.	DI NATALE A., A. Mangano, A. Asaro, M. Bascone, A. Celona, E. Navarre, M. Valastro.	SWO MED
SCRS/2004/159	First information about the Atlantic bonito (*Sarda sarda* L.) catch composition in the Tyrrhenian Sea and in the Straits of Sicily in 2002 and 2003.	DI NATALE A., A. Mangano, A. Asaro, M. Bascone, A. Celona, E. Navarra, M. Valastro.	SMT MED
SCRS/2004/160	A series of catch records by the harpoon fishery in the Strait of Messina from 1976 to 2003.	DI NATALE A., A. Celona, A. Mangano.	BFT
SCRS/2004/161	Pilot study on tuna sport fishing activity in Italy.	DI NATALE A., P. Addis, A. Cau, A. Celona, N. Cingolani, M. Deflorio, G. De Metrio, C. Fuggetti, F. Garibaldi, A. Mangano, G. Marano, G. Palandri, A.M. Pastorelli, C. Piccinetti, L. Relini Orsi, M. Valastro.	BFT
SCRS/2004/162	Size frequency composition of the albacore (*Thunnus alalunga*) catches in the Tyrrhenian Sea and in the Straits of Sicily in 2002 and 2003.	DI NATALE, A., A. Mangano, A. Celona, M. Valastro.	ALB MED
SC RS/2004/163	Actividades desarrolladas en el programa de investigacion intensiva sobre marlines en Venezuela: Período 2003-2004.	MARCANO, L.A., F. Arocha, J. Alío, J. Marcano, A. Larez.	BIL
SCRS/2004/164	Developing Bayesian mark-recapture methods for Atlantic Bluefin Tuna (*Thunnus thynnus thynnus*) to provide estimates of movement rates and improve estimates of harvest rates.	SHEMLA, A.,M.K. McAllister.	BFT
SCRS/2004/165	Microsatellite and mitochondrial DNA analyses of Atlantic bluefin tuna (*Thunnus thynnus thynnus*) population structure in the Mediterranean Sea.	CARLSSON, J., J.R. Mcdowell, P. Díaz-Jaimes, J.E.L. Carlsson, S.B. Boles, J.R. Gold, J.E. Graves.	BFT
SCRS/2004/166	Preliminary evaluation of the effects of North Atlantic bluefin tuna mixing: Summary of the main findings.	APOSTOLAKI, P., M. McAllister, E. Babcock.	BFT
SCRS/2004/167	Length to weight conversions for wahoo, *Acanthocybium solandri*, in the northwest Atlantic.	BEERKIRCHER, L.R.	SMT
SCRS/2004/168	Overview of the SEFSC Pelagic Observer Program in the northwest Atlantic from 1992-2002.	BEERKIRCHER, L.R., C.J. Brown, D.L. Abercrombie, D.W. Lee.	GEN
SCRS/2004/169	Historique de la production nationale de thonidés en Algérie	Ministère de la Pêche et des Ressources Halieutiques	STAT
SCRS/2004/171	Open environmental databases for Open-Sea Fisheries Biologists	FROMENTIN, J.M., F. Royer, F. Marsac	GEN
SCRS/2004/172	GAO: An environmental database and software designed for fisheries biologists	MARSAC, F.	GEN
SCRS/2004/173	Ageing based on spine sections reading of North Atlantic albacore (*Thunnus alalunga*): precision, accuracy and agreement.	Ortiz De Zarate, V., J.Landa, M.Ruiz and C. Rodriguez-Cabello	ALB
SCRS/2004/174	Spanish albacore *(Thunnus alalunga)* surface fishery in the northeastern Atlantic in 2003.	Ortiz De Zarate, V., S. Barreiro and C. Rodríguez-Cabello	ALB
SCRS/2004/175	A review of bluefin tuna juveniles tagging information and mortality estimation in waters around the Iberian Peninsula.	RODRIGUEZ MARIN, E., C. Rodriguez-Cabello, J.M. De la Serna, J.L. Cort, E. Alot, J.C. Rey, V. Ortiz de Zarate, J.L. Gutierrez and E. Abad	BFT
SCRS/2004/176	Report of the bluefin tuna direct ageing network.	RODRIGUEZ MARIN, E..	BFT
SCRS/2004/177	First results about swordfish (*Xiphias gladius*) fecundity in the central and western Mediterranean. An updated approach.	Macias, D, A. Fenech-Farrugia A, JM de la Serna, MJ Gómez-Vives y L. Lema	SWO
SCRS/2004/178	Preliminary results on fecundity of Atlantic bonito *(Sarda sarda)* caught in southwestern Spanish Mediterranean traps.	Macias, D, L. Lema, , MJ Gómez-Vives y JM de la Serna	BON
SCRS/2004/179	Datos sobre la actividad de la flota atunera española de cerco y barcos de apoyo pescando en el océano atlántico, obtenidos por observadores desde 2001 al 2004.	R. Sarralde, J. Ariz, A. Delgado de Molina, P. Pallarés y J.C. Santana.	TROP
SCRS/2004/180	Evolución de las capturas y del esfuerzo de pesca de la flota española de cerco tropical en el océano atlántico tras la aplicación de las moratorias voluntarias y la recomendación de CICAA, sobre el establecimiento de una veda de zona y temporada al uso de dispositivos agregadores de peces.	J. Ariz, A. Delgado de Molina, P. Pallarés, R. Sarralde y J.C. Santana.	TRP
SCRS/2004/181	Estimación de capturas de las especies accesorias y de los descartes en la pesquería de cerco de túnidos tropicales en el océano atlántico oriental, entre 2001 y 2004	A. Delgado de Molina, R. Sarralde, P. Pallarés, J.C. Santana, R. Delgado de Molina y J. Ariz.	TROP-BYC
SCRS/2004/183	Preliminary Results of the 2004 Bluefin tuna larval surveys off different Mediterranean sites (Balearic Archipelago, Levantine Sea and the Sicilian Channel).	A. García, Alemany, F. de la Serna, J.M. Oray, I, Karakulak, S. Rollandi, L. Arigò A. and Mazzola, S.	BFT
SCRS/2004/184	Observed by-catch of Taiwanese tuna longline fishery in Atlantic Ocean.	JOUNG, S.-J., K-M Liu, and H-H Hsu	BYC
SCRS/2004/185	Report on the progress in implementation of the measures to eliminate illegal, unreported and unregulated large scale tuna longline fishing vessels.	Fisheries Agency of Japan	GEN
SCRS/2004/186	Swordfish dead discards and live releases by Japanese longliners in the North Atlantic Ocean in 2002-2003.	Yokawa, K. And T. Fukuda	SWO
SCRS/2004/187	Observed by-catch of Taiwanese tuna longline fishery in Atlantic Ocean.	Shoou-Jeng Joung1, Kwang-Ming Liu2, and Hwa-Hsin Hsu	BYC

SCRS/2004/188	Advances in a pilot study for the development of a fish image database from pelagic longline fishery in the western central Atlantic.	F. Arocha and D.W. Lee	GEN
SCRS/2004/189	Report on the Mediterranean BYP Tuna larval meeting.	ORAY, I., S. Karakulak, A. Garcia, C. Piccinetti, L. Rollandi and J.M. de la Serna	BFT
SCRS/2004/190	Can we detect the effects of environmental variations on fish populations through VPA outputs? The North Atlantic albacore case.	L.T. Kell, J.M. Fromentin, V. Ortiz de Zarate and H.Arrizabalaga	ENV
SCRS/2004/191	Rapport du Coordinateur du Programme Billfish pour l'Atlantique Est pour l'année 2003.	N'Goran Ya, N.	BIL

Appendix 4

OPENING ADDRESS AND STATEMENT TO THE PLENARY

4.1 OPENING ADDRESS

Mr. Driss Meski, Executive Secretary of ICCAT

Mr. Chairman, Honorable Delegates, Ladies and Gentlemen,

First of all, I would like to welcome you to this meeting of the Scientific Committee of our Organization. I am very pleased to meet you in Madrid for the first time as the Executive Secretary of ICCAT.

I take this occasion to confirm my full support and that of the entire ICCAT staff as well as our full support of all the initiatives that are aimed at improving the results of our work.

The work of the Scientific Committee is of capital importance to our organization. In this sense, I would also like to pay homage to the scientists who have contributed to the research in the areas of concern to ICCAT for their efforts and sacrifices made towards the objective of increasing knowledge on the aspects related to the tuna species in our Convention area. The results of your work of which our annual meetings are tributary, constitute a fundamental basis for the Commission's important decisions.

Thanks to the efforts of the Scientific Committee the work of the Commission meetings progresses considerably and as a result, today ICCAT is a reference in matters of management of the tuna resources.

The scientific research for which I personally have considerable affinity is an inevitable means for the development of any plan of action and decision concerning the management measures that may be undertaken. For this, you will have from the Secretariat all the support you need to accomplish the mission assigned to the Scientific Committee.

As you know, all the Contracting Parties, Cooperators and other organizations closely follow the work of our Commission. I hope that the results of this meeting respond to their concerns and provide the responses to their questions.

I wish you total success in your work during this week. Thank you.

4.2 STATEMENT BY INTERGOVERNMENT ORGANIZATION TO THE PLENARY

Food and Agriculture Organization of the United Nations (FAO)

Text provided by J. Majkowski of FAO:

"Dr. Jacek Majkowski reported on activities of the Food and Agriculture Organization of the United Nations (FAO) that were of particular relevance to SCRS. He concentrated on the activities carried out by FAO's Marine Resource Service and mentioned various other activities of FAO. Referring to various Agenda Items of this Meeting, he emphasized the very close collaboration of one of FAO's fishery body, General Fisheries Commission for the Mediterranean (GFCM) and ICCAT, which is reflected in these Items.

Dr Majkowski outlined the objectives, activities and results of FAO's Project on the Management of Tuna Fishing Capacity: Conservation and Socio-Economics. He presented the conclusions and recommendations contained in the Statement prepared by the Technical Advisory Committee (TAC) for the Project at its 2nd Meeting held in Madrid, Spain in March 2004. He indicated that the Statement was presented to the Technical Consultation to Review and Promote the Full Implementation of the IPOA to Prevent, Deter and Eliminate IUU Fishing and the IPOA on the Management of Fishing Capacity (Rome, June 2004), resulting in some recommendations specific to the western and central Pacific.

Dr Majkowski also mentioned further developments of FAO's Fisheries Global Information System (FIGIS), pointing out the catch data and other information on tuna and tuna-like species that are available from that System. Referring the 2003 Meeting of FAO's Committee on Fisheries (COFI), he mentioned Expert and Technical Consultations and other meetings organized by FAO on IUU fishing, fishing capacity, turtles and CITES. He also mentioned various projects implemented by FAO in various regions which involve tuna.

Concluding his presentation, on behalf of FAO and GFCM, Dr Majkowski expressed thanks to ICCAT for its collaboration with FAO and GFCM and its contribution of its data, other information and expertise to FAO and GFCM. He mentioned the help provided by Dr Victor Restrepo, Assistant Executive Secretary of ICCAT to the FAO Project on the Management of Tuna Fishing Capacity and to other activities of FAO and GFCM."

Appendix 5

BLUEFIN YEAR PROGRAM (BYP)
EXECUTIVE SUMMARY

The Bluefin Tuna Year Program Working Group reviewed the progress made under the Bluefin Year Program, concluding that most of the research goals outlined for 2001 to 2004 had been met.

The current financial status is reviewed below and recommendations are made for direct BYP-funded research, for 2005 in particular, and for the future in general. The two primary areas of research considered important by the Working Group are stock structure and maturity, and the particular expenditures needed to accomplish the Working Group objectives in 2005 are outlined. While sampling for stock structure and maturity 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 elevated the quality and quantity of research proposals for consideration under the BYP. It is obvious that future funding levels need to be significantly elevated.

Financial report

The financial status of the BYP funds through 5 October 2004 was reviewed. With the expected 2005 Commission contribution of €15,000, the 2005 BYP operating budget should be on the order of €50,000.

Progress made on 2003-2004 BYP Research Plan

Biological sampling

The main objective of biological sampling within the BYP is in support of research on stock structure by means of genetic analyses (tissue) and microconstituents analyses (otoliths); research on reproduction (gonads) and research on growth (spines and vertebrae). Sampling in the eastern Atlantic as well as western, central and eastern Mediterranean was accomplished, as planned. For 2003-2004 samples were collected in Iceland, Spain, Turkey, Malta and Tunisia (sampling for the two last countries was accomplished in the framework of the FAO-COPEMED project). A total of 1,342 bluefin tuna belonging to all length classes was sampled (Iceland, 622; Canada 49 (SCRS/2004/095); Spain, 316; Turkey, 205; Tunisia, 50; Croatia, 50; Malta, 30; and Italy, 20) during the period.

Research on maturity

In 2003, the REPRO-DOTT project (an EU funded research program) continued. The overall objective of this project is to improve the understanding of the reproductive physiology of bluefin tuna as the basis to develop a suitable methodology for the control of its reproduction in captivity in order to establish a sustainable tuna aquaculture. Up to date, several progresses have been reached about developing handling techniques for bluefin tuna aquaculture research (anesthesia, safe and effective capturing approaches for sampling on dead or live fish, tagging operations, testing egg collection devices, and employment of non-intrusive methods for sex and maturity assessment). In addition, DNA sequentiation and assays to measure gene expression have been completed.

Furthermore, document SCRS/2004/082, based on histological studies, reported the presence of post-ovulatory follicles in bluefin tuna caught in the eastern Mediterranean (Levantine Sea).

Research on tuna farming

In 2002, the BYP Working Group endorsed the proposed research activities on tuna farming in the Adriatic Sea submitted by Croatian scientists at the 2002 SCRS meeting and provided partial support to continue this research in 2003. The research has progressed as proposed and the results are reported in document SCRS/2004/096.

On the other hand, bluefin tuna farming activities in Tunisia for 2003 are described in document SCRS/2004/084.

At present, additional research on tuna farming is being accomplished by an *ad hoc* GFCM-ICCAT Working Group that has held several meetings up to date and which will continue its activities for 2005.

Research on spawning areas

For 2003-2004 larval surveys were carried out in the Balearic Islands, Sicily, Tunisia and Turkey as well as in the U.S. Gulf of Mexico. The preliminary results of all the surveys conducted off different Mediterranean regions are reported in document SCRS/2004/183. Furthermore, the results for 2003 of the Spanish annual larval survey (TUNIBAL) are presented in document SCRS/2004/076. The Balearic Sea (TUNIBAL) showed the highest larval catch which is clearly associated to surface temperatures ranging from 24 to 25ºC. The Levantine Sea survey showed lower catches, possibly due to a lower bluefin spawning activity caused by a lower surface temperature regime during the survey. Similarities with the Balearic Sea hydrographic pattern have been found.

In 2003, the BYP Working Group endorsed the proposed research activities on spawning areas in the eastern Mediterranean submitted by Turkish scientists at the 2003 SCRS meeting and provided partial support to these activities in the Levantine Sea. The research has progressed as proposed and the results are reported in documents SCRS/2004/082 and 144. The Levantine Sea is suggested as a spawning ground for bluefin tuna using histological assessment of the ovaries. The presence of post-ovulatory follicles confirm that bluefin tuna spawn in the Levantine Sea from May to mid-June, almost a month earlier than reported for other Mediterranean spawning areas in the same year. The presence of a spawning period and the results of tagging experiments suggest the possibility of a local eastern Mediterranean component of this resource. Furthermore, 121 (5-9 mm in size) bluefin tuna larvae were collected. The concentration of bluefin tuna larvae was the highest as compared to other tuna larvae. Highest concentration was found in the Bay of Mersin.

On the other hand, in September 2004 a larval research meeting was held at Gyrnes (Cyprus). The report of the Mediterranean BYP Tuna Larval Meeting is summarized in document SCRS/2004/189. The result of tuna reproduction off the Levantine Sea, a revision of historical background of bluefin tuna larval research, the main results of the TUNIBAL project, the revision of the state of the fisheries off the northern coasts of Cyprus, results from Sicilian Channel and Turkey were summarized. In addition, a proposal to study small tuna larvae was presented. Finally, standardization of tuna larval surveys was discussed by the Group.

Research on genetics

The results of genetic analyses of the Atlantic bluefin tuna population in the Mediterranean Sea were presented in document SCRS/2004/165. The results of the microsatelites and mitochondrial DNA analyses suggested the possibility of a genetically discrete population in the eastern basin of the Mediterranean Sea.

Research on otolith microchemistry

Recent research, making use of samples obtained through the BYP and other sources has focused on the use of otolith 13**C** and $\delta^{18}O$ isotopes to distinguish nursery habitats. In particular, $\delta^{18}O$ should vary between the Mediterranean and the West Atlantic. The cooler Mediterranean should lead to an enriched level of $\delta^{8}O$ based upon kinetic considerations as well as empirical evidence (Thorrold *et al.* 1997; Gao *et al.* 2001). Preliminary findings suggest that $\delta^{18}O$ isotopes may be a powerful and reliable marker of nursery origin. For juveniles collected in 1999 and 2000, $\delta^{18}O$ of Atlantic bluefin tuna collected in the western Atlantic and Mediterranean were markedly different with no overlap between nurseries, and this difference was stable across the two years. Further, stable isotope values of otolith cores from medium and giant Atlantic tuna caught in the U.S. tended to delineate into either high or low $\delta^{18}O$ levels, indicative of origin in either the West Atlantic or the Mediterranean. On-going research is directed at evaluating potential bias due to the micromilling procedure, further verification of nursery-specific $\delta^{18}O$ levels, and preliminary examinations of nursery origins for sub-adults and adults collected in from U.S. and Mediterranean coastal waters

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, project TUNASAT, coordinated by the University of Bari (Italy) continued adult bluefin tuna tagging activities in cooperation with

several countries and scientists from the western Atlantic and Mediterranean Sea. The results are presented in document SCRS/2004/114, which reports movements of bluefin tuna tagged in the Mediterranean with pop-up satellite tags. Preliminary results indicate that adults over 100 kg remain in the Mediterranean after spawning and feed in areas of high primary productivity. After spawning, large bluefin tuna (150-230 kg) migrate into the eastern North Atlantic, either to the south, towards the Cape Verde Islands, or to the north, to Iceland and the Norwegian Sea. Some large bluefin move between the Alboran Sea and the Atlantic for feeding purposes.

A cooperative agreement was signed between the University of Bari (Italy), MCES (Malta), COPEMED and the IEO (Spain) for electronic tagging in the Mediterranean, coordinated by the BYP.

In 2003 and 2004 and following the recommendations by the BYP Working Group, the University of Bari (Italy) in cooperation with Malta (through MCES), in the framework of the FAO-COPEMED project, tagged a total of 8 bluefin tuna in the Maltese farming installations, 43 bluefin tuna in Turkish farming installations in cooperation with the University of Istanbul and 10 bluefin tuna in Spanish farming installations (Ricardo Fuentes) in cooperation with IEO (Spain). Both of these tagging activities were coordinated through the ICCAT BYP program.

At the 2nd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies (Marseille, May 2004), the current state of knowledge with respect to the available electronic tagging results were reviewed. The report of this meeting is available on the ICCAT web site as are copies of selected scientific presentations made at the meeting.

Conventional tagging

As regards conventional tagging, a review of juvenile bluefin tuna tagging information in waters around the Iberian Peninsula was presented in document SCRS/2004/175. The aim was to assess the planning of future conventional tagging surveys aimed to describe and quantify movements between the birth, wintering and feeding areas as well as to quantify the rate of survival and recoveries of juveniles.

Furthermore, conventional tagging of juvenile bluefin tuna isbeing accomplished in collaboration with recreational fishermen in the framework of the SFITUM project (EU-funded project on sport fisheries in the Mediterranean).

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. The aim of the network would be to compare and evaluate various ageing methods for various ages and from different seasons in order to develop a standardized protocol for age determination for bluefin tuna. In this sense, document SCRS/2004/176 reported the results obtained by the aforementioned bluefin tuna direct ageing network. Both hard parts, spines and vertebrae, had been used to estimate bluefin tuna age. Furthermore, otoliths have also been used successfully for the same purposes. Additional work on this topic will be required.

Abundance indices

A joint abundance index was developed for the Spanish and Moroccan trap fisheries addressed to bluefin tuna in the Straits of Gibraltar (SCRS/2004/071). In the same way, an abundance index was developed for the Spanish artisanal fisheries (baitboat and hand line) targeting bluefin tuna in the Strait of Gibraltar (SCRS/2004/075). Furthermore, in the framework of the FAO-COPEMED project, an abundance index was developed for the Tunisian trap fishery addressed to bluefin tuna as well as an abundance index for the Moroccan trap fishery targeting bluefin tuna.

Environment

As regards environmental research, document SCRS/2004/097 showed the effect of the environment, and especially fronts, in structuring the distribution of juvenile bluefin tuna schools. This is believed to be mainly a trophic association, since enhanced convergence and retention processes occur at fronts, possibly leading to higher prey densities.

Research Plan for 2005

There has been considerable progress to date on the sampling plan developed by the BYP in 1999 and continued through 2004, 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 (see BYP Detailed Report), the BYP research funds in 2004 and 2005 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 2004-2005, the BYP Working Group recommends expenditures of €50,000 to cover expenses associated with stock structure and maturity sampling, tagging, and larval sampling during the upcoming year. It is time to attempt to better harmonize the various activities under the BYP, especially considering that the resources available for conducting research fall far short of the actual resource level to conduct high priority research. To achieve this harmonization, three sub-coordinators were nominated to assist the BYPE and BYPW Coordinators in optimizing the use of available funds. The BYPE and BYPW Coordinators remain the responsible scientific authority for the BYP research (subject to the approval of general plans by SCRS) and the BYPE and BYPW Coordinators shall continue to review and approve, as appropriate, expenditures to be made under the plan framework 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, Larval Sampling, and Tagging. Sub-coordinators for these research themes nominated are J. M. de la Serna (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, but not yet fully accomplished, approximately 15% of the available research funds shall be directed toward Tagging activities, 40% toward Larval Sampling and 45% toward Biological Sampling. Additionally, small amounts will be used to support coordination activities under each research theme.

Table 1. Recommended 2004-2005 BYP contributions to bluefin research (€)

Project description	*2004-2005 Request*	*BYP Fund Balance*
		40,000
Planned expenditures in 2004 (to support commitments made in the 2003 BYP)		
Shipping samples	- 1,000	39,000
Larval and Biological Sampling (Turkey)	-10,000	29,000
Ageing Coordination	- 5,000	24,000
Anticipated 2005 Commission contribution	**15,000**	39,000
Planned expenditures in 2005		
I. Biological Sampling		
W. Atlantic Sampling (Canada)	- 4,000	35,000
Mediterranean & E. Atlantic Sampling (established by BYPE Coordinator)	-10,850	24,150
Biological Sampling Coordination	- 2,000	22,150
II. Larval Sampling (established by BYPE Coordinator)	-13,200	8,950
Larval Sampling Coordination	- 2,000	6,950
III. Tagging (established by BYPE Coordinator)	- 4,950	2,000
Tagging Coordination	- 2,000	0

Appendix 6

ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH - EXECUTIVE SUMMARY

(Expenditures/ Contributions 2004 & Program Plan for 2005)

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. The plan was initially formulated in 1986 and implemented in 1987 with the intention of developing the data necessary to assess the status of the billfish stocks. Efforts to meet this goal have continued through 2004 and are highlighted below. During the 2004 Billfish Working Group meeting, the Working Group requested that the IERPBF refocus 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 2004. The Secretariat coordinates the transfer of funds and the distribution of tags, information, and data. The General Coordinator of the Program is Dr. Joseph Powers (USA); the East Atlantic Coordinator is Dr. Nestor N'Goran Ya (Côte d'Ivoire), while the West Atlantic Coordinator is Dr. Eric Prince (USA). The billfish database is maintained at the NMFS Southeast Fisheries Science Center (Miami, Florida) and at the ICCAT Secretariat.

The objectives of this program follow the research recommendations made by the ICCAT Billfish Working Group. These recommendations are directly relevant to the objectives of the IERPB and highlight the need to increase the resources devoted to support the work pursued by the IERPB. The development of the IERPB research plan is also coordinated with the "Atlantic Billfish Research Plan"[1] from the NMFS Southeast Fisheries Science Center because both plans attempt to address similar research needs.

2004: Budget and Expenditures

This report presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2004. In 2004, funding for the ICCAT Enhanced Research Program for Billfish operated under the financial arrangement established by the 1997 SCRS (see 1997 STACFAD Report, item 9.3). The STACFAD specified that the Commission should make at least a symbolic contribution to the Enhanced Research Program for Billfish and this was continued in 2004 (1997 STACFAD Report, items 9.5 and 9.9). As a result of this development, the Program in 2004 was fully coordinated by the Secretariat in consultation with area coordinators and Contracting Parties.

Contributions in 2004 included an allocation of €10,944.67 from the regular Commission budget **(Table 1)**. Other funds that are normally contributed to the Billfish Program were not made available in 2004. Therefore, it was again necessary (as in 2003) to reduce major expenditures for 2004 Billfish research activities by about 50% (**Table 2)**.

The total funds available (as of the start of Fiscal Year 2004) for the 2004 Billfish Program amounted to €21,513.96, plus any contributions that were made during 2004. Several additional expenditures are expected to be incurred before the end of 2004 and into the first quarter of 2005, such as Program coordination travel. Therefore, there is a need to carry over the 2004 balance in Billfish Program funds to the 2005 Budget, as has been the practice for this and other special programs in previous years.

Although no new cash contributions were obtained in 2004, other than the Commission funds, in-kind contributions to the Program continued to be made during 2004. 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 ICCAT billfish rapporteur (Dr. David Die) assisted in overseeing shore-based sampling work, age and growth research, and standardization of recreational CPUEs in Venezuela in

[1] Copies can be obtained upon request to E.D. Prince, Western Atlantic Coordinator or by accessing the plan on the Southeast Fisheries Science Center's web site: http://.www.sefsc.noaa.gov/articlesandpublicatios.jsp.

2004 and this cost was 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 2004. 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.

Research contributions

The result of the reduction of cash contributions has been that part of the Program Plan for 2004 was successfully carried out in a timely manner, while other components of the Plan had to be reduced or not carried out at all. For example, only 11 observer trips on Venezuelan longline vessels were accomplished in 2004, a slight reduction from 2003, but about half of what had been planned.

As summary of research carried out during 2004 was summarized by the western area Coordinator in SCRS/2004/028, and by the Eastern Atlantic Coordinator in SCRS/2004/191. Additional working documents on billfish were submitted to the 2004 SCRS, including: SCRS/2004/079, SCRS/2004/140, SCRS/2004/141, SCRS/2004/146, SCRS/2004/147, SCRS/2004/148, SCRS/2004/151, SCRS/2004/160, SCRS/2004/163, SCRS/2004/181, and SCRS/2004/188.

2005: Coordination, Protocols, and Program Plan

It was confirmed that Drs. Powers and Prince (U.S.A.) will continue to function as the General Coordinator and West Atlantic Coordinator, respectively. Dr. N'Goran Ya (Côte d'Ivoire) will act as Co-Coordinator for the East Atlantic Ocean.

The summary of the 2005 proposed budget, totaling **€50,950** is attached as **Table 3**. The Working Group requests that, if possible, the Commission increase its contribution for 2004 to €15,000 to cover the most critical parts of the 2005 IERPB. At a minimum, the Commission should again provide at least the same level of research funding in 2005 as it did in 2004.The requested contribution from ICCAT and voluntary contributions, including those from The Billfish Foundation and Chinese Taipei, will be necessary to carry out the entire Program Plan in 2005. Detail or planned activities are provided in the section below.

Highlight reports of research activities will be provided to interested parties annually. In addition, the names and addresses of individuals receiving the reports and those involved or interested in the research program will continue to be made available upon request. Projected funds for future research activities will be available in subsequent annual plans.

All agencies and/or personnel receiving funding from the special Billfish Program account are required to summarize annual expenditures of funds to the Commission and research activities, either in the form of a working document to the SCRS or a report to the Program Coordinators. Due to changes in the financial structure of the ICCAT billfish account, all participating cooperators in this Program are now required to request the release of funds (via fax or email) directly from the ICCAT Secretariat, as well as General Program Coordinator and area Coordinators. In other words, the release of Program funds is not automatic, even if expenditures are described in the Program Plan-- release of funds is contingent upon requests being received by the ICCAT Secretariat and Program Coordinators. In addition, Program participants are required to submit data collected in previous years to area Coordinators or directly to the ICCAT Secretariat.

Detail of Research Activities planned for 2005

Shore-based sampling

West Atlantic

Barbados. Dr. Hazel Oxenford, University of West Indies, submitted a pre-proposal to expand work in this location for biological investigations on the domestic longline fleet. This work could include sampling hard parts for age and growth studies. It is anticipated that shore-based sampling will be €1,000 and hard part sampling in 2005 will be €500. Some coordination travel in this location by the West Atlantic Coordinator, or his designee, may be required in 2005.

Bermuda. Shore-based sampling of the annual billfish tournaments will be conducted in Bermuda in 2005. Dr. Brian Luckhurst of the Department of Environmental Protection of Bermuda will coordinate this activity, and no funds will be required. Bermuda will continue to conduct research involving pop-up satellite tags to evaluate the habitat use and critical habitat identification of billfish. This work may also require some travel from Bermuda to various locations in the western Atlantic to facilitate this research (see section on pop-up satellite tags). In addition, work on the reproductive biology of adult marlin will continue and possibly be expanded to include sampling of larvae in collaboration with the University of Miami's Rosenstiel School of Marine and Atmospheric Sciences.

Brazil. Shore-based sampling of selected billfish tournaments will be continued in Brazil for 2005 in the general vicinity of Santos, as well as other locations off southeastern Brazil. Dr. Alberto Amorim, *Instituto de Pesca*, will coordinate tournament-sampling activities. Shore-based sampling will begin in Fernando de Noronha Island and other locations of northeastern Brazil and this activity will be coordinated by UFRPE. It is not anticipated that this activity will require funds in 2005.

A joint research effort between Brazil and the United States, involving shore-based and at-sea sampling, is planned to start in the fourth quarter of 2004. Some coordination travel for this effort may be required in 2004.

Cumaná, Playa Verde, Punto Fijo, and Margarita Island, Venezuela. Shore-based sampling of size frequency data for billfish carcasses off-loaded from industrialized longline boats at the port of Cumaná will be continued in 2005. Funding will be €300 since some of this activity occurs on weekends and after normal working hours. Likewise, sampling artisanal fisheries in Playa Verde will be accomplished by contracting a technician on a part-time basis. Funding for this activity in 2005 is €700. Sampling artisanal longline boats and artisanal fisheries in Punto Fijo and Margarita Island will be conducted in 2005 and the requested funding for these segments is as follows: Punto Fijo €200, and Margarita Island €300. Trips by the West Atlantic Coordinator or his designee may be necessary to organize sampling, collect data, and transport biological samples to Miami in 2005. In addition, the amount of €900 will be required for tag rewards in Venezuela for 2005 that are made by the *Instituto Nacional de Investigaciones Agrícolas* (INIA) staff (this budget item is included in the Section on Tagging). Collection of biological materials for research on age and growth, as well as reproductive biology, will be enhanced during 2005 in Venezuela. Costs to the program for this activity in 2005 are indicated in the section on age and growth.

La Guaira, Venezuela. Shore-based sampling and detailed analysis of the recreational fishery (centered in La Guaira, Venezuela) will be continued in 2005. This sampling includes coverage of up to ten recreational billfish tournaments held in Puerto Cabello, La Guaira, Falcon, and Puerto La Cruz. Requested funding for this activity in 2005 is €500, since much of this sampling is conducted on weekends and some travel expenses are incurred while attending these events. Also, shore-based sampling, including documentation of the catch and effort statistics for the important recreational fishery at Playa Grande Marina, will be accomplished by contracting a technician on a part-time basis. Funding for this activity in 2005 is €2,000. Shore-based sampling in all Venezuelan locations, as well as at-sea sampling (see next section) in Venezuela will be coordinated by Mr. Luis Marcano of INIA.

Grenada. Shore-based sampling of size frequency, hard parts for ageing, and total landings from the artisanal and recreational fishery for billfish maybe continued by the Ministry of Agriculture, Lands, Forestry, and Fisheries (coordinated by Mr. Crofton Isaac and Mr. Paul Phillip) in 2005. Much of this activity will occur in early November 2005, to coincide with the start of the pelagic fishery at this location. This activity may also include sampling of the Spice Island Billfish tournament. Due to the extreme devastation of Grenada as a result of Hurricane Ivan in 2004, much of the island's infrastructure will have to be rebuilt and progress on research items is uncertain at this time. Requested funding for 2005 is €1,500.

St. Maarten, Netherlands Antilles. It is uncertain if shore-based sampling of size frequency data for off-loaded billfish carcasses from longline vessels will be continued in 2005 through the Nichirei Carib Corporation. If this activity does occur, the requested funding in 2004 is €1,500. Shore-based sampling of the annual recreational billfish tournament, initiated in 1992, may be continued in 2005 by the West Atlantic Coordinator or his designee (if time permits). Since this tournament normally contributes travel expenses for the week of the tournament, the West Atlantic Coordinator may also assist Nichirei Carib employees in sampling during his stay on the island. Thus, funds for this latter activity will not be required from the Program.

Uruguay. An evaluation of the historical billfish landings and CPUE data base from Uruguay may be conducted by the *Instituto Nacional de Pesca* (INAPE) in order to assess the possibility of recovering historical landing

statistics in the necessary formats required for Task I and Task II reporting. This activity has been planned for several years but thus far has not taken place. A report maybe be submitted to the 2004 SCRS concerning this activity but will not require funding in 2005.

East Atlantic

The Coordinator for the East Atlantic may need to travel to West African countries to check on data collections and thus a plan for coordination travel maybe submitted to the General Program Coordinator/Secretariat in 2005. We anticipate that this work, if in fact it occurs in 2005, will have to be done within the budgetary constraints and this may prevent full implementation.

Azores. Sampling marlin hard parts for age and growth research will be initiated in 2005 and a coordination trip maybe necessary by the ICCAT billfish rapporteur to identify possible sampling opportunities. Cost of coordination travel in 2005 is indicated in section on age and growth research, as is a modest cost for sampling of hard parts (€500) .

Côte d'Ivoire. Abidjan shore-based sampling of the artisanal and recreational fisheries for billfish will be continued and directed by the East Atlantic Coordinator, Dr N. N'Goran of CRO, in 2004. Funding for 2005 will be €1,500.

Dakar, Senegal. Shore-based sampling of the Senegalese artisanal, recreational and industrial fisheries for billfish size frequency, sex determination, and catch and effort data may be continued in 2005 by Dr. Taib Diouf. Requested funding for 2005 is €1,500.

Ghana. Shore-based sampling of size frequency and sex determination, and catch and effort of the artisanal gillnet fisheries for billfish will be continued in 2005 by Mr. Paul Bannerman. Funding for 2005 will be €1,500. Some travel by the East Atlantic Coordinator may be required to accomplish this task in 2005.

Morocco. A prospecting mission will be conducted by national scientists with a view to improving the knowledge of the recreational fishery for billfish in Morocco and for establishing a sampling program, including possible collection of hard parts for age and growth research on marlins in 2005. Funding for this activity in 2005 is not anticipated, although this could change if field sampling opportunities of biological materials are identified in 2005. A coordination trip by the ICCAT billfish rapporteur maybe necessary in 2005 and cost of travel is given in section on age and growth.

Portugal and Madeira. Some coordination travel to Portugal and Madeira maybe necessary in 2005 to investigate sampling opportunities for collection of hard parts for age and growth work. Costs of coordination travel are indicated in sections below.

Sao Tome and Principe. As a result of the East Atlantic Coordinator's trip to this location in 2003, a sampling plan for shore-based sampling has been proposed for Sao Tome and Principe for 2005. Such a plan, if received by the General Coordinator and ICCAT Secretariat, is not anticipated to exceed €1,000 for 2005.

At-sea sampling

West Atlantic

Bermuda. At-sea sampling of home based longline vessels targeting pelagic species maybe initiated in 2005 by the Department of Environmental Protection, provided this fishing activity takes place. Possible biological sampling opportunities on home based longline vessels will also be assessed. ICCAT funding of this research activity is not required in 2005. In addition, the Department of Environmental Protection will continue to facilitate deployment of pop-up satellite tags on billfish in the West Atlantic and work on reproductive biology will be continued and expanded in 2005. This proposed work represents a continuation of a commitment to study habitat use, critical habitat identification, and reproductive biology of billfish. Some travel costs for Dr. Luckhurst may be required for his participation relative to deployment of pop-up satellite tags in various Atlantic locations. Travel costs for this activity in 2005 are shown in the next section.

Brazil. At-sea sampling on Brazilian longliners may be initiated in 2005 and Dr. Fabio Hazin from the UFRPE will direct these research activities. However, it is not certain whether this activity will require funding at this

time. Opportunities for sampling hard parts for age and growth research will be evaluated in 2005, although no expenses are anticipated for this activity during the upcoming year.
Mexico. At-sea sampling of Mexican longline vessels has been ongoing for several years. A plan may be submitted next year to expand on-going work but no funds are needed for 2005.

Uruguay. At-sea sampling aboard home-based longline vessels was initiated in 1998 by the *Instituto Nacional de Pesca* (INAPE) of Uruguay, but no detailed data are collected on billfish, except for measuring length. However, it is uncertain if this activity will take place in 2005 and funding of this project will not be required.

Venezuela. At-sea sampling out of the ports of Cumaná, Puerto La Cruz, and Margarita Island will be continued in 2005. A total of about 10 tuna trips and 7 swordfish trips on mid-sized industrial longline vessels will be made in 2005, and the cost will be €8,000. In addition, two long-range trips on large Korean-type vessels (€1,500), and two trips on smaller longline vessels (€400) will be made in 2005. Therefore, the total West Atlantic at-sea sampling for 2005 will be €9,900. In addition, insurance for at-sea sampling for 2005 will be €1,200.

Critical habitat of billfish using pop-up satellite archival tags

Several projects to evaluate habitat use and critical habitat needs of blue and white marlin using pop-up satellite archival tag technology are planned by scientists from several scientific entities in the west Atlantic Ocean in 2005. These projects are independently funded but may require funding of airfare, in the amount of €5,000, for research associates to travel to various Atlantic locations for the deployment of tags in 2005.

Tagging

The following conventional tagging activities and expenditures are proposed. The purchase of tags and tagging equipment will not be required in 2005. However, ICCAT tagging T shirts to promote the program (outreach) will be required in 2005 and the cost to the Program will be €2,000. The total for tag rewards (including the €900 needed in Venezuela) will amount to €1,500 for 2005. A lottery reward of €500 will also be necessary for 2005.

Age and growth

Requested funding (primarily travel costs) for biological sampling of billfish for age and growth studies, as well as tag-recaptured billfish, is €1,000 for 2005. In addition, purchase of hard parts in 2005 will be €1,000 (Barbados and Azores). As the 2004 Billfish Working Group identified this work during the 2004 SCRS as critical, it is possible that a research proposal and request for additional funds (other than travel) may be submitted to the ICCAT Secretariat during 2005. Implementation of any newly submitted work will be contingent on the availability of funds.

Coordination

Training and sample collection

Experience in the West Atlantic continues to indicate that it will be necessary to make a series of trips to specific Caribbean island locations, and occasionally to West Africa, Madeira (Portugal), Bermuda, and Brazil, to maintain quality control of on-going research. The purpose of this travel will be to train samplers in data collection, pick up data, assist in pop-up tagging and data analysis, hand-carry frozen biological samples back to Miami, monitor the rapidly changing pelagic fisheries, and maintain contacts with project cooperatives. The travel to West Africa will be to assist the East Atlantic Coordinators in refining sampling programs, particularly to encourage tag release and recapture activities. Travel by the East Atlantic Coordinator will be to establish sampling programs and oversee sampling activities. Funding for West and East Atlantic Coordinators in 2005 will be €20,000, subject to the availability of funds. Travel may include the following areas:

- *West Atlantic*
  Cumaná, Margarita Island, Caracas, and La Guaira (Venezuela)
  Grenada
  Santos and Recife (Brazil)
  St. Maarten (Netherlands Antilles)
  St. Vincent
  Trinidad and Tobago
  Cancún and Cozumel (Mexico)

Bermuda
Barbados
Other Caribbean countries
Ascension Island

- *East Atlantic*
  Dakar (Senegal)
  Abidjan (Côte d'Ivoire)
  Ghana
  Madeira (Portugal)
  Gabon
  Morocco
  Azores
  Other West African countries

Miscellaneous/Mailing

The requested funding for 2005 for East Atlantic miscellaneous and mailing is €100. Similar needs for the West Atlantic Coordinator are covered by the U.S. domestic budget.

Data base management

During the 1999 SCRS meeting, a problem surfaced relative to data base quality control and data entry for the at-sea and shore-based sampling components of this program. Given quality control and data entry is still lagging behind due to shortage of NMFS staff to accomplish these duties, it may be necessary to contract a work study student from the University of Miami or University de Oriente (Venezuela) for these data entry functions. However, there are no anticipated costs for quality control and data entry for 2005 at this time.

Bank charges

Charges by the bank for the transfer of funds and bank checks in 2005 are estimated at €250.

Because of unforeseen changes in the fisheries and opportunities for sampling, it may be necessary for the ICCAT Secretariat and the General Coordinator to make adjustments in budgeted program priorities. These changes, if any, will be duly transmitted to the area Coordinators. Also, the proposed budget for regular Program activities in 2005 is attached as **(Table 3)**. The expansion or reduction of expenses will depend, to a large degree, on the available funds. It should be noted that regular Program activities will be implemented based on receipt of sufficient funds and the carry-over of unused funds from 2004.

Table 1. Summary budget for the Billfish Program

Source	€
Balance at start of Fiscal Year 2004	21,513.96
Income (Allocation from ICCAT Regular Budget)	10,944.67
Expenditures (see **Table 2)**	- 12,585.83
BALANCE (as of September 28, 2004)	**19,872.80**

Table 2. 2004 Budget & Expenditures of the Enhanced Research Program for Billfish (as of 28 Sept. 2004)

Chapter	*Budget €*	*Expenditures €*
West Atlantic sampling		
Venezuela	16,593	10,004.08
Grenada	1,098	0
Other	6,044	0
East Atlantic sampling		
Ghana	1,648	1,206.00
Cote d'Ivoire	3,736	1,246.05
Tagging		
Rewards	2,198	29.05
Outreach (including T shirts)	2,000	0
Travel by Program coordinators		
West	10,989	
East	10,989	
Mailing & miscellaneous--East Atlantic	100	0
Bank charges on Billfish account	275	100.65
TOTAL	**55,670**	**12,585.83**

Table 3. 2005 Budget of the ICCAT Enhanced Research Program for Billfish (The release of funds is contingent upon conditions described in the text.)

Budget Chapters	*Amount* (€)
STATISTICS & SAMPLING	
West Atlantic shore-based sampling:	
Venezuela	4,000
Grenada	1,500
Barbados	1,000 *
St. Maarten, Netherlands Antilles	1,500 *
West Atlantic at-sea sampling:	
Venezuela (Cumaná, Puerta la Cruz, and Margarita Island)	11,100
East Atlantic shore-based sampling:	
Dakar, Senegal	1,500
Ghana	1,500
Côte d'Ivoire	1,500
Sao Tome & Principe	1,000 *
TAGGING	
Tag reward	1,500
Lottery rewards	500
Outreach	2,000
AGE AND GROWTH	
Purchase of hard parts (Barbados & Azores)	1,000 *
Travel	1,000 *
COORDINATION	
Coordination travel (training of samplers, collection of statistical and biological samples)	20,000 *
Mailing & miscellaneous-East Atlantic	100
Bank charges	250
GRAND TOTAL	**50,950**

*Authorization of these expenditures depends, in part, on sufficient funds being available from new contributions in 2005.

Appendix 7

REPORT OF THE SUB-COMMITTEE ON STATISTICS

1 Meeting arrangements

The meeting was held on 30 September-1 October 2004 at the ICCAT Secretariat Offices. Dr. Pilar Pallares (EC-Spain), convener of the Sub-Committee, chaired the meeting and Dr. Guillermo A. Diaz (United States) served as Rapporteur.

2 Data submission

2.1 Updated report on statistic collection systems

Given the low response to the Survey on Statistic Collection System during 2003 (only 17 responses have been received since the surveys were first sent out) the Secretariat decided to re-circulate the questionnaire in 2004 requesting those who had not already completed it to do so as soon as possible. Since then, three additional countries have sent their completed questionnaires (Brazil, EC-Spain, and South Africa). The total number of responses is still very low to reach any conclusions. The list of countries that have responded to the questionnaire is presented in **Table 1**.

The Sub-committee reiterated the importance of the questionnaire to facilitate the work of the SCRS and recommended those countries that have not answered it to do so as soon as possible.

2.2 Submission of Task I and Task II data

The deadlines set by the SCRS of 31 July should allow sufficient time for Parties, Entities or Fishing Entities to collect and process the information to be submitted to the Secretariat, which in turn should have reasonable length of time to process and enter these data into the ICCAT data base. If stock assessment meetings are held prior to the deadline date, the submission of the data should be done to make it available for the meeting.

The Secretariat informed the Sub-Committee that 80% of the Task I data was submitted after the established deadline and much of them during the SCRS species group meetings. As a consequence, most species groups did not have complete 2003 landing statistics available at the time of their meetings. For the submission of 2003 Task I and II data, the Secretariat has implemented new electronic forms. In 2004, 14 Parties reported their statistical information using such forms. This standard format allows the automatic integration of statistical data into the ICCAT database. The efficiency and accuracy of this approach was very satisfactory, since data manipulation is virtually nil and the information is validated before being integrated into the database. Contracting Parties that do not submit large amounts of data are requested to adopt the use of the standard electronic forms. For those Parties submitting large data sets, the Secretariat can develop specific routines based on previously defined format as longs as the same format and codes are used each year.

The Secretariat informed the Sub-Committee that it received data submissions that did not use any of the ICCAT official languages or gear/species codes, which resulted in delays in processing the data. The Sub-Committee emphasized the need for all Contracting Parties to submit data using only the ICCAT official languages, coding systems, and standard procedures for submission of Task I data. The Sub-Committee also pointed out that the submission of data in the form of a National Report (or any other report) is not a standard procedure and it will not be considered as a Task I data submission.

The Sub-Committee recommended that Task I data submitted later than a week before the beginning of the SCRS species group meeting not be included in the catch statistics and it emphasized that Contracting Parties should make an effort to submit Task I and II data by the deadline date set by the SCRS.

2.3 Tagging

2.3.1 Tagging database

The Secretariat recently incorporated the information of the traditional tagging data into an ICCAT relational database, which included 350,900 records for release and 24,832 recoveries. The data set for sharks (75,000 records) was not incorporated to this database due to problems in identifying the alpha prefix of the tag code and

some records for tuna were flagged and pending clarification. It was recommended that the Secretariat contact the entities responsible for the data to solve pending problems.

The Secretariat reported that the tagging data still need to be thoroughly screened. The Sub-Committee acknowledged that the improvements made in the tagging database were a direct result of better reporting from the contributing parties. However, release information is still incomplete and needs to be submitted.

Quality control of the tagging database can not be entirely performed by the Secretariat. The Sub-Committee recommended that each Contracting Party, Entity, and Fishing Entity, and each Species Group download the tagging data from the ICCAT database to revise and screen the submitted information (e.g., missing information, length units, etc.). The Secretariat also informed the Sub-Committee of the need to develop a standard tag-code format in the near future.

2.3.2 Electronic tags

The payments of rewards for the recovery of electronic tags continued to present problems. The Sub-Committee recommended the Secretariat to facilitate the advance payment of rewards for returned tags, and to establish mechanism for the repayment of the funds used with each individual tagging entity.

An inventory of electronic tags was created as recommended by the SCRS in 2003 and is available through the ICCAT web page. The collaboration of all participant scientists is essential in order to maintained an updated database.

It is stressed that this inventory should not contain sensitive data (such as movement tracks or proportion of time spent at depth, for example) as the inventory is intended to assist ICCAT in facilitating providing rewards to individuals returning these valuable tags.

2.3.3 Conventional tags

The Secretariat continues to collaborate with the scientist in sending tags and applicators. This year 300 tags were sent to France, Spain, and Portugal. At the present time, 118 recoveries were received for the annual lottery. The Sub-Committee was concerned about the possibility of duplicate codes/tag numbers among countries with active tagging programs. The creation by the Secretariat of a database with all tag codes and tag types used by all tagging programs was recommended by the Sub-Committee. For this purpose, all Contracting Parties should provide the Secretariat with all tag codes and tag types being used to establish a protocol to avoid possible code duplications. The Secretariat can contact non-Contracting Parties and research institutes to request the same information.

2.4 Revision to historical data

2.4.1 Algeria

A historical revision of the bluefin tuna series 1991-1998 was submitted by Algeria in the form of a scientific document (SCRS/2004/169). However, the document did not provide sufficient information to evaluate the changes or statistical methodology applied for these changes. Thus, the Sub-Committee recommended delaying the decision to adopt the new reported landings until the appropriate information is provided.

2.4.2 South Africa

South Africa reported that the landings of swordfish, yellowfin and bigeye and sharks from longline gear for the period 1998-2002 that were submitted as live weight actually corresponded to dressed weight. South Africa is in the process of estimating conversion factors to apply to the estimated landings to transform the submitted dressed weight landings into live weight. The methodology developed by South Africa to implement the required changes should be presented to the next SCRS meeting.

2.4.3 EC-Spain

Following an enquiry by the Spanish authorities on the catch of south Atlantic albacore by Spanish purse seiners, the Secretariat requested that the SCRS undertake a review of the figures in the database. The Sub-Committee concluded that during the period 1999-2001, the figures for the Spanish South Atlantic albacore purse seine catch shown in the Executive Summary catch tables were indeed duplicated. The duplicate records were deleted and the changes were made permanent in the ICCAT database.

2.4.4 Discrepancies between the FAO and ICCAT databases for Mediterranean catches

A joint FAO and ICCAT paper (SCRS/2004/81) highlighting discrepancies between the FAO and ICCAT databases for Mediterranean catches was presented to the Sub-Committee and examined by some species groups. Historical data completely missing in the ICCAT database were found to be useful to complement the Task I database. FAO will continue to replace most of the data provided by its national correspondents with the ICCAT catch data.

The Sub-Committee commended the effort made by the Secretariat and FAO to improve the database.

The Sub-Committee invited the ICCAT Secretariat and FAO-FIDI to conduct a similar work covering the Atlantic Ocean in the near future.

2.4.5 Shark statistics

The Sub-Committee acknowledged the problems that arose during the Inter-Sessional Meeting of the ICCAT Sub-Committee on By-Catches (Shark Stock Assessment) in Japan due to the lack of reliable historical shark catch/landing statistics. It was recognized that the nature of ICCAT shark database has changed over time from by-catch reporting, only, to both by-catch and pelagic shark-target fishery landings. This change over time might explain some of the discrepancies observed in the reported landings by different Contracting Parties. Also, many longline catches reported in the past were combined for all or many shark species. Attempts have been made to solve this problem and further work is needed.

The Sub-Committee recommended that Contracting Parties make a special effort to improve shark landings estimates by developing special projects with that specific goal and to make an effort to estimate historical catches by species.

2.5 Trade data

2.5.1 Submission of information

During the bigeye assessment, Japan submitted a document summarizing the import data for this species. After examining the data, the group concluded that almost all the data for recent years related to countries that have been submitting their data regularly to ICCAT. Biannual reports of data from ICCAT statistical document programs were received from Japan, Korea, Chinese Taipei, Singapore, Thailand, Tunisia, and the United States.

As in recent years, no individual statistical documents have been received (contrary to the SCRS recommendation made in the last three years). The Sub-Committee recommends that all Contracting Parties implement the Statistical Document for swordfish, bigeye and bluefin. Given the importance of correct identification of the origin of the catches, the Sub-Committee recommends that, where possible, information on the individual documents be submitted in electronic format. The Sub-Committee also agrees that requesting statistical documents on live imports would be helpful because these documents can provide very useful data.

The Secretariat estimated the potential amount of unreported catch by comparing trade data information with Task I data. In the case of swordfish and bigeye, the Secretariat was unable to reach a conclusion due to the poor quality of the data and the lack of conversion factors from product type to live weight.

The Sub-Committee emphasized the need to develop conversion factors for swordfish and bigeye for various product types and various fleets as soon as possible.

Japan presented the Sub-Committee with an update (SCRS/2004/185) on its effort to reduce the number of Illegal Unreported and Unregulated (IUU) large-scale longliners of Japanese and Chinese Taipei origin. The number of IUU longliners worldwide has been reduced from 250 in 2000 to 25 at the present time. The IUU catch appeared reduced to a minimum level. On the other hand, a possibility was noted that some of the catches made on regulated restricted areas are reported as being caught in unregulated areas.

3 Updated report of progress made in the ICCAT relational database

3.1 Current status

Currently, the ICCAT-DB is a relational database system made up of a statistical database of nearly 1.5 gigabytes and around 90 related tables containing all Task I and Task II data, a tagging database of around 500

megabytes and approximately 30 related tables, and other specific databases used to manage catch-at-size estimates, CATDIS, trade statistics, contacts, publications, etc.

3.2 Progress made

The Secretariat presented an update to the Sub-Committee on the projects related to the improvement of the ICCAT data systems. During 2003, three major goals were accomplished:

a Unification of all statistical databases which basically involved a rearrangement of databases and respective structures in a way that allows a simplified and more efficient management of all statistical data. The data unification allows to manage and track all changes made to Task I and Task II data, and more significantly, simplifies the association between Task I and Task II.

b Development and testing of the framework to automatically incorporate the statistical data reported in the new electronic forms into the ICCAT database. The framework is finalized and tested for Task II and additional testing is needed for Task I.

c A revision of the tagging database (data and structure) was accomplished and included the integration of an inventory of all tags distributed by ICCAT over all the years. The current link between this catalogue and the reported release/recoveries to ICCAT is only partial and needs to be finalized in the future.

The Sub-Committee commended the effort of the Secretariat to improve the ICCAT database and systems in such a short time.

3.3 Future enhancements

With the aim of continuing the improvement of the ICCAT database throughout the following year, the Secretariat will focus on the following tasks:

- Continue the work on the revision of tagging data and complete the ICCAT tag inventory.
- Continue to develop the output programs for the most common data requests.
- Integrate the new hierarchical codes adopted for fleet, gears, Task I areas, and reclassify the available statistical information with the new codes.
- Document all the ICCAT-DB system.
- Continue to develop the ICCAT web publishing facilities.
- Develop the programs to update CATDIS.
- Improve the routines for estimating catch-at-size.
- Develop the infrastructure to move on to the GIS system.

3.4 Coding system

Given the lack of clear geographic delimitation of the areas currently used to report Task I data, the Secretariat presented a proposal (see Figure 1 to the "Secretariat Report on Statistics and Coordination of Research, 2003-2004" in this volume) that was discussed by the SCRS. The Committee recognized the need for clearly delimited areas and recommended further review of the proposed areas by the Secretariat. A new proposal will be submitted to the next SCRS.

The Sub-Committee discussed and approved modifying the Task I electronic reporting form to incorporate the option of reporting landings by Task II statistical areas.

As recommended by the Inter-sessional Meeting of the Sub-Committee on Statistics held in March 2003, the Secretariat developed a new coding system for fleet identification that was approved by the Sub-Committee. A new gear classification system was also presented by the Secretariat. The Sub-Committee agreed that a new gear coding system would be an improvement and the Secretariat will continue to work to improve the newly proposed gear codes before they are presented to the SCRS for final approval.

4 Review of progress made for a revised Field Manual

The Secretariat gave a brief overview of the progress on the revision of the ICCAT Field Manual. While the project was first endorsed by the SCRS over two years ago, little practical progress was made until the proposed contribution for a chapter on biology of albacore was presented this year (SCRS/2004/088). The Sub-Committee discussed general issues as follows:

4.1 Contents of the proposed contribution on albacore biology (SCRS/2004/088)

The Sub-Committee commended the authors for the work presented. It was suggested that specific comments on the contents of this contribution to the Manual would best be handled through the albacore species group. It was recommended that the contents of this and future contributions to the biology chapters be coordinated through the species group rapporteur with help from the Secretariat.

The Sub-Committee considered that the contents of the albacore contribution were organized in a useful way, following the outline approved in 2003. The Sub-Committee recommended that other species groups be encouraged to produce similar contributions to the Manual using SCRS/2004/088 as an example, recognizing that some flexibility is needed because not all species profiles can be organized in exactly the same way.

4.2 Assimilation of contributions into a Manual

The Sub-Committee discussed the need for a formal mechanism to incorporate potential contributions into a Field Manual as an official publication of the Commission. It was recommended that at some point in the future, when a larger number of proposed contributions become available, an overview committee should be set up for this purpose. This committee could be composed of the SCRS Officers (Chairman, Sub-Committee Conveners, and Species Rapporteurs). In the intervening period, the Secretariat should make the proposed contributions available on the web site and note that they are drafts and that they have not been sanctioned officially.

4.3 Completion of the Manual

Chapter 4 and other parts of the Manual outline approved in 2003 deals with collection, analysis and reporting of statistics and other data used by the SCRS. The Sub-Committee noted that the completion of the Manual, especially Chapter 4, required a very intensive investment of work and thus it was necessary to seek ways in which a consultant(s) could be hired to facilitate this task. The Commission should be aware that the completion of the updated Field Manual can be an effective instrument for capacity-building to help all Contracting Parties fulfill their data-collection obligations. In addition, the Field Manual should contain all of the data collection and reporting requirements established by the Commission, which have increased substantially since the Manual was last revised in 1990. Therefore, it is important to update the Field Manual so that it can serve as an official source for data collection and reporting requirements.

The Sub-Committee recommended that the plans to publish an ICCAT Manual proceed quickly. In order to do this in a reasonable timeframe (i.e. two years), €50,000 are needed (€25,000 annually). The Sub-Committee recommends that the Secretariat actively seek donors to accomplish this (e.g., from special contributions to the Data Fund or from remaining funds in programs like the BETYP).

5 National and international statistical activities

The Secretariat informed the Sub-Committee that ICCAT staff have been present at several meetings where statistics or research issues of interest to ICCAT were discussed. A summary of these and other meetings where ICCAT was represented is presented in Appendix 1 to the Secretariat Report on Statistics and Coordination of Research (SCI-010/2004).

6 Review of publications

As previously, the Sub-Committee requested that all senior authors submit the documents to be presented at the SCRS meeting to the Secretariat on a PDF format. The Sub-Committee recommended to make all working documents available only on electronic format through the Secretariat. Authors of working documents will be asked to provide only ten hard copies at the time of the meetings (instead of the current request for 80 copies).

6.1 Data record

The Secretariat informed the Sub-Committee that this volume has not been published for the last three years due to the restructuring of the database. Following the advice of the Sub-Committee in Statistics, the SCRS has recommended that this no longer be published in a book form. Task II information is currently published on the Internet by means of a downloadable data file. A CD-ROM with all the Task II data available at the Secretariat will be published before the end of 2004.

6.2 Statistical Bulletin

This publication was published in February 2004 and equivalent information is partially available on the Internet.

6.3 Collective Volume of Scientific Papers

In May 2004, Volume 56 was published on a CD-ROM containing 109 documents and a total of 1,532 pages. In addition, another 14 documents submitted to the 2003 SCRS were either withdrawn by the senior author or submitted after the deadline.

In 2004, further efforts have been made to standardize the Publication Guidelines for both the Detailed Reports and the papers submitted so that publication time is reduced and the end product is more consistent.

6.4 Biennial Report

Part II of the ICCAT Report for the 2002-2003 Biennial Period was published in three volumes (Commission, SCRS, and National Reports), in Spanish, French, and English.

7 Plan for port sampling

The Sub-Committee recognized that although some problems on surface fisheries still exist (i.e., Ghana), major sampling problems are mostly related to port sampling from the large-scale longline fleets.

Some major problems involved the identification of the origin of some catches due to transshipment. In addition, the nature of the unloading process makes port sampling difficult since fish are landed super-cooled and their exposure to air is minimized. Possible alternatives to port sampling programs include the implementation of longline observers programs and/or the development of specific logbook reporting systems with the close collaboration of crews.

In contrast, port sampling of small-scale (less than 24 m vessels) longline fleets, like the ones operating in the Caribbean area, proved to be very efficient in collecting valuable landing data.

The Sub-Committee recommended that each species group report on where data deficiencies exist and give suggestion on how to improve data recording

8 Other recommendations

It was agreed that the meeting of the Sub-Committee on Statistics should be scheduled to minimize or avoid overlapping with the species group meetings.

9 Future plans and recommendations

In addition to information concerning future plans and the Sub-Committee's proposals and/or recommendations in various Agenda items, a summary of the Sub-Committee's recommendations is included in section 15 of the SCRS Plenary.

10 Other matters

No other matters were discussed.

11 Adoption of the report and closure

After review, the report of the Sub-Committee on Statistics was adopted and the 2004 meeting was adjourned.

Table 1. Responses received to the ICCAT Questionnaire on Data Collection Systems.

Contracting Parties							
Algerie	Yes						
Angola	No						
Barbados	No						
Brazil	Yes						
Canada	Yes						
Cap-Vert	Yes						
China, P.R.	Yes						
Côte d'Ivoire	No						
Croatia	No						
European Community	Yes	(only with respect to United Kingdom-Bermuda)					
France (St. P & M)	No						
Gabon	No						
Ghana	No						
Guinea Equatorial	No						
Guinea Republic	No						
Honduras	No						
Iceland	Yes						
Japan	Yes						
Korea	No						
Libya	Yes						
Maroc	No						
Mexico	Yes						
Namibia	No						
Nicaragua	No						
Norway	No						
Panama	No						
Philippines	No						
Russia	Yes						
São Tome e Principe	No						
South Africa	Yes						
Trinidad & Tobago	Yes						
Tunisia	No						
Turkey	No						
United Kingdom (OT)	Yes	(only with respect to United Kingdom-Bermuda)					
Unites States of America	Yes						
Uruguay	Yes						
Vanuatu	No						
Venezuela	No						
Cooperators							
Chinese Taipei	Yes						
Guyana	No						

Appendix 8

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON BY-CATCH

1 Opening of the meeting, adoption of Agenda, and arrangements for the meeting

At the request of the Chairman of the SCRS, the 2004 Sub-Committee on By-Catch Meeting was opened by Dr. G. Scott (U.S.A.) opened the meeting. The Agenda, which was circulated before the meeting, was reviewed, modified and adopted and is attached to this report as **Addendum 1 to Appendix 9**.

2 Review of new information concerning by-catches

The available information concerning the Sub-Committee was reviewed. By-catch is the unintentional/incidental capture of non-target species during fishing operations. Different types of fisheries have different types and levels of by-catch, depending on the gear used, the time, area and depth fished, *etc*.

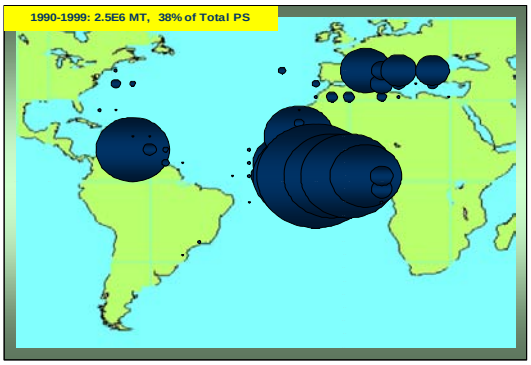
Article IV of the Convention states: "the Commission shall be responsible for the study of the population of tuna and tuna-like fishes (the Scombriformes with the exception of Trichiuridae and Gempylidae and the genus Scomber) and such other species of fishes exploited in tuna fishing in the Convention area as are not under investigation by another international fishery organization". This text is interpreted as a responsibility for collecting information on catches of sharks and other fishes which are coincidental to fishing effort directed toward tuna and tuna-like species.

Concern over issues raised at CITES relative to ICCAT species led to the establishment of the SCRS Sub-Committee on By-catch in 1996. The SC is led by Dr. Hideki Nakano (JPN). The SC guides research and analytical activities related to by-catch, especially of sharks with focus on blue, mako and porbeagle; it recommends methodological adaptations to the national statistical data collection systems in order to better quantify by-catch (logbook and observer programs designed to characterize total catch composition and disposition); and it coordinates data gathering and cooperation with other fishery or wildlife organizations on by-catch issues (e.g. FAO, CITES, ICES, *etc*.)

One product of the Sub-Committee is a running tabulation of the diversity of species caught by the various gear-types used to target tuna and tuna-like fishes in the Atlantic and Mediterranean. While the tabulation provides no information for quantifying by-catch levels, it does provide guidance about the range of species interacting with these gears (LL, longline; GILL, gillnets; PS, purse-seine; BB, baitboat; HARP, harpoon; TRAP, traps; and OTHER gears). This information, which cannot be used to quantify impacts, is summarized below.

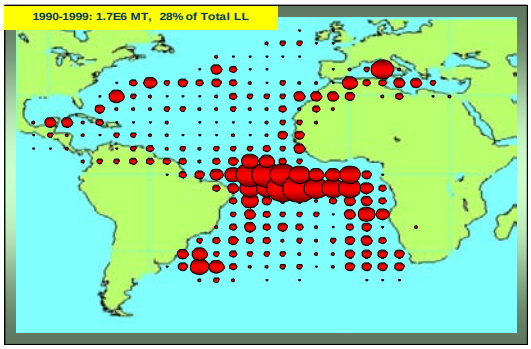
Count	Group	LL	GILL	PS	BB	HARP	TRAP	OTHER
214	*All Groups*	149	110	78	12	33	20	43
		69.6%	51.4%	36.4%	5.6%	15.4%	9.3%	20.1%
12	*Skates and Rays*	10	6	6	0	2	0	1
		83.3%	50.0%	50.0%	0.0%	16.7%	0.0%	8.3%
46	*Coastal Sharks*	45	19	6	1	7	2	9
		97.8%	41.3%	13.0%	2.2%	15.2%	4.3%	19.6%
11	*Pelagic Sharks*	10	7	5	0	5	2	4
		90.9%	63.6%	45.5%	0.0%	45.5%	18.2%	36.4%
23	*Teleosts (ICCAT Species)*	23	18	16	9	6	7	11
		100.0%	78.3%	69.6%	39.1%	26.1%	30.4%	47.8%
82	*Teleosts (excluding Scombridae and billfishes)*	44	37	25	2	5	4	17
		53.7%	45.1%	30.5%	2.4%	6.1%	4.9%	20.7%
5	*Sea Turtles*	3	4	5	0	2	1	1
		60.0%	80.0%	100.0%	0.0%	40.0%	20.0%	20.0%
9	*Sea Birds*	8	2	0	0	0	0	0
		88.9%	22.2%	0.0%	0.0%	0.0%	0.0%	0.0%
26	*Marine Mammals*	6	17	15	0	6	4	0
		23.1%	65.4%	57.7%	0.0%	23.1%	15.4%	0.0%

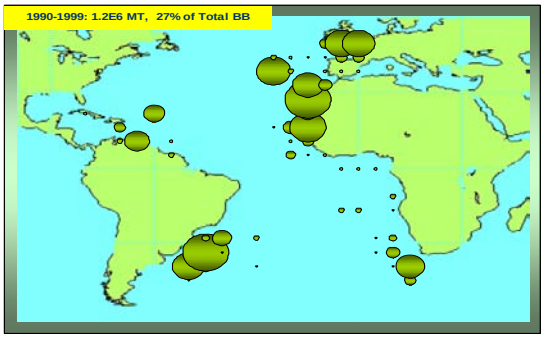
For fish species, longline gear shows the highest documented diversity of catch, followed by gillnets and purse-seine. For sea birds, longline gear again shows the highest diversity of catch, while for sea turtles and marine mammals, purse seine and gillnet have higher diversity thus far documented for the Atlantic tuna fleets.



Purse seines produce the highest volume catch of ICCAT species from the Atlantic. The catch (and effort, see Figure at left) is concentrated in several geographical regions and is generally restricted to the upper reaches of the water column. At-sea observations of purse-seine fishing in the Gulf of Guinea and other areas are underway and will likely lead to greater quantification of total catch composition and disposition. Based on these observations, estimates of the purse-seine by-catch of some species (marlins, for example) have been incorporated into assessments.

Longline effort produces the second highest volume of catch and the catch (and effort) is the most broadly distributed (horizontally and vertically) of the gears used to target ICCAT species (See Figure at right). Scientific observer data are being collected on a range of longline fleets and will become useful for better quantification of total catch composition and disposition as these observer programs mature. The estimated by-catch of billfish, tunas, and sharks from some longline fleets are used in assessments. Estimated by-catches of other species are also reported to ICCAT by some nations.





Baitboat catches represent the third leading volume of Atlantic tuna and tuna-like species catch (see Figure left). The documented diversity of catch in this fleet is the lowest of the major gear types used in the Atlantic. By-catch appears to be less of a concern for this gear-type. Gillnet, harpoon and other gears are minor in the context of the overall catch of ICCAT species. Gillnets in particular, are implicated in a broad range of by-catch issues, but in the context of the Atlantic tuna fisheries, their contribution is small.

The Committee noted that new information concerning the diversity of by-catch species by gear type has been accumulating at a slower pace than during the first years of the Sub-Committee's work. As noted, the available information does not permit estimating overall magnitude of interactions across the gear types since most of the information thus far collected does not permit this type of quantification. As scientific observer programs mature, this form of quantification should become possible.

3 Review of other national or international activities concerning by-catches

The following activities by other international organizations related to by-catch were noted:

1 The CITES Convention of Parties will be held later in October, 2004, in Bangkok. One petition under consideration at this meeting is the possible listing of great white sharks.

2 It was announced that the biannual meeting of the Brazilian Elasmobranch Society (SBEEL- *Sociedade Brasileira para o Estudo dos Elasmobrânquios*) will take place in November, in Recife, and that the by-catch of sharks in the Brazilian tuna longline fishery is going to be one of the main topics.

3 An International Fishery Observer Meeting will be held in Australia in early November, 2004.

4 Report of the 2004 shark assessment meeting.

In response to the 2001 *Resolution by ICCAT on Atlantic Sharks* [Res. 01-11], The Sub-Committee on By-catch met on 14-18 June 2004 in Tokyo, Japan, to conduct stock assessments for blue shark (*Prionace glauca*) and shortfin mako (*Isurus oxyrinchus*). The report of the meeting is SCI-029. The report includes a review of the biology of these species, a description of the fisheries affecting them, analyses of the state of the stocks, given the available data, and recommendations for improving statistics and for future research. Due to limitations of the quantity and quality of the information available for the stock assessment of blue shark and shortfin mako, the assessment was considered very preliminary in nature. The Committee recommends that, should the Commission wish improved advice on the status of these and other by-catch species, as well as advice on the likely impacts of the tuna fisheries on these species, larger monitoring and research investments directed at sharks in particular, and other by-catch species in general, need be made.

5 Consideration of Resolution [Res. 02-14] on Seabirds

The Committee was reminded of the language of Resolution [Res. 02-14]. It requests information from Contracting Parties and non-Contracting Parties, Entities or Fishing Entities on progress related to the implementation of NPOAs for seabirds. It also encourages the collection of all available information on interactions with seabirds and voluntarily provided to the SCRS. At the end, the Commission resolved that SCRS should present to the Commission an assessment of the impact of incidental catch of seabirds resulting from the activities of all fleets in the Convention area, when feasible and appropriate. The Committee encouraged Contracting Parties, Entities and Fishing Entities to implement the Resolution.

The Committee was informed of cooperative efforts in Brazil, involving fishermen, fishery research institutions and organizations devoted to the conservation of sea birds, which meet in a workshop, held in April this year, to discuss and approve a draft version of the Brazilian Plan of Action for Reducing Incidental Catches of Sea Birds in longline fisheries. A significant progress was reached and it is expected that the Plan will be finalized and officially approved still this year.

The United States reported that available information on progress made on its implementation of an NPOA for seabirds was included in its Annual Report, as were available observations and estimates of by-catch of seabirds in the U.S. Atlantic pelagic longline fleet.

It was reiterated that ICCAT has not collected quantitative data on seabird by-catch, but that this information might be available from the observer programs conducted by various Contracting Parties and Cooperating non-Contracting Parties, Entities, or Fishing Entities.

The Committee (as it had in previous discussion) again noted that the implications of element 3 of Resolution [Res. 02-14] could be quite broad. The Committee was concerned that to achieve this would require expertise not yet held by SCRS. In all, this request would require significantly enhanced commitments by national scientific delegations and greater expertise available at the Secretariat. To further work along the lines recommended by the Commission, the Committee recommends that the Commission consider hiring a By-catch Coordinator at the Secretariat and to encourage Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities to enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics.

6 Consideration of Resolution [Res. 03-11] on Sea Turtles

The Committee was reminded of the language of Resolution [Res. 03-11]. There are two elements of the Resolution pertinent to the work of SCRS. Firstly, it requests that all available information from Contracting Parties and non-Contracting Parties, Entities or Fishing Entities (CPCs) on interactions with sea turtles in ICCAT fisheries, including incidental catches and other impacts on sea turtles in the Convention area, such as deterioration of nesting sites and swallowing of marine debris be provided to SCRS. Secondly, it encourages CPC's to seek through the appropriate ICCAT body (herein taken as the Sub-Committee on Statistics) the development of data collection and reporting methods for the incidental by-catch of sea turtles in tuna and tuna-like species fisheries.

Canada noted that in recent years, its pelagic longline fishery has had augmented observer coverage, sometimes in excess of 10% coverage on a per trip basis in certain years. This enhanced coverage offers an opportunity to examine the catch composition of this fishery on a quantitative basis, and Canada has initiated an analyses of key fishing variables (e.g., time of day, month, location, fishing depth, etc), and how such characteristics relate to the catch of species of special concern.

Currently, Mexico is carrying out research work on the dynamics of the by-catch of other species on bluefin tuna fishing with longline in the Gulf of Mexico. This analysis consists of analyzing the possible relation of the catch of some groups of species (other tunas, billfish, sharks and sea turtles), with variables such as the type of hook, depth of the set, period of the year and others. The objective is to determine which of these variables influence by-catches, in order to reduce them or eliminate them. Currently only partial results are available from the Exploratory Data Analysis, with a time-area perspective.

The United States reported on research to mitigate the interactions between pelagic longline and by-catch of marine turtles which was conducted under a cooperative research program involving the U.S. Atlantic pelagic longline fishery. The Northeast Distant Fishery Experiment was conducted from 2001 through 2003 on the high seas of the western Atlantic Ocean, in an area known as the Grand Banks. In cooperation with fishermen, research was conducted to test various fishing methods, such as bait and gear type, to determine which combinations worked best to minimize sea turtle encounters in pelagic longline fisheries. Research results demonstrated some combinations used achieved up to a 90 percent reduction in fishing gear-sea turtle interactions for leatherbacks and loggerheads. This research also led to development of new gear so fishermen could safely dehook and disentangle the few turtles that were accidentally caught. The United States and partners are now launching an international education initiative to invite all fishing nations with pelagic longline fleets to begin exploring this technology. Gear and techniques developed by this program are being tested in research programs in several countries, and results of this research are being used in other fisheries and countries that operate longline gear. A report on the research progress for this program can be found at http://www.mslabs.noaa.gov/mslabs/docs/watson2.pdf. Other material of interest on this topic can be found at http://www.nmfs.noaa.gov/mediacenter/turtles/.

7 Recommendations

Due to concerns raised relative to the condition of shark species impacted by the Atlantic tuna fleets, the Commission in the *Resolution by ICCAT on Atlantic Sharks* [Res. 01-11] requested SCRS to provide scientific advice on the status of blue shark and shortfin mako. Since the mid-1990s, ICCAT has requested data on removals and the sex, size, and age-frequency characteristics of the catches of these species from Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities with interest in tuna fisheries in the Atlantic and Mediterranean. The current situation on submission of shark statistics indicates that the overall volume of catch reported to ICCAT does not represent the total removals of these sharks and the available data are also very limited with respect to the size-, age- and sex- composition of the reported removals. The SCRS has previously reported on the general inadequacy of these statistics (ICCAT 2004a and ICCAT 2004b). It is apparent that while some Parties were able to provide data for a period of their tuna fishing history in the Atlantic, most have not yet been able to, suggesting that there is insufficient infrastructure within the Contracting Parties dedicated to monitoring the catches of sharks. Improvements in the ICCAT shark database can only be achieved if the Parties increase infrastructure investment into monitoring the overall catch composition and disposition of the overall catch of sharks and other by-catch species. Therefore, the Group recommends that, should the Commission wish improved advice on the status of these and other by-catch species, as well as advice on the likely impacts of the tuna fisheries on these species, larger monitoring and research investments directed at sharks in particular, and other by-catch species in general, need be made by the Parties. This investment should include at a minimum, participation in Working Group meetings by national scientists with knowledge of the fleets impacting these species.

Furthermore,

1 The Committee recommends further coordination and collaboration with other international organizations, especially ICES and GFCM, for the assessment of the Atlantic and Mediterranean stocks of blue and shortfin mako sharks.

2 It is recommended that all conversion factors related to sharks be provided to the Secretariat by national scientists, so that the ICCAT database can incorporate these conversion factors.

3 It is recommended that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities continue to develop and conduct observer programs for their own fleets to collect accurate data on shark and other catches by species (including discards).

4 The Committee recommends that the Commission consider hiring a By-catch Coordinator at the Secretariat and to encourage Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities to enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics.

5 Noting that there were apparent inconsistencies in the interpretation of the blue shark CPUE information (data from observers on Japanese vessels operating in and around the Canadian EEZ) presented by Canadian scientists (SCRS/2004/014) and the results of the ICCAT Sub-Committee on By-Catch, the Sub-Committee recommends that Canadian and Japanese scientists conduct collaborative research in order to resolve the apparent discrepancies in the two documents.

8 Other matters

No other matters were discussed.

9 Adoption of the report and closure

After review, the Report was adopted and the 2004 Meeting of the Sub-Committee on By-catch was adjourned.

Addendum 1 to Appendix 8

Agenda of the Sub-Committee on By-catch

1 Opening, adoption of agenda and meeting arrangements
2 Review of new information concerning by-catches
3 Review of other national or international activities concerning by-catches
4 Report of the 2004 shark assessment meeting
5 Consideration of Resolution [Res. 02-14] on seabirds
6 Consideration of Resolution [Res. 03-11] on sea turtles
7 Recommendations
8 Other matters
9 Adoption of the report and closure

Appendix 9

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON ENVIRONMENT

1 Opening, adoption of the agenda and meeting arrangements

The meeting of the Sub-Committee on Environment was held on October 6, 2004 at the Hotel Gran Velazquez, Madrid. Dr. J. M. Fromentin (EC-France) chaired the session. By decision by the SCRS in 2003, the Sub-Committee's objective for 2004 was to prepare a summary of the databases that are available and accessible on the Internet which could be useful to the ICCAT scientists. The results of these studies have been presented as well as the new information available concerning the environment.

2 Review of new information concerning environment

In addition to two documents on the environmental data bases (see section 3), seven working papers were presented that deal specifically with the influence of environmental fluctuations on the resources or the tuna fisheries in the Atlantic.

Documents SCRS/2004/051, SCRS/2004/142 and SCRS/2004/156 discuss the impact of the environment on the catchability of the fishing gears (an important issue that has been discussed many times in the SCRS). The first of these documents (SCRS/2004/051) tests (by simple linear regressions) the possible dependence of the CPUE of Polish longliners fishing bigeye tuna with the water temperature at different depths and the thermocline. The authors conclude there is the possibility of the relationship between CPUEs and the depth of the thermocline and surface water temperature. However, these results should be considered preliminary since the methodological approach used does not permit interactions between the different explicative variables. Document SCRS/2004/142 considers the matter of the impact of the phases of the moon on the swordfish catchability by Portuguese longliners. The favorable effect of the full moon on swordfish catches is found in the majority of the cases, regardless of the period of the year or the size of the fish. This influence of the moon, which has already been documented on this type of fisheries in other oceans, should be taken into account in the standardization of the CPUE series, particularly to correct the non-equilibrium sampling plans or to study the potential interactions of the moon with other factors. This matter is also discussed in document SCRS/2004/156 which presents a quantitative analysis (by GLM) of the effects of surface temperature (SST), of the force of the wind and general meteorological conditions on the CPUEs of skipjack from purse seiners fishing in the southwest Atlantic. These interesting results are also noted, especially between the interaction between the "zone" factor and general meteorological conditions and wind. One can also note that the SST is not so much an influence, but simply a quantitative variable, which is not totally surprising and, as the authors suggest, it is the underlying oceanographic structures that it can reveal, such as fronts, rather than the SST, which is important.

This last result does not permit, however, establishing a relation with documents SCRS/2004/055, SCRS/2004/076 and SCRS/2004/097 which report instead on the tuna habitat. The last document (SCRS/2004/097) studies the influence of the frontal structures, revealed by satellite images, on the spatial distribution of bluefin tuna juveniles obtained from some aerial scientific cruises. The relation between fronts and tunas proves to be very strong and probably denotes an association of the trophic type, since the fontal zones are also the site where processes of retention and convergence occur (this is confirmed by the aerial observers who point out that the fish in these zones searching for food). However, this type of association does not fully explain the spatial distribution of tunas, particularly on a small scale where the phenomena of over-aggregation are observed. Document SCRS/2004/055 estimates the catch rates of bigeye tuna caught by Chinese longliners in relation to hook depth, temperature and salinity (measured by CTD). The results confirm the deep habitat of bigeye tuna, between 240 and 330 m, corresponding to temperatures between 10º and 13º and to salinities between 35 and 35.3 g/kg, but the authors insist that these results have been obtained from theoretic and immeasurable hook depths and should thus be considered preliminary. Document SCRS/2004/076 tries to establish the oceanographic habitat of the reproduction area of bluefin tuna around the Balearic Islands. From 2001 to 2003, the hydrograph of this area has been submitted to strong inter-annual variations. Bluefin tuna larvae have been caught in 24-25ºC waters and mainly in waters of Atlantic origin. The authors also point out the importance of the frontal zones and the anti-cyclonic swirls could have on the spawning strategy of the species, survival and larval concentration.

The last document, SCRS/2004/190, discusses a matter of more general interest, to learn if the effects can be detected of the environmental influences on the stock structure of fish exploited through results provided by the

assessment models, particularly VPA. To carry out this work, which is part of the European Project FEMS, coordinated by L. T. Kell, the authors have used North Atlantic albacore as a case study.

Past studies put forward that numbers-at-age 1 of albacore may be correlated with the winter NAO index in the previous year. Two main hypotheses have been stressed to explain such observation, i.e. an impact of the NAO on the recruitment or on migration patters and consequently in the availability and catchability of specific age classes to the surface fishery. To test whether such processes can be distinguished using VPA outputs, the authors first computed simple cross-correlations between the NAO at various lags, catches-at-age, numbers-at-age and F-at-age estimated in the last assessment. Since results were inconclusive, simulations were undertaken. The results showed that the probability of detecting spurious correlations between a given environmental variable, such as the NAO, and VPA outputs appears to be strongly related to the level of errors due to the observation process and modeling assumptions made within the assessment procedure. The authors concluded that correlations based solely on VPA outputs should be interpreted with considerable caution.

3 Review of environmental databases and the GAO program

During the 2003 plenary sessions, the SCRS approved the Sub-Committee on Environment Convener's proposal on the environmental databases available on the Internet and the GAO program of the IRD (France).

Document SCRS/2004/171 presents a list and a description of the major Internet sites hosting environmental databases concerned with fishery ecology and with tuna resources. These can be divided into three large categories, *in situ* databases: (i) (7 sites with access to the data bases *in situ* of more than 20 environmental factors, such as the SST, wind, sea level, etc. and the different climatic indices, particularly the NAO and the SOI); (ii) by satellite (5 sites with access to data on SST, altimetry, wind and water color at different resolutions); and (iii) results of oceanic models (2 sites). The document already provides a significant number of websites holding marine environmental data sets of interest for fisheries biologists. Most of the data can be accessed free of charge, but some are restricted over a given period or to research activity. Nonetheless, a few data collections are with charge. Most often, the data sets appear of high quality as they mainly come from international programs or national agencies. However, the quality control procedure is rarely described. A secondary difficulty relates to the format of these databases. Most of them can be easily and directly downloaded, but formats vary among sites and some imply particular software. More important is the difficulty to find the appropriate website corresponding to a given request, as several important providers can be reached through various paths that do not always lead to the same window (and consequently to the same databases). Finally, the web provides an impressive source of data about the marine environment, but it can be time consuming to find and get access to this information, especially when the request is rather specific (e.g., high resolution gridded data of a regional sea).

Document SCRS/2004/172 describes software (GAO) for the processing of oceanographic data useful in fisheries research. GAO was created from voluminous data sets covering the tropical areas of the Atlantic and Indian Oceans, the first of which go back to the early 20th century. The observations are limited to the layer of the first 500 meters of the ocean, which encompasses the essential habitat of tunas and other larger oceanic predators. The data sets include oceanographic stations (temperature, salinity, dissolved oxygen, phosphates and nitrates at different immersion levels), vertical temperature profiles (MBT, XBT, CTD), some trips of the model of oceanic circulation OPA (temperature, salinity, current vectors, vertical speed, at 13 levels of the water column), ranges of surface temperature and wind according to a square area, ocean level anomalies measured by the Topex satellite, and soon a database on temperature at standard immersions according to a square area of the world ocean. These data sets are prepared in such a way as to permit archive of the data and processing on a local level, on a hard disk of an office computer. Software developed under Windows allows the extractions and searches on the databases. The objective of GAO is to becoming an easy tool for use in the working groups on the fisheries where quick references to the physical environment are needed. Dr. F. Marsac concluded that his program and the databases that can be assessed with it could be provided free for use by any interested scientist.

Following this presentation, some discussion ensued. Many members of the SCRS as well as the Secretariat congratulated Dr. F. Marsac for the quality and clarity of his presentation and they also expressed their interest for this tool which seems to be adequate for the needs of the scientists in matters related to the environment. The discussions afterwards centered on the best way to make this software available to the SCRS scientists. Taking into account the Secretariat's time and financial constraints, the solution reached was that GAO be hosted on the ICCAT web site (for example, on a page of the Sub-Committee of Environment would have to develop). The maintenance and updating, at least at first, will be the responsibility of Dr. Marsac and his team. The Secretariat,

Dr. Marsac, and the Convener of the Sub-Committee will also resolve some legal issues (right of access to the database found in GAO, the GAO copyright, etc.) concerning the hosting of this software. Within the next few weeks, Dr. Marsac will make a "simplified" version of GAO available to the Secretariat so that the scientists can become familiar with this software.

4 Recommendations

The Sub-Committee on Environment considers that the GAO software responds to many of the needs identified by the SCRS regarding the environmental databases and, besides, it seems accessible and easy to use. Consequently, the Sub-Committee recommends that:

- GAO software and database be hosted on the ICCAT Secretariat web page.
- A group, including Dr. Marsac, the Convener of the Sub-Committee on Environment and a member of the ICCAT Secretariat, supervise the hosting of GAO and check for any potential legal issues.

These recommendations have been discussed and endorsed by the SCRS.

5 Other matters

The opportunity of passing from a single-species approach to a multi-species and eco-system approach has been for some years at the heart of the discussions of the fisheries community, i.e., some international commissions to assess the resources (as regards the SCRS, we can cite the tropical tunas group). This matter was again discussed this year in the different species groups and it seems necessary to discuss it at length in the plenary session because the eco-system approach also poses feasibility problems.

On the one hand, it is undeniable that the single-species approach traditionally used in the SCRS species groups has some limits and generates confusion, particularly in quantifying fishing effort and the CPUEs of the mixed fleets, such as the tropical purse seine fleets. Further, it is evident that the carrying capacity and the potential of rebuilding an exploited stock depends, in large measure, on the dynamics of the ecosystem in which it evolves and, at the same time, its exploitation will, in turn, influence this eco-system. On the other hand, the multi-species and eco-system approaches imply a great amount of data and information (e.g., stomach contents, isotope ratios, prey abundance, etc.) which are not routinely collected by the statistical programs of the Contracting Parties. Consequently, this approach requires very important research efforts. Besides, the models currently available, such as multi-species VPAs, the indicators (such as size spectrums), the statistical models (based on the time series) or the trophic models of the ECOPATH type, are not yet fully operative in terms of assessment and, above all, helpful for decisions on the management of the stocks exploited. In conclusion, it appears necessary to form a "think tank" on this issue within the SCRS, particularly to develop a work plan adapted to the general mandate of the SCRS. To do this, it is proposed that the work be carried out within the Sub-Committee on Environment and that the Sub-Committee expand its area of research to eco-system matters.

Many members of the SCRS recognized the importance of this matter from a strictly scientific point of view as well as from a more general point of view, specifically regarding the social concerns. However, the SCRS also recognizes the magnitude of this work and considers it unrealistic to think that such an approach can be operational for the assessment of the Atlantic tuna stocks in the near future (e.g. 2, 3 years). From a general point of view, a process should be initiated within the framework of the SCRS. To do this, it is proposed that a small group be formed under the auspices of the Sub-Committee on Environment, to prepare a study on the current status of this subject and to envisage the possible developments that could take place within ICCAT (work that could be included in SCRS document to be presented to the next plenary session). Various SCRS members also noted the importance of following-up the work already been started on this subject and on the fishery ecosystems in general, either through the CLIOTOP research program (GLOBEC regional program) or other tuna commissions, such as IATTC.

6 Adoption of report and closure

After review, the report was adopted and the 2004 meeting of the Sub-Committee on Environment was adjourned.

Addendum 1 to Appendix 9

Agenda of the Sub-Committee on Environment

1 Opening, adoption of Agenda and meeting arrangements
2 Review of new information concerning environment
3 Review of environmental databases and the GAO Program
4 Recommendations
5 Other matters
6 Adoption of the report and closure

Appendix 10

REPORT OF THE 2004 MEETING OF THE *AD HOC* WORKING GROUP ON SCRS ORGANIZATION

The Working Group[1] met at the request of the SCRS Chairman on 1 October 2004, at the Secretariat offices. Dr. Gerry Scott (USA) chaired the meeting and Dr. Victor Restrepo (Secretariat) served as rapporteur.

1 Protocol for approving data fund expenditures

The 2003 *Resolution on Improvements in Data Collection and Quality Assurance* [Res. 03-21] established a Data Fund to be used for training and for supporting of scientific participation in SCRS data preparatory and stock assessments. The fund has about €16,000 as of 1 October 2004. The Working Group discussed the usefulness of formalizing a protocol for approving expenses from this fund in order to help the Secretariat manage it in a way that is consistent with the priorities established by SCRS.

The Working Group recommended that the SCRS approve the draft protocol in **Addendum 1 to Appendix 10** and submit it to the Secretariat for consideration.

2 Assessment meeting schedule for 2005

The Working Group noted that the various other groups that met during the current week had been discussing the schedule of meetings for 2005. These include:

Proposed Meeting	*Comments*
BUM & WHM Assessments	To be assessed in 2005 according to [Rec. 02-13]
ALB-North Assessment	To be assessed in 2005 according to [Rec. 03-06]
BFT (west & east+Med)	To be assessed in 2005 according to [Rec. 02-08] and [Rec. 03-08]
SWO Stock Structure Workshop	Proposed by SWO group
Tropical Species Workshop	Proposed by Tropical species groups to evaluate alternatives to the 3.2 kg minimum size
ALB Data Preparatory	Proposed by the albacore group to examine size data and substitutions by fishery
BFT Planning Meeting	Proposed by bluefin tuna group to develop a research plan

The Working Group reminded the SCRS of its past recommendation to try to avoid scheduling more than five meetings in any given year. These meetings should be scheduled to minimize overlap, but provide sufficient time in advance of the SCRS plenary to complete the assessment work.

3 Scientific Editor position

The Working Group noted with regret Dr. Julie Porter´s decision to leave the Secretariat after having served two years as Scientific Editor, having accomplished a good job in improving the quality of ICCAT publications.

The Working Group discussed the need to provide advice to the Secretariat for the re-staffing of the position so as to take into account the needs of the SCRS. In this sense, it was reiterated that the staff person in charge of coordinating publications should not be limited to administering the process, but should also be able to contribute towards improving the quality of the publications. The Working Group recommended that the position be filled with the required qualifications, following the same selection process used in the past. The Working Group also recommends that the position be advertised in the future.

[1] F. Hazin (Brazil), J. Mejuto (EC-Spain), J. Pereira (SCRS Chairman), R. Pianet (EC-France), J. Powers (USA), G. Scott (USA), and Z. Suzuki (Japan).

4 Peer reviews

The Working Group recommended that the external peer review funds be used in 2005 to bring an independent scientist to chair the bluefin tuna stock assessment meeting. Sufficient funds should be made available to retain the expert's services for a period of 2-3 weeks (the amount of time needed to become familiar with the main issues before the meeting, plus the duration of the meeting, plus some time after the meeting to arbitrate the adoption of the report, if necessary).

5 Duration of the species group and SCRS meetings

The Working Group discussed the problem faced by some scientists who cannot afford travel for the two weeks spanning the species groups, Sub-Committee on Statistics and SCRS meetings, which would make it desirable to shorten the meetings. Also, the timing and duration of meetings have consequences for the utilization of Secretariat resources. Several options were considered, together with their pros and cons.

- Hold the Species Group meetings separately (e.g., one month before). This could make it more difficult for parties to make the data available on time and could involve higher travel expenses.

- Discuss only the species being assessed in a given year and match this schedule to the pluri-annual decision-making by the Commission. This option could shorten the meetings substantially but would be risky because bad signals in fishery indicators could go undetected for years. Also, scientists who only attend the SCRS or Species Group meetings may need this as the only opportunity to present their information to ICCAT.

- Adopt the SCRS report by correspondence. This could reduce the duration of the meetings by 2-3 days but it would be problematic because delegates could arrive at the Commission meeting without having scientific consensus on important conservation issues.

The Working Group concluded that the current two-week approach was working efficiently and should not be modified substantially unless instructed to do so by the Commission. In years with few contentious assessments, the Secretariat could schedule the SCRS meeting to last for 4 days instead of 5. This shortening of the SCRS meeting could be accomplished if the SCRS takes the following measures into account:

- Avoid duplication in the adoption of reports. Some reports are typically adopted twice (especially those of Sub-Committees).

- Reduce the amount of formalities. Delegations should be introduced briefly. Reports of recent fishery developments should be short and summaries ("country reports") should be made available in writing to the Secretariat before the species group meeting so that they can be translated and distributed before the SCRS starts.

- Shorten the presentation of Executive Summaries for species that have not been assessed during the year. The presentation for such species could focus primarily on the sections that have been updated (typically the Description of Fisheries).

6 Other matters

Representation of Contracting Parties during the SCRS

It sometimes happens that scientists attend assessments or species group meetings as individual experts but no scientists from the same country are later accredited as formal delegates to the SCRS meeting. The Working Group considered that it was important for parties to contribute to the understanding of the fish populations managed by the Commission not only by reporting fisheries data but also by participating in the scientific meetings. Scientific presence at the SCRS meeting was considered of utmost importance because this is the only time when the status of all stocks is discussed in unison, thus providing an opportunity for input and exchange of views by all parties.

The Working Group recommended that the SCRS instruct the SCRS Chairman to send each year a letter such as that shown in **Addendum 2 to Appendix 10** to CPCs that do not attend the SCRS meeting.

The Working Group also recommended that, in preparing the list of participants to the species group and SCRS meetings, the Secretariat clearly distinguish those who attended the latter.

Addendum 1 to Appendix 10

Proposed Protocol for the Use of the ICCAT Data Fund

Background

In 2003, the Commission adopted a *Resolution on Improvements in Data Collection and Quality Assurance* [Res. 03-21]. The Resolution calls for the establishment of a special Fund, made from voluntary contributions, to be used for capacity-building related to data collection and quality assurance. The purpose of this document is to specify the procedure in which the funds will be used.

Administration

The Fund is administered by the ICCAT Secretariat through a trust fund. Each year, the Secretariat should present to the SCRS a financial report on the Fund. This report should be included in the SCRS Report so as to be presented to the Commission.

Steering Committee (SC)

All major Fund expenditures should require the approval of a Steering Committee (SC), which will be composed of the following:

- SCRS Chairman (who will act as the SC Chair)
- Sub-Committee on Statistics Convener
- Members of the *Ad Hoc* Working Group on SCRS Organization

Decisions on allocation of funds

The SC will make decisions on the types of activities that should be funded, consistent with Resolution [Res. 03-21], e.g., those activities deemed as priorities by the Sub-Committee on Statistics. The SC may either solicit proposals from potential Fund users, or it may decide to allocate funds to a particular scientist for a particular activity, without the need to issue a call for proposals.

Decisions will be made by correspondence (e-mail) at the request of the SC Chair. Responses that are not received within a time frame established each time by the Chair (typically 2 weeks) will be taken as approvals of the request.

Addendum 2 to Appendix 10

Model Letter for CPCs not Attending the SCRS Meeting

[TO HEAD DELEGATE OF CPC]

Dear Sir/Madam:

I am writing to you as Chairman of the ICCAT Standing Committee on Research and Statistics (SCRS). The Committee plays a key role in advising on scientific matters so as to ensure that that the Commission has available at all times complete, current and equivalent statistics on fishery activities in the Convention area. The Committee also plays a key role in developing scientific consensus on stock status and in evaluating the effectiveness of the conservation and management measures in force for these stocks.

This year [CPC] was not represented at the SCRS meeting. This is unfortunate because [CPC] may have missed important opportunities to have its expertise considered during the SCRS process that leads to a consensus report on the status of stocks and recommendations for management. In addition, the presence of [CPC] during the SCRS meeting would have enriched the exchange of views that forms the basis of openness and transparency that is so important to ICCAT.

I encourage you to take all necessary steps in order to ensure that [CPC] will attend the SCRS meeting next year.

Please do not hesitate to contact me if you require any additional information.

Yours sincerely,

[Name]
SCRS Chair

Appendix 11

TROPICAL TUNAS WORK PLAN FOR 2005

No stock assessment(s) are planned for yellowfin tuna, bigeye tuna or skipjack tuna in 2005. The Commission asked the Working Group [Ref. 03-01] for an "analysis of the effectiveness of the current minimum size [weight] recommendation and … advise in 2004 on alternative measures for the protection of juvenile bigeye, taking into account the current moratorium."

The Working Group decided that a complete and thorough evaluation of alternative measures for the protection of juvenile bigeye tuna cannot be accomplished in the limited time of the SCRS working group. The Group expressed that the revision of alternative measures will concern not only bigeye tuna but should include other tropical tunas (yellowfin and skipjack tunas) due to the multi-species nature of the fishery, particularly the surface fisheries in the Gulf of Guinea. Therefore, the Working Group proposed a workshop in 2005 that will respond to the Commission's request. The proposed workshop will be held prior to the SCRS general meeting. The Group will extend an invitation to tropical tuna scientists to present and review different management alternatives for the protection of juveniles, not only of bigeye tuna but also for yellowfin, considering their impact on the skipjack tuna fisheries, which are frequently caught together in the surface fisheries in the Gulf of Guinea. The workshop should address multi-species interactions, and the likelihood of success of the different alternatives given the current operation of the surface fisheries, including the current moratorium on FAD operations.

The Working Group also stressed that prior to evaluating those alternatives, it should:

– Revise and analyze the updated comprehensive tagging information of tropical tunas to provide estimates of natural mortality, in particular for the early ages.

– Evaluate the ratio of natural mortality and fishing mortality of juvenile tropical tunas to find out if the objective is reachable and beneficial for the stocks of bigeye and yellowfin tunas.

– The Working Group suggested several alternative measures that can be reviewed based on the latest biological and statistical data available for bigeye, yellowfin and skipjack tuna. Those alternatives might include, but are not limited to:

  - Change in the minimum size (weight) for yellowfin tuna and bigeye tuna, taking into account discard mortality rates;
  - Restrictions on specific types of fisheries and/or fishing operations (independent of time/area closures;
  - Reductions in fishing effort;
  - Quota implementation;
  - Time/area closures, targeted to fisheries that primarily catch juvenile fish;
  - Extension of the current moratorium in a specific type of fishery; and
  - Potential of methodological/technological improvements that would change the current selectivity of the surface gears, mainly purse seine.

The Group considered that the likelihood of compliance for several of the alternatives previously mentioned should be taken into account, and that the Group should propose indicators to measure their effect once the implementation is adopted.