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for the
CONSERVATION of ATLANTIC TUNAS

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INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

CONTRACTING PARTIES

(as of 31December 2005)

Algeria, Angola, Barbados, Belize, 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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Panel No.	***PANEL MEMBERSHIP***	***Chair***
-1- Tropical tunas	Angola, Belize, Brazil, Canada, Cape Verde, China (People's Rep.), Côte d'Ivoire, Equatorial Guinea, European Community, France (St. Pierre & Miquelon), Gabon, Ghana, Guatemala, Honduras, Japan, Korea (Rep.), Libya, Mexico, Morocco, Namibia, Panama, Philippines, Russia, Sao Tome & Principe, Senegal, South Africa, Trinidad & Tobago, United Kingdom (Overseas Territories), United States, Venezuela	Côte d'Ivoire
-2- Temperate tunas, North	Algeria, Canada, China (People's Rep.), Croatia, European Community, France (St. Pierre & Miquelon), Iceland, Japan, Korea (Rep.), Libya, Mexico, Morocco, Norway, Panama, Tunisia, Turkey, United Kingdom (Overseas Territories), United States	European Community
-3- Temperate tunas, South	Brazil, European Community, Japan, Namibia, South Africa, United Kingdom (Overseas Territories), United States	South Africa
-4- Other species	Algeria, Angola, Belize, 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, Tunisia, Turkey, United Kingdom (Overseas Territories), United States, Uruguay, Venezuela	Japan

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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 II (2005)"***, which describes the activities of the Commission during the second half of said biennial period.

This issue of the Biennial Report contains the Report of the 19th Regular Meeting of the Commission (Seville, Spain, November 14-20, 2005) 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 Annual Reports of the Contracting Parties of the Commission and Observers, relative to their activities in tuna and tuna-like fisheries in the Convention Area.

The Report for 2005 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 Annual Reports of the Contracting Parties of the Commission and 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

Introduction

This document provides a brief summary of the Secretariat's work in the collection, dissemination, coordination and preparation of information on fishery statistics as well as its work in the coordination of research during the course of 2005 (up to November 7, 2005).

1. Catch data

According to regulatory provisions, the submission of statistical information is the responsibility of the Parties, Entities and Fishing Entities that fish in the Convention area. The deadline date established for the submission of information was July 31, 2005, but the Secretariat was somewhat flexible and the data received up to September 16, 2005 were taken into consideration in this document. The information submitted after that date will be included before the next annual meeting of the Commission in accordance, therefore, with the recommendation of the SCRS in 2004.

1.1 Submission of Task I

The catch data by gear, area and species required for the year in course refer to the catches of the previous year (2004). **Table 1** summarizes the status of the receipt of information. The observance of the deadline dates and the use of the protocols for the submission of information to the Secretariat have improved slightly this year.

1.2 Historical revisions of Task I

The catch data reported by South Africa for 1998-2002, included in the Secretariat's database, were expressed in gilled and gutted weight. The scientists of this country should work this year to obtain conversion factors by species to recalculate these historical caches in live weight. The procedure of estimating these new values is explained in document SCRS/2005/068. Furthermore, Japan, Venezuela and Ukraine have made revisions to their data on billfish and small tunas (**Table 2**). For Ukraine, these changes refer essentially to the gear and the fishing area. In the case of Japan and Venezuela, the changes are from the Billfish Data Preparatory Meeting held in Brazil in May 2005.

The Secretariat's database will consequently be revised after the SCRS' official acceptance of these new figures.

1.3 Submission of Task II (catch and effort and size sampling)

To facilitate the inclusion of this information in the database, the Secretariat had prepared an electronic form for this purpose that is being used more and more. The detailed information submitted by fleet for 2004 is included in **Table 1**.

As concerns sharks, the Secretariat has received a large amount of Task II information on the U.S. fleet. However, due to the difficulties the Secretariat encountered in trying to standardize the structure of these files, these data have not yet been integrated in the database. A request was sent to the statistical correspondent concerned asking him to study the possibility of re-submitting this information in a standard format to facilitate the processing and integration of the information in the Secretariat databases.

1.4 Task II validation

One of the objectives of the relational database is to facilitate the management of information, but also to validate the data so as to avoid the tedious task of filtering carried out before each stock assessment. In April 2005 all the Task II information, as well as the data catalogue (catch, effort, and sampling) was placed on the ICCAT web site with the possibility to carry out consultations or to download the databases. The Secretariat sent an official letter to all the scientists requesting them to verify the data of their respective country and to notify the Secretariat of possible omissions or errors. Unfortunately, the response to this request was very limited. A French scientist made the effort to review the files and he sent us some comments and recommendations to correct errors that he had detected (**Table 3**). The Secretariat will continue to publish the Task II data on the web

site and to urge the scientists of the countries to collaborate in improving these base data which at times are somewhat incomplete, questionable and/or uncertain.

1.5 General conclusions

- As of the time of this report, 16 Contracting Parties (as shaded in **Table 1**) have not submitted any information to the Secretariat.
- Taking into account the information received, 52% of the Task I data do not have Task II data (catch and effort) and 53% do not have size sampling.
- The official Task I data of Cape Verde, Netherlands Antilles, Gabon, Senegal, Côte d´Ivoire and the Virgin Islands are not yet processed, awaiting the breakdown of the catches by gear or clarifications on the species.
- Wide general use of the electronic form is encouraged since copies of the forms sent by fax cannot be entered in the databases.

2. Data on farming

The reliability of catch and size data is a crucial element in the stock assessments and the management of the fisheries. Since the advent of tuna farming in the Mediterranean, the quality of the information has tended to deteriorate. To remedy this and also to preserve the quality of the data, the Commission has made important recommendations aimed at having available all the statistical information concerning farming. Among the information required, data on catches and size sampling are of primary importance.

2.1 Catch data

Following the adoption of Recommendation [Rec. 03-09], Italy reported, in its Task I data, purse seine catches of 2600 t transferred to farming cages for fattening. Catches by other fleets have also been transferred to fish farms, but this information has not been submitted to the Secretariat.

2.2 Data on size sampling

Information regarding size sampling of fish carried out after a specific fattening period cannot be used directly in the assessments unless there is a means to estimate the growth of fish during captivity. Nevertheless, and in application of Recommendation [Rec. 03-09], Italy and Turkey submitted data on size sampling of fish carried out certainly much later than their capture at sea.

3. Trade data

Information from Statistical Documents Programs are regularly summarized in reports by the different parties and submitted to the Secretariat for their exploitation. On the basis of the studies of these documents, catches that have not been reported in Task I can be identified and estimated.

3.1 Submission of information

A total of eight Contracting or Cooperating Parties have submitted information regarding statistical documents. Details on the information, by Party, are included in **Table 4**.

3.2 Estimate of unreported catches

In **Table 5**, **Table 6** and **Table 7**, the Secretariat presents comparative figures between the catches reported in Task I and the figures obtained from the statistical documents for bluefin tuna, bigeye and swordfish, respectively. This estimate is based only on the information received by the Secretariat (up to November 7, 2005).

4. Survey and improvement of national data collection systems

In 2003, the SCRS and the joint meeting of fishery scientists and managers outlined some attempts to identify fleets that have gaps in their data collection systems and transmission of data. Later, the Contracting Parties considered it opportune to provide the Secretariat with funds to help certain countries improve their capacity to collect and information on their tuna fisheries.

4.1 Summary of ICCAT survey

A detailed summary of the various data collection systems is presented in **Table 8**. The detailed responses to the questionnaires are available at the Secretariat. For next year the Secretariat proposes that these questionnaires be studied in detail and to present a working document that establishes a fishing profile of the Parties that have responded to these surveys.

4.2 Data Fund

The 2003 *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* [Res. 03-21] established a Data Fund to be used "for training in data collection and for supporting of scientific participation in SCRS data preparatory and stock assessment sessions by scientists from Parties with insufficient capacity to meet data collection, quality assurance, and reporting obligations." Following herewith is a summary of the income and expenditures of the Data Fund:

Balance as of 31/12/2004		€ 4,581.42
Income: U.S. contributions in 2005		103,476.30
Expenditures:		
Purchase of 5,000 tags	2,263.17	
Travel support, BIL meeting (As of Aug. 31, 2005)	3,060.41	
Travel support, SCRS meeting (As of Dec. 12, 2005)	5,986.41	
Bank charges	59.50	11,369.49
Projected Balance 31/12/2005		**€96,688.23**

The protocol for approving the use of the Fund for particular activities was developed by the SCRS at its 2004 meeting.

In 2005, the Data Fund was used to finance the participation of scientists to scientific meetings: one participant (from Côte d'Ivoire) to the Billfish Data Preparatory Meeting, and two participants (from Ghana and Senegal) to the SCRS meeting. The Data Fund was also used to purchase 5,000 streamer tags in order to accommodate the increasing number of requests for tags and to avoid depletion of the inventory kept by the Secretariat.

For 2006, it is expected that the Data Fund will continue to be used for capacity-building and data collection activities in conformity with the priorities identified by SCRS. In addition, the SCRS may want to explore the use of the Fund to aid in the completion of the Field Manual.

4.3 Japan Data Improvement Project (JDIP)

At the end of 2004, Japan initiated a five-year project to aid several countries meet their data collection and reporting obligations. The report of the Project activities is presented in **Appendix 1**.

5. Publications

5.1 Statistics

5.1.1 CATDIS

Given the difficulty of receiving Task I data (total annual nominal catch by country) in five degree squares and by month or quarter, the Secretariat attempted to breakdown the data by quarter and by 5 degree squares. This work file was updated to cover the period from 1950 to 2003. This work has enabled the preparation of fishing maps published in the last *Statistical Bulletin* and the reports of the species groups. This file has also been used by the CWP for the publication of data of integrated fisheries databases of the Atlantic.

5.1.2 FISHSTAT

This program created by FAO provides a standard access to many databases of regional fishery bodies. Preliminary work is needed to format the Task I data in accordance with a format that is compatible with this software. This work has been carried out and the file is available on the ICCAT web site.

5.1.3 Statistical Bulletin

This year the Secretariat has made a considerable effort to improve the presentation of data in *Statistical Bulletin, Vol. 34*, which can be summarized in the following three points:

- presentation of graphics in color;
- inclusion of all the years from 1950 to 2003; and
- presentation of fishing maps.

Part of this work constitutes the initial phase for the development of the ICCAT Atlas proposed by the SCRS in 2002.

5.1.4 Task II

The publication in paper copy of these data (*Data Record*) was discontinued in 2000. Starting this year (April 2005) all information will be available on the ICCAT web site.

5.2 Other publications

5.2.1 Collective Volume of Scientific Papers

Volume 57 was published, consisting of two issues (487 pages) corresponding to reports and documents for the 2004 BETYP Symposium and the Second World Bigeye Tuna Meeting. The latter issue was peer-reviewed. Both issues were produced in hard-bound and CD versions. Volume 58 was published with the remaining documents and reports pertaining to other inter-sessional meetings and the SCRS meeting held in 2004. The Volume consists of five issues (1,782 pages) produced on CD.

During 2004 and 2005, the Secretariat scanned every scientific paper published since 1973 in the *Collective Volume* series, as well as the 1986 special publication for the Skipjack Year Program. The entire collection, about 3,200 files, is available in PDF (those documents published after 2000 are editable; older documents are available only as images). The collection is available from the ICCAT web site and will also be available on DVD in 2006.

For 2006, the Secretariat plans to enhance the accessibility of individual documents in the collection through the construction of a database. Currently, the collection is maintained in a series of HTML files with links to individual papers. Unless users know the Volume number or year of publication of the document they are looking for, they have to consult a separate ACCESS database that contains the title, main subject matter, and list of authors for each paper, and then look for the corresponding HTML file. Better accessibility of the documents would be achieved by modifying the database to include direct links to the individual files.

5.2.2 Biennial Report

In 2005, the *Report for Biennial Period 2004-2005 (Part I, 2004)* was published in three issues: Commission (1), SCRS (2) and Annual Reports (3). Produced in three languages, the Biennial Reports represent one of the main publication tasks by the Secretariat.

5.2.3 Newsletter

In 2005, the Secretariat reinstated the practice of issuing a Neswletter aimed at the general public to inform them of recent and planned activities, and major achievements. Two issues were prepared (February and September, 2005).

5.2.4 Field Manual

In February 2005, the Secretariat requested the Japan Data Improvement Project (JDIP) to consider funding Field Manual activities. The Project agreed to provide funding for contracting the writing of Chapter 4 which deals with sampling for statistics and biological information. After a review of the relative merits and costs of several bids, it was decided to award the contract to CEFAS (U.K.). An initial draft of Chapter 4 was presented to the 2005 SCRS Meeting for review.

In 2005, the Secretariat also completed a draft of Chapter 1 (an overview of ICCAT and the main types of data used), as well as some of the appendices that summarize biological information and conversion factors. These can be consulted in http://www.iccat.es/pubs_Field Manual.htm

The pace at which future work can be completed depends on the availability of funds. The JDIP has committed an additional €10,000 for 2006, which will be used towards the drafting of species summaries. However, this amount is probably insufficient for the completion of the remaining tasks and it is therefore necessary to identify other potential sources, such as:

- Data Fund. The Fund established by the 2003 *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* aims to aid in training for data collection, which is directly related to the need for a revised Field Manual.
- Contributions form Special Research Programs. The SCRS could study whether the special research programs could be used to fund parts of the Manual, especially those having to do with the species or fisheries that are of interest to each program. For example, the BYP budget could contribute towards chapters on bluefin biology or about fisheries that target bluefin. It should be noted that the BETYP ended with a positive balance and the two main contributors to the BETYP (EC and Japan) have been asked to apply this balance.
- Additional contributions. In March 2005, the Secretariat notified all Contracting Parties about the 2005 commitment for the JDIP towards Chapter 4 and asked Head Delegates if they could provide additional contributions (including in-kind). No responses have been received to date, but additional funding sources or contributions seem necessary to complete the Manual.

6. Tagging

The Secretariat is attempting to update all of the information it has for conventional and archival tagging of tunas and billfishes in the Atlantic. This section summarizes the activities carried out in this regard and some of the problems found. The Secretariat recommends that the SCRS establish an *ad hoc* group to improve coordination and communication of all tagging programs carried out for ICCAT species.

To support the tagging campaigns carried out by different national laboratories, the Secretariat has supplied 2,400 tags to Spain, 100 to Croatia, 200 to Italy, 200 to Greece and 200 to South America. The information obtained from these campaigns should be submitted to the Secretariat.

6.1 Tagging database (update & harmonizing)

The tagging database has been updated with the information received during last year from EC-España (AZTI: 632; IEO-Coruña: 6; IEO-Santander: 190), EC-Greece (126), EC-Ireland (6), and also sporadic recoveries reported by various other entities (16). Two additional data sets are waiting clarification. The largest and most problematic one is another integral tagging revision (more than 500,000 tags) submitted by United States in August 2005. The Secretariat will contact the US scientists in order to request advice on how to proceed with this large revision. Meanwhile United States submitted, upon the Secretariat's request, a short file with the tags recovered in 2004 (32) for inclusion in the 2005 lottery.

As recommended by the Sub-Committee on Statistics at the 2004 SCRS meeting, the Secretariat continued with the tagging revision and a quality control process started in 2004. This task was done in collaboration with ICCAT scientists involved in tagging experiments. Given the complexity of this revision it is crucial to improve this collaboration in the future, considering that a large fraction of tagging/recapture records is still flagged for revision and clarification.

Many of the problems faced by the Secretariat in respect to tagging information are due to the lack of a data exchange protocol (rules, formats, codes, procedures, etc.) regulating the submission and revision of tagging data. The Secretariat is planning to prepare a draft document with standard formats, rules and procedures, in order to contribute to the future ICCAT tag data exchange protocol.

6.2 Payment of rewards

The problem of the payment of rewards to encourage the return of tags should be discussed in the *ad hoc* working group proposed in section 6 above.

6.3 Posters & publishing

A list of tagging programs known to the Secretariat is available from http://www.iccat.int/tagging.htm. The reward posters used in these programs are also available from the web. It should be noted that many of these posters have outdated information (e.g. old phone numbers for the Secretariat). Another problem is that several posters are available only in one language; translation and distribution of these posters in other languages (including non-ICCAT languages) could improve tag recovery rates substantially.

7. Review of the Secretariat relational database

The ICCAT relational database system is a composite structure of various databases (Task I, Task II catch-and-effort, Task II size sampling, catch-at-size, CATDIS, tagging, trade statistics, etc.) with nearly 120 inter-related tables and more than three gigabytes (GB) in size. Its design is considered finalized in terms of model and structure. In terms of data management tools, only a part of the "user-friendly" data manipulation tools were, or are, under development. The Secretariat plans to continue this complex and time consuming task during the following years. At the same time, the Secretariat will continue the data revision and validation of Task II.

7.1 Database documentation

The documentation of the relational database is a major task for 2006. The Secretariat will produce a set of technical documents that will address this issue. Those documents will be presented for review to the Sub-Committee on Statistics during the 2006 SCRS meeting. When necessary, draft versions of those documents will be distributed to the ICCAT scientists, for review and comments.

7.2 Definition and classification of area, fleets and fisheries

The definition of the fleets and the fisheries was adopted by the SCRS, and consequently the Secretariat established and defined a coding system. A problem that still needs to be resolved concerns the geographic delimitation of the areas used to report Task I. It is essential that the working groups develop associations between Task I and Task II in order to create the catch-at-size and CATDIS files. In this regard, precise geographic location of the areas used in Task I is essential. **Table 9** provides an exact list of these areas as well as the catches carried out in the different strata.

7.3 Distinguishing null catches from unreported data

The identification of null catches and unreported catches in the database is an extremely complex task and its maintenance will require considerable work in terms of man hours, which the Secretariat and the correspondents in charge of transmitting this information may not be able to carry out. To do this work, the database should include a matrix combining all the fleets, all the fishing gears, all the species, and all the fishing areas, which would multiply in an exponential manner the size of databases and the forms to submit information.

In this framework all null catches should be reported for all species and for all existing fishing gears. Another difficulty is to define the way to present additional information in the tables for cases when various fleets have null catches or unreported catches.

8. Webpage and Internet domains

8.1 Web site

The ICCAT web site continues to grow in information content. The primary site occupies 2.2 GB of space with over 6,500 files. The most substantial additions made during the last year were: (a) the entire collection of documents published in the *Collective Volume* series, and (b) a password-protected database of officials authorized to validate ICCAT Statistical Documents.

The ICCAT web site has been routinely modified to be kept up to date, especially with regards to ICCAT publications, including draft reports of current year meetings. Furthermore, several problems have been corrected, such as errors encountered with browsers other than Internet Explorer. One of the main improvements planned for 2006 is the implementation of a search tool for locating files.

Since 2003, the SCRS has requested that the Secretariat make the SCRS documents for the current year available on the Internet. In 2004 this was done through an FTP site, but several scientists experienced difficulties due to firewall restrictions to FTP access from their workplaces. As a result of this, since 2005 the Secretariat has been placing current-year SCRS papers on a password-protected directory on the ICCAT web site.

8.2 Wireless facilities and photocopying

The Secretariat is making a wireless network available in the ICCAT headquarters during inter-sessional meetings. Meeting participants with WiFi-enabled computers can thus access the Internet as well as have access to a local computer that is used to deposit and exchange electronic documents and datasets. The Secretariat also intends to use WiFi to facilitate the exchange of documents during SCRS plenary sessions.

Distribution of photocopies was reduced substantially during the 2005 inter-sessional scientific meetings because of electronic document distribution. It is planned to use wireless network facilities increasingly so as to reduce the number of photocopies made and distributed during inter-sessional and SCRS meetings. This should reduce costs for ICCAT and speed up the process of document distribution during meetings.

8.3 Domains and e-mail

In order to maintain ownership of the acronym "ICCAT" across different domains, the Secretariat has maintained three domain names for several years: ICCAT.ES, ICCAT.ORG and ICCAT.INT. Currently, the ICCAT.ES domain is used widely because it was the first one that was acquired, and because the email addresses of the Secretariat are based on this domain.

In terms of web sites, both the ".ES" and ".INT" domains point to the main ICCAT site, while the ".ORG" domain houses the list of authorized vessels greater than 24m. The ".ES" domain is specific to Spain and its use implies a Spanish institution or business; the ".ORG" domain is intended primarily for non-profit organizations, including NGOs. Both of these apply to ICCAT. However, the ".INT" domain is most appropriate because it is restricted to inter-governmental organizations that are established under a Treaty, such as ICCAT.

As a result of this, in September 2005 the Secretariat initiated a migration towards preferential usage of the ".INT" domain. Similar migrations have been accomplished by other RFBs such as NAFO and SPC. This plan includes:

– Changing the Secretariat's e-mail addresses to "@ICCAT.INT";
– Changing ICCAT's letterhead and all correspondence to refer to the ".INT" domain;
– Keeping all three domains under the ownership of ICCAT indefinitely;
– Consolidating all three domains to point to the same web site.

9. Special research programs

9.1 Bluefin Year Program (BYP) and Enhanced Billfish Research Program (EBRP)

The activities of the BYP and EBRP are presented separately in reports to the SCRS (see Appendices 8 and 9, respectively, to the 2005 SCRS Report). The Secretariat's involvement in these programs is primarily to facilitate the communication of research proposals to the program coordinators for their approval, to disburse the funds accordingly, and to maintain the accounting of the Program funds.

The Secretariat sadly noted that Mr. Nestor N'Goran Ya, who served many years as EBRP Coordinator for the East Atlantic, passed away in August 2005. His efforts to collect fishery statistics for billfishes, especially from artisanal fisheries in western Africa, have greatly improved ICCAT's database for these species.

9.2 Bigeye Tuna Year Program (BETYP)

The last activities financed by the BETYP were the publication of the 2004 BETYP Symposium and Second World Bigeye Meeting (ICCAT 2005a) and the funding of tagging activities that had been committed before the 2004 SCRS.

The final financial audit of the Program was carried out in 2005, thus ending the program officially. The two main contributors of the Program, EC and Japan, were asked to instruct the Secretariat regarding the disposition of the remaining balance of €39,963.28.

10. International activities

The various meetings at which ICCAT was represented are provided in Appendix 2 to the 2005 Administrative Report. The Appendix includes a summary of the main issues discussed in these meetings. Other specific activities pertaining to international arrangements are listed below.

10.1 GFCM/ICCAT

The Third and final joint GFCM-ICCAT meeting on sustainable bluefin tuna farming practices in the Mediterranean took place in March 2005 (FAO 2005). The meeting developed a series of guidelines, many of them in the area of collection of statistics, to aid in ensuring the sustainability of this industry.

ICCAT also participated at the 29th Session of GFCM where the relationship between ICCAT and GFCM was reviewed, as it was done previously at the 2004 ICCAT annual meeting. In September, the GFCM Secretariat sent a proposal for a permanent joint Working Group to be established between the two Commissions which was presented at the November 2005 ICCAT meeting.

10.2 CWP

A CWP meeting was held in 2005 and the main conclusions were the recommendation to separate catch data and farming data in the databases of regional fishery bodies, and the definition adopted regarding the size of vessels. The Secretariat invited the CWP to host their 2006 meeting at the Secretariat.

10.3 FIRMS

ICCAT is a member of the Fishery Resources Monitoring System (FIRMS) Partnership, a mechanism for globally distributing information about the status of resources. ICCAT participated in a FIRMS Steering Committee meeting where various policy issues of the partnership were discussed. In the interim, the FIRMS Secretariat (hosted by FAO) set up a web page where example resource descriptions from different RFBs (including ICCAT) will be placed. These should become available to the public towards the end of 2005.

FIRMS will also hold a technical meeting in December 2005 to further develop concepts, protocols and rules for making information available through the Partnership. A training workshop will also be held about XML tagging and other processes needed to convert the stock status reports (in the case of ICCAT these are the SCRS Executive Summaries) to FIRMS information sheets. The Secretariat's publications officer will participate in the training.

10.4 ASFA

ICCAT is a member of the Aquatic Sciences and Fisheries Abstracts (ASFA) partnership, the largest indexing/abstracting service in the field. One of the obligations of ICCAT as a partner is to prepare database records pertaining to the papers published in the *Collective Volume* series. However, the Secretariat was unable to achieve this during 2002-2004.

In 2004, the Secretariat contracted the services of India's National Institute of Oceanography to prepare the records for the Collective Volume issues published in 2001-2004 (505 entries in total). This work was completed in August 2005.

10.5 GAO database

In 2004, the SCRS discussed the need to make oceanographic databases more readily available to ICCAT scientists through the ICCAT web site. Particular attention was focused on the GAO database and software, developed by IFREMER/IRD. The corresponding web page for the Sub-Committee on Environment (http://www.iccat.int/SC_ENV.htm) was therefore updated with a number of links to databases.

Table 1. Catalogue of 2004 data received during 2005.*

					Species													
	Flag	Gear	Fleet	Task	Tuna										Sharks				Date
Status	Name	Group	info	info	ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	BSH	POR	SMA	other	Reported
CP	Algerie	GN		T1			■				■			■					01/08/2005
		HL		T1			■				■			■					01/08/2005
		LL		T1			■				■			■					01/08/2005
		PS	X	T1			■				■			■					01/08/2005
		TP		T1			■												01/08/2005
		UN	X	T1			■				■			■					01/08/2005
	Angola			ALL															
	Barbados			ALL															
	Belize	LL		T1											■				27/07/2005
				CE											■				25/07/2005
	Brasil	BB	X	T1	■	■	■	■	■	■	■	■	■	■	■		■	■	05/08/2005
				CE	■	■				■			■	■					05/08/2005
				size						■									08/05/2005
		LL	X	T1	■	■	■	■	■	■	■	■	■	■	■		■	■	05/08/2005
				CE	■	■		■	■	■	■	■	■	■	■		■	■	05/08/2005
				size		■					■		■						08/05/2005
		PS		T1	■	■	■	■	■	■	■	■	■	■	■		■	■	05/08/2005
		SU		T1	■	■	■	■	■	■	■	■	■	■	■		■	■	05/08/2005
	Canada	HP		size	■	■						■	■						18/04/2005
							■				■								07/09/2005
		LL		size	■	■						■	■						18/04/2005
							■				■								07/09/2005
		RR		size			■												07/09/2005
		TL		size			■												07/09/2005
		TP		size			■												07/09/2005
		TR		size	■	■							■						18/04/2005
		TW		cas							■								07/09/2005
	Cape Verde	PS		size						■			■	■					02/08/2005
	China, P.R.	LL		T1	■	■	■	■	■		■	■	■						05/08/2005
				CE	■	■	■	■	■		■	■	■						05/08/2005
	Côte D'Ivoire	GN		T1				■	■		■	■							04/06/2005
				size				■	■		■	■							04/05/2005
	Croatia	PS	X	T1			■												29/07/2005
				CE			■												29/07/2005
		SP		CE			■												29/07/2005
	EC.Cyprus	LL		T1	■		■				■				■				16/09/2005
				CE	■		■				■				■				15/07/2005
		PS		T1			■												16/09/2005
				CE			■												15/07/2005
		TN		T1	■									■					16/09/2005
				CE	■									■					15/07/2005
		SP		T1	■														16/09/2005
		TW		T1														■	16/09/2005
	EC.Denmark			ALL															
	EC.España	BB		T1	■	■	■			■	■		■	■					26/07/2005
				CE	■	■	■			■	■		■	■					26/07/2005
		HL		T1			■												19/09/2005
		LL		T1	■	■	■	■	■	■	■	■	■	■	■		■	■	19/09/2005
		PS		T1		■				■			■	■					07/06/2005
				CE		■				■			■	■					23/06/2005
		SU		T1	■					■				■					19/09/2005
		TR		T1	■														19/09/2005
		UNC		T1		■	■				■								19/09/2005
	EC.Estonia			ALL															
	EC.France	BB		T1	■	■	■			■			■	■					10/08/2005
				CE		■				■			■	■					12/08/2005
		LL		T1	■		■								■	■		■	10/08/2005
		PS		T1	■	■	■			■			■	■					10/08/2005
				CE	■	■				■			■	■					12/08/2005
				size	■	■	■			■			■	■					12/08/2005
		TN		T1											■	■		■	10/08/2005
		TR		T1												■			10/08/2005
		TW		T1	■		■								■	■		■	10/08/2005
		UN		T1	■		■	■			■	■			■	■		■	10/08/2005
	EC.Germany			ALL															
	EC.Greece	HL	X	T1	■		■												15/07/2005
		LL	X	T1	■		■				■								15/07/2005
				CE	■		■				■							■	15/07/2005
				size	■						■								15/07/2005
		PS	X	T1	■		■			■				■					15/07/2005
		UN		size			■												15/07/2005

Status	Flag Name	Gear Group	Fleet info	Task info	Tuna ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	Sharks BSH	POR	SMA	other	Date Reported
	EC.Ireland	LL		T1	■														16/09/2005
		TW		T1	■		■				■								16/09/2005
		TR		T1	■														16/09/2005
	EC.Italy	FARM		size			■												03/08/2005
		GN		size			■				■			■					03/08/2005
		HL		size			■							■					03/08/2005
		HP		size							■								03/08/2005
		LL		T1			■												10/08/2005
				size	■		■				■			■					03/08/2005
		PS		T1			■												10/08/2005
				size			■												03/08/2005
		RR		T1			■												10/08/2005
		SP		T1			■												10/08/2005
		SU		size	■									■					03/08/2005
		TP		T1			■												10/08/2005
				size			■												03/08/2005
		TRAP-S		size										■					03/08/2005
		UN		T1			■												10/08/2005
	EC.Latvia			ALL															
	EC.Lithuania			ALL															
	EC.Malta	LL		T1	■		■				■								16/09/2005
	EC.Netherlands			ALL															
	EC.Poland			ALL															
	EC.Portugal	BB	X	T1	■	■	■			■			■	■					02/08/2005
				CE	■	■	■			■			■	■					02/08/2005
				size	■	■	■			■									20/06/2005
		LL	X	T1	■	■	■	■	■	■	■	■		■	■	■	■	■	02/08/2005
				CE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	29/04/2005
				size							■				■				20/06/2005
		PS		T1						■	■			■	■		■	■	02/08/2005
				CE						■	■			■					
		SU		T1	■			■	■	■	■		■	■	■	■	■	■	02/08/2005
				CE	■	■		■	■	■	■		■	■	■	■	■	■	02/08/2005
		TP		T1			■	■		■	■			■					02/08/2005
				CE				■		■	■			■					02/08/2005
				size			■							■					20/06/2005
	EC.Sweden			ALL															
	EC.United Kingdom	GN		T1														■	01/08/2005
		LL	X	T1							■							■	01/08/2005
				CE							■							■	01/08/2005
		TW		T1					■										01/08/2005
				CE					■										01/08/2005
	FR.Saint Pierre et Miquelon			ALL															
	Gabon			ALL															
	Ghana	BB		T1		■				■			■	■					27/07/2005
				CE		■				■			■	■					27/07/2005
				size		■				■			■						08/07/2005
		PS		T1		■				■			■	■					27/07/2005
				CE		■				■			■	■					27/07/2005
				size		■				■			■						08/07/2005
	Guatemala			ALL															
	Guinea Ecuatorial			ALL															
	Guinée Conakry			ALL															
	Honduras			ALL															
	Iceland			ALL															
	Japan	LL		T1	■	■		■	■		■	■	■		■			■	11/07/2005
				CE	■	■	■	■	■	■	■	■	■						11/07/2005
				size				■											20/04/2005
	Korea, Republic of	LL		T1	■	■					■	■	■						01/08/2005
				CE	■	■	■	■		■	■	■	■					■	01/08/2005
		PS		T1			■												01/08/2005
	Libya			ALL															
	Maroc	GN		T1						■	■			■					15/09/2005
		HL		T1			■			■				■					15/09/2005
		LL		T1			■			■	■			■					15/09/2005
		PS		T1			■			■	■			■					15/09/2005
		TP		T1			■			■				■					15/09/2005
	Mexico	LL	X	T1		■	■	■	■	■	■	■	■	■			■		16/08/2005
				CE	■	■	■	■	■	■	■	■	■	■	■		■		16/08/2005
				size									■						10/08/2005
	Namibia	BB	X	T1	■	■				■			■					■	06/09/2005
				CE	■	■							■						06/09/2005
				size	■	■													07/09/2005

Status	Flag Name	Gear Group	Fleet info	Task info	Tuna ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	Sharks BSH	POR	SMA	other	Date Reported
		LL	X	T1	■	■				■	■		■		■		■	■	06/09/2005
				CE	■	■					■		■		■		■	■	06/09/2005
				size											■		■		07/09/2005
	Nicaragua			ALL															
	Norway			ALL															
	Panama			ALL															
	Philippines	LL	X	T1		■					■		■						31/03/2005
				CE		■					■		■						23/06/2005
	Russian Federation	TW	X	T1										■					25/07/2005
	S. Tomé e Príncipe			ALL															
	Senegal			ALL															
	South Africa	BB	X	T1	■	■				■			■						02/08/2005
				CE	■	■				■			■						02/08/2005
				size	■														02/08/2005
		HL	X	T1									■						02/08/2005
				CE									■						02/08/2005
		LL	X	T1	■	■					■		■		■		■		02/08/2005
				CE	■	■					■		■		■		■	■	02/08/2005
				size	■	■					■		■		■		■		02/08/2005
		RR	X	T1		■				■			■		■				02/08/2005
				CE		■				■			■						02/08/2005
	Trinidad and Tobago	LL	X	T1	■	■		■	■		■	■	■	■	■		■	■	02/08/2005
				CE		■		■	■		■	■	■	■					09/09/2005
		RR		T1				■	■					■					02/08/2005
				CE				■	■					■					09/09/2005
		UN	X	T1					■					■				■	02/08/2005
				CE										■				■	09/09/2005
	Tunisie			ALL															
	Turkey	PS	X	T1			■												02/08/2004
	U.S.A.	GN	X	T1	■					■	■		■	■				■	01/08/2005
				size										■			■	■	05/08/2005
		HL		T1	■	■	■			■	■		■	■				■	01/08/2005
				size	■	■	■				■		■	■			■	■	05/08/2005
		HP	X	T1			■				■								01/08/2005
				size			■				■								05/08/2005
		HS		T1										■					01/08/2005
		LL	X	T1	■	■	■	■	■	■	■	■	■	■	■	■		■	01/08/2005
				CE	■	■		■	■	■	■	■	■	■					05/08/2005
				size	■	■	■				■		■	■	■	■	■	■	05/08/2005
		PS	X	T1			■							■					01/08/2005
				size			■							■					05/08/2005
		RR	X	T1	■	■	■	■	■	■	■	■	■	■			■	■	01/08/2005
				size			■						■						05/08/2005
		TP		T1	■	■				■	■		■	■					01/08/2005
		TR		T1										■					01/08/2005
		TW	X	T1	■	■				■	■		■	■					01/08/2005
				size		■					■								05/08/2005
		UN	X	T1	■	■		■	■	■	■	■	■	■	■				01/08/2005
	UK.Anguilla			ALL															
	UK.Bermuda			ALL															
	UK.British Virgin Islands			ALL															
	UK.Sta Helena			ALL															
	UK.Turks and Caicos Islands	RR		T1				■					■	■					22/04/2005
				CE				■						■					22/04/2005
		SP		T1				■					■	■				■	20/10/2004
				size															
	Uruguay**			ALL															
	Vanuatu			ALL															
	Venezuela	BB		T1		■				■			■	■					13/09/2005
				CE		■				■			■	■					13/09/2005
				size		■				■			■	■					13/09/2005
		LL		T1	■	■		■	■		■	■	■	■	■		■	■	13/09/2005
				CE	■	■		■	■		■	■	■	■	■		■	■	13/09/2005
		PS		T1	■	■				■			■	■					13/09/2005
				CE	■	■				■			■	■					13/09/2005
				t2sz	■	■				■				■					13/09/2005
NCC	Chinese Taipei	LL	X	T1	■	■	■	■	■	■	■	■	■						05/05/2005
	Guyana	GN	X	T1										■				■	28/07/2005
	Netherlands Antilles			ALL															
NCO	NEI.etro	BB		T1		■				■			■						07/06/2005
				CE		■				■			■	■					23/06/2005
		PS		T1		■				■			■	■					07/06/2005
				CE		■				■			■	■					23/06/2005

Status	Flag Name	Gear Group	Fleet info	Task info	Tuna										Sharks				Date Reported
					ALB	BET	BFT	BUM	SAI	SKJ	SWO	WHM	YFT	small t.	BSH	POR	SMA	other	
	Dominica	TR	X	T1		■		■	■	■	■		■	■					28/07/2005
	Grenada	LL	X	T1	■			■	■		■	■	■						23/03/2005
				CE	■		■	■	■	■	■	■	■						23/03/2005
		TR		T1			■			■									23/03/2005
	Falklands			ALL															
	Saint Kitts and Nevis	TR		T1										■					25/07/2005
	St. Vincent and Grenadines	LL		T1	■	■			■	■			■						08/08/2005
				CE	■	■			■	■			■	■					08/08/2005
		TR		T1	■					■			■	■				■	08/08/2005
	Sta. Lucia	TR		T1		■		■		■	■		■	■					21/03/2005
		UN		T1														■	21/03/2005

* Cells in black or with an "X" indicate data received; gray shading indicates data not received for this fleet.

** Data received later.

Table 2. Historical revisions to Task I.

				Year											
Status	*Flag*	*Species*	*Gear*	*1992*	*1993*	*1994*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
CP	Japan	ALB	LLHB										926	972	1575
		BET	LLHB										15473	17873	20441
		BLM	LLHB										1		5
		BSH	LL										742	825	1160
		BUM	LLHB								866	335	155		
													125	421	854
		SAI	LLHB											24	81
		SBF	LLHB										1244	1707	109
		SHX	LL										171	201	318
		SPF	LLHB											52	78
		SWO	LLHB										848	907	1367
		WHM	LLHB								83	56	6		
													10	35	49
		YFT	LLHB										2082	2653	8747
	Venezuela	BUM	GILL								80				
		WHM	GILL								12				
NCO	Ukraine	FRI	TRAW							36	48				
		BIL	TRAW	5											
		BON	TRAW	25			342	2786	1918	1114	399	231	656	30	
		MAW	TRAW	90							21			12	
		MIX	TRAW	1	3	4			303		28			4	

New figures from Morocco (BFT-1998) not included in this table and pending SCRS approval.

Table 3. Errors detected in Task II.

Chinese Taipei longline 1968-1978	Data duplicated.
Catches on land	Verify areas of catch.
Italie 2000 SWO-BFT	Error in units.
Ghana BB 88-89-90-98	Duplication and data missing for 1990.
France _Spain PS 1969-1982	BET catch not adjusted according to species composition.
France 1980	Purse seine data missing.
Brazil BB	Missing Task II data for 1999 and 2000.
Senegal	Task II data incorrect.
Southern bluefin tuna (SBF)	Do not accumulate with other species in the catalogue.
France albacore (ALB)	Data missing for the 1970s and 1980s.

Table 4. Statistical documents catalogue.

RepCountryID	*StatDocID*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
Communauté européenne	BFTSD												
Japan	BETRC												
	BETSD												
	BFTRC												
	BFTSD												
	SWORC												
	SWOSD												
Korea	BETRC												
	BETSD												
	BFTRC												
	BFTSD												
	SWOSD												
Thailand	BETRC												
	BETSD												
	SWORC												
	SWOSD												
Tunisie	BFTSD												
Turkey	BFTSD												
Chinese-Taipei	BETSD												
	BFTRC												
	BFTSD												
USA	BFTex												
	BFTRC												
	BFTSD												

Table 5a. BFT: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Contracting Parties, Entities or Fishing Entities, in live weight (t).

			Task-I					*Trade statistics*										
								SD						*RC*				
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005**	*2000*	*2001*	*2002*	*2003*	*2004*	*2005**
CP	Algerie	MED	2330	2012	1710	1586	1208												
	Brasil	AT.W		0						0	0								
		UNK											5						
	Canada	AT									4								
		AT.W	595	537	641	571	552	531	489	590	535	518	7		1	2	5	20	
	China, P.R.	AT										1101							
		AT.E	80	68	39	19	41	53	121	38	57	27	55						
	Croatia	MED	930	903	977	1139	827	856	1280	2218	2997	3117	2531		2				
		UNK											26					28	5
	EC.Cyprus	AT.E								5									
		MED	61	85	91	79	105	18	9	18	8	1	959						
		UNK																	20
	EC.España	AT									31								
		AT.E	3474	3633	4090	2129	1938	1690	1544	2142	1183	970	751	6	54	22	35		
		AT.W								1		2							
		MED	2772	2234	2215	2521	3216	5389	6735	6728	6490	7411	4674	31	16	165	22		
		UNK															144	94	130
	EC.France	AT.E	542	629	755	518	561	2	1			3							
		AT.W						0		1									
		MED	6780	6119	5810	5979	6469	316	433	102	921	597	8	690	386	324	153	3693	1635
		UNK															9	70	113
	EC.Greece	MED	622	361	438	422	389	309	331	412	102	52	490						
	EC.Ireland	AT.E	22	8	15	3	1	8	7	6	1	2							
		AT.W						5	2	0		1							
	EC.Italy	AT.W									0	5							
		MED	3845	4377	4628	4973	4686	4058	1051	2598	1257	2115	851	385	1655	3632	3851	2780	1540
		UNK															60	111	155
	EC.Malta	AT.E															37		
		MED	376	219	240	255	264	87	213	9	475	238	64	78	79	18	31	16	
		UNK															11	10	
	EC.Portugal	AT.E	441	404	186	61	26	90	109	122	15	2	0						
		AT.W					1												
		MED	61	64		2			64										
	EC.United Kingdom	AT				0													
		AT.E	0																
		AT.W			0														
	FR.SP et Miquelon	AT.W			3	11													
	Guinea Ecuatorial	AT.W						143											
		MED						17											
	Iceland	AT.E			1			30	5										
	Japan	AT									13								
		AT.E	2895	2425	2536	2695	1986				18								
		AT.W	492	506	575	57	396												
		MED	136	152	390	316	638				57	32	18						1
		UNK									0						1	10	
	Korea, Republic of	AT.E	6	1															
		MED					700					700						109	
	Libya	AT.E	487																
		MED	1063	1940				514	344	216	552	1256	484		239	317	41	71	1188
		UNK															47	15	60
	Maroc	AT									55								
		AT.E	2228	2497	2565	1797	1961	1498	2688	921	1660	736	378	281	396	723	300	271	88
		MED	695	511	421	760	819	38	17		3		4			6	112	44	
		UNK															336	175	4
	Mexico	AT.W	29	10	12	22	9	23	11	6	8	10	8	8	1			1	
		MED						0					2						
	Namibia	AT.E			0														
	Philippines	UNK											1						
	South Africa	AT.E									1								
	Tunisie	MED	2184	2493	2528	791		646	1743	358	303	974	1500		187	40	1200	8	363
		UNK											4					3	61
	Turkey	MED	1070	2100	2300	3300	1075	534	584	1410	1834	3735	1264					1334	1126
		UNK															1	39	44
	U.S.A.	AT.E						0											
		AT.W	1279	1614	1882	1530	971	941	1021	924	729	309	22						
		MED									0								
	UK.Bermuda	AT.W	1	1	1	0													
	Uruguay	AT.W			1	0													

Data reported with mixed Contracting Parties.

	EC.France + Libya	MED															440	
	France + Spain	MED									429	135	10				407	543
	Italy + Spain	MED									19	13	106					

*****Partial data.

Table 5b. BFT: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Non-Contracting Parties, Entities or Fishing Entities (NCC: cooperating; NCO: Others), in live weight (t).

			Task-I					*Trade statistics*										
								SD						*RC*				
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005**	*2000*	*2001*	*2002*	*2003*	*2004*	*2005**
NCC	Chinese Taipei	AT.E	144	304	158			41	154	40									
		MED	169	329	508	445	51	22	448	326	170	370	27				134	8	
		UNK															80	9	
NCO	Cuba	AT.W			74														
	Faroe Islands	AT.E	118					67	38										
		AT.W						61											
	Israel	MED								2	3	1							
	Maldives	UNK											15						
	NEI.COMB**	MED	109	571	508														
	NEI (Eq. Guinea)	AT.W	143																
		MED	17																
	NEI (Sierra Leone)	AT.W	127	49															
	Oman	UNK											0						
	Seychelles	AT.E			2														
	Sierra Leone	AT.E	93	118															
		AT.W							377	128					11	7			
	Yugoslavia Fed.	MED	4																

*****Partial data.

**NEI.COMBINED (NEI.COMB) includes estimates of unreported catches of Croatia, France, Italy, Maroc, Portugal, Spain, Lybya, Malta and Tunisie aggregated.

Table 6a. BET: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Contracting Parties, Entities or Fishing Entities, in product weight (t).

			Task-I					*Trade statistics*					
								SD			*RC*		
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2003*	*2004*	*2005**	*2003*	*2004*	*2005**
CP	Angola	AT							20				
	Barbados	AT	18	6	11	11							
	Brasil	AT	2768	2659	2582	2455	1496		1	79			
		UNK								3			
	Canada	AT	327	241	279	182	143						
	Cape Verde	AT	2		1	1	1						
	China, P.R.	AT	6564	7210	5840	7890	6555	7917	5518	1901			
		UNK										3	2
	Côte D'Ivoire	AT	2										
	EC.España	AT	11250	10134	10524	10969	8251	10					
	EC.France	AT	5949	4948	4293	3940	2926						
	EC.Ireland	AT		10			0						
	EC.Portugal	AT	1498	1605	2590	1655	3204						
	FR.SP et Miquelon	AT			21	28							
	Gabon	AT	150	121									
	Ghana	AT	5586	14095	5893	4816	6944						
	Japan	AT	24605	18087	15473	19055	15203	5	1	0			
		UNK									22		
	Korea, Republic of	AT	43	1	87	143	629	122	534	161			
		UNK									162		
	Libya	AT	400	31	593	593							
	Maroc	AT	770	857	913	889	929			13			
	Mexico	AT	2	2	7	4	5						
	Namibia	AT	589	640	274	215	177		8	4			
	Panama	AT	952	89	63								
	Philippines	AT	975	377	837	855	1854	649	2060	856			
	Russian Federation	AT	91										
	Senegal	AT	1131	1308	565	407	548						
	South Africa	AT	249	239	341	113	270						
	Trinidad and Tobago	AT	5	11	30	6	5						
	U.S.A.	AT	574	1085	601	482	414						
	UK.Bermuda	AT	0	0	0	0	1						
	UK.Sta Helena	AT	8	5	5								
	Uruguay	AT	25	51	67	59	40						
	Venezuela	AT	226	708	629	516	1060						

*****Partial data.

Table 6b. BET: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Non-Contracting Parties, Entities or Fishing Entities (NCC: cooperating; NCO: Others), in product weight (t).

			Task-I					*Trade statistics*					
								SD			*RC*		
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2003*	*2004*	*2005**	*2003*	*2004*	*2005**
NCC	Chinese Taipei	AT	16795	16429	18483	18682	16399	18081	15585	5829			
		UNK										1	43
	Netherlands Antilles	AT	2359	2803	1879	3203							
NCO	Cuba	AT			16	16							
	Dominica	AT		5			0						
	Ecuador	AT								46			
	Faroe Islands	AT	8										
	Grenada	AT	0	0	0								
	Liberia	AT	57	57	57	57							
	NEI (Belize)	AT	4450	3658									
	NEI (Cambodia)	AT		515									
	NEI (Eq. Guinea)	AT	4481	1652									
	NEI (FR.SP et Miquellon)	AT		90									
	NEI (G. Conakry)	AT	27										
	NEI (Gambia)	AT		5									
	NEI (Georgia)	AT		140	383								
	NEI (Honduras)	AT	6134	1880									
	NEI (Panama)	AT		473	148								
	NEI (S. Tomé e Principe)	AT		18									
	NEI (Sierra Leone)	AT		39									
	NEI.ETRO	AT	2285	3024	2248	7229	5278						
	Seychelles	AT	58		162								
		UNK									25		
	Sierra Leone	AT	6	2									
	St. Vincent and Grenadines	AT	1216	506	15	103	18						
	Sta. Lucia	AT		1	2	2	0						

*****Partial data.

Table 7a. SWO: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Contracting Parties, Entities or Fishing Entities, in product weight (t).

			Task-I					*Trade statistics*			
								SD			*RC*
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2003*	*2004*	*2005**	*2005**
CP	Algerie	MED	816	1081	814		564			9	
	Angola	AT.S							2		
	Barbados	AT.N	13	19	10	10					
	Brasil	AT.N	117								
		AT.S	4579	4082	2910	2920	2998			418	
		UNK								14	
	Canada	AT.N	1018	1105	992	1363	1248				
	China, P.R.	AT.N	22	102	90	316	56				
		AT.S	344	200	423	353	278	18	26	131	
		UNK									1
	Côte D'Ivoire	AT.N								36	
		AT.S	20	19	19	43	29			1	
	EC.Cyprus	MED	82	135	104	47	49				
	EC.España	AT.N	4595	3968	3957	4586	5376	57	9		
		AT.S	6388	5789	5741	4527	5483				
		MED	1436	1484	1498	306	950				
	EC.France	AT.N	122		74	169	102				
		MED		12	27		19				
	EC.Greece	MED	1960	1730	1680	1230	1129				
	EC.Ireland	AT.N	35	17	5	12	1				
	EC.Italy	MED	7515	6388	3539	8395	6942				
	EC.Malta	MED	175	102	257	163	195				
	EC.Portugal	AT.N	732	735	766	1032	1320				
		AT.S	392	393	380	354	345				
		MED	13	115	8	1	120				
	EC.United Kingdom	AT.N	1								
		AT.S			0						
	FR.SP et Miquelon	AT.N			10	39					
	Gabon	AT.S				9					
	Ghana	AT.S	117	531	372	734	343				
		UNK								0	
	Japan	AT.N	400	239	239	102	742				
		AT.S	791	684	902	972	523				
		MED	2	1							
		UNK									99
	Korea, Republic of	AT.S	10	0	2	24	70	63	24		
	Libya	MED	8	6							
	Maroc	AT.N	114	523	223	329	335			137	
		MED	2708	3026	3379	3300	3253			909	
	Mexico	AT.N	37	27	34	32	44				
	Namibia	AT.S	469	751	504	191	549			58	
		UNK								24	
	New Zealand	AT.S						0			
	Philippines	AT.N		1	4	44	5				
		AT.S		6	1	8	1	26	32	1	
	Senegal	AT					108				
		AT.N								31	
		UNK								76	
	South Africa	AT.S	328	547	649	293	295	11	0		
	Trinidad and Tobago	AT.N	41	75	92	78	83				
	Tunisie	MED	483	567	1138	288				13	
		UNK								4	
	Turkey	MED	373	360	360	350				2	
	U.S.A.	AT		15	0						
		AT.N	3353	2510	2648	2794	2600				
		AT.S	144	43	200	21	16				
	UK.Bermuda	AT.N	3	2	0	0	1				
	UK.British Virgin Islands	AT					4				
	UK.Sta Helena	AT.S		20	4						
	Uruguay	AT.S	713	789	768	850	1105	4		137	
	Venezuela	AT.N	30	21	34	45	46				

*****Partial data.

Table 7b. SWO: Task I catches versus trade statistics (Statistical Document Programs) for ICCAT Non-Contracting Parties, Entities or Fishing Entities (NCC: cooperating; NCO: Others), in product weight (t).

			Task-I					*Trade statistics*			
								SD			*RC*
Status	*Flag*	*Area*	*2000*	*2001*	*2002*	*2003*	*2004*	*2003*	*2004*	*2005**	*2005**
NCC	Chinese Taipei	AT							13		
		AT.N	347	299	310	257	30	25	30		
		AT.S	1303	1149	1164	1254	745	164	359	65	
		UNK								44	
NCO	Argentina	AT.S		5							
	Australia	UNK						55	28	6	
	Belize (foreign obs.)	AT.S	8								
	Chile	UNK								21	
	Cuba	AT.N			10						
	Dominica	AT.N		1			0				
	EC.France+España	AT.S	4								
	Egypt	UNK								0	
	Faroe Islands	AT.N	4								
	Grenada	AT.N	84		54	88	73				
	Indonesia	UNK								20	148
	Israel	MED						0			
	Maldives	UNK								0	
	Seychelles	AT.N	10								
		AT.S			6						
	Sierra Leone	AT.N	2	2							
	Sri Lanka	UNK								8	
	St. Vincent and Grenadines	AT		22							
		AT.N	0			7					
	Sta. Lucia	AT.N				0	2				
	Viet Nam	UNK								16	

*****Partial data.

Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
ALGERIE	Longline Haul Seine Hand Trap	ALB SWO BON LTA BOP SSM YOU FRI SKJ	10 vessels for large pelagics. 985 multi-specific small boats	Medit.	August to May	BFT = 125cm SWO = 125cm LTA = 33 cm	1950 to 2001	No	All foreign boats have observers	Census from dealer	Port sampling	Fish not measured	By-catch included in system	No discards	Verification carried out in 3 major ports	Yes, not specified
BRAZIL	Longline	BFT YFT ALB BET BLF SKJ SAI BUM WHM SWO SPF BSH OCS FAL SMA LMA MAK BTH ALX POR DOL WAH	61 vessels (26 foreign leased boats and 55 Brazilian boats)	South west /north west	All year	Medium - large fish	Late 1960s - present	No	All foreign boats have observers on board	Logbook, dealer census, sampling system, federal sanity inspection	Logbook	Size sampling is carried out by on-board observers and at landing sites on major species. About 10% of the catch is measured	WHM, BUM, SAI, SPF, Sharks and other fishes are included	Discards data are collected but not raised to the total catch and not reported to ICCAT	Comparison between census and logbooks, by ratio logbook coverage, by cross checking between logbook and federal sanity inspection	Biological sampling for maturity, growth and stomach contents studies
	Baitboat	YFT ALB BET SKJ DOL FRI LTA BLF	42 vessels	South west	All year, but mainly Nov-Mar	55-57 cm	1979-present	Yes	No observ.	Sampling programs - results extrapolated to total catch	Logbooks and interviews	SKJ and YFT, about 13% of catch is sampled	included	No	Comparison between census/logbooks, ratio logbook coverage, cross check between logbook and federal sanity inspection	Biological sampling for maturity, growth and stomach contents studies

Results of the ICCAT survey on data collection systems. The empty cells signify that no information has been received.

Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
CANADA	Longline	SWO	77 vessels	N.W.Atl	April to Nov.	swo=58kg	1960-2001	Yes	Yes	Logbook and census	Logbook and census	All fish measured and weighed when unloading	By-catch recorded but not always sampled	Discards estimated & reported to ICCAT		
		BET				bet=41kgr	1980-2001									
		YFT				yft=36kgr										
		ALB				alb=19kgr										
	Harpoon	SWO	1248 persons	N.W.Atl	June to Nov.	swo=111 kg	1940-2001		0 % for SWO and 5% for BFT	Logbook and census	Logbook and census	All fish measured & weighed at dockside	No			
		BFT	757 persons			bft= medium	1980-2001						No			
	Tended line	BFT	757 persons	N.W.Atl	June to Nov.	200 kg	1980 to 2000	Yes	5% coverage	Logbook and census	Logbook and census	All fish measured and weighed when unloading		No discards		
		BET														
		YFT														
		ALB														
	Rod & reel	BFT	757 persons	N.W. Atl	June to Nov.	300-400 kg	1900-2001	Yes	5% coverage	Logbook census	Logbook census	All measured		No discards		
	Trap	BFT	4*6 trapnets	N.W. Atl	June_Oct:	med.-larg.	1970-2001	Yes		Logbook census	Logbook census	All measured		No discards		
CAP-VERT	Baitboat, hand, purse seine	SKJ	68 indust. vessels & 1257 artisanal boats	EEZ of Cape Verde	All year	Medium size	First year not known	Yes	No observ.	Logbook	Port sampling	Port sampling	By-catch data included in data collection	No discards estimated	No verification done	No
		YFT														
		BET														
		LTA														
		FRI														
		WAH														
CHINA P. R.	Longline	BFT		Trop. Atl for BET Medit. & North Atl for BFT	All year for BET, and variable for BFT	Medium and large fish	1993 to 2001	Yes	1 observ. for 1994-96 and 3 for 2001	Full log coverage	Full log coverage		By-catch included in system	Discards estimated from scient. observ.	Validation made by TUNA Working Group	No
		BET														
		YFT														
		ALB														
		SWO														
		BLM														
		WHM														
		SAI														
CROATIA	Purse seine and small spor & LL fishery	BFT	35 vessels	Medit:	March to Oct.	8-10 kg	since 1991	Yes	No observ.	All catch to farming operations				No discards	Underwater video recording	Studies on fish grwth

Results of the ICCAT survey on data collection systems. The empty cells signify that no information has been received.

Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
E.C.ESPAÑA	Surface longline (Atl)	SWO	150 vessels	Atlantic north and south	All year	150-160cm	1950-present	Yes	About 5% coverage	Logbooks and port sampling, and on-board observers	As Task I	30-60% of the catch is measured	included	minimal	Various data sources are compared	Muscle, heart, liver samples and sex studies. More than 100000
		BSH														
		BIL														
		TUN														
	Surface longline (Medi)	SWO	91 vessels	Medit.	Jan-Dec	104 cm		Yes	Yes		Survey, sales by vessel	10-15% SWO is measured			Various data sources are compared	Muscle, heart, liver, plasma and gonad samples for maturity and genetic studies
		BFT				91 cm										
		ALB														
		BSH														
		SMA														
		ALV														
		BFT	Variable	Medit.	Mar-Nov	190-210 cm		Yes			Sales sheets, port surveys	Samples by vessel			Various data sources are compared	
	Purse seine	BFT	7 vessels	Medit.	Apr-Oct	25 kg		Yes	Yes, by rotation	Sampling in processors and official	Sales by vessel	Samples during processing			Official data by vessel	Gonad, muscle, sex by size
	Baitboat (Medi)	BFT	35-40 vessels	Medit.	Aug-Dec	135 cm		Yes		Total official data by species	Sales on board, port surveys	90% port sampling			Fishery associations and independent studies	Length-weight, muscle
	Longline (BFT)	BFT	25-35 vessels	Medit.	May-Jul	195 cm		Yes	Yes, by area and fleet strata	Total official data by species	Survey in factories, sales by vessel	20-30% measured			Various data sources are compared	Gonad weight, muscle
	Trap	BFT	2 Medit. and 4 Atl.	Medit. and NE	Mar-Oct (Medi) Apr-Aug (Atl)	200 cm		Yes		Sampling by IEO personnel	Monitoring in the trap and sales	30-45% sampled			Trap sales compared to independent sampler data	
		BON														
		FRI														
		LTA														
		SWO														
		OTH														
	Baitboat (Biscay)	BFT	35 vessels	Bay of Biscay	Jun-Oct	90 cm	1950-present	Yes	No observ.	Sales data and observer census	Logbook, sales by vessel	Samples by boat and commercial size			Fishery associations and independent studies	Age determina-tion through first dorsal fins
		ALB														
	Baitboat (NE)	ALB	180 vessels	North-east and Bay of Biscay	Jul-Nov	55-120 cm	1954-present	Yes		Sampling by day, port, gear, trip raised to total catch	As Task I	0.9% sampled			Guild sales data, EU logbooks	
		BFT											included			
		BET											included			
		SKJ											included			
	Trol	ALB	550 vessels	North-east and Bay of Biscay	Jun-Oct	55-120 cm	1930-present	Yes		Sampling by day, port, gear, trip raised to total catch	As Task I	2-4 % sampled			Guild sales data, EU logbooks	
		BFT											included			
		BET											included			
		SKJ											included			

Results of the ICCAT survey on data collection systems. The empty cells signify that no information has been received.

Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
E.C. FRANCE	Trawl	ALB BFT BET SWO	78 vessels	N.E Atl	August to Sept.	Juveniles & adults	1986 to 2001	Yes	No observ.	Logbook & census from dealer	Logbook & census from dealer	0.054% of catch measured	By-catch included in system	No discards estimated	No verification done	No
	Gillnet	ALB BFT SWO	38 vessels	N.E Atl	July to Sept.	Juveniles & sub_adults	1987 to 2001	Yes	No observ.	Logbook & census from dealer	Logbook & census from dealer	0.84% of catch measured	By-catch included in system	No discards estimated	No verification done	No
	Baitboat	ALB BFT	4 vessels	N.E Atl	Summer	Juveniles & sub_adults	1950 to 2001	Yes	No observ.	Logbook & census	Logbook & census	No fish measured	Inluded in system	No discards estimated	No verification	No
	Purse seine	BFT	38 vessels	West Medit.	Mar to Nov.	Variable	1960 to 2001	Yes	No observ.	Logbook & census	Logbook & census	Size from dealer	No by-catch	No discards observ	BFTMED E.C. project	No
	Purse seine	YFT BET SKJ ALB LTA FRI BUM WHM SAI WAH OTH	14 vessels	East trop.	All year	30-80 cm FADS 40-160 cm FREE 35-100 cm 30-60 cm 90-130 cm	1963 to 2001	Yes - up to 1990 data included Cote d'Ivoire, Senegal and sometimes Morocco	Associated fauna study 3% coverage 90% during Morator-ium, BET >15% under BETYP	Complete cov of comm landings corrected for species comp Local market sampling, since 1994 inc other sources	Logbooks Observer estimates	Double sampling - actual size from catch and size composition by main species- about 1 sample per 130 tons	Included in catch data but not regularly sampled	Not usually estimated, occasional data from observers	Verification procedures for each trip and for annual data for the whole fleet	Sex-ratio planed for YFT and BET Occasional biometric relations, sexual maturity, growth
	Baitboat	YFT BET SKJ LTA FRI BUM WHM SAI WAH OTH	5 vessels	East trop.	All year	30-100 cm 35-100 cm 35-65 cm	1956-2001	Yes, up to 1990 data included Cote d'Ivoire, Senegal and sometimes Morocco	No observ.	Complete cov of comm landings corrected for species comp from logbooks	Logbooks Rarely included	1 sample for each 500 tons		Rarely included		

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Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
E.C FRANCE-MARTINIQUE	Hand (flotsams)	WAH		West trop.	January to June			Yes		Weekly survey on landing sites and markets	Weekly survey on landing sites and markets	Sampling conduct at landing site				
		FRI														
		LTA														
		YFT														
		BLF														
		SKJ														
	Hand (FAD)	WAH		West trop.	All year	84 CM	1990 to 2001	Yes		Weekly survey on landing sites and markets	Weekly survey on landing sites and markets	Sampling conduct at landing site			Specific customized software in use	
		FRI				28 CM										
		LTA				27 CM										
		SAI				157 CM										
		SKJ				32 CM										
		BUM				203 CM										
		SPF				-										
		YFT				57 CM										
		BLF				33 CM										
EC-IRELAND	MWTD	ALB BFT SWO	25 vessels	Bay of Biscay & Ireland SW	July to October	74 cm for ALB	Since 1998	Yes	Minimum of 10% coverage	Full logbook coverage	Full logbook coverage	Scientific monitoring pgm conducted	Included in catch data	No discards in this fishery	Auality checked and collated	Sample of spines for ageing
EC-ITALY	Trawler Purse seine Pair traw Longline Dredges Artisanal Multi-gear Passive	ALB-BFT-SWO-SKJ-BON-LTA								Survey and census						
EC-MALTA	Drifting surface longline	BFT	91 longliners & 2 PS	Medit.	April to July	162 kg for BFT	1989-2004	Yes	No, but cooperation with MCFS	Census from dealer	Survey	Sampling conduct at landing site		No discards estimated	Cross check with cooperatives	Sex-maturity and ageing
		SWO														
		ALB														
EC-NEI	Purse seine	YFT		East Trop	All year	30-80 cm FADS	1991-2001	Yes	No observ.	As for EC-France	As for EC-France	As for EC-France	As for EC-France	As for EC-France	As for EC-France	No
						40-160 FREE										
		BET				35-100 cm										
		SKJ				30-60 cm										
		ALB				90-130 cm										
		LTA														
		FRI														
		BUM														
		WHM														
		SAI														
		WAH														
		OTH														

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Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
JAPAN	Longline	BFT SBF YFT ALB BET SKJ BLM BUM WHM SPF SWO	250 vessels	All Atlantic including Medit.	All year	Medium to large	1972 to 2001	Yes	< 1 % coverage for observ.	Logbook and extrapolation based on effort	Logbook and extrapolation based on effort	20 % of catch sampled	Billfish and major shark species are covered	Discards from observ. program	Logbook checked by personnel when landing and review ed by biologist and by computer	No
LIBYA	Trap	BFT LTA	3 traps	Medit.	May-June	Medium-large	1919-2001	yes	No	Full logbook coverage	Logbook and sampling by day	80% sampled	Sharks and Perciforms	No discards	Visit by scientist	Sex and maturity
	Longline	BFT SWO	6 exc. joint ventures	Medit.	May	Medium-large	1975-2001	yes	yes	Full logbook coverage	Full log coverage	Weight only. 100%	--	--	Visit by scientist	Only weight
	Purse seine	BFT	5 boats	Medit.	May-June	Medium-large	1990-2001	yes	-	By dealer census	--	--	--	No discards	--	Length-weight. Sex mat
MEXICO	Longline	YFT	40 vessels	Gulf of Mexico	All year	137 cm	1994 to 2004	Yes	All trips covered	Logbooks and observ.	Logbooks and observ.	80-100 % catch measured	Included in the collection system	Collected and reported	Logbooks vs census	
RUSSIA	Longline	ALB YFT BET WAH SAI BUM WHM SWO SHK	6 vessels and 3 process-ing boats	East trop.	All year	Large fish	From 1964 to 1990	Yes	70 % of fishing time covered by observ.	Logbook full coverage	Logbook full coverage	25 % of catch measured	Shark catches collected in LL until 1990.No by-catch data availabe for PS	No discards	Catch estimates vs canning	Wgting sex gonads muscle morphometry
	Purse seine	YFT BET SKJ LTA FRI BLT	From 3 to 12 vessels depend-ing on the year	East trop.	All year	Variable	From 1979 to 2000	Yes	50 % of fishing time covered by observ.	Daily report from fishing vessel	Daily report from fishing vessel	1 % of catch measured	No data available	No data available	Verification only with observers data	Wgting sex gonads stomach

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Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
SOUTH AFRICA	Longline (shark)	MAK BSH YFT BET SWO BIL ALB SPN THR BRO OTH	23 vessels	S.E (S. African EEZ)	All year	—	From June 1991	Yes	No, but from May 2004 up to 30% coverage.	Logbooks	Logbooks	None	Included in system. Several tuna and other shark species taken	No data available	Fisheries Control Officers / data entered are verified.	Vertebrae, some biological samples by isolated researchers
	Baitboat (tuna pole)	ALB YFT BET SKJ SBT	163 vessels (117 actively fishing)	SE, 10-40 nautical miles from the coast of South Africa	Sept. - May	c. 81 cm FL 116 cm FL	From 1980	Yes	None	Full logbook coverage and trade estimates	Logbooks	150 albacore per fishing ground. YFT varies	Included in system	No data available	Export data used to verify/ correct logbook reports	None
	Rod and reel	ALB YFT BET MAK BSH	approx. 100 vessels	S.Africa EEZ, west edge of Agulhas bank and	Sept. - May	c. 81 cn No data available	From about 1970	Yes	None	Records of cold storage facilities	No effort data available	No size sampling	Not recorded	No data available	None	None
	Tuna longline	SWO YFT BET SBT ALB SKJ WHM BUM BLM SAI SPN POR THR OCS SMA BSH OTH	30 permits, between 15-26 vessels operate per year	South African EEZ, in both Atlantic and Indian Oceans	All year	170 cm LJFL 142 cm FL 139 cm FL 91 cm FL 121 cm FL 158 cm FL	Since November 1997	Yes	Coverage has varied between 6.5% and 25.6% since 1998	Logbook coverage	Logbooks	All billfish and tuna landed must be measured, as well as BSH and mako sharks.	Now included in the system, but failure to report in the early phases of the fishery (1997-2000)	Collected, but not yet reported as entry not finalized.	VMS fitted to all LL vessels. Logsheets compared to observer data	Anal spines, gonads and stomachs from SWO, as well as ageing, maturity and dietary studies. Tissue samples collected for SWO genetic studies

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Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
TRINIDAD & TOBAGO	Artisanal	BET SKJ BON FRI WAH KGM SAI BUM BRS MIX	1190 boats	Carribean area	All year		? To 2001	Yes		Interviews with fishermen or vendors	Interviews with fishermen or vendors	Sample size freq. Done at landing site	All catch data collected	No data available	Data entry process verification	
	Longline	YFT ALB BET KGM SAI BUM WHM SWO	10 vessels	Carribean area	All year		1950 to 2001	Yes		Export data and domestic sales	Export data and domestic sales	Wgt of fish recorded when exported	Export data and domestic sales	No data available	No process established except fro swo to monitor quota	
URUGUAY	Longline	SWO BET YFT ALB SHK BUM WHM OTH	8 vessels	S.W. Atl	All year but 1st quarter min and 3rd quarter max	Large fish	Since 1981	Yes	Observ. pgm each 3 months	Logbooks but less coverage and landings form	Logbooks but less coverage and landings form	Fish sampled on board	Some shark species. Birds and marine mammals	Discards from observ. Pgm	Low coverage of data less quality	
UKOT-BERMUDA	Hook and line (RR-LL)	YFT ALB BET BLF LTA SKJ WAH BUM WHM SWO SPF	200 vessels	N.W. Atl	All year most effort in summer		1950 to 2001	Yes	No observ pgm; some vessels take commercial fisheries officers	Full census	Full census	Some size sampling conducted at dockside	By-catch included in system	Not collected but very low	Opportunis-tic verification & data entry process verification	Sex gonad maturity hard part tissues

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Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
USA	Longline (LL)	BFT	125 active vessels	N.W.Atl.;GOM; W. trop.	All year with peak in 2nd and 3rd quarters	Varies by species	Since 1950s	Yes	3-5% (may be higher in recent years)	Full logbook coverage, dealer records, tallies of individual weights, scientific on-board observer sampling, tagging of sold fish (for BFT)	All species covered by Pelagic Longline Logbook Program	3-5% of the catch is measured at sea. Catch at size developed from indiv. Weight landings tallies reported by captains.	All by-catch species are included	Pelagic Longline Observer Program used to estimate discards	Weigh-out sheets from vessel captains compared to landing reports from dealers	SWO,YFT,BFT ageing, genetics and reporoduc-tion
		YFT														
		ALB														
		BET														
		BLF														
		LTA														
		SKJ														
		BON														
		FRI														
		WAH														
		KGM														
		SAI														
		BLM														
		BUM														
		WHM														
		SWO														
		SPF														
		DOL														
		Others														
	Rod and reel (RR)	BFT	Unknown	N.W.Atl, GOM; W. trop.	All year with peak in 2nd and 3rd quarters	Varies by species	Since early 1900s	Yes	Sporadic coverage	On-board observer sampling; other sampling programs; fish tagging (BFT)	Random sampling	Dock-side intercepts or logbook reports	All species covered	Estimated only if suitable observer data are available	Weigh-out sheets from vessel captains compared to landing reports from dealers	Biological specimens collected during observer sampling
		YFT														
		ALB														
		BET														
		BLF														
		LTA														
		SKJ														
		BON														
		FRI														
		WAH														
		KGM														
		SAI														
		BLM														
		BUM														
		WHM														
		SWO														
		SPF														
		DOL														
		Others														

Results of the ICCAT survey on data collection systems. The empty cells signify that no information has been received.

Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
		BFT YFT ALB BET BLF LTA SKJ BON KGM SAI BLM BUM WHM SWO DOL Others	Gill, hand, traw, harp, trap, pound, PS	Varies by gear. 5 PS vessels and several thousand commer-cial handliners	All year with peak in 2nd and 3rd quarters	Varies by gear, species, region and year	Since at least 1950s (some gears earlier)	Yes	On board observers placed on vessels using GILL and some PS	Dealer records, tallies of individual weights, scientific on-board observer sampling, tagging of sold fish (for BFT), partial logbook coverage	Logbooks, dealer reports, port agent reports.	Tallies submitted by vessel captains, port agents conducting dock-side interviews. BFT weight & length required. Occasional on-board observer data	All species covered	Estimated only if suitable observer data are available	Weigh-out sheets from vessel captains compared to landing reports from dealers	Biological specimens collected during observer sampling
BENIN	Haul seine	BLF BET SKJ MAW	76 boats	Gulf of Guinea	Sept. to Jan.	Medium size				Random sampling	Random sampling	No size sample				
ICELAND	Longline	BFT	5 vessels	Iceland EEZ	August-October	200 cm	1996-2001	Yes	100% covered	100% observer coverage	100% observer coverage	98% sampled	yes	Not reported	Checked with Jap. logbooks	Sex, diet, maturity, genetics
CHINESE TAIPEI	Longline	ALB BET YFT BFT SKJ SAI BLM BUM WHM SWO OTH	190-200 vessels	All Atlantic including Medit.	January to Dec.	alb=100cm bet=120 cm yft=120 cm bft=220 cm swo = 150 cm whm = 170 cm bum = 200 cm blm = 180 cm sai = 130 cm skj = 70 cm oth = 130 cm	1967 to 2001	Yes	No observ. program	Census from dealer	From logbooks	First 30 fish caught each fishing day measured (20 % of catch)	Included in the collection system	Not available	Cross check with sales record verification sales settlement certification NJS	

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Table 8. Summary of survey.

Party/ Entity	*Gears*	*Species*	*Current fleet size*	*Fishing area(s)*	*Fishing season*	*Average size*	*Period*	*Continuity*	*Observ. Prog.*	*Landing & catch*	*Catch & effort*	*Size data*	*By-catch*	*Discards*	*Quality control*	*Other bio. info*
STA LUCIA	Hand line	BLF ALB YFT SKJ BON BET LTA BLT WAH CER SMM BIL	--	Sta Lucia EEZ	Main fishing season Janaury - April but also Dec. - June	Mainly small and medium but some large fish	Year of commencement unknown	Yes	No observ. program	Sampling programs	Sampling programs	Specific projects only, pelagic species, tuna, wahoo and dolphin	Not categorized	Discards are rare as all of the catch is utilized	Comparison of estimates with major purchasers	Maturity and ageing under CFRAMP
ALBANIA	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
EC-DENMARK	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
EC-SWEDEN	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
GUATEMALA	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
SALVADOR	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
SINGAPORE	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
THAILAND	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-
UKOT-FALKLAND	Responded - Do not have tuna fisheries in Convention area.							-	-	-	-	-	-	-	-	-

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Table 9. Catches reported in Task I by area (source: Statistical Bulletin, 34).

	ADRI	ATL	ATMED	AZOR	CANA	CVER	EAST	ETRO	GOFM	LIGU	MDRA	MEDI	N.ION	NE	NORT	NW	NWC	S.ADR	S.ION	SARD	SE	SOUT	SW	TYRR	WEST	WTRO
1950				803				9000			709	5473		61628		6968					100			2200		6000
1951				1464				5100			646	5498		59374		8437					200			1978		6000
1952				1980				6600			619	5300		67306		7967					200			1044		7729
1953				2295				15700			1442	12868		66084		7556					200			2007		7681
1954				1702				15800			1950	24865		69876		7049					100		300	1752		8270
1955				2902				13900			3098	62418		69787		7005					100			1589		9396
1956		1		2687				10043			1084	63597		66848	13	8670						69		1560		9215
1957		177		5334			33	24077			3087	48748		78945	642	9575					100	1730		2571	30	13394
1958		278		3111			2	29914			1426	35463		92760	1689	12076						1824	2740	2736	32	24372
1959		183		5017			56	50338			2144	15944		78594	2190	11528					100	3954	8920	1823	200	25690
1960		843		5634			481	57670			1712	40693		81957	3818	9544					100	11953	7641	1229	339	28316
1961		604		5920			508	57672			1310	55034		73009	3908	9660					600	21188	8978	1423	430	18464
1962		1357		5904	98		2941	42743			3579	16761		88356	9346	18281					8189	22242	8469	1280	1362	41709
1963		1795		9152	491		2113	62962			3259	34894		64465	20799	27236					7367	21604	9285	1227	6431	35295
1964		3105		4599	144		1098	61343			3739	23467		70739	22825	26652					6660	30504	7953	1652	12701	36868
1965		3724		8157	2198		1741	79643			3522	37928		70871	21448	26536					13503	36065	7317	1264	10294	27458
1966		3219		3163	2477		1364	68057			3673	32705		62068	12400	22183					9281	32768	6555	945	3186	29963
1967		2022		7583	2749		806	83190			3766	54965		69505	12318	19876					7384	20692	9019	1949	1074	22291
1968		3845		1131	3024		1305	127603			1726	40753		51379	9984	21699					13300	29135	9039	1739	952	24082
1969		3021		4487	3298		1164	128595			3384	72341		49545	17759	20078					14819	35255	12117	1324	846	27450
1970		9413		3297	7745		763	123514			3003	31781		47520	21844	27918					8833	39396	12430	2264	1065	31505
1971	496	7137		3942	11726		984	143889			3461	42590		68732	24806	24391					14773	37773	7330	1984	950	33703
1972	95	6218		6081	9869		1222	164866		1668	2046	29675		59994	19112	18134					14289	46964	10883	1955	620	35293
1973	117	5581		5167	10073		704	165468		1358	3818	19358		45042	28473	18419					16982	40054	10802	1692	352	37767
1974		4870		7988	13797		233	228285		2880	6373	25386		60344	26037	25739					12597	30550	16166	3959	332	37310
1975		8248		2325	9833		136	189560		2100	6330	19609		59194	27575	19304					12042	26621	7410	4983	221	39622
1976	597	5864		1845	6720		488	206910		4890	3821	23557		52317	28854	24681					13030	24716	5587	5194	423	35109
1977	47	6413		5101	6787		354	264659		1205	3923	25913		53633	26064	25728					15999	27509	10860	5428	205	33052
1978	125	4006		6830	7359		196	259641	26	2438	3057	25431		51351	23876	21888	68				10589	36298	9824	3176	95	38339
1979	400	3109		5428	5812		61	226225	4231	450	1237	29594		50968	19649	22875	827				15876	39491	10039	3645	119	38591
1980	1000	3225		5260	7203		12934	254046	8377	1759	311	35780		44334	23509	28504	524				18784	37246	19176	4014	133	38675
1981	1000	2943		5751	7818		140	295830	10190	2992	534	45781		38677	24961	27251	455				18165	37609	24100	2486	187	43203
1982	1000	637		5979	5762		166	319012	8528	3260	1002	54103		43461	38329	16633	634				8466	62363	33745	2754	199	62004
1983	1000	1642		5970	5370		75	291976	5095	1992	839	58735		50006	29143	24456	692				6337	36218	31786	3239	55	70818
1984	1933	2227		8204	8258	61	122	217652	7422	1003	1257	50178		33024	34608	23178	966				12551	41696	35343	4207	134	76804
1985	800	2040		7688	15004		221	224187	7498	2379	1869	55020		36445	35813	20201	1326				13496	62941	40318	4020	152	70575
1986	1560	15065		11187	7453		85	221999	9419	2257	2094	50405		44727	34316	22890	1520				11835	53660	40645	3759	109	54009
1987	1560	14686		12941	9931		61	238577	10165	575	761	60360		50035	15036	20732	1481				16255	52948	35227	2472	38	54116
1988	1560	12043		14907	7802		72	250760	14307	446	1911	70300		69123	13814	18338	2106				23225	54541	37899	2195	322	54519
1989	1560	14850		8945	8951		81	251498	11683	446	3995	54161		58358	23492	16653	4786				26227	52989	39962	2311	210	62313
1990	2271	19921		9098	10334		92	300466	9425	171	4266	54448	538	55043	19572	16742	3153	3	212	85	22651	57926	38969	7545	133	61781
1991	2246	25479		6753	13537		232	319457	10218	211	8176	59445	177	43292	21905	21286	3473	116	323	32	15981	56360	37607	6658	231	70358
1992	2087	22944		6604	14253		249	279971	12181	333	8321	49702	158	44548	22832	19261	2688	39	2034	62	19419	56430	40171	9351	111	73444
1993	3143	17668	41	10125	9002		502	305911	12599	129	4868	59236	159	46755	21827	21071	3259	50	1900	199	21134	61073	41574	7352	262	75868
1994	2637	27355	68	6756	15668		566	278886	10499	577	5397	63901	228	41179	28416	22594	2834	150	2637	201	25768	69332	39900	9324	285	80115
1995	2336	25648	76	12322	13895		487	258173	8932	134	9091	59044	111	50620	21939	22755	3298		714	152	22646	64626	39569	11449	89	66438
1996	2185	24245	80	9430	13278		868	259976	9201	27	6655	69509	132	47226	28947	20571	1681		15	217	24327	60951	44161	7497	103	68689
1997	1735	26616		6779	12938		901	233310	10899	27	4183	61150	117	54115	22231	22674	2112		21	98	22941	54653	49899	7550	65	64574
1998		35818		8124	10139		921	246060	10016		3103	80892		46094	21759	22326	2291				30615	44251	48054		143	45074
1999		32939		3871	12877		2179	266884	11220		1571	76052		46565	26879	21704	2613				26812	50952	48564		718	37985
2000		27808		2312	3743		2044	238152	10227		692	74084		47614	24264	24739	3144				18946	56379	54832		151	31604
2001		19756		2010	5700		724	286875	10487		1574	75363		37947	24338	30218	670				19901	44549	53571		490	38933
2002		3815		2679	3485		2026	242359	10690		2325	65146		35973	20948	19433	2982				17847	48990	50348		6897	29842
2003	1373	1390		4229	6147		7673	238523	10785	244	2291	45589	646	27465	27527	25420	3463	1035	2494	588	14648	55126	46817	6421	2842	18401

ADR	Adriatic
ATL	Atlantic
ATMED	Atlantic-Medit.
AZOR	Azores
CANA	Canarias
CVER	Cap-Vert
EAST	East Atl.
ETRO	East tropical
GOFM	Gulf of Mexico
LIGU	Ligurian
MDRA	Madeira
MEDI	Mediterranean
N.ION	North Ionian
NE	North East Atl.
NORT	North Atl.
NW	North West
NWC	North West Central
S.ADR	South Adriatic
S.ION	South Ionian
SARD	Sardinia
SE	South East
SOUT	South
SW	South West
TYRR	Tyrrhenian
WEST	West
WTRO	West tropical

Appendix 1

COORDINATOR'S REPORT ON ACTIVITIES OF THE JAPAN DATA IMPROVEMENT PROJECT (JDIP): DECEMBER 2004 TO NOVEMBER 2005

1. Introduction

Article IV of the ICCAT Convention specifies the need to collect data and carry out the types of studies in order to assess and manage tuna and tuna-like species in the Atlantic Ocean and adjacent seas. Article IX of the Convention makes it an obligation for ICCAT Contracting Parties "to furnish... any available statistical, biological and other scientific information the Commission may need". This obligation is endorsed by the *1966 Resolution on the collection of statistics on the Atlantic Tuna Fisheries* [Res. 66-01] and the *2001 Resolution by ICCAT on the deadlines and procedures for data submission* [Res. 01-16].

At its 14th Special Meeting in 2004, the Commission was informed by Japan of the establishment of the trust fund “Japan Data Improvement Project (JDIP)”, for data improvement, which would be beneficial to improve the collection and analysis of data for developing Contracting Parties. The fund is to be dedicated mainly to African, Central American and South American countries.

The project which started in December 2004 is a five-year project. This report covers the activities carried out from December 2004 to November 2005.

2. Description of the Project

This project (JDIP) has been established to provide capacity-building assistance in some of the Contracting Parties to ICCAT, so as to help them perform their duties to collect and report the required data. A Steering Committee was set up, composed of the Executive Secretary (Chair), the SCRS Chairman, the Convener of the Sub-Committee on Statistics, a representative from the donor country, and the Coordinator of the JDIP, up to provide guidance for this project. The first meeting was held in February 2005.

Specific objectives of the Project include those listed below:

(a) To develop and implement capacity-building programs to improve the collection of Task I and Task II statistics.
Expected achievement: Improvement in data-collection and data-reporting by key developing Contracting Parties and Cooperators.

(b) To investigate and document the major sources of uncertainty in Task I and Task II data, both historically and currently.
Expected achievement: Identification of major weak points, by species and gear/flag/area.

(c) To develop and implement specific work programs, based on the results of (b), to fill historical gaps in Task I and Task II data.
Expected achievement: Improvement of historical fishery statistics for selected species.

(d) To aid in the preparation of the revised ICCAT Field Manual.
Expected achievement: To facilitate (b).

(e) To develop and implement a program to assimilate international trade statistics for bluefin tuna, bigeye tuna, and swordfish.
Expected achievement: To help identify developing Contracting Parties where unreported catches for these species in the Atlantic may be substantial, and thus facilitate (a).

(f) To provide financial assistance to the ICCAT Secretariat to hold meetings and to have consultancy services related to data improvement.

3. Project activities 2004-2005

3.1 Steering Committee meeting

The first Steering Committee meeting was held on February 16, 2005 at the ICCAT Secretariat. The Budget and project activities for 2004-2005 were discussed. These include a Brazilian proposal for training in data collection and CPUE standardization procedures, a Ghanaian project for the implementation of a new database, a contribution towards the revision of the ICCAT Field Manual and other issues related to the management of the project overall. This meeting was also devoted to adopt the procedures of providing assistance and those related to expenditures.

3.2 Brazilian Project

A Memorandum of Understanding (MOU) between ICCAT and the University of Pernambuco regarding the implementation of a training course in Brazil was agreed on June 9, 2005. The training course taught by 2 instructors familiar with ICCAT data collection and analyses was implemented from July 11 to 22 in Recife, Brazil. Twelve students from Brazil, five from Venezuela and one from Uruguay participated in this course to acquire basic knowledge on Task I data and Task II data and to learn about CPUE standardization.

3.3 Ghanaian project

The Steering Committee agreed that the ADVTH database developed by IRD-France to manage data for European tropical tuna fisheries would be adapted to current practices in the Ghanaian fishery, in cooperation with the IRD in France. The MOU between ICCAT and Ghana was agreed on May 30, 2005. For this purpose, a technician to adapt the software to the Ghanaian situation, and an English translator who translated the User Manual which was originally in French, were contracted to carry out this work. In October 2005, an IEO (Spain) expert will travel to Ghana in order to provide Ghanaian scientists with training on using the database.

3.4 Update of Field Manual

The first Steering Committee meeting also decided that JDIP should contribute 20,000 Euros over a two-year period to assist in the updating of the Field Manual. This year, ICCAT signed an Agreement with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS, U.K.) to develop Chapter 4 of the ICCAT Field Manual, which deals primarily with the collection and submission of fishery and biological data. A first draft is expected to be available for presentation to the 2005 SCRS.

3.5 Other

In connection with the Ghanaian project, a Ghanaian scientist was funded for travel expenses to attend the Tropical Group Meeting in July. Other scientists from two developing Contracting Parties will also be funded for their travel expenses to attend the 2005 SCRS meeting.

3.6 Investigation and documentation of the major sources of uncertainty in Task I and Task II data

Regarding the three main species (BFT, BET and SWO), Task I and Task II (catch-effort and size) data dating from 1981 are being studied. The results of this study will be presented to the Steering Committee meeting. This study will help to identify potential countries for targeted capacity-building programs in the future.

4. Implementation of 2004-2005 budget

Contribution, budget agreed and expenditures of 2004-2005 are shown on **Appendix-Table 1**.

4.1 Salaries

The salary of the Coordinator and the assistant are included in this chapter. It also includes travel expenses for the first year and relocation costs for the Coordinator.

4.2 Travel

This chapter includes travel expenses for the Coordinator or the Secretariat to coordinate the project. The Steering Committee agreed that some funding from the JDIP would be allocated to the 3rd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategy and to the Working Group to Review the Statistical Monitoring Programs in order to investigate the current situation on the data collection system used in the Contracting Parties. The Secretariat's travel expenses for those two meetings and the Coordinator's travel expenses to Brazil, Ghana and the 19th Regular Meeting of the Commission (Seville, November 2005), are included herein.

4.3 Equipment

This chapter includes the purchase of equipment for the Coordinator or assistant such as computers, software, furniture, and office material in general.

4.4 Administration

This chapter includes an annual external auditing of the funds. A 5% overhead on the total budget is reimbursed to the Secretariat to cover administrative costs of the project.

4.5 Financial expenses

This chapter includes contingencies such as fluctuations in exchange rates and bank charges.

4.6 Project

This chapter includes funding to pay for various project activities: Brazilian project, Ghanaian project, contribution to the ICCAT Field Manual and funding of travel expenses for some scientists from developing Contracting Parties to attend the SCRS meeting.

5. Possible project activities for 2005-2006

5.1 Capacity-building programs

5.1.1 Training for scientists and technicians in developing Contracting Parties

This includes training in data collection and data reporting, and specialized workshops or training courses on applied stock assessment methods.

Brazil is in the process of submitting a proposal for the implementation of the training course of advanced methods of stock assessments commonly used in ICCAT.

5.1.2 Improvement of ICCAT Task I and Task II statistics

The JDIP contemplates the implementation of tasks that could result in more accurate stock assessments, and consequently, the management of fisheries. Some of these tasks are included below:

- Training course on implementing data-collection programs;
- Observer program / development of a sampling scheme; and
- Improvement of the logbook form and its coverage.

The Ghanaian Project will be continued as well as contact with some Caribbean and West African countries regarding potential capacity-building programs.

5.1.3 Assistance for participation in the SCRS meeting

The JDIP would like to encourage scientists in developing Contracting Parties to attend the SCRS meeting by funding their travel expenses.

The Terms of Reference for travel assistance are presented in **Addendum 1 to Appendix 1**.

5.2 Investigation and documentation of the major sources of uncertainties in Task I and Task II data

This work package will be carried out for bigeye, bluefin and swordfish. Attention will be centered on data regarding catch, size composition and fishing effort in those fisheries that currently account for and that, in the past, have accounted for, substantial portions of the catch in number or in weight.

5.3 Update of Field Manual

The contribution of this project would emphasize species identification and the collection of basic fishery statistics, thus supporting other capacity-building programs.

6. Contribution and proposed budged for 2005-2006

The contribution and proposed budget for 2005-2006 are shown on **Appendix-Table 2**.

Appendix-Table 1. 2004-2005 Budget and situation on August 31, 2005.

Contribution[1]

	Euros	US$
Japanese trust fund	242,353.67	*308,338.00*

Expenses (in Euros)

Chapter	Sub-chapter	Current expenses[2]	Projected expenses to end of 2005[3]	Estimated total expenses
Coordination expenses	Salary	51,252.44	23,086.83	74,339.27
	Other benefit (Relocate)	10,614.34	-	10,614.34
	Subtotal	**61,866.78**	**23,086.83**	**84,953.61**
Travel and meeting	Travel (Tickets)	16,202.65	6,099.90	22,302.55
	Travel (Perdiem)	7,942.30		7,942.30
	Travel (Hotel)	3,842.68		3,842.68
	Other expenses	1,169.57		1,169.57
	Subtotal	**29,157.20**	**6,099.90**	**35,257.10**
Administration	Contract (Auditor)	-	7,000.00	7,000.00
	Overhead	-	12,130.00	12,130.00
	Other	225.40	1,000.00	1,225.40
	Subtotal	**225.40**	**20,130.00**	**20,355.40**
Equipment	Equipment	6,925.35	-	6,925.35
	Other	20.78	903.82	924.60
	Subtotal	**6,946.13**	**903.82**	**7,849.95**
Project	Brazil	46,900.00	-	46,900.00
	Ghana	3,775.00	11,225.00	15,000.00
	Field Manual	5,000.00	5,000.00	10,000.00
	Other (travel assistance)	2,455.32	5,544.68	8,000.00
	Contingency	-	3,000.00	3,000.00
	Subtotal	**58,130.32**	**24,769.68**	**82,900.00**
Financial expenses	Financial expenses	10,601.87	435.74	11,037.61
	Subtotal	**10,601.87**	**435.74**	**11,037.61**
Total expenses		**166,927.70**	**75,425.97**	**242,353.67**

1: Nov. 2004 UN US$/€ exchange rate applied:

$308,338 @ 0.786 = €242,353.67.

2: Actual expenses incurred as of August 31, 2005.

3: Projected expenses between September 1, 2005 and November 30,2005.

Appendix-Table 2. 2005-2006 Proposed Budget.

Contribution[1]

	Euros	US$
Japanese trust fund	248,008.74	*308,350.00*

Estimated Expenses (in Euros)

Chapter	Sub-chapter	Projected expenses[2]
Coordination expenses	Salary	90,000.00
	Subtotal	**90,000.00**
Travel and meeting	Travel	15,500.00
	Subtotal	**15,500.00**
Administration	Contract (Auditor)	7,000.00
	Overhead	12,400.44
	Other	1,075.40
	Subtotal	**20,475.84**
Equipment	Equipment	6,660.00
	Subtotal	**6,660.00**
Project	Brazil	35,000.00
	Ghana	10,000.00
	Field Manual	10,000.00
	Other project activities	41,800.00
	Other (travel assistance)	11,000.00
	Contingency	3,469.61
	Subtotal	**111,269.61**
Financial expenses	Financial expenses	4,103.29
	Subtotal	**4,103.29**
Total estimated expenses		**248,008.74**

1: Aug. 2005 US$/€ exchange rates applied:

$200,000 @ 0.792 = €158,403.29 (Bank rate).

$108,350 @ 0.827 = €89,605.45 (UN rate).

2: Projected expenses between December 1, 2005 and November 30, 2006.

Addendum 1 to Appendix 1

Terms of Reference for Travel Assistance in the Japan Data Improvement Project

The Japan Data Improvement Project (JDIP) is established towards capacity-building in some of the Contracting Parties to ICCAT, so as to help them perform their capacity to collect and report the required data.

JDIP will fund for travel expenses to encourage scientists in developing countries to attend the SCRS meeting. It would be important that the national scientists could have the opportunity to participate in the meeting so that they have a leadership role which involves active participation in assessment and management of fisheries targeting tuna and tuna-like species in the Atlantic Ocean.

(Minimum qualification for the scientist)

1. Under 50 years of age.

2. Experience with the research on tuna and tuna-like species related to ICCAT.

3. Working in research on tuna and tuna-like species related to ICCAT hereafter.

4. The person should be recommended by the official of the delegation.

(Cost)

1. Regarding funding for the trip, JDIP will fund an air ticket and per diem in accordance with Article 30 of the *ICCAT Staff Regulation and Rules* on JDIP Expenses Payment.

2. Selected persons should provide information for travel and the JDIP will pay round trip plane tickets in Economy Class.

3. *Per diem* will be paid upon arrival in Madrid.

The JDIP will not pay any other cost.

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

(Madrid, Spain - October 3 to 7, 2005)

1. Opening of the Meeting

The 2005 Meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, October 3, at the Hotel Velasquez, in Madrid, by Dr. Joao Gil Pereira, the Chairman of the Committee. Dr, Pereira welcomed all the participants to the annual meeting and asked for a moment of silence in memory of Dr. F. X. Bard and N. N'Goran Ya, active members of the Commission, who had passed away in 2005.

Dr. Pereira introduced the Executive Secretary, Mr. Driss Meski, who welcomed the participants and emphasized the importance of the work of the SCRS, which is the base of the Commission's conservation and management measures. He assured the Committee of his support and that of the entire Secretariat to facilitate the Committee's work and he wished the scientists a productive meeting. The Executive Secretary paid homage to the two scientists who had passed away in 2005, Drs. Bard and N'Goran. The Executive Secretary's opening address is attached as **Appendix 4**.

2. Adoption of the Agenda and meeting arrangements

The tentative Agenda was reviewed and adopted without change and is attached as **Appendix 1**.

The following scientists served as rapporteurs of the various species sections (item 8 of the Agenda) of the 2005 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 Zárate
BFT –	Bluefin tuna	J. Powers (W), J.M. Fromentin (E)
BIL –	Billfish	D. Die
SWO –	Swordfish	G. Scott (Atl), G. Tserpes (Med)
SBF –	Southern bluefin tuna	CCSBT
SMT –	Small tunas	J. M. Ortiz de Urbina

Dr. Pilar Pallarés served as rapporteur for the remainder of the Agenda items.

3. Introduction of Contracting Party delegations

There were 22 Contracting Parties present at the 2005 meeting: Brazil, Canada, Cape Verde People's Republic of China, Côte d'Ivoire, Croatia, European Community, Ghana, Republic of Guinea, Japan, Republic of Korea, Mexico, Morocco, Russian Federation, United Kingdom (Overseas Territories), Sao Tomé and Príncipe, Senegal, South Africa, Turkey, United States of America, and Uruguay. The List of Participants (species groups and plenary sessions) is attached as **Appendix 2**.

4. Introduction and admission of observers

Representatives from CARICOM, GFCM and IWC, and scientists from Chinese Taipei and SEO/BIRDLIFE were admitted as observers (see **Appendix 2**).

5. Admission of scientific documents

The Secretariat informed the Committee that 88 scientific documents had been presented during the year, many of which were prepared for the intersessional meetings.

Besides the scientific documents, there are three reports of scientific meetings, 22 Annual Reports of the Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities, and a report from CARICOM, as well as various Secretariat documents. The List of SCRS Documents is attached as **Appendix 3**.

6. Report of Secretariat activities concerning statistics and research

The Secretariat briefly summarized the major items of the "Secretariat Report on Statistics and Coordination of Research 2004-2005", which had been presented to the meeting of the Sub-Committee on Statistics and discussed at length.

The Secretariat informed the Committee about the improvements made in the data collection and dissemination system as well as in publications and the development of the ICCAT web site. The Committee congratulated the Secretariat for the improvements which has made ICCAT a reference as concerns access and availability of information. The Committee called attention to the need for the web site to be available in the three official languages of the Commission.

Under this Agenda item, discussion ensued on the two projects for the improvement of statistics: the Japan Project for the Improvement of Statistics (JDIP) and the Fund for the Improvement of Data; the latter is relative to Resolution [Res. 03-21]. Ms Miho Wazawa presented the progress made in the first year of the JDIP (see Secretariat Report on Statistics and Coordination of Research). The development of Chapter 4 of the Field Manual and the actions to support the collection and improvement of statistics of countries such as Ghana, Brazil, Uruguay and Venezuela were the major activities of this first year of the project. As regards the use of the special Fund for the improvement of statistics, the Committee accepted the proposal of the Sub-Committee on Statistics to dedicate part of the fund to the recuperation of historical data, as well as the Field Manual. This work should be done in coordination with the various current research projects (Billfish, BYP, etc.). The Committee agreed with the need to define common objectives and priorities and to coordinate the use of the funds from these projects so as to avoid overlapping and to optimize these resources. **Appendix 5** includes recommendations supported by the Committee for improved coordination.

The Executive Secretary informed the Committee about the balance of the BETYP program. There is a proposal from Japan to utilize the part of the balance of these funds that corresponds to them for electronic tag rewards that had been applied by Japanese scientists. A possible use of the funds that correspond to the EC would be the development of the chapter on species of the Field Manual. The Committee agreed with the need to assure that these funds can be used for the Committee's work. The Committee reiterated its request to EC to utilize the remaining BETYP funds in order to elaborate chapters on bigeye tuna biology and fisheries for the Field Manual.

7. Review of national research programs and fisheries

This year the format for the presentation of the national reports and inclusion in the SCRS Report has been changed. Following this new format, only information relative to new research programs was presented to the Committee. The Committee considered the need to include information of interest for its work, separating it from the annual report which, with its current structure, is more geared to providing information to the Commission on compliance. The Committee reiterated the need to follow the guidelines established for the preparation of the annual reports and to try to clearly define the contents under the various sections (scientific or on compliance). Further, it was proposed that each year all parties present a table summarizing the Basic information **(Appendix 6)**. It was recommended that the Sub-Committee on Statistics discuss the issue of how to improve the scientific and fishery information content of Annual Reports at its 2006 meeting. This review should take into account the results of the Survey that has been conducted in recent years, particularly in terms of obtaining more precise information about the development of fleets over time.

The Secretariat called attention to the gaps that exist in the information received concerning tagging programs (types of tags, tag number, species, dates, areas, etc.). Such information is essential in order to maintain an updated inventory that is useful and interesting for the scientific community. The Committee emphasized that it is in the countries' interest to present detailed information on the tagging programs that are being carried out.

Brazil

In 2004, the Brazilian tuna longline fleet consisted of 89 vessels, a decrease of 25.2% in the total number of vessels from 2003, when 119 vessels were operating. The number of baitboats operating in 2004 was 41, the same from 2003.

The Brazilian catch of tunas and tuna-like fishes, including billfishes, sharks, and other species was 44,642.1t (round weight), in 2004, representing a decrease of about 8.6% from 2003. The majority of the catch again was taken by baitboats (25,511.2t; 57.1%), with skipjack tuna being the most abundant species (23,036.0t). Total catch of the tuna longline fishery (10,002.7t) was about 32.7% lower than 2003, with Swordfish being the most abundant species (2,913.6t), accounting for 29.1% of the longline catches. Yellowfin tuna and blue shark, accounting for 19.7% (1,968.2t) and 15.7% (1,568.3t) of the catches, were, respectively, the second and third most caught species. Bigeye tuna ranked fourth, in 2004, with 1,378.8t. Besides the blue shark, 753.4t of other shark species were caught as by-catch as well as a target species.

The total catch of white marlin, blue marlin and sailfish was, respectively, 80.5t, 194.8t and 533.9t, a decrease of about 69.8%, 66.4%, and 8.7%, from 2003. The strong catch reductions of white and blue marlins were the result of the mandatory release of blue and white marlins that are alive by the time of boarding; the ban on sales of white and blue marlins, since 2002 (I.N. 045; 01/07/02), up to December 2005 (I.N. 011, 11/11/04); and the mandatory presence of VMS and observers aboard all chartered vessels (Decree 4.810, 19/08/03). Data collected from observers on board, indicated the following amounts of discards (already included in the total catch figures provided above): white marlin: 3.9t live and 2.0t dead, blue marlin: 3.3t live and 0.3t dead; and sailfish: 5.6t live and 1.6t dead.

Besides the catch and effort data regularly collected from Brazilian tuna fisheries, in 2004, a total of 36.747 fish were measured at landing, an increase of more than 6 times the number of fish measured in 2003 (5,688). The distribution of fish measured by species was: yellowfin 7,839; bigeye 10,321; albacore 383; swordfish 9,307; and skipjack 8,297.

In 2005, an important research effort in cooperation with US scientists was begun, including collection of spines and gonads, for age and growth and reproduction studies, as well as habitat utilization, through PSAT tags, and gear selectivity, by the use of circle hooks, hook timers, and TDRs. At least part of these results should be available for the assessment planned for 2006.

Also in July 2005, with funds made available by the Japanese Data Fund, a two-week course on CPUE standardization was held in Recife-PE (Brazil). Eighteen researchers from Brazil, Uruguay and Venezuela attended it. The Brazilian delegation is grateful to the Government of Japan, as well as to the instructors of the course (Drs. Mauricio Ortiz, from NOAA/ USA; and David Die, from University Miami/ United States), which, we are sure, will greatly enhance South American participation in future ICCAT stock assessments.

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 and blue marlins. 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 or blue marlin landed was also prohibited until December 31, 2005.

Canada

Landings of the traditional species harvested by Canada (bluefin tuna and swordfish) in 2004 were comparable in quantity and spatial distribution to the recent past. For bluefin tuna, a new management approach was implemented for the 2004 fishery season, which results in each of the seven fleet sectors being assigned a specific share of the Canadian quota based on catch history. Fleets operate independently of each other, adopting their own strategies to address when and how to harvest the resource.

Considering the other tunas, yellowfin tuna was the most important species in terms of tonnage landed for the first time in recent years, followed by bigeye and albacore.

Canada has provided enhanced national funding for highly migratory species research, including tunas, swordfish and sharks. New initiatives are now underway to better understand stock structure, age determination, and post-release survival.

Cape Verde

Historically, fishing for tunas and tuna-like species is one of the most important fisheries in the Cape Verde economy. The monitoring of the state of the resources, as well as research on alternatives for their fishing, constitutes one of priorities of Cape Verde's research.

The major gear used in tuna fishing is baitboat (using live bait).

Cape Verde tuna catches have been lower than expected, in spite of their important weight in the national landings.

The annual catches of tunas are about 3,600 t. Although some fluctuations have been observed in the annual catch, fishing effort has increased considerably.

Besides the national market, the tuna fishing products are oriented towards export (fresh, frozen and canned products).

The catches of the artisanal fishery have not changed significantly, which indicates there is relative stability. In any case, the annual industrial catch has fluctuated, with a decreasing trend.

The foreign fleet that operates in the Cape Verde EEZ, within the framework of agreements and contracts, is essentially comprised of tuna vessels (baitboats and purse seiners) and surface longliners, the majority pertaining to European Community countries.

As concerns research activities, Cape Verde collects statistical data on the catches of tunas and tuna-like species which are entered to a database. A Statistical Bulletin has been published every year since 1985, but with some constraints in recent years. Cape Verde, therefore, contributes to ICCAT by also providing data aimed at updating the stock assessments.

China (People's Rep.)

Longline is the only fishing gear for tunas by the Chinese fishing fleet in the Atlantic Ocean. The total number of tuna longliners operating in the Atlantic Ocean was 31 in 2004. The total catch of tuna and tuna-like species (in round weight, including sharks) amounted to 8,622 t, in 2004, lower than that of 2003 (10,048 t). Bigeye tuna and bluefin tuna are the targeted species of the Chinese longline fleet, and its catches amounted to 6,555.3 t and 41.0 t, respectively in 2004. Bigeye tuna is the most important species, accounting for 76.0% of the total and 1,334.4 t (16.9%) lower than that of 2003. Yellowfin tuna, swordfish and albacore are taken as by-catch. The yellowfin tuna catch increased from 1,049.7 t in 2003 to 1,305.2 t in 2004. The swordfish catch was 333.6 t, a 50.1% decrease from the previous year. The albacore catch was 144.3 t, a 20.5% decrease from the previous year.

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 began to carry out a tuna observer program in ICCAT waters in 2001. In 2004, one observer was sent to the Chinese Atlantic tuna longline fishing fleet. This area covered by this observer was 09°35′N-5°46′S, 18°30′W-38°54′W and the average nominal CPUE of bigeye (yellowfin) tuna was 6.760 (1.527) indivs./1000 hooks for the duration of his investigation.

In terms of implementation of the relevant ICCAT conservation and management measures, the fishery administration authority of China required all the fishing companies operating in the Atlantic Ocean to report their catch monthly to the Branch of Distant Water Fisheries of China Fisheries Association and the Tuna Working Group in Shanghai Fisheries University in order to comply with the catch limits. The Chinese Government is establishing a fishing vessel management system, including the issuance of licenses to all Chinese fishing vessels on the high seas of world oceans, implementing a VMS program by the end of 2005.

Côte d'Ivoire

Côte d'Ivoire has not had an industrial tuna fleet since 1985. However, Ivorian scientists, in partnership with their French and Spanish colleagues are in charge of monitoring the fleets that frequent the fishing port of Abidjan. In 2004, the activity was as follows:

- 45 tuna vessels (21 Spanish and assimilated, 12 French, 7 Ghanaian, 3 Guinean and 2 cargo vessels);
- About 100,000 t of tunas processed (landings, transshipments, canneries);
- 14,861 t of "false tuna" (tunas rejected by the canneries because of damage or small size, minor tunas (Atlantic black skipjack, frigate tunas), billfish, sharks, and other species landed by the purse seiners).

The canoes of the artisanal driftnet fishery made 14,595 trips and landed:

- 218 t of billfish, comprised of: 73 t of sailfish *(Istiophorus albidus)*; 115 t of blue marlin *(Makaira nigricans)*; 29 t of swordfish *(Xiphias gladius)*; and 1 t of while marlin *(Tetrapturus albidus)*.
- 41 t of various sharks: mako *(Isurus oxyrynchus)*, hammerheads *(Sphyrna zygaena* and *S. lewini)*, silky *(C. falciformis)*.

Croatia

The total Croatian catch of tuna and tuna like fishes in 2004 was 827 metric tons (t). 100% of the catch is bluefin tuna. Almost the total catch was caught by purse seine, with only 450 kg have been reported as caught by sport fishing. Additionally, 447 t of large bluefin tuna were imported in Croatia from France and Spain for growing purposes.

The number of licensed vessels actively fishing for tuna and tuna like species in 2004 was 31, while 15 of these have been reported as licensed large- scale vessels.

The study on bluefin tuna farming based on the tagging of live specimens in captivity, within framework of the BYP, continued as proposed, targeting specimens of approximately 12-25 kg live round weight. Additionally, samples of heart muscles were taken for genetic studies. Some of the results obtained within the framework of the BYP farming study, particularly those concerning the new conversion factor estimated to convert GG product weight (originating from farming) to RWT, have been reported in document SCRS/2004/096.

All catch and farming data are reported to the National Fisheries Information System.

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

European* Community *(EC)

Catches of tunas and billfish in 2004 in the Atlantic and the Mediterranean by European Community countries surpassed 200,000 t, which are provided, by country, in the following table:

	Cyprus	*Spain*	*France*	*Greece*	*Ireland*	*Italy*	*Malta*	*Portugal*	*UK*	*Total*
ALB	255	15,599	2,537	773	175	3,671	10	522		*23,542*
BET		8,251	2,926		0			3,204		*14,381*
BFT	105	5,154	7,030	389	1	4,686	264	27		*17,656*
SKJ		38,751	21,879	99	14	34		8,507		*69,283*
YFT		21,414	23,949					5		*45,368*
SWO	49	11,809	121	1,129	1	6,942	195	1,785	221	*22,253*
Others	6	2,966	282	1,547	391	4,012	0	828	20	*10,051*
Total	**415**	**103,944**	**58,723**	**3,937**	**583**	**19,345**	**470**	**14,878**	**241**	**202,534**

As in previous years, these fleets operated in all the areas of the Atlantic and Mediterranean, and here they have caught significant quantities of all the species managed by ICCAT. The annual catches, by gear, region, country and EC fleet are summarized in the EC Annual Report. Details on these annual catches are included in the ICCAT *Statistical Bulletin*. All these fisheries have, as in previous years, been subject to statistical and biological monitoring, which is carried out by the scientists of each country. These efforts have been facilitated by the EC regulation that since 2000 supports the collection of biological data on tunas. This has resulted in obtaining and submitting diverse biological information to ICCAT, on the target species as well as on by-catch species and discards of the European fisheries.

It should be noted that there are still serious statistical and biological uncertainties for some fisheries and because of this the data submitted, unfortunately, do not conform to the ICCAT requirements. These problems occur in particular, but not exclusively, in the Mediterranean. Efforts are under way to try to reduce these statistical uncertainties which for some stocks seriously limit the analyses carried out by the SCRS.

Various research programs have continued to be carried out actively on the majority of the stocks managed by ICCAT, by the various research institutes of the EU countries that are active in these fisheries, and concern the temperate tunas (bluefin tuna and albacore), the tropical tunas (yellowfin, skipjack and bigeye tunas) as well as swordfish. This research is aimed at studies on the biology and ecology of the various species as well as on modeling the catches of these resources for their sustainable exploitation. The results obtained in 2004-2005 from this work have been submitted in 41 scientific documents presented to the SCRS in 2005 by EU scientists.

Guinea (Rep.)

With a 300 km maritime coast, Guinea is characterized by a marine environment made up of important estuaries and a highly developed continental shelf, which varies from 87 miles to the South to 104 miles to the North, with a surface area of 43,000 km^2, which is the largest of western Africa.

The potential exploitable fishery is on the order of 150 to 200,000 t of fish per year. Two fishing types (the artisanal fishery and the industrial fishery) share the fishery resources in the Guinean EEZ.

- Artisanal fishing, a dynamic sector experiencing a strong expansion, long in the hands of foreign fishers (Senegal, Sierra Leone and Ghana) is now practiced by and controlled by Guinean fishers. The total catches, comprised mostly (more than 60%) of small, coastal pelagic fish (sardines and ethmaloses) fluctuate at about 75,000 t per year.

- The industrial fishery, which includes the tuna vessels, is largely dominated by the foreign fleets, particularly those of the EU (France and Spain), fish within the framework of fishing agreements.

The tuna fishery, as well as the other components of the industrial fishery (pelagic fishing, demersal fishing, shrimp and celaphopods fishing) is practiced exclusively by foreign fishing boats.

The number of Community tuna vessels fishing in Guinea is relatively stable with an annual average of 40 vessels for the last 10 years. The catches made are transshipped and landed at neighboring ports (Côte d'Ivoire, Ghana, Senegal), or Las Palmas where the boat owners are based.

A recent event in the tuna fishery is the inclusion of their total catches in the national statistics on maritime fishing. The data on these catches are obtained from the EU Delegation based in Guinea because these tuna vessels do not make any landing in the autonomous port of Conakry.

The data thus collected indicated a total catch of 1,594 t made by EU tuna vessels in 54 fishing days in 2003. These catches are comprised mainly of two tuna species: yellowfin tuna (1,403 t) and skipjack tuna (186 t). For 2004, a total catch of 1,429 t is noted.

Perspectives

Negotiations are on-going to improve and consolidate the system of data collection on fishing activities for the overall foreign fleets.

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 a recent peak of 291 vessels in 1996 to 205 and 222 in 2003 and 2004, respectively. This declining trend has also synchronized with a decline of fishing effort (about 40%) in the Atlantic, although 2003 and 2004 effort was slightly recovered. The reduction of fishing effort is attributable to the overall reduction of the total number of boats and a shift of longline boats to the Pacific or other areas partly due to the low catches of bigeye.

The provisional 2004 catch of tunas and tuna-like fishes in the Atlantic Ocean and Mediterranean Sea by the Japanese fishery is estimated to be 27,500 t (a decrease of 2,300 t as compared to 2003). Bigeye is the most

important species, accounting for about 65% of the total catch in weight, followed by yellowfin, bluefin tuna, albacore and swordfish in this order. In 2004 catches increased for most of the major species, except for bigeye and southern bluefin tunas. Bluefin tuna remained at the same level as 2003. There are some changes in the fishing areas; one is the shift of fishing area toward the central North Atlantic encompassed by 25ºN, 35ºN, 40ºW and 70ºW. Another change is the reduced fishing effort for southern bluefin tuna in the area off the tip of South Africa between 0º-20ºE. The fishery remains unchanged except for the above-mentioned changes.

Korea (Rep.)

The total catches of tuna and tuna-like species in the Atlantic in 2004 were estimated as 2,607 t. Almost 85% of the 2004 total catch of the longline fishery in the Atlantic was comprised of two species, yellowfin and bigeye tuna, of which 984 t were yellowfin and 629 t bigeye tuna. 700 t of bluefin tuna were caught by a chartered Turkish purse seiner in the Mediterranean Sea and these bluefin tuna catches were reported by an on-board observer of Turkey.

The major fishing area of Korean longliners in the Atlantic Ocean was the eastern waters off Africa, from 30 degrees west longitude to 30 degrees east longitude as well as the EEZ of the People's Republic of Angola and the Republic of South Africa with yellowfin tuna and bigeye tuna as main target species in 2004.

In 2004, two observers were deployed on a Korean purse seiner in the Pacific Ocean; one observer researched a southern bluefin tuna longline vessel fishing in the EEZ of South Africa. Five observers worked in the Pacific and Indian Oceans for scientific purposes and two observers were on board the charted Turkish purse seine to monitor the catches of target and by-catch species in 2005.

Morocco

The tuna fishery in Morocco continues to occupy an important place in the national economy. In 2004, the total catches amounted to 10,947 t.

As regards scientific research, the major recent event concerns the reinforcement of the activities of the *Institut National de Recherche Halieutique, INRH* (National Institute of Fishery Research) through the carrying out of the project of the Regional Center of Tangiers/M'Diq. This concerns five large research centers whose programs and activities cover the entire coast of the Kingdom of Morocco and at the same time in the Atlantic and the Mediterranean.

Further to the activities of surveillance of the healthiness and quality of the marine environment, in particular, the biological and chemical aspects (hydrocarbon pollution), aquaculture studies and trials, oceanographic studies, the Regional Center of the INRH in Tangiers/M'Diq is in charge of monitoring the state of exploitation of the major fishery resources, notably the large migratory species (pelagic species, tunas and others) in the Atlantic and in the Mediterranean.

With regard to fishery research activities, in the short- and medium-term, the main activities assigned to the Regional Center of the INRH in Tangiers/M'Diq are as follows:

- Study of the swordfish stock units, aimed at the evaluation and management at the same time.
- Study of the technological aspects of the vessels and fishing gears, in support of a national program to withdraw driftnets;
- Socio-economic study of the impact of the implementation the management measures in force.

To carry them out, these activities will need financing, the source of which could be national (Ministry) and/or foreign (international cooperation, etc.).

Consequently, it should be noted that to respond to the recommendations made by the SCRS, Morocco has carried out for some time, a series of tasks that have resulted in the compilation and the reassembly of data on shark landings from 1995 to 2004. These data are included in Morocco's Annual Report. Besides, the species that live in Moroccan territorial waters and concern the statistics have been identified and cited.

Senegal

Senegal has a national tuna fishery comprised of baitboats with Dakar as their base port, extending throughout the sub-region, and numerous artisanal canoes targeting small coastal tunas and tuna-like species. The description and development of fishery indicators and transformation industries, information regarding research and conservation measures that have been implemented are the basis of a document presented (see Senegal Annual Report).

Senegal has once again become an active member of ICCAT in 2004 after having been an observer for more than ten years. This new situation has implied the observance of certain measures adopted by ICCAT and a more involvement in the dynamics of tuna research in the Atlantic.

Thus, Senegal has participated in the "pop-up" tagging program of billfish in the East Atlantic in which 10 fish were tagged in 2004; one recovery has been reported Furthermore, the monitoring of the rate of live release of billfish by the Senegalese sport fisheries is now better monitored. The coverage rate of the catches landed in the recent period is about 45%. This observation shows the effort made for the conservation of resources that are essentially highly exploited. This national program will be reinforced and the partnership broadened at international and regional level.

In the framework for the improvement of fishery statistics, Senegal has initiated important restructuring of its databases. This work, once completed, will allow Senegal to provide historical data and also to provide statistical information in real time on species of interest to ICCAT.

South Africa

Fisheries

- There is an emerging rod and reel fishery targeting yellowfin tuna due to the increased seasonal availability of this species in near-shore waters in the last two years.
- Average size of albacore in the baitboat fishery remained high (85 cm FL).
- Average sizes of swordfish (177 cm LJFL), bigeye (138 cm FL) and yellowfin (145 cm FL) increased for the longline fishery in 2004.

Research

- More than 800 swordfish tissue samples have been collected since 2004 from the west, south and east coast of South Africa for genetic analysis to determine stock delineation of the stocks in this region.
- A project has been implemented this year to conduct an age and growth study of the southern albacore stock.
- A pilot tagging program was implemented in 2004. This program uses commercial longline vessels to tag swordfish, bigeye and pelagic sharks. Thus far, 169 fish have been tagged in the southwest Indian Ocean.
- A study has been conducted this year to evaluate the level of by-catch of sharks, birds and turtles in the longline fishery and to investigate various mitigation measures.
- Observer program still in operation since 1998.
- Swordfish biological sampling is still continuing to determine the life history of this species in southern African waters.

Turkey

Annual fisheries information

Bluefin tuna were harvested in Turkish waters from May to July in the eastern Mediterranean Sea. In October-November bluefin tuna were targeted in the Aegean Sea.

The total bluefin tuna catch in 2004 was 1,075 metric tons (t). Almost all of the catch was caught by purse seiners. The number of licensed vessels to fish bluefin tuna was 68. Almost all of the total purse seine catch was transferred to floating cages for on-growing.

The official catch of swordfish in 2004 was 286 t; the catch of Atlantic bonito was 5,701 t. There were also 284 t of bullet tuna and 568 t of Atlantic black skipjack caught.

Research and Statistics

In 2004, funds from the Bluefin Year Program were utilized for biological and larval sampling of bluefin tuna.

A tuna larval survey (TUNALEV) in the northern Levantine Basin (Cicilian Basin) was conducted from June 5 to 18, 2004. Further evidence of spawning of bluefin tuna and other tuna species in the eastern Mediterranean Sea was provided. Samples of bluefin tuna larvae were shipped for genetic studies to the United States. Results of this study are underway.

In 2004, collaboration between Turkish and ICCAT scientists and the "Reprodott" Program continued.

The otolith samples of bluefin tuna collected by Turkish scientists in 2001-2004 in Turkish waters are being studied jointly by Turkish, Greek and U.S. scientists.

A study on size and age-at-first-sexual maturity of female bluefin tuna from the Mediterranean Sea by Turkish and EU scientists in 2001-2004 was completed.

Implementation of ICCAT conservation and management measures

Conservation and management measures

All conservation and management measures regarding bluefin tuna, swordfish, bonito, bullet tuna, and Atlantic black skipjack fisheries and bluefin tuna farming are enforced.

Minimum size and catch restrictions

Bluefin tuna	90 cm	July 16-August 15
Swordfish	130 cm	
Bonito	25 cm	April 1-September 1
Bullet tuna		May 1-September 1
Atlantic black skipjack	45 cm	May 1-September 1

Inspection schemes and activities

Turkey has nothing to report at this time.

United Kingdom-Overseas Territories

Histological analyses of gonads of blue marlin collected over the past three years in tournament sampling provides clear evidence of spawning in July at Bermuda's northerly latitude (32^{o}N).

United States

Annual fisheries information

The total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2004 was 25,824 t, a decrease of about 5 % from 27,353 t in 2003. Estimated swordfish catch (including estimated dead discards) decreased 136 t to 2,685 t, and provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico decreased in 2004 to 2,079 t from 2,527 t in 2003. The estimated 2004 Gulf of Mexico landings of yellowfin tuna accounted for about 32% of the estimated total U.S. yellowfin landings in 2004. U.S. vessels fishing in the northwest Atlantic caught an estimated 973 t of bluefin in 2004, a decrease of 441 t compared to 2003. Provisional skipjack landings increased by 24 t to 102 t from 2003 to 2004, estimated bigeye landings decreased by 69 t as compared to 2003 to an estimated 414 t in 2004, and estimated albacore landings increased from 2003 to 2004 by 200 t to 449 t.

Research and statistics

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 2003 and 2004 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 3,800 billfishes (swordfish, marlins, sailfish, and spearfish) and 1,796 tunas in 2004. This represents a decrease of 21.3% for billfish and a 195.5% increase for tunas from 2003 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.

Uruguay

The Uruguayan Government is currently making its greatest effort to contribute to the study of the species that its fleet catches. Since 2002 the area of pelagic resources has two operative centers, one in Montevideo and another in Puerto de La Paloma. Coverage of the Observer Program has increased significantly, which includes new activities and Uruguay is trying to develop a Port Sampling Program to supplement it. Due to the change of authorities, the National Directorate of Aquatic Resources is revising the fishing permits, as well as the national laws aimed at complying with international recommendations concerning management currently in force. A process has been initiated to develop Action Plans to mitigate the incidental catch of sea birds, sharks and marine turtles.

Observers from Cooperating Parties, Entities or Fishing Entities

Guyana

Guyana's inshore artisanal fishery, which is comprised of about 991 vessels using various types of passive fishing gear, targets a number of groundfish species (*Sciaenidae*, *Ariidae*, *Sparidae*, etc.) with scombrids (mackerels and kingfish) and sharks being caught seasonally as incidentals within the national Exclusive Economic Zone. In 2004, a total of 3,067,987 kg of shark and 804,791 kg of scombrids were harvested. At present, sharks are landed dressed and this continues to pose a real problem for the collection of data by species. Due to an extension of duties, Guyana's Coast Guard, responsible for monitoring all the fishing activities within Guyana's EEZ, was only able to conduct eight fisheries surveillance trips (four aerial reconnaissance and four on water), with no apprehensions being made.

Observers from inter-governmental organizations

Caribbean Community (CARICOM)

National fisheries information, including large pelagic landings for 2004, is reported for the commercial fisheries operating in Grenada, Commonwealth of Dominica, St. Kitts and Nevis, and St. Lucia. Large pelagic fisheries in these four countries continue to involve multi-species, multi-gear, opportunistic operations. Annual fluctuations in landings are believed to reflect fluctuations in local abundance and availability of the different species caught. Fishing methods have also been changing gradually in recent years. The practice of fishing around FADs continues to improve the efficiency of local fishing operations. The most important species landed are yellowfin and skipjack tunas, small tunas, and billfishes. In May 2005, the CRFM Ad Hoc Working Group on Methods held its first meeting, with the aim to explore and test assessment methods suitable for application to fisheries situations within the Caribbean region.

8. Executive Summaries on species

Until 2004, the main purpose of the Species Executive Summaries was to provide a succinct overview of each species to the Commission. These were summaries of the biology and fisheries affecting stocks of concern, the status and outlooks for these stocks, evaluations of effectiveness of management measures agreed by the Commission, and recommendations for additional management measures that the Committee felt would improve the odds of meeting the Commission's objective of attaining Maximum Sustainable Yield levels from the stocks.

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

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

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

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

8.1 YFT – YELLOWFIN TUNA

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

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

- Section 15.1 contains recommendations in relevant to yellowfin tuna.
- The Tropical Tunas Work Plan **(Appendix 13)** includes plans to address research and assessment needs for yellowfin tuna.
- Summary of the main findings and recommendations of the 2005 ICAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Section 9.4).
- Section 16.1 contains the response to the Commission on the effectiveness of the season/area closure [Rec. 04-01].

YFT-1. Biology

One document presented to the 2005 SCRS gave an overview of fishery trends and stock status for yellowfin tuna worldwide. It was noted that the natural mortality vector used by ICCAT in the Atlantic, while the same as that used by the IOTC for the Indian Ocean, is lower than is used by other scientific bodies for other oceans, particularly for the youngest ages. It was further noted that more recent information and methodologies may be available to potentially improve the estimates of natural mortality. Another document did consider the estimation of natural mortality from multi-species tagging data. Due to limitations in the data (such as unbalanced design and different size distributions of released fish) and potential fishing differences between fleets, conclusions were limited to ratios of total mortality between fishing periods rather than any direct statement about natural mortality. Considering the importance of natural mortality estimates in the assessment of the stock, the improvement of natural mortality estimates remains a high research priority. It was noted that future stock assessments should include an evaluation of the sensitivity of results to the uncertainty in natural mortality estimates. Differences were also noted for other biological parameters used by the various scientific bodies, such as growth and maturity vectors; the extent to which these differences reflect estimation methodology, data quality, or real differences between stocks warrants investigation.

YFT-2. Fishery indicators

In contrast to the increasing catches of yellowfin tuna in other oceans worldwide, there has been a steady decline in overall Atlantic catches since 2001. Atlantic surface fishery catches have shown a declining trend from 2001 to 2004, whereas longline catches have increased. In the eastern Atlantic, purse seine catches declined from 89,569 t in 2001 to 58,632 t in 2004, a 35% reduction **(YFT-Table 1; YFT-Figure 1)**. Baitboat catches declined by 23% from 19,886 t to 15,277 t. This decrease is almost entirely due to reduced catches by Ghana baitboats, which resulted from a combination of reduced days fishing, a lower number of operational vessels, and the observance of the moratorium on fishing using floating objects. Catches by other baitboat fleets were generally increasing. In the western Atlantic, purse seine catches declined from 13,072 t to 3,217 t, a 75% reduction. Baitboat catches declined by 8% from 7,027 t to 6,735 t. For the same time period, longline catches were increasing. In the eastern Atlantic, longline catches increased from 5,311 t to 10,851 t, a 104% increase. In the western Atlantic, longline catches increased from 12,740 t to 15,008 t, an 18% increase. The most recent available catch distribution is given in **YFT-Figure 2**.

At the same time, the nominal effort in the purse seine fishery was declining. As an indicator, the number of purse seiners from the European and associated fleet operating in the Atlantic declined from 46 vessels in 2001 to 34 vessels in 2004. On the other hand, the European and associated baitboat fleet increased from 16 to 22 vessels during the same period.

Of the relevant scientific documents presented to the 2005 SCRS, most were descriptive of the catches by country fleets. Three papers discussed observer programs in Ghana, Uruguay, and Spain, and three papers analyzed catches in the context of the moratorium. No new standardized catch rate information has been

presented since the last assessment. However, examination of nominal catch rate trends from purse seine data suggest that catch-per-unit effort was stable or possibly declining since 2001 in the East Atlantic **(YFT-Figure 3a)**, and was clearly declining in the West Atlantic **(YFT-Figure 3b)**. Since effort efficiency was estimated to have continued to increase, adjustments for such efficiency change would be expected to result in a steeper decline. Also, the average weights in European purse seine catches have been declining since 1994 **(YFT-Figure 4)**, which is at least in part due to changes in selectivity associated with fishing on floating objects.

Recent signals in the fishery data could result in a substantially different evaluation of stock status than that which is summarized below. It is important that the next assessment take these and other indicators (such as age of vessels and any loss of regional yellowfin fisheries) into account.

YFT-3. State of the stock

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

Since the relatively high catch levels of 2001 (159,000 t), catches have declined each year to a level of 116,000 t, a reduction of 27%. A potential explanation for this decline is the reduction in purse seine effort, but until a full assessment is conducted it is not possible to confirm this, since declines in nominal catch rates could suggest decreases in abundance or availability.

YFT-4. Effects of current regulations

The 1972 *Recommendation by ICCAT on a Yellowfin Size Limit* [Rec. 72-01] established a 3.2 kg minimum size with a 15% tolerance in numbers of fish landed. 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, and from 63% to 82% undersized fish for baitboats over the period 1997-2001. Landings of undersized fish occur primarily in the equatorial fisheries. Compliance with this measure has never been effectively achieved, largely due to the characteristics of the purse seine gear and operations, which is the principal source of fishing effort on juveniles. Unfortunately, the use of minimum size limits as a means of reducing the mortality of juvenile tuna remains extremely problematic in this fishery for several reasons which are described in detail in “Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, July 4-8, 2005)”. In accordance with the Committee’s current recommendation, any minimum size limit (or lack thereof) should be consistent for all species in a multi-species fishery. It follows that, since the minimum size limit for bigeye tuna has been eliminated, the minimum size limit for yellowfin tuna should likewise be eliminated. Notwithstanding this, the protection of juvenile tunas may be important and alternative approaches to accomplish this should be studied.

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

An evaluation of the season/area closure to purse seine and baitboat fishing [Rec. 04-01] is detailed in “Report of the 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, July 4-8, 2005)”.

ATLANTIC YELLOWFIN TUNA SUMMARY

Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2001)	159,000 t
(2004)	116,000 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].

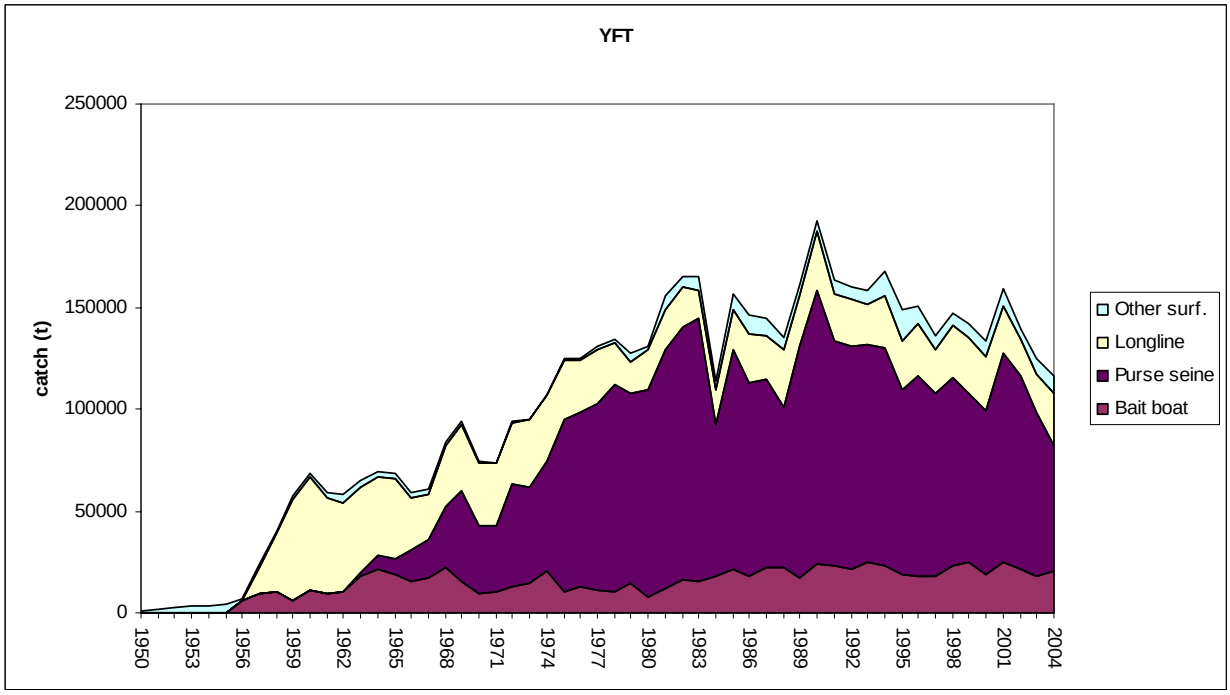
[1] MSY estimates based upon results of age-structured and non-equilibrium production models, and VPA. The complete range of results from all models is 147,200-161,300 t.
[2] The assessment was conducted using the available catch data through 2001. Reports for 2004 should be considered provisional.
[3] These are ranges of point estimates; no estimates of uncertainty were calculated around these point estimates during the assessment.
[4] Result exclusively from VPA and yield-per-recruit analyses.

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

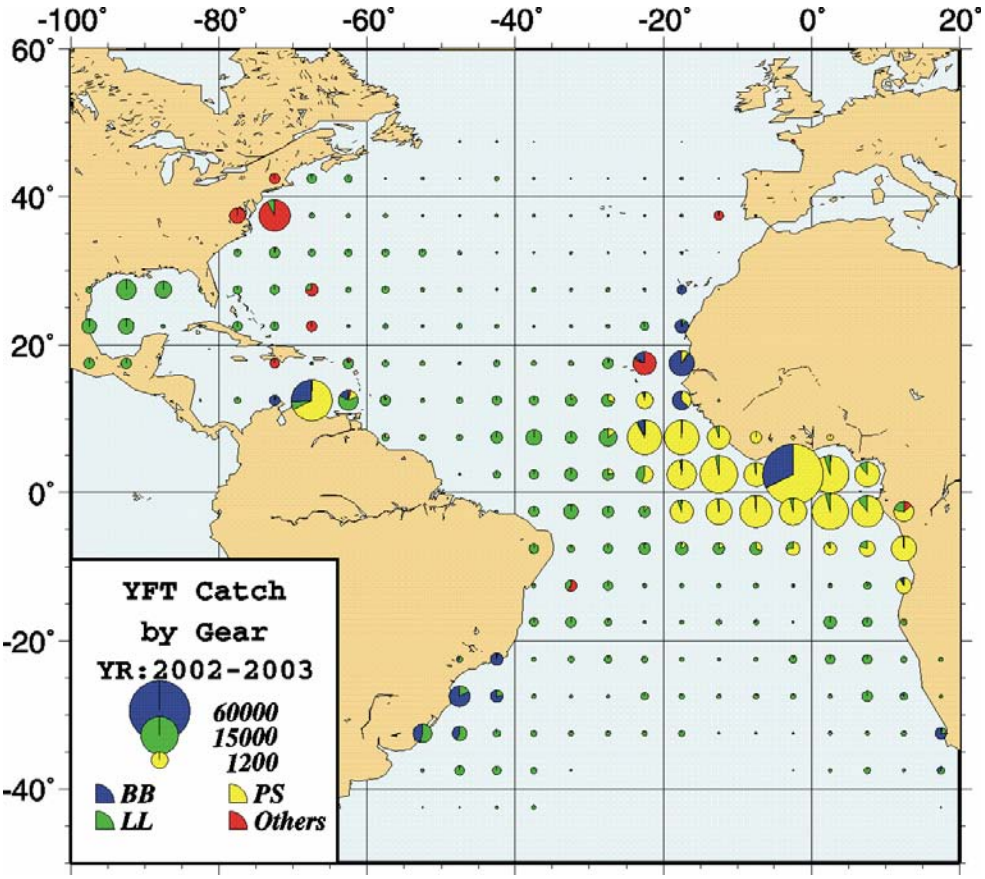
			1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL			130696	155818	165001	165373	113940	156547	146535	144428	135219	161322	192456	163848	160492	158338	168170	149112	150624	136469	147470	141718	133572	159264	139250	124980	116275
	AT.E		117798	138114	138711	124953	76053	113656	106606	110304	99180	123239	157112	123371	120167	115163	113854	108075	111903	99604	110729	104944	95990	116718	109091	99374	86337
	AT.W		12898	17704	26290	39666	37481	42365	31751	27680	30284	32807	27095	32640	32895	37230	46335	34047	30682	29609	28044	28980	30357	38154	29344	24779	29829
	UNCL area		0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	816	826	110
Landings	AT.E	Longline	12508	7986	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8047	7497	8292	5311	5347	8352	10851
		Purse seine	97026	114993	111820	103502	50860	86576	85325	86141	73117	102200	127673	96314	98660	90505	87794	84770	87586	77634	83647	76922	72383	89569	87647	75504	58632
		Bait boat	7690	9788	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18470	15652	13496	13804	13974	17480	19056	13009	19886	15138	14435	15277
		Other surf.	574	5347	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	2305	1951	960	1084	1577
	AT.W	Longline	6735	11323	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11638	12740	11605	9996	15008
		Purse seine	4870	2822	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13072	7966	4607	3217
		Bait boat	392	1917	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315	6009	3764	4868
		Other surf.	901	1642	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4580	5345	5200	7027	3763	6413	6735
	UNCL area	Longline	0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4392	737	826	109
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	0
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0	0	0	
	UNCL area	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	AT.E	Angola	558	959	1467	788	237	350	59	51	246	67	292	510	441	211	137	216	78	70	115	170	35	34	34	34	34
		Belize (Observed 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	
		Benin	95	100	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1	0	0	
		Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cape Verde	864	5281	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684	1693	1896	1896
		Cayman Islands	602	1460	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	71	1535	1652	586	262	1033	1030
		Chinese Taipei	71	432	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	3363	4946	4298
		Congo	140	50	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	0	0	0	0	0	0	0	
		Cuba	5128	2945	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	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	2	0	0	673	213	99	302	565
		EC.España	38759	51428	54164	51946	40049	66874	61878	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	30937	31260	24709	21378
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.France	54372	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211	32753	32429	23949
		EC.Ireland	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	255	54	16	0	55	151	223	97	25	36	72	334	334	334
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	77	208	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	178	194	3	6	4	5
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	12	88	218	225	225	295	225	162	270	245	44	44
		Gambia	0	0	0	0	0	0	0	0	0	0	2	16	15	0	0	0	0	0	0	0	0	0	0	0	
		Georgia	0	0	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0	0	0	
		Ghana	1974	5510	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	16504	17807	28328	17010	30642	23499	19030	15137
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
		Japan	2217	2863	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2286	1550	1510	1992	4372
		Korea, Republic of	5349	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	209	984
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208	0	0	
		Maroc	3243	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	108	95
	*	NEI (ETRO)	0	0	3121	5388	1104	0	0	2077	3140	5436	12513	3988	10049	8251	6186	6143	8437	5981	7224	5190	5448	9273	8209	4913	10979
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165	89	139	85
	*	Netherlands Antilles	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	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	1661	341	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7838	8644	10854	5759	3137	1753	930	1103	574	1022	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	9	68
		Russian Federation	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	31	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	279	681
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	
		Seychelles (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	
		South Africa	540	178	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	240	320	191	342	152	298	402
		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	1	0	
		U.S.A.	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.	448	541	1004	1282	2168	3768	1851	1275	3207	4246	3615	0	0	0	0	0	0	0	0	0	0	0	0	0	

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		UK.Sta. Helena	55	59	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	0	
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	0	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	AT.W	Argentina	0	8	7	0	0	44	23	18	66	33	23	34	1	0	0	0	0	0	0	0	0	0	0	0	
		Barbados	40	30	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142	115	116	116
		Brasil	1008	2084	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985
		Canada	0	0	0	0	0	0	0	0	30	7	7	29	25	71	52	174	155	100	57	22	105	125	70	73	304
		Canada (Japan)	0	0	0	0	0	0	2	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	17	275
		Chinese Taipei	616	435	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1296	1540	1527
		Colombia	0	0	3	29	0	180	211	258	206	136	237	92	95	2404	3418	7172	238	46	46	46	46	46	46	46	46
		Cuba	689	1997	1503	793	2538	1906	2081	1062	98	91	53	18	11	1	14	54	40	40	15	15	0	0	65	65	65
		Dominica	0	0	0	0	0	0	0	0	0	0	18	12	23	30	31	9	0	0	0	80	78	120	169	119	81
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	220	226	226	226	226	226
		EC.España	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		Grenada	487	64	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759	593	749	460
		Jamaica	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	1117	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1775	1141	572	727	1085
		Korea, Republic of	1933	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0	0	0	
		Mexico	16	42	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084	1133	1313	1208
		Netherlands Antilles	173	173	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0	0	0	
		Panama	807	262	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	145	299
		Seychelles	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	1	40	48	22	65	16	43	37	35	48	38	33	24	884	568	4251
		Sta. Lucia	27	25	26	23	56	79	125	76	97	70	58	49	58	92	130	144	110	110	276	123	134	145	94	139	152
		Trinidad and Tobago	0	0	0	232	31	0	0	0	1	11	304	543	4	4	120	79	183	223	213	163	112	122	125	186	224
		U.S.A.	553	1688	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6500
		UK.Bermuda	35	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37	48	47	47
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Uruguay	0	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	90	91	95	204
		Venezuela	5397	4500	14426	26576	21879	20535	11755	11137	10949	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	18651	11421	7411	5774
	UNCL area	China, People's Republic of	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	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	209	175	36
		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
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	73	73
		Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79	0	
		NEI.Other	0	0	0	754	406	526	956	1297	2324	2780	4100	4318	3836	2671	4404	4202	5962	6100	8339	7409	5269	2883	175	578	
		Panama	0	0	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	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	1956	1341	280	0	
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	167	0	0	0	0	
	UNCL area	UK.Turks and Caikos	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

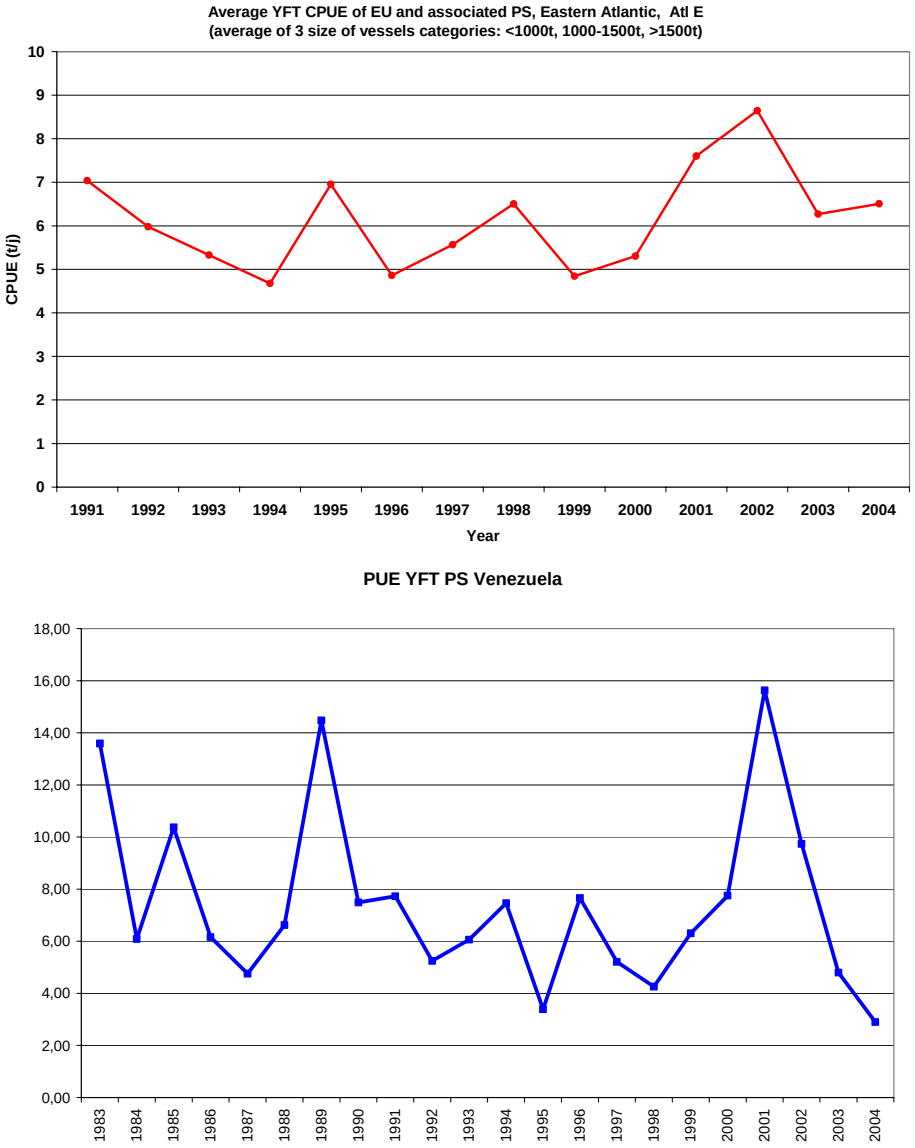
* Netherlands Antilles catch is included on NEI (ETRO) for 2004.



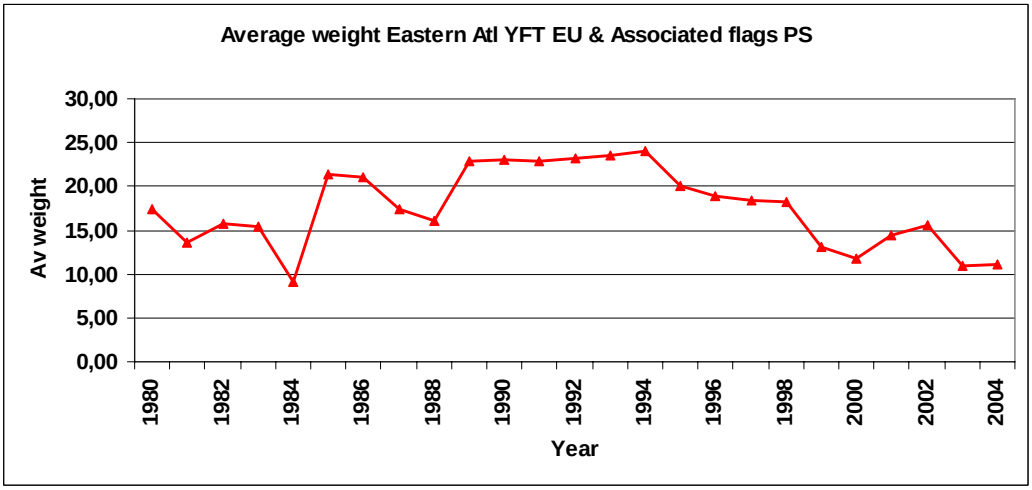
YFT-Figure 1. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2004.



YFT-Figure 2. Geographical distribution of yellowfin tuna catches for most recent years (2002-2003) by major tuna fishery.



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



YFT-Figure 4. Trend in yellowfin tuna average weight for the EU and associated purse seine fleet in the eastern Atlantic, across all set types (floating object and free school).

8.2 BET - BIGEYE TUNA

The last stock assessment for bigeye tuna was conducted in July 2004. Due to the early date of the meeting, the most recent catch information covered in the assessment was 2002. This document highlights on changes that may have taken since then; readers interested in a more complete summary of biology, fisheries and state of stock on Atlantic bigeye tuna should consult the report of the 2004 SCRS meeting.

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

- Section 16.1 contains response to the Commissioner's request [Rec.04-01].
- Report of 2005 ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Section 9.4).
- 2004 ICCAT Bigeye Tuna Year Program Symposium (Anon 2005).
- Report of the Second World Meeting on Bigeye Tuna (Anon 2005a).

BET-1. Biology

Several documents were presented to the 2005 SCRS. Most of the topics provided were the statistics as well as fishery information monitored by the observer program. There are no documents that directly dealt with the biology of this species.

BET-2. Fisheries indicators

The most noteworthy trend in fisheries observed is the general declining trend in catches for all gears after a high peak (121,000 t) in 1999. After that, the total annual catch declined to 103,000 t, 96,000 t, 76,000 t, 85,000 t, and 72,000 t for 2000-2004 **(BET-Figure 1)**. The decline of longline catch is mostly attributable to the decrease of Japanese and estimated IUU catches while the other country/entity's catches are generally maintained. Other gears (purse seine and baitboat) also indicated a similar but more variable decline. The decline of the Japanese catch is related to the reduced fishing effort as well as the declined CPUE in the major fishing grounds in tropical waters.

Among the fisheries catching bigeye, two changes are noted. One is the recovery of catch in the northern Islands (Azores and Madeira) baitboat fisheries after 4 years of low catch for 2000-2003. Another change is also observed for the fishing area of Japanese longline fishery. Since around 2001, some of the fleet had operated in central north Atlantic between 25°N-35°N and 40°W-75°W. The most recent catch distribution is given in **BET-Figure 2**.

In addition to the above changes in fisheries, several countries increased their catch significantly in 2004, though the amount is not so large. Such increases are reported for Philippines (1,850 t), Venezuela (1,060 t) and Korea (630 t). The current reported catch of Chinese Taipei for 2003 is considered under-estimated. Chinese Taipei will re-estimate the bigeye catch for 2003 in near future. New estimate is expected to be higher than the current reported catch.

BET-3. State of the stock

The 2004 assessment indicated that the stock has declined due to the large catches made since around the mid-1990s to around or below the MSY level, and that fishing mortality exceeded F_{MSY} for several years during that time period. Projections indicate that catches of more than 100,000 t will result in continued stock decline. Given the high uncertainties in the catches, abundance indices and other parameters used in the assessments, catch levels of around 90,000 t or lower values for at least for the near future would promote the recovery of the stock **(BET-Figure 3)**.

BET-4. Effects of current regulations

The bigeye minimum size regulation of 3.2 kg [Rec. 79-01] was adopted in 1980 to reinforce the same regulation for yellowfin, and was in effect until 2004. The Committee did not evaluate this regulation at this time. However, as was the case while the measure was in effect, it is believed that a large quantity (around 50% in total number

of fish) of juvenile bigeye tuna smaller than 3.2 kg was caught in 2004 as well, because there are no substantial changes in the fisheries (the equatorial surface fleets) that account for most of the juvenile catch.

The Commission asked the Committee to examine the impact on stocks of the current minimum size regulation (BET Recommendation 04-01). At the same time, the Commission also asked to recommend the necessary modifications that would improve its effectiveness as well as to review possible modifications to be applied to the closure. Although the new regulation has not implemented yet, the Committee got together to provide a response to the Commission, as provided separately under Agenda Item 16.1 of the 2005 Committee Meeting.

The moratorium on FAD fishing by surface gears in the Gulf of Guinea were observed by all fishing sectors, including Ghanaian surface fleet during 2004/2005 season. However, available purse seine catch and effort data indicated significant fishing on FADs in the moratorium area.

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 and 2004 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) were 67,000 t and 59,500 t, respectively. These were much lower than the total catch limit (84,200 t) for these counties/entities. As a whole, the total catch in 2003 and 2004 for all countries is about 12,000 t and 24,000 t lower than the average total catch of 1991 and 1992 (96,000 t).

ATLANTIC BIGEYE TUNA SUMMARY	
Maximum Sustainable Yield (likely range[1])	93,000 t - 114,000 t
Current (2004) Yield [2]	72,000 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. 79-01]. - 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]. - No purse seine and baitboat fishing during November in the area encompassed by 0°-5°N and 10°W-20°W. [Rec. 04-01]. This recommendation will replace [79-01 and 99-01] after June, 2005.

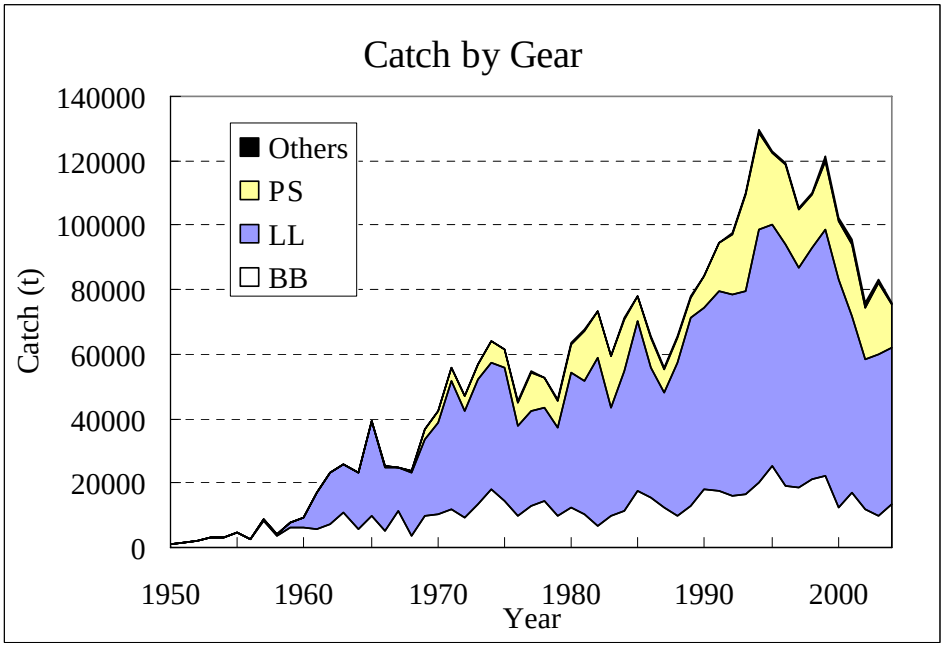
[1]Range based on point estimates from various production models and including a delay-difference model. Other models applied during the assessment resulted in estimates outside this range.
[2]Provisional figure, subject to change in the future.

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

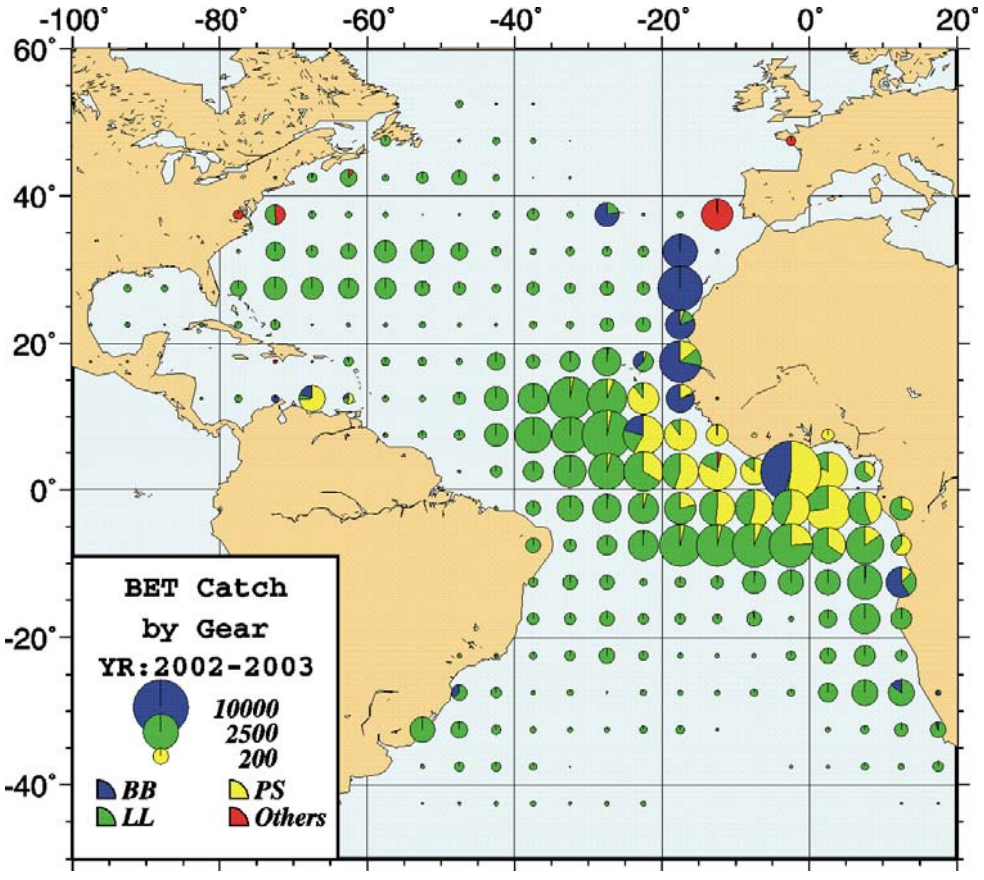
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL	63596	67753	73493	59370	71052	78215	65396	55976	65796	78068	84337	94795	97758	110060	129512	123155	119114	105639	109890	121183	102635	95818	75910	84576	72349
Longline	41677	41608	51805	33757	43303	52595	39942	35570	47758	58389	56537	61556	62359	62871	78296	74816	74900	68251	71836	76527	71194	55265	46584	51065	43620
Purse seine	9204	15656	14476	15654	16063	7554	9286	7148	7859	6371	9407	15055	18547	30074	29952	22226	24902	18213	16362	20923	17909	22060	16192	22237	13388
Bait boat	12349	10124	6922	9796	11439	17651	15618	12631	9710	12672	18106	17750	16248	16467	20290	25552	18959	18639	21263	22360	12311	16870	11639	9932	14107
Other surf.	366	365	290	163	247	415	550	626	469	636	287	434	604	648	974	561	353	536	429	1373	1221	1623	1496	1342	1233
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	
Argentina	0	0	0	0	0	100	41	72	50	17	78	22	0	0	0	0	0	0	0	0	0	0	0	0	
Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	17	18	18	6	11	11	
Belize (Observed 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	
Benin	0	40	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	0	0	
Brasil	698	505	776	521	656	419	873	756	946	512	591	350	790	1256	601	1935	1707	1237	644	2024	2768	2659	2582	2455	1496
Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	
Canada	0	0	0	0	0	0	0	0	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279	182	143
Canada (Japan)	0	0	0	0	0	0	11	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cape Verde	27	72	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	1	1	1
China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840	7890	6555
Chinese Taipei	2561	1887	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	18483	18682	16399
Congo	5	0	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	0	0	0	0	0	0	0	
Cuba	1385	711	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16	16	
Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	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	5	0	0	0
EC.España	8430	10010	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524	10969	8251
EC.France	6283	8020	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293	3940	2926
EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0
EC.Poland	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
EC.Portugal	3706	3086	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3313	1498	1605	2590	1655	3204
FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	28	
Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	0	0	
Gabon	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	332	780	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	7431	13252	11460	5586	14095	5893	4816	6944
Grenada	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	4	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	1	0	0	0	0	
Japan	20922	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24605	18087	15473	19055	15203
Korea, Republic of	10235	12274	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87	143	629
Liberia	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	508	1085	500	400	400	400	400	400	400	31	593	593	
Maroc	387	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913	889	929
Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7	4	5
* NEI (ETRO)	0	0	338	1141	157	0	0	85	20	93	785	751	1462	2787	2321	2008	3822	1910	1685	3697	2285	3024	2248	7229	5278
NEI.Other	0	0	0	46	369	354	758	1406	2155	4650	5856	8982	6151	4378	9000	10697	11862	16569	24896	24060	15092	8470	531	0	
Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274	215	177
* Netherlands Antilles	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	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Panama	4518	2500	2844	2732	3165	4461	5173	5616	3847	3157	5258	7447	9991	10438	13234	9927	4777	2098	1252	579	952	89	63	0	
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837	855	1854
Russian Federation	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	5	0	0	0	0	0	0	
Senegal	0	0	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565	407	548
Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162	0	
Seychelles (Observed 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	
Sierra Leone	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	422	381	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	53	55	249	239	341	113	270
St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15	103	18
Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2	2	0

	1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
Togo	0	0	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	0	0	
Trinidad and Tobago	0	0	0	191	41	22	0	0	1	19	57	263	0	3	29	27	37	36	24	19	5	11	30	6	5
U.S.A.	202	158	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	601	482	414
U.S.S.R.	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	
UK.Sta. Helena	9	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5	0	
Uruguay	0	86	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	51	67	59	40
Venezuela	661	1684	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457	189	274	222	140	226	708	629	516	1060
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	

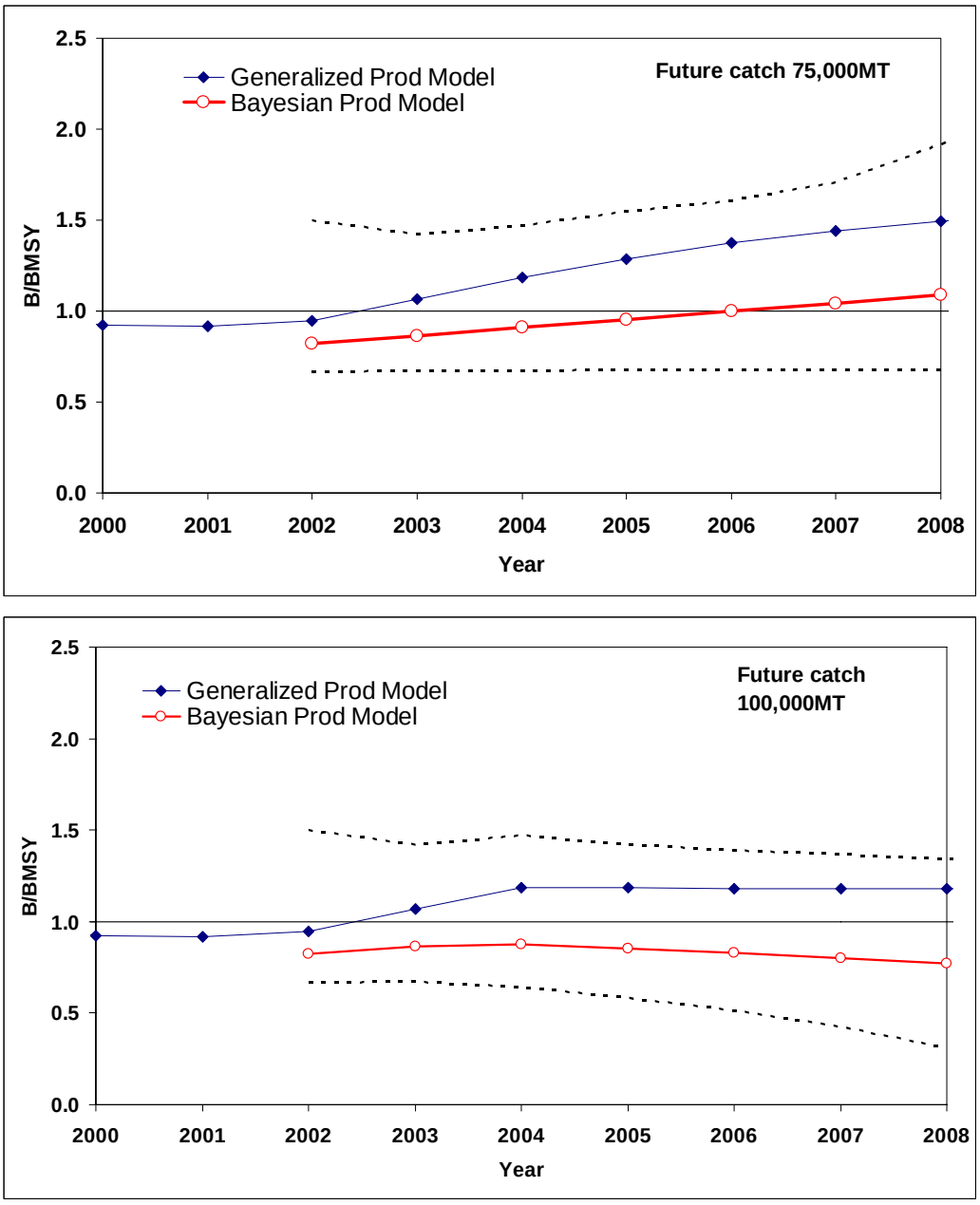
* Netherlands Antilles catch is included on NEI (ETRO) for 2004.



BET-Figure 1. Trend of bigeye catches (1950-2004) by major tuna fishery.



BET-Figure 2. Geographical distribution of bigeye catches for most recent years (2002-2003) by major tuna fishery.



BET-Figure 3. 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).

8.3 SKJ – SKIPJACK TUNA

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

SKJ-1. Biology

Skipjack tuna is a gregarious species that is found in schools in the tropical and subtropical waters of the three oceans **(SKJ-Figure 1)**. Skipjack are often caught under FADs in association with juvenile yellowfin tuna, bigeye tuna and with other minor tunas. One of the characteristics of skipjack is that it spawns opportunistically throughout the year in vast sectors of the ocean and its growth varies according to the latitude. During the ICCAT Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas in July 2005 (Document SCI-032), a re-analysis on the tagging data in the Senegalese area showed however that the parameters of the growth curve obtained in this region were in fact closer to the growth estimates made in the Gulf of Guinea or in other oceans than those done previously in Senegal.

The increasing use of fish aggregation devices (FADs) seems to have changed the behavior of the schools and the movements of this species ("ecological trap" concept). It is noted that, in effect, the free schools of mixed species were considerably more common prior to the introduction of FADs than they are at present.

SKJ-2. Fisheries indicators

The total catches obtained in 2004 in the Atlantic Ocean amounted to almost 161,000 t **(SKJ-Table 1**, **SKJ-Figure 2)** which represents an increase on the order of 12.9% as compared to the average of the last five years.

Since the early 1990s numerous changes in the fishery (such as the use the FADs and the expansion of the fishing area to the west) have increased skipjack catchability as well as the proportion of the skipjack stock which is exploited. At present, the major fisheries are the purse seine fisheries, particularly those of EC-Spain, EC-France, NEI, Ghana and Netherlands Antilles, followed by the baitboat fisheries of Ghana, EC-Spain and EC-France. The catches made in 2004 in the East Atlantic reached 134,000 t, representing a 15.8% increase as compared to the average of 1999-2003 **(SKJ-Figure 3)**.

In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. The 2004 caches in the West Atlantic amounted to 26,900 t, which is a level close to the average of the historical period in recent years **(SKJ-Figure 4)**.

There is no quantified information available on the effective fishing effort exerted on skipjack tuna in the East Atlantic **(SKJ-Figure 5)**. It is supposed, however, that the increase in fishing power linked to the introduction to improved technologies on board the vessels as well as to the development of fishing under floating objects have resulted in an increase in the efficiency of the various fleets. An estimate of the increase in the coefficient of total mortality (Z) between the early 1980s and the end of the 1990s was carried out with a model using tagging data (cf. Workshop on the mortality of juveniles in July 2005). For the range of sizes considered (about 40-60 cm FL) the increase in Z on the order of a factor 3 would reflect this increase in efficiency. The comparison of the size distributions of skipjack for the East Atlantic between the periods prior to and following the use of FADs reinforces this interpretation in the measure or an increase is observed in the proportion of small fish in the catches.

A document on the Spanish observer program on board purse seiners, presented during the 2005 SCRS, shows that for the 2001-2005 period the average rate of discards of skipjack tunas under FADs in the East Atlantic is estimated at 42 kg per ton of skipjack landed.

Fishing effort of the Brazilian baitboats which comprises the major skipjack fishery in the West Atlantic, decreased by half between 1985 and 1996, but seems to be stabilized since, after a slight increase.

SKJ-3. State of the stocks

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

The skipjack stocks show some characteristics of a biological and a fishery nature, which make it very difficult to apply traditional stock assessment models. For these reasons, no standardized assessment (for example, global models, VPA, etc.) of the Atlantic skipjack stocks have been carried out. Notwithstanding, some estimates were made to analyze the temporal development of several fishery indices that would reflect the changes in the state of the stocks over time.

The fisheries operating in the east are extended towards the west beyond 30°W longitude. However, based on the scientific studies, the Committee decided to maintain the hypothesis in favor of two distinct stock units. However, taking into account the biological characteristics of the species and the location of the various fishing areas, small stock units can be envisaged.

Eastern stock

The indices from the purse seine fishery often show divergent trends depending on the area concerned. The fact that a reduction in abundance for a local segment of the stock would have little repercussion on the abundance of the stock in other areas, leads to suppose that only a minor proportion of skipjack carry out extensive migrations between areas (cf. notion of stock viscosity) **(SKJ-Figures 6 to 9)**.

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

Western stock

The development of nominal abundance indices of Brazilian baitboat fisheries and Venezuelan purse seiners seem, obtained up to 2004, seemed to show a stable stock status **(SKJ-Figure 11)**.

SKJ-4. Effects of current regulations

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

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

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

A new regulation on time-area stratum of fishing effort of the surface fisheries was proposed by the Commission and studied by the Workshop on the mortality of juveniles (see section 9.4). It was noted that compared to the 2003 landings, the catches of skipjack would increase about 7.5% if this new regulation stratum replaced the moratoria.

SKJ-5. Management recommendations

No management recommendations were proposed for this species.

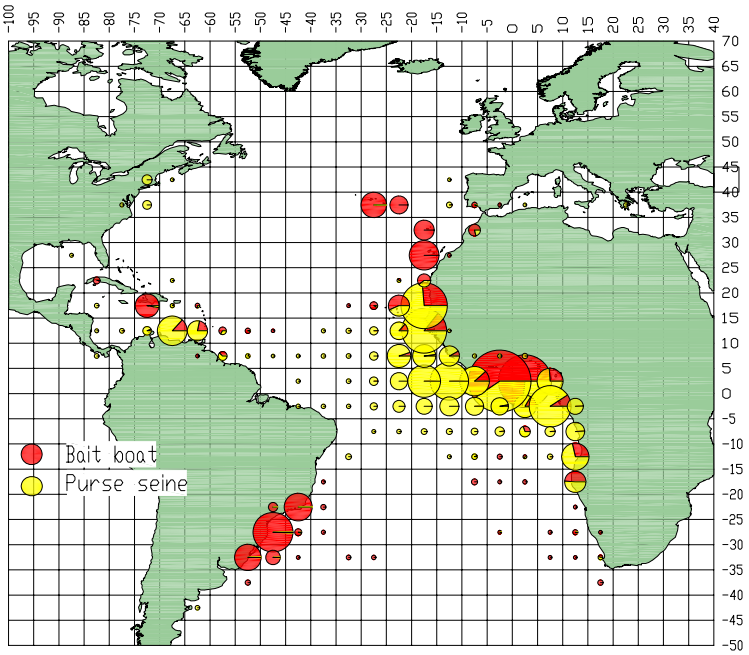
ATLANTIC SKIPJACK TUNA SUMMARY		
	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2004) Yield	134,274 t	26,910 t
Current Replacement Yield	Not estimated	Not estimated
Relative Biomass (B_{2004}/B_{MSY})	Not estimated	Not estimated
Relative Fishing Mortality: F_{2004}/F_{MSY}	Not estimated	Not estimated
Management measures in effect	None	None

SKJ-Table 1. Estimated catches (t) of Skipjack tuna by major area, gear and flag.

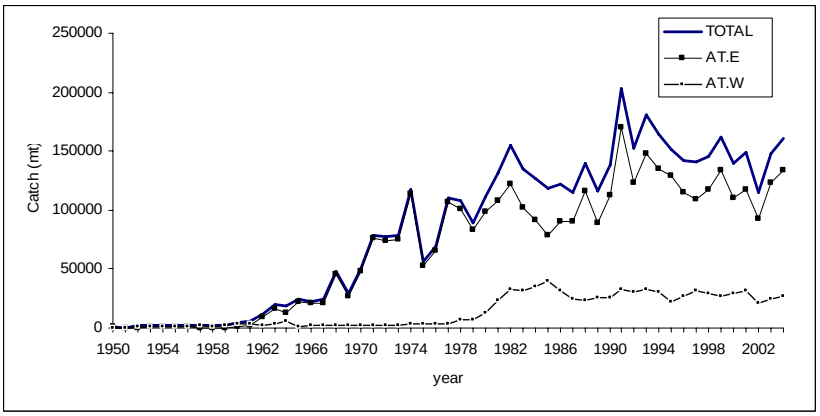
		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL		111173	131061	154909	135038	126826	118713	122172	114566	139962	116120	138659	203175	152815	180929	164435	151249	142118	141079	145875	161514	139935	149301	114882	147728	161089
	AT.E	98774	107941	122368	102669	91230	78441	90021	90402	116226	89738	112549	169771	122660	147708	134486	129390	114557	109367	116790	134159	110630	117850	93258	123599	134174
	AT.W	12388	23073	32520	31839	35596	40272	32151	24164	23736	26382	26110	33404	30155	33221	29949	21859	27561	31712	29085	27356	29306	31451	21507	24125	26910
	UNCL area	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	5	4
AT.E	Longline	0	22	2	62	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	33	78	308
	Purse seine	56734	66473	74824	65492	61795	48348	58353	50553	66875	47260	74802	126264	85548	115022	96348	95388	82180	70558	73762	92425	77699	72698	68598	90474	86548
	Bait boat	38134	38918	44488	34873	28085	29868	30009	38803	48015	41000	36569	41612	35660	31656	37817	33691	32047	38624	42012	41403	30548	44437	23877	32466	46272
	Other surf.	3906	2528	3054	2242	1328	219	1640	1040	1332	1469	1178	1890	1449	1028	311	308	323	138	930	288	2335	662	750	580	1046
AT.W	Longline	1	9	23	8	25	24	8	6	9	25	23	33	29	20	16	33	19	12	21	58	23	60	143	95	231
	Purse seine	2887	4654	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116	2296	2769
	Bait boat	9351	17999	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737	21366	23537
	Other surf.	149	410	390	653	842	567	1657	518	355	600	600	872	764	710	1577	2023	452	556	515	481	465	951	511	367	373
UNCL area	Longline	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5	4
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	
AT.E	Algerie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0	0	
	Angola	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	30	60	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	0	0	
	Bulgaria	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cape Verde	2094	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	298	371	371
	Cayman Islands	289	1800	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	China, People's Republic of	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	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	23	26	18
	Congo	1250	200	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	0	0	0	0	0	0	0	
	Cuba	196	198	189	135	310	246	569	81	206	331	86	0	0	7	0	0	0	0	0	0	0	0	0	0	
	Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1173	259	292	143	559
	EC.España	26384	35458	38016	28934	46659	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25441	44832	38747
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.France	25767	26926	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637	19899	21879
	EC.Germany	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	102	99
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
	EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	29	34
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	1954	2825	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958	4315	8477
	Gabon	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	5812	7858	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	27667	34150	43460	29950	43340	31887	32766	33600
	Japan	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	6718	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Maroc	5001	3017	3956	2532	885	1015	1222	1041	428	295	1197	254	559	312	248	5024	684	4513	2486	858	1199	268	281	524	809
	* NEI (ETRO)	0	0	1560	3383	927	590	540	791	2994	2263	10516	6054	6941	9482	6521	6146	10220	4901	6749	7701	7128	8121	8544	7696	28232
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0	0	0
	* Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427	12084	
	Norway	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	1735	144	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1560	281	342	0	
	Rumania	8	0	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	0	0	
	Russian Federation	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	33	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0	0	
	Senegal	0	0	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1046	733	1271
	South Africa	48	110	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0	2	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	1	0	
	U.S.A.	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.	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	70	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63	63	63
	Venezuela	0	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
AT.W	Argentina	17	1	137	243	505	101	138	90	7	111	106	272	123	50	1	0	0	0	0	0	0	0	0	0	
	Barbados	0	78	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0	0	
	Brasil	6071	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338	20416	23037
	Canada	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Chinese Taipei	0	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	1	2	1	0	1	16	14	25
	Colombia	0	0	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	0	0	

		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
	Cuba	2255	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0	0	
	Dominica	0	0	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	45	55	51	30
	Dominican Republic	59	71	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	0	0	
	EC.España	0	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0	0	
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	3	29
	Grenada	8	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14	16	21
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	0	0	
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Korea, Republic of	0	0	0	0	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mexico	1	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	6	51	13	54	71	75	9
	Netherlands Antilles	40	40	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	0	0	0	
	Panama	1026	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	17	28	29	27	20	66	56	53	37	42	57	37	68	97	264	92	251
	Sta. Lucia	40	37	38	35	64	53	76	60	53	38	37	51	39	53	86	72	38	100	263	153	216	151	106	132	137
	Trinidad and Tobago	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	
	U.S.A.	981	2753	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	88	79	102
	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	
	Venezuela	1890	4900	12645	12778	16526	10712	5690	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6870	2554	3247	3270
UNCL area	Chinese Taipei	7	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	25	5	4
	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	4	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0	

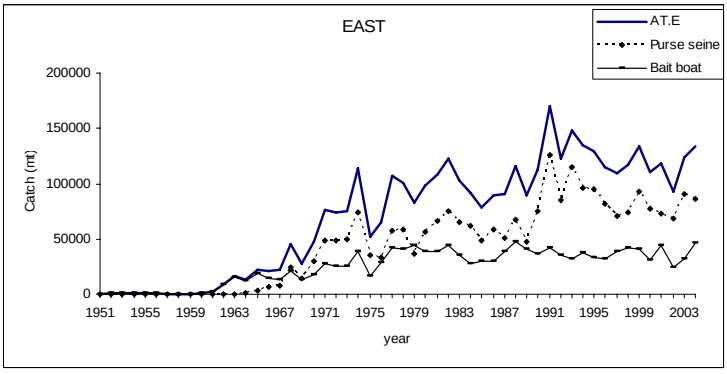
* Netherlands Antilles catch is included on NEI (ETRO) for 2004.



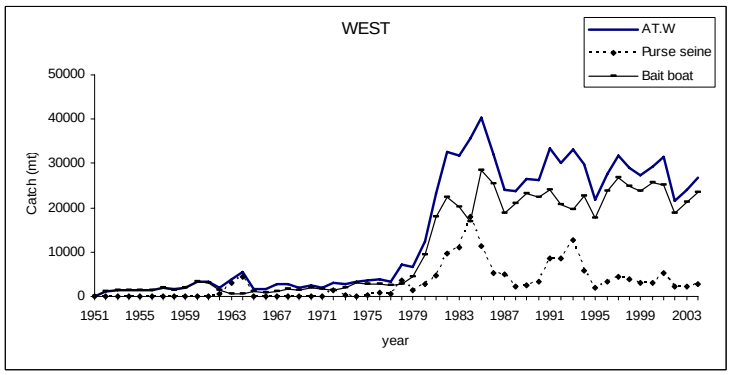
SKJ-Figure 1. Geographical distribution of skipjack catches by gear for the period 1950-2003.



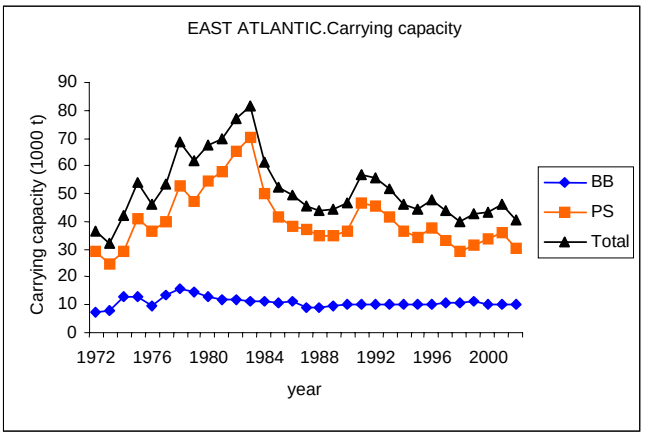
SKJ-Figure 2. Total eastern and western Atlantic skipjack landings (1950-2004).



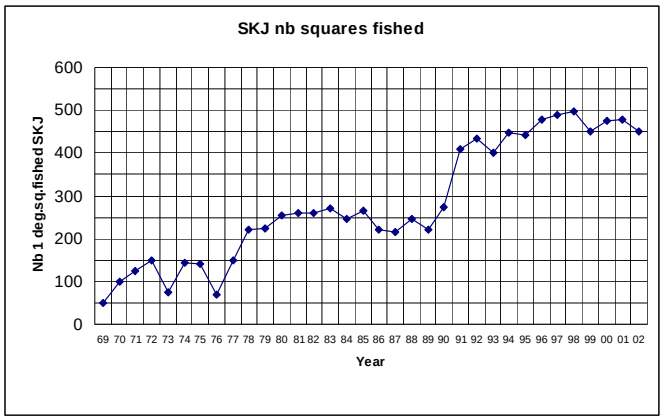
SKJ-Figure 3. Reported landings of skipjack in the eastern Atlantic, by major gear (1950-2004).



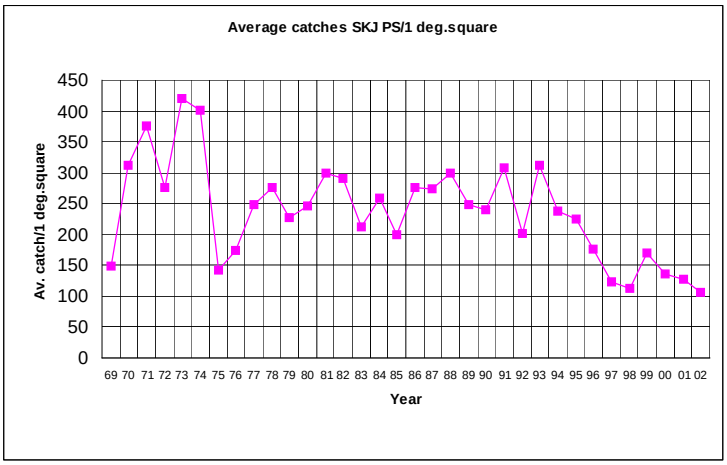
SKJ-Figure 4. Reported landings of skipjack in the western Atlantic, by major gear (1950-2004).



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

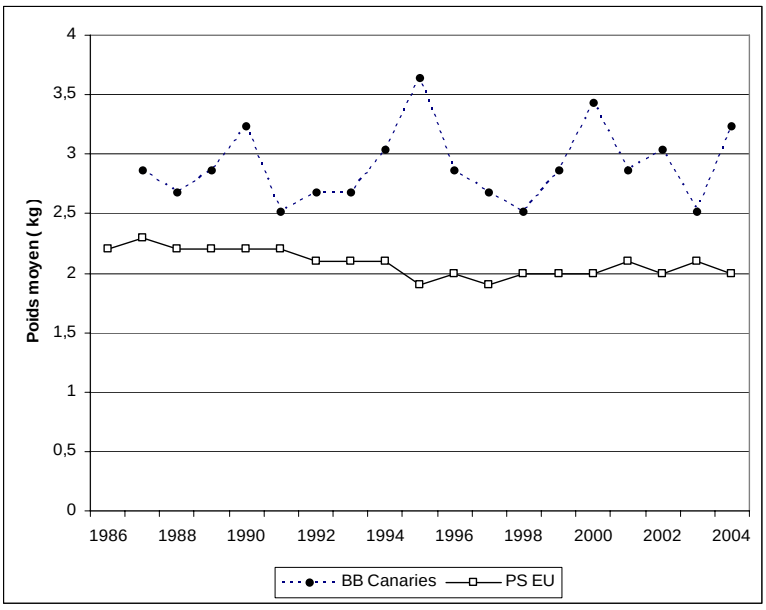


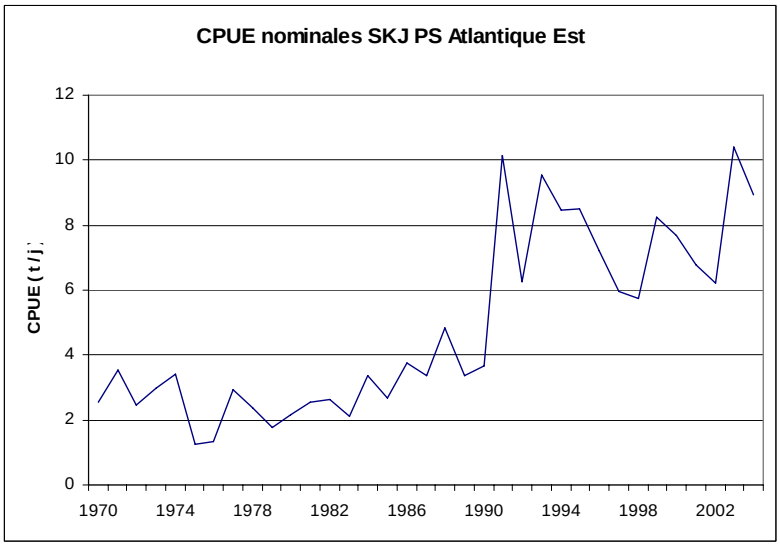
SKJ-Figure 6. Number of 1x1 degree areas where skipjack catches were reported in the eastern Atlantic purse seine fisheries (1969-2002).



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

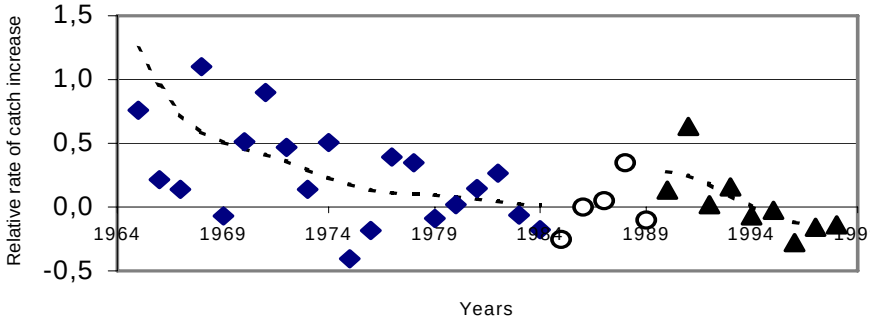
SKJ-Figure 8. Development of the average weight of skipjack tuna landed in the East Atlantic.

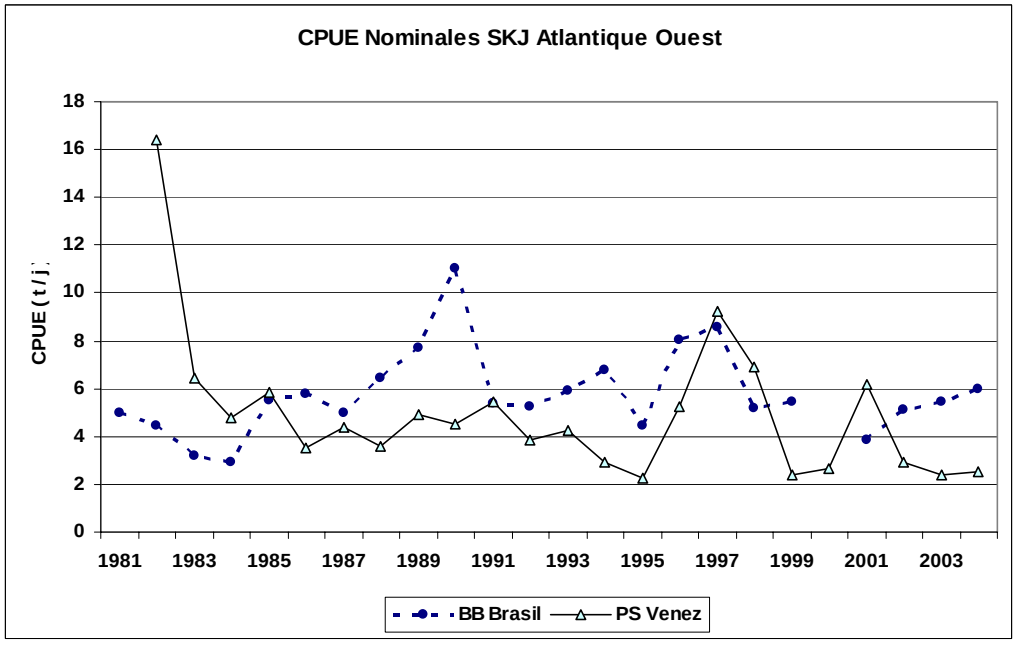




SKJ-Figure 9. Development of nominal CPUE of SKJ from European purse seiners in the East Atlantic.

SKJ-Figure 10. 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-Figure 11. Development of nominal CPUEs of SKJ from Venezuelan purse seiners CPUEs and Brazilian baitboats CPUEs in the West Atlantic.

8.4 ALB – ALBACORE

The last assessment of the North stock was conducted in 2000 (1975-1999) and that of the Southern stock in 2003; no assessment of the Mediterranean stock has ever been carried out. This report updates the latest information and catch data available for 2004.

Complete information for North stock assessment can be found in Anon 2001 and for South stock in Anon 2004a.

ALB-1. Biology

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

A paper was presented on albacore growth for the North Atlantic stock, which supported previous estimates on albacore growth. Present available knowledge about habitat distribution according to size, growth, spawning areas and maturity estimates remained the same for the three albacore stocks considered.

ALB-2. Description of fisheries or fisheries indicators

North Atlantic

The northern stock is exploited by surface and longline fisheries targeting mainly immature fish (50cm to 90 cm FL) and sub-adult and adult albacore (60-120 cm FL) respectively. The main surface fisheries are carried out by EC fleets (Spain, France, Portugal and Ireland) in the Bay of Biscay, in the adjacent waters of the northeastern Atlantic, and in the vicinity of the Canary and Azores Islands. The main longline fleet is of Chinese Taipei and operates in the central and western North Atlantic. Total reported landings for the North Atlantic generally declined since 1983, largely due to a reduction of fishing effort by traditional surface (trolling and baitboats) and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). Some stabilization followed in the 1990s, mainly due to the increased effort and catch by new surface fisheries (driftnets and mid-water pair pelagic trawl) with a peak in 1993 at 38,063 t. Catches decreased to the lowest on record in 2002 caused by a decrease in catches in the surface fishery. The declared catch in 2004 was 25,460 t, and was similar to that of 2003 and higher than the total reported landings for 2002. The surface fisheries accounted for the bulk of the total catch (72%) in 2004. The troll fleet catch increased by approximately 40 % and mid–water pair pelagic trawl fleet catch decreased by about 33% in comparison to 2003 catches.

South Atlantic

The recent total annual South Atlantic albacore landings were largely attributed to four fisheries, namely the surface baitboat fleets from South Africa and Namibia, and the longline fleets from Brazil and Chinese Taipei (**ALB-Table 1**; **ALB-Figure 2**). The surface fleets are entirely albacore directed and mainly catch juvenile fish (70-90 cm FL). These fisheries operate seasonally, from October to May, when albacore are available in coastal waters. The longline fleets consists of vessels that target albacore and vessels that take albacore as a by-catch in swordfish- or bigeye-directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets.

Total reported albacore landings for 2004 was 22,468 t and decreased by about 5,500 t compared to 2003. Furthermore, the total reported landings for 2004 has been the lowest on record since 1984. The decline in catch is likely due to a reduction in fleet size as is the case for Chinese-Taipei and Brazil. Chinese-Taipei longliners stopped fishing for Brazil in 2003, which resulted in albacore only being caught as a by-catch in swordfish- and tropical tuna-directed longline fisheries. In addition, the decreased availability of albacore in the inshore waters of South Africa and unfavorable foreign currency exchange rates in the last two years has caused a general reduction in the number of active baitboat vessels. There has also been an increasing component of the South African baitboat fleet which has shifted targeting to yellowfin tuna in the last two years.

Mediterranean

Reported landings in 2004 accounted for 4,847 t, which represents a decrease of 3,045 t in respect to 2003 catches, which are the largest catch reported in the time series for the Mediterranean Sea (**ALB-Table 1** and **ALB-Figure 2**). The 2004 albacore fishing season in the Mediterranean was affected by bad weather conditions in the late spring and autumn, the most important seasons for this fishery. This situation had resulted in a relevant reduction in catches compared to 2003, particularly remarkable from the EC-Italy catch, which showed a reduction of 47% and EC-Greece (18%). The situation of catch statistics in the Mediterranean appears still incomplete, because albacore catches are known to happens almost in all the Mediterranean Sea, either as a target fishery or, more common, as by-catch in other pelagic fishery, however reporting number of fleets is scarce.

ALB-3. State of stocks

North Atlantic

In 2003 the Committee concluded that it was inappropriate to proceed with a VPA assessment based on the catch-at-age until the catch-at-size to catch-at-age transformation is reviewed and validated. In 2005 a document was presented on the analyses of catch-at-size and identifying the source of bias in the catch-at-age of the North Atlantic albacore stock. The Committee recommends holding a data preparatory working group meeting to allow for a thorough revision of North Atlantic stock prior to the next assessment in 2007.

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

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

Equilibrium yield analyses, carried out in 2000 and made on the basis of an estimated relationship between stock size and recruitment, indicate that spawning stock biomass was about 30% below that associated with MSY (**ALB-Figure 4**). However, 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 the Committee assessed the status of the Southern Atlantic albacore stock with an age-structured production model (ASPM), using the same specifications as in 2000, to provide a Base Case assessment for South Atlantic albacore. Results were similar to those obtained in 2000, but the confidence intervals were substantially narrower in 2003 than in 2000. In part this may be a consequence of additional data now available, but the underlying causes need to be investigated further. The estimated MSY and replacement yield from the 2003 Base Case (30,915 t and 29,256 t, respectively) were similar to those estimated in 2000 (30,274 t and 29,165 t). In both 2003 and 2000 the fishing mortality rate was estimated to be about 60% of F_{MSY}. Spawning stock biomass has declined substantially relative to the late 1980s, but the decline appears to have leveled off in recent years (**ALB-Figure 6**) and the estimate for 2002 remains well above the spawning stock biomass corresponding to MSY. A statistical (Bayesian) age-structured production model was used for the first time in 2003. The results from this model were qualitatively similar to those from the ASPM. Projections were carried out using this alternate model.

Mediterranean

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

ALB-4. Effects of current regulations

North Atlantic

Since 2001, the Commission established a total allowable catch (TAC) of 34,500 t for this stock and, in 2003 extended it up to 2006. A 1998 Recommendation that limits fishing capacity to the average of 1993-1995 also remains in force. The Committee noted that reported catches for 2001, 2002, 2003 and 2004 have been below the TAC **(ALB-Table 1)** and is unable to assess whether or not these recommendations have had a direct effect on the stock.

South Atlantic

Since 1999, the Commission established the total allowable catch (TAC) for this stock (in 2001-2003 the TAC has been set to 29,200 t) and, in 2003 extended it to 2004. The Committee noted that reported catches have not exceeded the TAC in 2004. Also the total catch by Chinese Taipei, South Africa, Brazil and Namibia (21,640 t) did not exceed the 27,500 t catch limit of parties actively fishing for southern albacore [Res. 02-06]. Japan adhered to its by-catch limit of 4% of the total catch of bigeye tuna in the Atlantic Ocean [Rec. 03-06]. However, the Committee is unable to assess whether or not these catch limits have had a direct effect on the stock.

Mediterranean

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

ALB-5. Management recommendations

North Atlantic

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

South Atlantic

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

Mediterranean

There were no management recommendations for the Mediterranean stock.

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY			
	North Atlantic[1]	**South Atlantic**[2]	**Mediterranean**
Current (2004) Yield	25,460 t[5]	22,468 t	4,847 t
Maximum Sustainable Yield	32,600 t (32,400-33,100)	30,915 t (26,333-30,915)	Unknown
Replacement Yield (2004)	Not estimated	29,256 t (24,530-32,277)	Not estimated
Relative Biomass[3]			
$B_{current}/B_{MSY}$	0.68 (0.52-0.86)	1.66 (0.74-1.81)	Not estimated
Relative Fishing Mortality[3,4]			
$F_{current}/F_{MSY}$	1.10 (0.99 - 1.30)	0.62 (0.46-1.48)	Not estimated
$F_{current}/F_{MAX}$	0.71 (0.66 - 0.78)	--	Not estimated
$F_{current}/F_{0.1}$	1.25 (1.14 - 1.39)	--	Not estimated
Management measures in Effect	[Rec. 98-08]: Limit number of vessels to 1993-1995 average. TAC: 34,500 t [Rec. 03-06]	[Rec. 03-07]: Limit catches to 29,200 t.	None

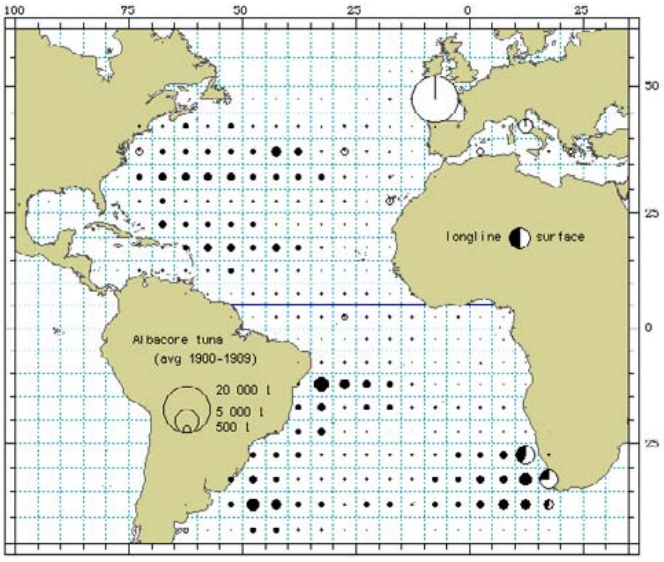
[1] VPA results based on catch data (1975-1999). 80% confidence intervals from bootstrap.
[2] ASPM results based on catch data (1956-2002). 80% confidence intervals from bootstrap.
[3] F_{1999} = North Atlantic, Geometric Mean 1996-1998.
[4] North "current" is from 2000 assessment (F_{1999}); South "current" is from 2003 assessment (F_{2002}).
[5] This figure includes reported catch, provisional catch reported to the Committee.

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

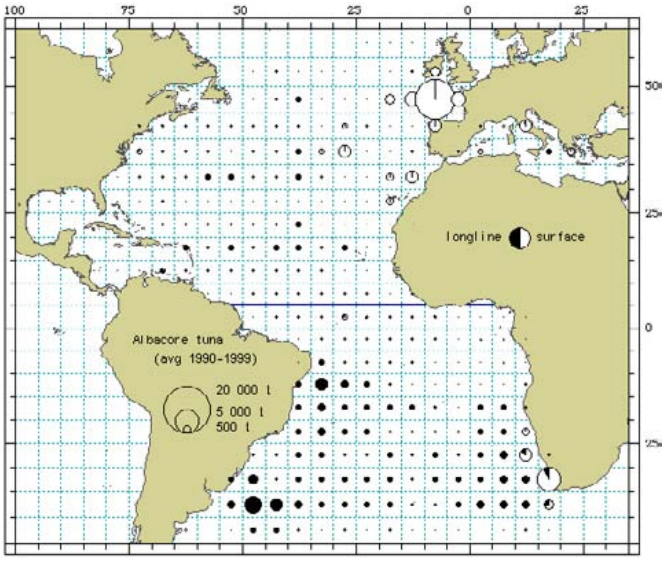
		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL		62137	60071	73617	67643	59842	76052	88554	82738	68048	63342	67167	56342	69598	73078	71614	67512	60352	59439	58880	67295	71424	70259	60023	61375	52775
	AT.N	38707	34531	42673	51490	41829	40826	47554	38115	33878	32070	36557	27938	30815	38063	35036	38295	28780	28988	25587	34840	33762	25222	22632	25516	25460
	AT.S	22930	24040	29672	14918	14599	31097	37288	40630	30107	27212	28714	25866	35918	32516	34733	27231	27898	27802	30487	27553	29266	34508	31710	27967	22468
	MEDI	500	1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	2130	1349	1587	3125	2541	2698	4851	5577	4866	5608	7893	4847
	UNCL area	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	73	0	
AT.N	Longline	9451	9819	13206	16863	19709	17413	21232	7296	3013	2228	2683	5304	3103	7020	7196	4776	4620	4044	3875	6621	6614	5975	6162	7290	6246
	Purse seine	16	0	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	118	211	348
	Bait boat	16170	13410	15857	21108	8305	12589	15202	18756	16752	15374	18625	8985	12449	15646	11967	16411	11337	9820	7562	8781	12113	6099	6639	7918	8128
	Trawl	0	1	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331	3836	1089
	Troll	13059	10778	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007	5249	7487
	* Other surf.	10	523	694	367	2231	108	213	343	994	1662	3865	3999	5173	7279	7506	3555	3337	4378	6846	7646	6119	3089	376	1013	2162
AT.S	Longline	20671	20426	25255	11941	9834	22672	29815	30964	21828	19407	21590	21859	26519	23650	24224	19718	20472	19447	19699	20588	22282	23747	21636	20603	14694
	Purse seine	464	1804	1349	699	365	182	244	948	185	0	4	416	2516	1448	1079	412	257	118	435	183	53	25	39	309	0
	Bait boat	1346	1721	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712	6973	7475
	Other surf.	449	89	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	127	0	73	58	377	323	82	299
MEDI	Longline	0	0	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	3706	4248	2345
	Purse seine	0	0	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	0	1	478	326
	Bait boat	0	900	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29	0	
	Troll	0	0	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117	0	
	Other surf.	500	600	700	700	1716	2973	3552	3782	3879	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4265	2689	2193	1755	3166	2176
UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	18	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	
	Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	
AT.N	Barbados	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5	5	
	Brasil	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	0	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113	56	27
	Canada (Japan)	0	0	0	0	0	0	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Cape Verde	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	8	20	0	0	21	16	57	196	155	32
	Chinese Taipei	7090	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4330	4557	4278
	Cuba	31	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	
	Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	0	0	
	EC.España	25202	20819	25478	29557	15685	20672	24387	28206	27557	25424	25792	17233	18176	18380	16998	20197	16323	17294	13285	15364	15965	9177	8952	12530	15379
	EC.France	3955	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4289	3641	2537
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100	755	175
	EC.Portugal	79	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953	553	513
	EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	0	0	
	FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	7	
	Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	23	46	25
	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	1036	1740	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	688	1126	713	684	1169
	Korea, Republic of	797	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0	0	
	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	120
	Mexico	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	193	177	494	357	2551	601	525	44	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	4	0	0	0	0	
	Sierra Leone	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	0	0	
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	300	1555	89
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	3	2	10	
	Trinidad	0	0	0	268	194	318	0	0	0	0	4	0	247	0	0	0	0	2	1	1	2	11	9	12	12
	U.S.A.	22	472	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	480	444	646
	U.S.S.R.	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	1	0	2	2	2	0	0	
	Venezuela	300	331	137	823	1076	467	172	26	137	41	95	319	205	246	282	279	315	49	107	91	1374	349	162	424	457
	Argentina	4	2	7	55	209	153	356	469	344	354	151	60	306	0	2	0	0	0	0	0	0	0	0	0	
AT.S	Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0	0	
	Brasil	476	276	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228	2647	522

		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	Cambodia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
	China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	89	26	30	26	112
	Chinese Taipei	18710	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17321	17351	13288
	Cuba	27	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0	0	
	EC.España	0	889	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	573	836	376	81
	EC.France	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	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433	415	9
	Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0	0	
	Japan	333	558	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	554	341	213	299	468
	Korea, Republic of	803	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0	5	37
	Maroc	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	4	8	122	68	55	63	41	5	27	0	2	10	14	53	
	Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	950	982	1199	1429	1162	2418	3419	2962	3152	3328
	Netherlands Antilles	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	167	129	210	0	0	0	280	924	0	0	0	240	129	168	213	12	22	0	3	14	0	0	0	0	
	Philippines	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	1850	2320	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507	3469	4502
	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	27	0	
	U.S.A.	0	2	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	8	2	1
	U.S.S.R.	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UK.Sta. Helena	4	7	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2	0	
	Uruguay	0	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	135	111	108	120
MEDI	EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12	30	255
	EC.España	0	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	475	404	380	126	284	152	200	209	1	138
	EC.France	0	0	0	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	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352	950	773
	EC.Italy	500	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	4032	6912	3671
	EC.Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	2	0	10
	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	
	Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0	0	
UNCL area	Maroc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	
	NEI.Other	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	
	Panama	0	0	0	0	0	0	0	0	0	0	0	0	382	210	363	289	369	58	58	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	2819	5662	18	0	

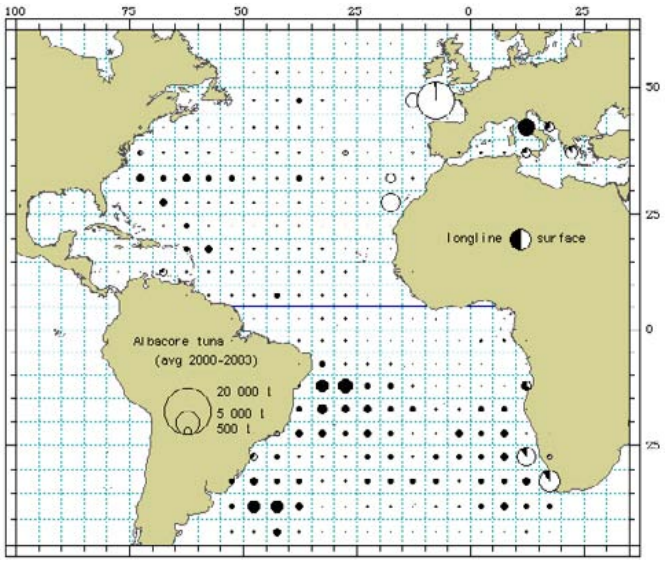
* For 2003 and 2004, most of the catch reported under "Other surf." gear were made by EC.France pelagic trawlers.



1980-1989

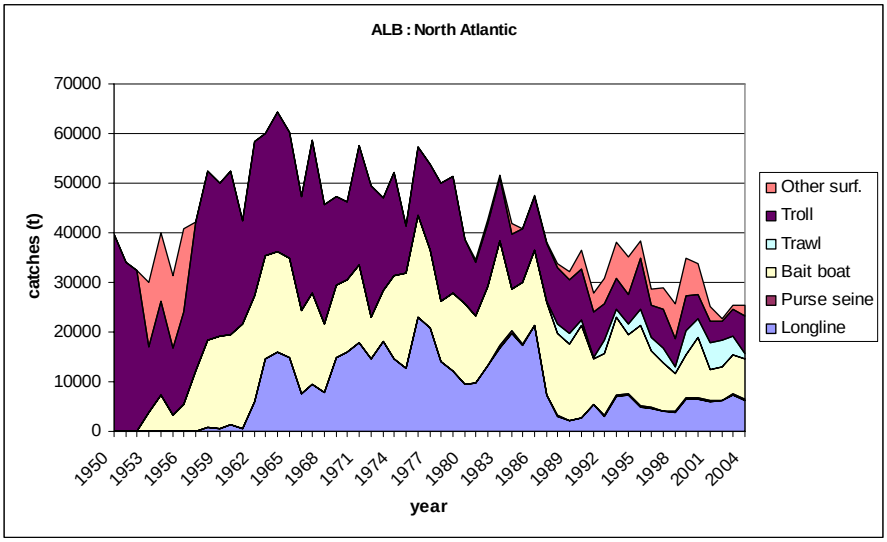


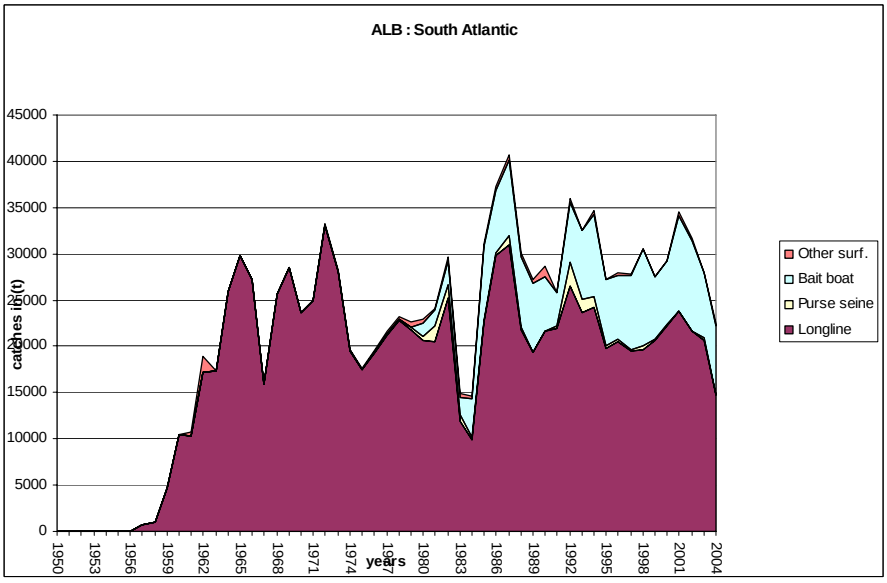
1990-1999

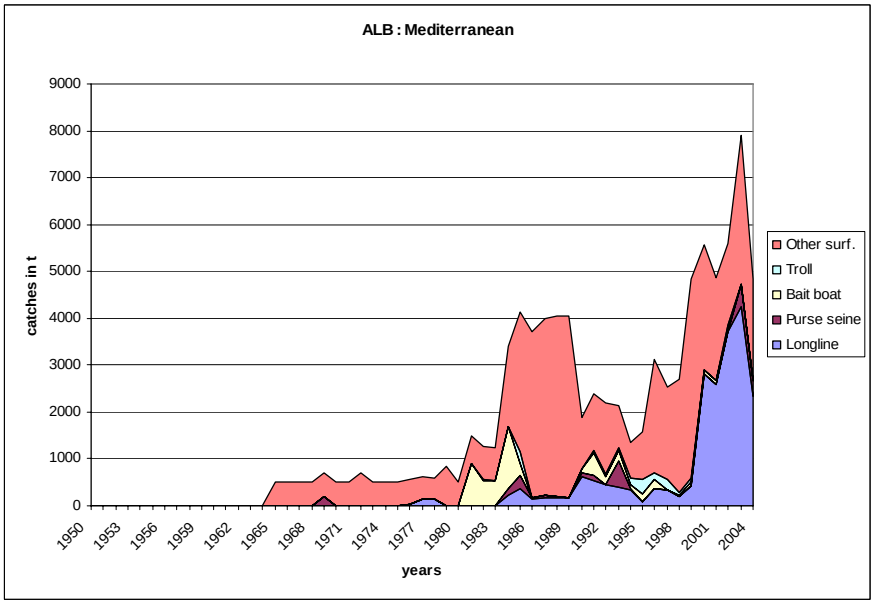


2000-2003

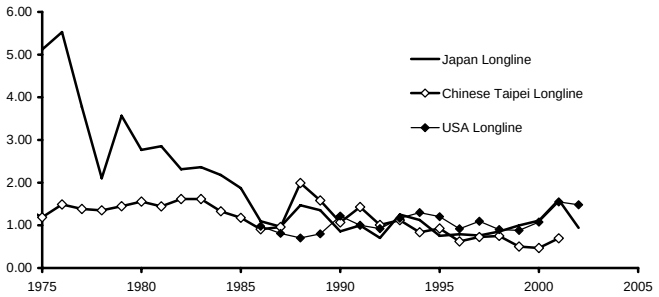
ALB-Figure 1. Average albacore catches by decade and gear group.

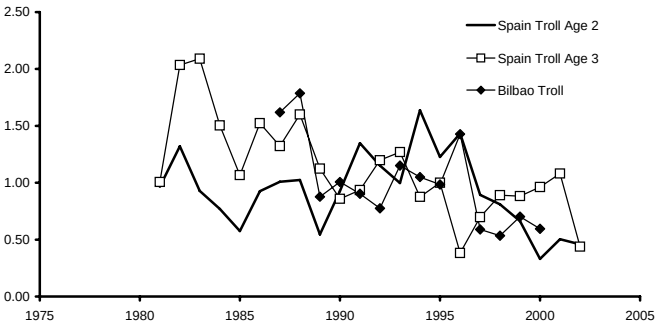


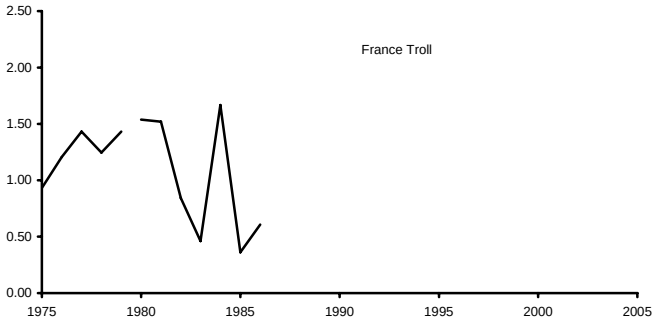


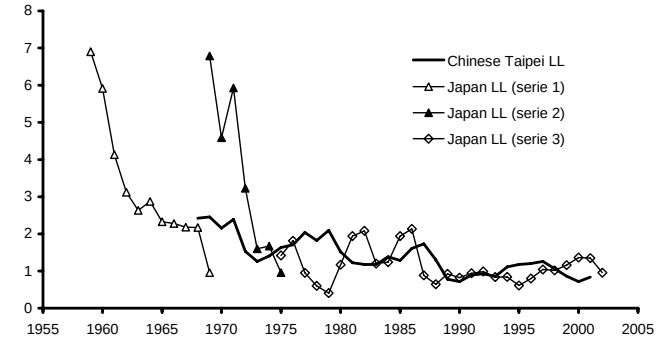


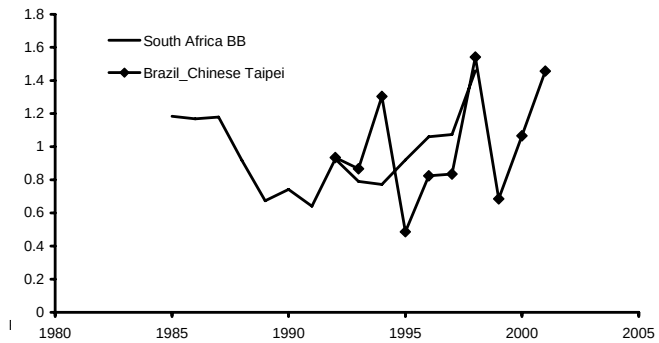
ALB-Figure 2. Albacore landings (t) by stock and major gear types, 1950-2004. Data from the Mediterranean Sea are highly uncertain and provisional in recent years.



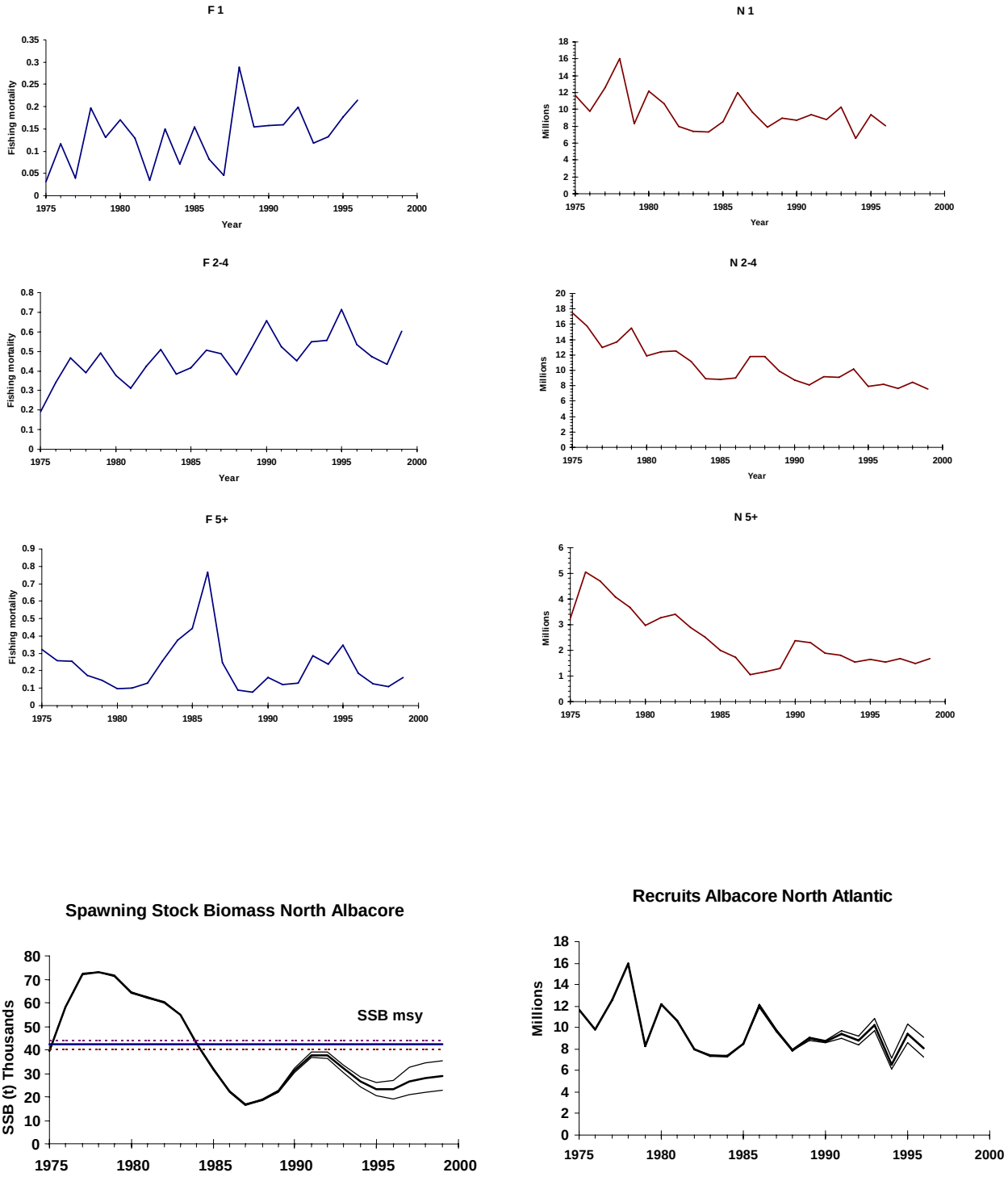




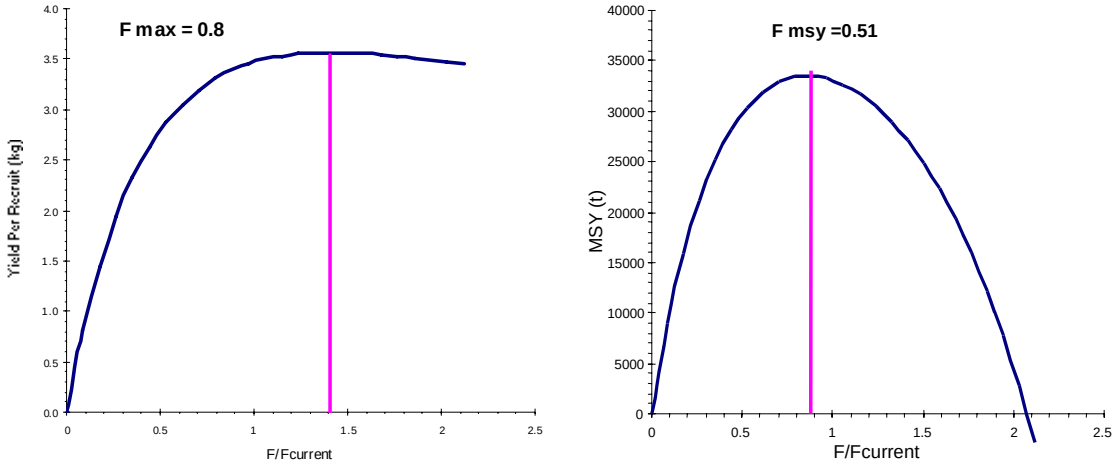




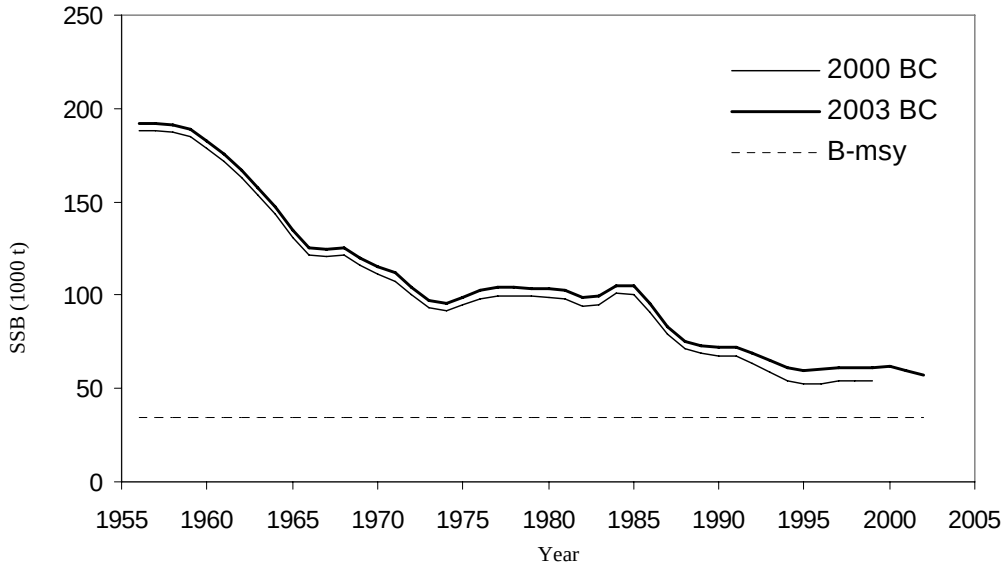
ALB-Figure 3. CPUE series for North (top 3 panels) and South Atlantic (bottom 2 panels) albacore (scaled to the means).



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



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



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

8.5 BFT – ATLANTIC BLUEFIN TUNA

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 **(BFT-Figure 1)**. The last assessments for Atlantic bluefin tuna were conducted in 2002. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic bluefin tuna should consult the report of the 2004 SCRS meeting.

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

- Section 16.4 contains recommendations regarding management issues identified by the Commission's Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies at its 2005 meeting in Japan.
- Section 16.7 contains recommendations in regards to the prioritized Bluefin Tuna Research Program that the SCRS is proposing in order to address issues identified by the Commission's Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies [Rec. 02-11].
- Anon 2005b summarizes the main findings and recommendations of the 2004 Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna. These relate to main data-related problems that the Committee identifies for the assessment of the eastern stock, namely: (i) probable misreporting of Task I data, (ii) the low proportion of size samples, (iii) the very large amount of substitutions to estimate the size composition of the various fleets for which no size samples are available, and, (iv) high uncertainties in the ageing of older age-classes.
- The bluefin research program planning and preliminary time-area closure analyses are provided in Anon 2005b.
- **Appendix 7** reports on the 2005 GFCM/ICCAT discussions on sustainable bluefin farming practices.
- **Appendix 8** summarizes the main activities and future plan for the Bluefin Year Program (BYP).

BFT-1. Biology

More than 20 scientific documents related to bluefin tuna biology were presented to the 2005 SCRS. Many of the contributions dealt with the important issue of stock structure and mixing, and new information is available for both stocks. In particular, studies of otolith microchemistry and genetics have resulted in advances in our understanding of this component of the biology of bluefin tuna. These results continue to advance our knowledge about the overlapping distribution of fish originating from the east and the west. Therefore, the SCRS continues to question present hypotheses on stock identification. While these results are promising, more complete sampling and development of appropriate analytical approaches are required. The Committee also received contributions relating to age and growth, sampling, parasitology and condition of bluefin tuna.

BLUEFIN TUNA - WEST

BFTW-2. Fishery indicators

A noteworthy pattern of change in the fisheries since 1998 has been the trend of increase followed by a trend of decrease in catches to below TAC level. The reported total catches of western Atlantic bluefin tuna increased from about 2600 t in 1998 to about 3,200 t in 2002 and has subsequently fallen below 2,000 t in 2004 **(BFT-Table 1; BFT-Figure 2)**. The 2002 catches were the highest since 1981; however the 2004 catches were the lowest since 1982, when ICCAT catch restrictions were first established.

The Japanese longline fishery catch in the West Atlantic in 2003 was a substantial decrease from its 2002 catch level, but increased in 2004 to a level somewhat below its average catch from 1993-2002. This variation resulted from the adjustments made by Japan for previous quota overages. The Canadian reported landings remained at relatively stable levels over the past decade. Recent declines in U.S. landings have been attributed to a general lack of availability of large fish in the fisheries off the northeastern U.S. coast for the past several years. **BFT-Table 1** provides details on country specific catches.

BFTW-3. State of the stock

The 2002 assessment results 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 was estimated, leaving the 2001 SSB at 13% of the 1975 level. The 2002 assessment also indicated that the fishing mortality rate during 2001 on the spawning stock biomass (SSB) was the highest level in the series used for the assessment.

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 future recruitment scenarios. 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 the stock is over-fished according to the Convention's objective of maintaining stocks at the MSY-biomass level) (See Summary Table).

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, those projections indicated the TAC could be increased to at least 3000 t without violating the Commission's rebuilding plan. If the high recruitment scenario is valid, those projections indicated the TAC should be decreased to less than 1,500 t to comply with the plan.

The Committee cautioned that the conclusions of the 2002 assessment do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Furthermore, the projected increases in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment.

BFTW-4. Effects of current regulations

In 1998, the Commission adopted a 20-year Rebuilding Program for the western Atlantic bluefin management area [Rec. 98-07] aimed at rebuilding the stock to the biomass that will produce MSY (B_{MSY}) by 2018 with a 50% or greater probability. 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 reported 2003 catches were 2,191 t. The reported catches in 2004 were about 2,000 t.

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. Since 1992, the proportion of undersized fish for all reported catches combined has been below the allowance level (e.g., 1% and 3% <115cm in 2000 and 2001, respectively). No estimates are available since that time, but will be available at the next stock assessment.

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

Current (2004) Catch[1] (including discards)	~2,000 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:	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. Fishery indicators

The reported catch for 2004 is 26,961 t, but it is incomplete and substantial revisions are expected. The Republic of Korea indicated very low landings since 1999, but has reported 700 t in 2004. The reported catch for 2003 is 28,205 t. However, information regarding size composition of catch is missing and should be provided to the Secretariat. Based on the knowledge of the fisheries and fishing conditions in 2003, the Committee was surprised by such a low value reported. A substantial amount of additional unreported catch that was not in accordance with the Commission's recommended allocation scheme has previously been recorded through the Bluefin Tuna Statistical Document program. Unfortunately, the Committee is no longer confident that this system provides an adequate basis for estimating total unreported catch levels since the markets for "sashimi" have expanded beyond that of Japan and since not all countries are reporting to the program. This and the inadequacy of the 2003 and 2004 reports clearly reinforce the skepticism of scientists regarding the veracity of basic fishery statistics for the East Atlantic and Mediterranean bluefin tuna stock. 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.

Economic gains in Atlantic bluefin tuna farming have led the private sector to continue investing 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 (see **Appendix 7** for more details) There was general agreement within the Committee that bluefin tuna farming operations in the Mediterranean Sea have significantly affected data collection, especially Task I and Task II (size) statistics, and consequently the quality of stock assessments.

BFTE-3. State of the stock

In addition to the uncertainties about basic catch statistics, 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.

Results of the 2002 assessment indicate that the SSB in 2000 was about 86% of the 1970 level (first year of data in the assessment). There appears to have been a general trend of increasing recruitment in the early 1980s followed by a period without trend. 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 results of projections of the 2002 assessment assuming constant recruitment suggest that current reported catch levels cannot be sustained in the long-term under the current selectivity pattern and current fishing mortality rate for the stock. 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 remains 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 abrupt increase of catches of large fish since 1994 is of grave concern because these levels are considered unsustainable. Furthermore, the Committee believes recent catches are substantially underreported, thus leading to the false impression of potential for improved stock condition.

BFTE-4. Effect of current regulations

Catch limits have been in place for the eastern Atlantic and Mediterranean management unit since 1998. In 2002, the Commission fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Rec. 02-08]. Reported landings for 2003 and 2004 (28,205 and 26,961 t, respectively) are clearly below that level, but the Committee strongly believes, based on the knowledge of the fisheries and caging system, that substantial under-reporting is occurring.

A number of minimum size regulations have been in place since 1975. High catch of small individuals still occurred in recent years and the Committee recommended that every effort be made so that the current measures on the size limit of 6.4 kg [Rec. 02-08] are adhered to. [Rec. 04-07] reinforces size limit regulations at 6.4 kg and 10 kg, without tolerance, in the East Atlantic and Mediterranean, respectively. Reduction of fishing on juveniles could contribute substantially to increase in both biomass and yield (see section 16.4). Also, the 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.

The enforcement of [Rec. 04-06] partially allows recovery of the size composition of fish caught by Mediterranean purse seiner fleets and put into cages.

The time closure of the whole Mediterranean Sea from 16 July through 15 August for purse seine catches and from 1 June through 31 July longline catches [Rec. 02-08] seems to be adhered to, but the Committee is not able to evaluate the effect of this measure.

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY[1]

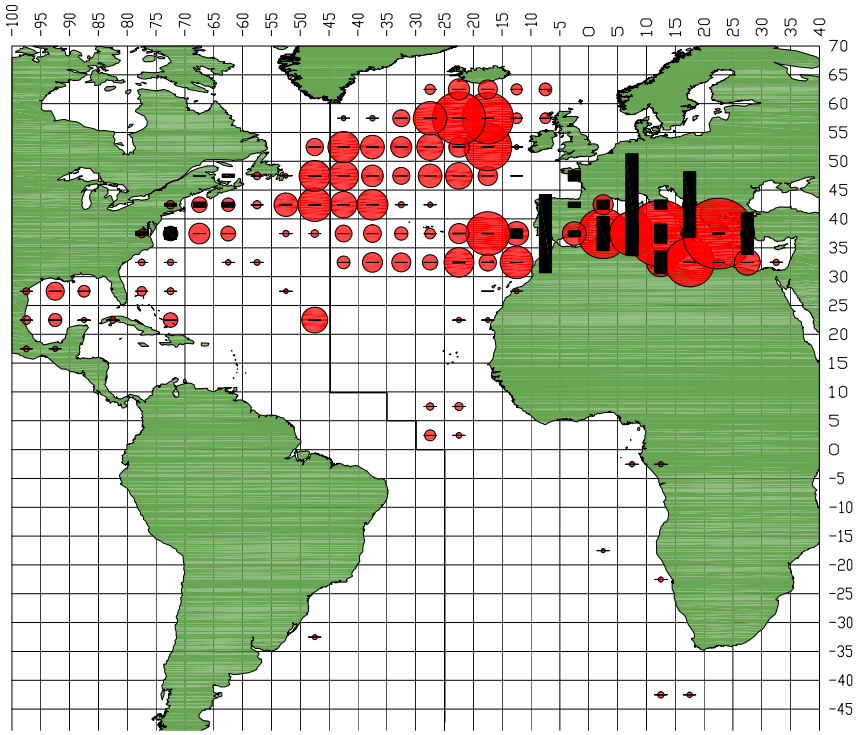
Current (2004) Yield [2]	26,961 t
2001 Replacement Yield	Not estimated
Maximum Sustainable Yield	Not estimated
Relative biomass SSB_{2000}/SSB_{1970}	0.86
Relative numbers $N_{8+,2000}/N_{8+,1970}$	0.70
Relative fishing mortality F_{2000}/F_{max}	2.4
TAC (annually, 2003-2006)	32,000 t

[1]Summary statistics are based on three runs (Trials 5, 9 and 12 in the 2002 Detailed Report (Anon 2003a)) that represent alternative model formulations.
[2]2004 reported yields are incomplete and are further suspected to be strongly under-reported.

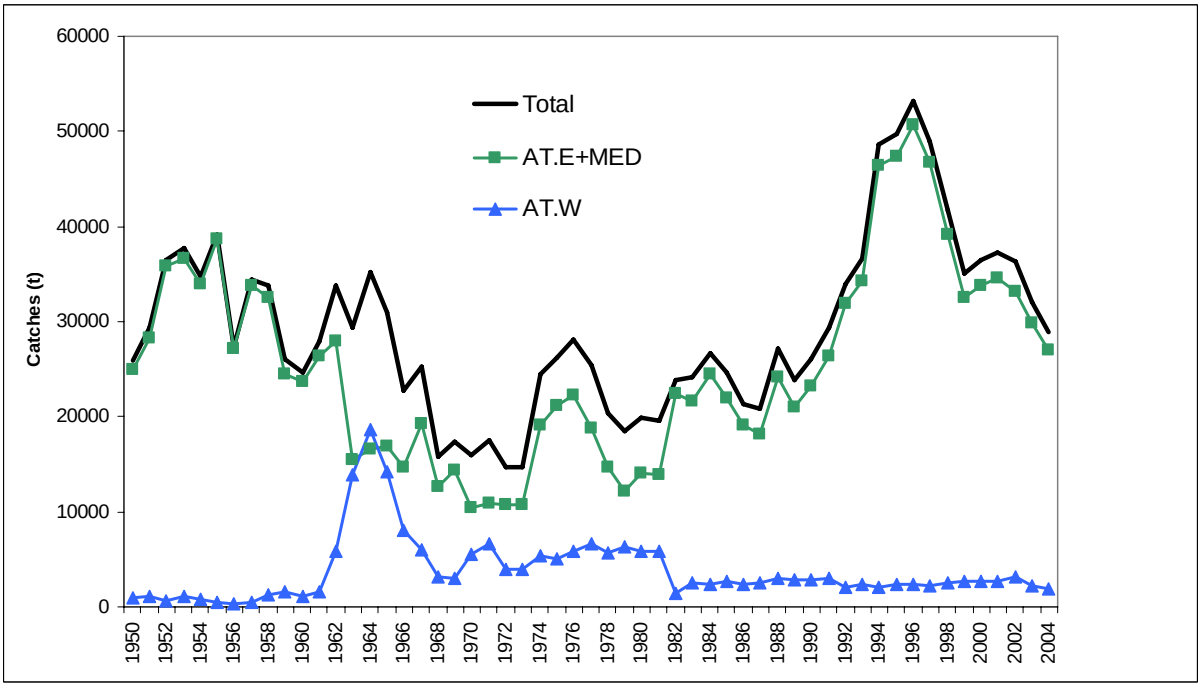
BFT-Table 1. Estimated catches (t) of northern bluefin tuna by major area, gear and flag.

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL			19904	19616	23820	24202	26717	24647	21373	20789	27128	23818	26045	29420	34012	36579	48577	49716	53163	48988	41688	35116	36417	37274	36298	31982	28889
	AT.E+MED		14103	13845	22375	21660	24425	21962	19051	18196	24117	20951	23247	26428	31897	34268	46471	47290	50762	46758	39097	32454	33752	34557	33111	29791	26961
	AT.W		5801	5771	1445	2542	2292	2685	2322	2592	3011	2867	2798	2992	2115	2311	2106	2426	2401	2230	2591	2662	2665	2718	3187	2191	1928
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E+MED	Longline	1255	917	4255	3606	2734	1763	1448	1703	2396	1974	2522	6066	6416	5059	9224	12867	12959	10206	7049	6484	7052	7052	5180	4480	3683
		Purse seine	8978	8795	12786	10746	10302	11305	9621	8857	11198	9450	11304	13291	18269	19321	26026	24046	26344	25006	21608	15636	17341	17324	18340	15260	12277
		Bait boat	1874	1653	1010	3032	4647	2644	2253	2128	2682	2683	2018	1796	1624	4048	2285	3299	5362	3542	2787	1590	2014	2426	2568	1371	1790
		HAND+RR	105	93	100	194	275	508	323	436	839	459	1553	738	951	1237	2257	3556	2105	2468	1252	1652	2032	1334	1688	1473	1297
		Traps	1251	1446	3673	3274	4507	2390	1740	1953	3658	2789	4376	2993	2186	2001	2834	1924	2522	4367	4129	3711	3735	4763	3644	2223	1239
		Other surf.	640	941	551	808	1960	3352	3666	3119	3344	3596	1474	1544	2451	2602	3845	1598	1470	1168	2272	3380	1577	1657	1691	4984	6674
	AT.W	Longline	3972	3879	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	727	228	542
		Purse seine	758	910	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208	265	32
		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
		HAND+RR	893	808	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2035	1398	1139
		Traps	47	41	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28	84	32
		Other surf.	131	133	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	110	149	97
	UNCL area	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	
Discards	AT.W	Longline	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	73	51	57	50	113	38	79	66	86
		HAND+RR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	0	0	0	0	
		Other surf.	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	0	0	
Landings	AT.E+MED	Algerie	190	220	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710	1586	1208
		Cape Verde	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	137	93	49	85	103	80	68	39	19	41
		Chinese Taipei	5	6	16	2	0	0	0	0	0	0	0	0	0	334	729	502	472	504	456	249	313	633	666	445	51
		Croatia	0	0	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977	1139	827
		EC.Cyprus	10	10	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	85	91	79	105
		EC.Denmark	0	3	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0	0	
		EC.España	2468	2601	3813	5257	7547	5090	3577	3654	5995	5210	5379	3664	4532	7096	5878	8426	8762	8047	5800	5363	6246	5867	6304	4650	5154
		EC.France	1961	2503	5028	4060	4202	5920	3838	4863	6504	4894	5223	5185	8270	8094	12179	10329	9690	8470	7713	6741	7321	6748	6565	6498	7030
		EC.Germany, Fed. Rep.	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	5	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438	422	389
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21	52	22	8	15	3	1
		EC.Italy	6272	6017	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628	4973	4686
		EC.Malta	24	32	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	240	255	264
		EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	24	17	41	174	34	29	193	163	48	3	27	395	358	208	668	481	473	749	377	487	502	468	186	63	26
		EC.Sweden	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	1	0	1	1	12	0	0	0	0	
		Ex. Yugoslavia	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	67	104	118	0	0	0	
		Guinée Conakry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	0	0	0	0	0	0	0	
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	27	0	0	1	0	
		Israel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	
		Japan	999	615	3534	3286	2550	1426	1080	1180	1427	965	1636	3066	3473	3277	2611	4784	4106	3090	3556	3071	3031	2577	2926	3011	2624
		Korea, Republic of	0	0	0	3	0	77	0	0	0	0	0	0	0	0	688	663	683	613	66	0	6	1	0	0	700
		Libya	398	271	310	270	274	300	300	300	300	84	328	370	737	635	1422	1540	1388	1029	1331	1195	1549	1940	0	0	
		Maroc	161	179	993	366	175	98	344	472	577	746	1557	1456	767	494	1812	1713	1621	2603	2430	2227	2923	3008	2986	2557	2780
		NEI.COMB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508	0	
		NEI-1	0	0	1	0	25	3	172	183	638	763	415	1754	1349	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	0	0	
		NEI.Other	0	0	0	0	0	0	0	0	0	0	0	85	144	223	495	828	242	1274	891	140	17	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Norway	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	117	48	12	0	17	22	11	76	67	0	74	287	484	467	1500	1517	3400	491	0	13	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	2	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	0	0	
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Tunisie	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	391	565	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300	3300	1075
		U.S.A.	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	2	4	0	0	0	4	0	0	0	
	AT.W	Argentina	0	0	0	0	0	6	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Brasil	2	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0	0	0
		Canada	324	425	291	433	264	142	41	50	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604	557	537
		Canada (Japan)	0	0	0	0	0	0	32	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Chinese Taipei	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	74	0	
		EC.Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	
		FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	11	
		Japan	3936	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575	57	396
		Korea, Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	10	20	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12	22	9
		NEI-1	0	0	14	1	0	0	0	0	0	30	24	23	17	0	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	2	0	0	429	270	49	0	0	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	9	14	12	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	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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

			1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
		U.S.A.	1505	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1840	1478	899
		UK.Bermuda	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	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1	0	
	UNCL area	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	
Discards	AT.W	Canada	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	6	16	11	46	13	37	14	15
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	77	51	44	39	67	25	42	52	72



BFT-Figure 1. Distribution of Atlantic bluefin catches by longline (circle) and surface gears (bars) for the period 2000-2003.



BFT-Figure 2. Atlantic bluefin catches (in t, including discards) by region.

8.6 BUM - BLUE MARLIN

No new blue marlin assessments have been conducted since 2000.

BUM-1. Biology

Seven scientific documents related to blue marlin biology were presented to the 2005 SCRS. Several of these papers analyzed data derived from satellite archival tags. The results of these studies improve our knowledge of how marlin use habitat depths and will aid in the quantification of the interactions of marlin and longline gear. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. Important advances continue to be made in obtaining data from archival tags, but it is not clear how the new information will be taken into account for the next stock assessment.

BUM-2. Description of the fisheries

The spatial distribution landings are given in **Figure BUM-1**. The fishery 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 2004 reported catches for blue marlin (2,076 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. A recent study suggests that catches of blue marlin made around moored FADs in Martinique may be important and suggests that other neighboring islands are also making similarly important catches around FADs. These nations are encouraged to monitor and report these catches.

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 2001-2004 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. Overall, catches of blue marlin are probably under-estimated.

BUM-3. State of the stock

New CPUE data are available through 2004 for the Venezuela pelagic and artisinal longline and gillnet fisheries, the Brazilian longline fishery and the US recreational and pelagic longline fisheries. Substantial progress was made in 2005, particularly at the Natal meeting, in the development of statistical and modeling methods for the analysis of CPUE data. In spite of this progress we still can not satisfactorily interpret the historic CPUE trends, especially explain the large decrease in longline CPUE of the early 1970s. Furthermore, additional analysis on the available information on relative abundance is needed to provide precise descriptions about recent trends in stock size.

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. The 2000 assessment used 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. 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}. There is uncertainty in the assessment related to the historical data that is not well quantified. Although sensitivity analyses were not meant to quantify possible biases and the results were generally within the range of uncertainty reported for the assessment, many of the runs provided more optimistic results than those reported above.

BUM-4. Outlook

There is no new information available to change the outlook as presented in the 2000 report. 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

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". 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).

BUM-6. Management recommendations

There is no new information available in 2005 to change the last management recommendations that were made in 2004. The current assessment indicates that the stock is unlikely to recover if the landings contemplated by the 1996 Commission recommendation continue into the future. The uncertainties in stock status and replacement yield estimates 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.

Not enough improvements were made during 2005 in the methods of cpue analysis for marlins. The scope of a 2006 assessment will be limited, as described in section 9.2.

ATLANTIC BLUE MARLIN SUMMARY[1]	
	Total Atlantic
Maximum Sustainable Yield (MSY)	~ 2,000 t (~ 1,000 ~ 2,400 t)[2]
2002 Yield	2,626 t
2003 Yield	2,713 t
2004 Yield[4]	2,076 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.

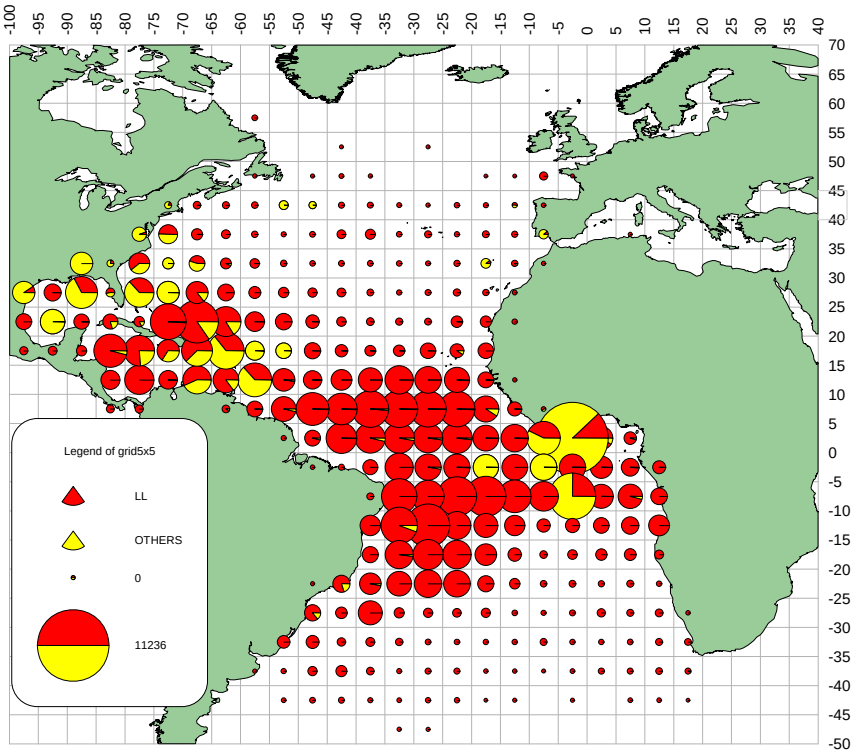
BUM-Table 1. Estimated catches (t) of Atlantic blue marlin by major area, gear and flag.

			1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL			1848	2032	2708	2130	2748	3311	1993	2053	2736	4214	4520	4128	2947	3001	3946	3802	4559	5041	3927	3836	3757	3037	2626	2713	2076
		AT.N	1085	1296	1650	1214	1378	1566	1069	836	909	1540	1943	1411	1081	1057	1510	1446	1742	1711	1489	1248	1101	551	516	641	596
		AT.S	619	567	884	749	1252	1623	789	1085	1690	2530	2378	2580	1750	1798	2303	2229	2607	3073	2299	2430	2335	2276	1975	1745	1481
		UNCL area	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	211	134	327	0
Landings	North	Longline	643	792	1162	809	920	1223	695	327	415	1009	1597	981	629	600	1065	925	1266	1227	950	752	664	331	391	451	448
		Sport (HL+RR)	301	300	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17	19	25
		Other surf.	140	204	189	206	252	174	160	190	184	197	136	225	223	217	212	292	214	331	432	377	341	176	60	151	86
	South	Longline	498	430	822	533	975	1362	661	964	1530	2017	1958	2280	1473	1415	1643	1565	1991	2250	1517	1524	1485	1284	899	1220	895
		Sport (HL+RR)	2	2	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	0	0	
		Other surf.	119	135	60	216	276	260	127	121	159	512	418	299	277	382	658	662	605	753	780	904	850	991	1076	524	586
	Uncl	Longline	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.	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	210	257	139	158	321	210	130	327	0
Discards	North	Longline	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37	19	33
		Sport (HL+RR)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	11	0	1
	South	Longline	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	1	0	0	
Landings	North	Barbados	73	117	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	0	0	
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	15
		Canada (Japan)	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, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	48	41	51	79	133	9	31	15	17	10
		Chinese Taipei	160	98	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	48	66	46
		Cuba	162	178	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	69
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	0	0	
		EC.España	0	0	0	0	3	4	1	0	8	7	2	1	7	7	6	1	22	5	6	3	25	8	1	6	27
		EC.Portugal	0	0	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1	31	27
		Grenada	1	1	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	69	72	45
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	
		Japan	193	332	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	442	155	125	158	168
		Korea, Republic of	48	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50	70	90
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	0	0	
		Netherlands Antilles	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	
		Philippines	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	1	1	5	0	0	5	5	5	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	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	4	1	0	10	5	0	18	17
		Trinidad and Tobago	0	0	0	3	8	3	17	2	0	28	4	6	4	3	27	46	21	81	70	33	55	17	16	4	11
		U.S.A.	313	342	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17	19	24
		U.S.S.R.	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	4	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	2	2	2	2	
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	
		Venezuela	81	106	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	108	72	76	84	26
	South	Benin	0	6	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	0	0	
	*	Brasil	23	28	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387	577	195
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	25	21	27	41	68	15	61	73	72	49
		Chinese Taipei	129	104	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	246	253	269
		Cuba	187	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	0	0	

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Côte D'Ivoire	0	0	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	78	109	115
		EC.España	0	0	0	0	0	0	0	0	0	15	0	6	23	18	21	38	88	71	82	109	116	86	27	6	24
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	1	0
		Gabon	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	119	129	52	216	166	150	16	5	7	430	324	126	123	236	441	471	422	491	447	624	639	795	999	415	470
		Japan	115	136	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	180	155	311	359
		Korea, Republic of	46	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	0	0	
		NEI (ETRO)	0	0	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	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	38	0	0	0	
		Philippines	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	35	0	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	1	4	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	1	0	
		U.S.S.R.	0	1	0	0	0	7	16	22	32	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	
	Uncl	Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	38	55	56	0	3	
		Dominican Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0	207	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France+España	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	0	0	0	
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	122	59	37	187	131	130	110	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	
Discards	North	U.S.A.	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49	19	35
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	South	U.S.A.	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	1	0	0	

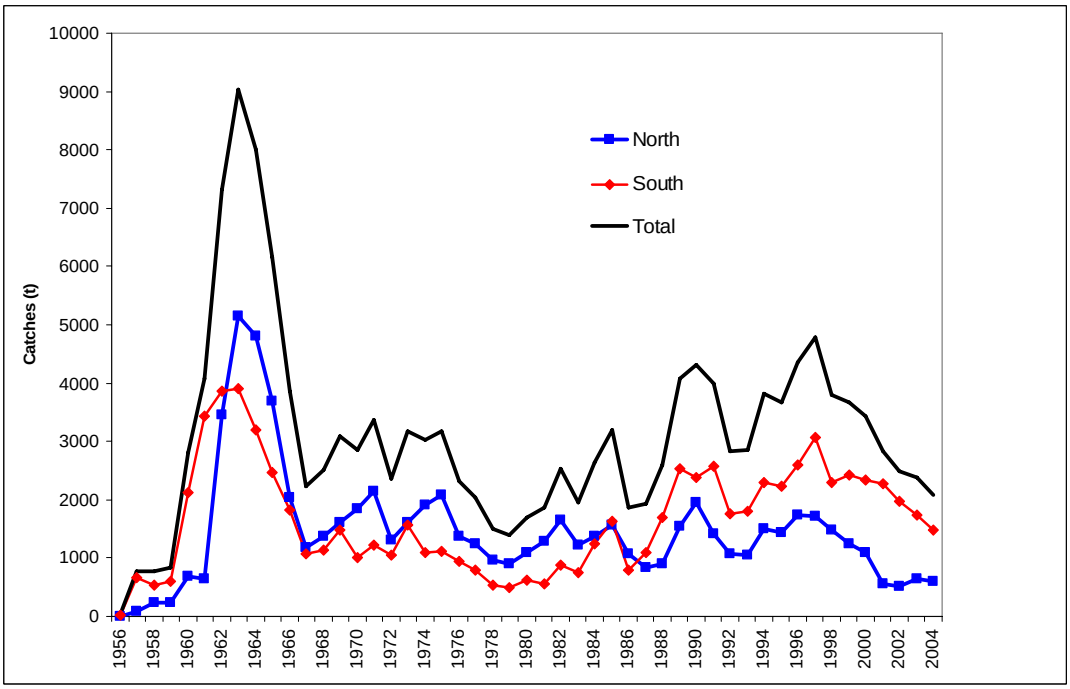
Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).

* Includes live discards.



BUM - 1956-2003

BUM- Figure 1. Geographical distribution of reported catches of blue marlin for the period 1956-2003.



BUM-Figure 2. Estimated catches (including landings and dead discards in t) of blue marlin in the Atlantic by region (1950-2004).

8.7 WHM - WHITE MARLIN

The last assessment for white marlin was conducted in May 2002.

WHM-1. Biology

Three scientific documents related to white marlin biology/behavior were presented to the Data Preparatory Meeting in May 2005. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. Some important advances have been made form the PSAT tagging researches and aging studies. Post-release survival studies concluded that white marlin can generally survive the trauma of capture on long-line gear (63%-89.5% survival rate) and suggest that current management measures requiring the release of live white marlin will reduce fishing mortality on the stock. Spawning grounds in the western north Atlantic were confirmed by results gathered during larval sampling studies. Two additional papers analyzed data derived from satellite archival tags. The results of these studies improve our knowledge of how marlin use habitat depths and will aid in the quantification of the interactions of marlin and longline gear.

WHM-2. Description of the fisheries

The spatial distribution landings are given in **Figure WHM-1**. Landings for the total Atlantic fluctuated between 1,000 to 2,000 t through 1999. Catches have been less than 1000 tons since 2000 **(WHM Figure 2, WHM-Table 1)**. The 2004 preliminary reported catches were 532 t, slightly decrease from 2003. In the 2002 assessment (Anon 2003), 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. Reported 2004 catches by Brazil are substantially lower than those reported for previous years. This decrease is the result of the implementation of the ICCAT recommendation to release live marlins that led to a ban on marlin sales, the imposition of compulsory on-board observers and a reduction of longline effort. 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 2001-2004 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. Overall, catches of white marlin are probably under-estimated.

WHM-3. State of the stock

New standardized catch rate information was presented in 2005. Standardized catch rate from US long-line and recreational fisheries in the northwest Atlantic and Gulf of Mexico and, standardized catch rates from the Venezuelan long-line fishery in western central Atlantic an in Caribbean Sea were updated. New standardized catch rates were estimated for the Venezuelan artisanal surface gear. Substantial progress was made in 2005, particularly at the Natal meeting, in the development of statistical and modeling methods for the analysis of CPUE data. In spite of this progress we still can not satisfactorily interpret the historic CPUE trends. Furthermore, additional analysis on the available information on relative abundance is needed to provide precise descriptions about recent trends in stock size.

The last assessment was conducted in 2002 when the data available was not informative enough to provide an estimate of stock status with certainty. However, the previous three white marlin assessments, 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 last two assessments, made in 2000 and 2002 lead to similar estimates of MSY and $B_{MSY.}$ To evaluate the uncertainty and sensitivity of the assessment to data and model inputs, the Committee considered alternative models and data set combinations. The uncertainty in the estimates of population parameters remains large and not well quantified; the calculated uncertainty underestimates the real uncertainty on these parameters.

WHM-4. Outlook

There is no new information available to change the outlook as presented in the 2002 report. 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". 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 not enough data are yet available to evaluate the effect of this last recommendation on stock status of white marlin.

WHM-6. Management recommendations

Management recommendations here are the same as those made in 2004. While there is substantial uncertainty in stock status and replacement yield, these uncertainties can only be addressed through research. The Committee suggests that the Commission makes substantial investment on research to help produce 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.

Not enough improvements were made during 2005 in the methods of CPUE analysis for marlins. The scope of a 2006 assessment will be limited, as described in Section 9.2.

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	615 t	--		--
2004 Yield[5]	532 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 2004, which is likely an underestimate of total catch.

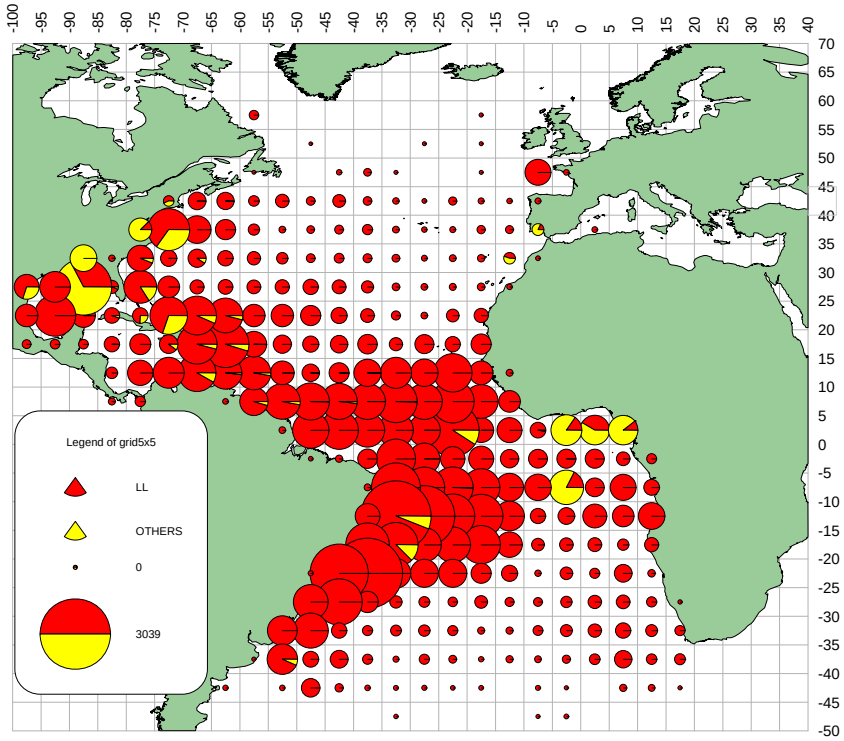
WHM-Table 1. Estimated catches (t) of Atlantic white marlin by major area, gear and flag.

				1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL				976	1241	1100	1772	1200	1727	1611	1491	1352	1805	1626	1589	1437	1523	1965	1577	1708	1094	1069	1028	961	642	822	615	532
	AT.N			521	750	605	1280	653	860	905	587	406	368	393	235	610	565	657	617	628	407	385	382	362	291	264	205	190
	AT.S			428	460	463	461	525	844	680	879	921	1409	1196	1343	817	946	1297	951	1073	676	676	634	579	350	557	392	343
	UNCL area			27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	11	21	1	1	18	0
Landings	AT.N	Longline		403	671	548	1196	570	788	812	433	167	234	251	105	466	436	528	451	514	316	333	301	282	248	208	177	161
		Sport (HL+RR)		112	72	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6	1	1
		Other surf.		6	7	12	5	17	29	61	54	150	11	40	21	35	34	57	48	30	49	13	18	38	22	17	10	0
	AT.S	Longline		419	340	442	308	471	825	654	870	832	1333	1152	1320	803	923	1295	945	660	589	552	623	570	327	488	388	340
		Sport (HL+RR)		0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	0	0	0	0	0	0	0	
		Other surf.		9	120	21	153	54	19	26	9	89	76	40	23	14	22	1	2	3	50	123	11	9	23	69	4	2
	UNCL area	Longline		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.		27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	11	21	0	1	18	0
Discards	AT.N	Longline		0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29	17	27
		Other surf.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4	0	0
	AT.S	Longline		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 area	Longline		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	117	11	39	17	24	29	26	43	15	41	33	25	25	0	0	0	
		Brasil		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	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2	1	2
		Canada (Japan)		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, People's Republic of		0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	6	7	10	20	1	7	4	2	1
		Chinese Taipei		105	174	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	61	15	21
		Cuba		70	189	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7	0	
		EC.España		0	0	0	0	9	14	0	0	61	12	4	8	18	15	25	10	75	71	65	88	118	43	4	19	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	5	11
		Grenada		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	8	0	33
		Japan		99	118	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	15	10	22	17
		Korea, Republic of		18	49	12	6	18	147	37	2	2	82	39	1	9	4	23	3	7	2	0	0	0	0	0	0	
		Mexico		0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	8	0	5	6	11	18	44	15	15	28
		NEI-1		0	0	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	0	0	0	0	0	0	
		Panama		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	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	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	2	5	9	6
		U.S.A.		116	78	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6	1	1
		U.S.S.R.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda		0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	
		Venezuela		113	142	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	25	72	110	55	23
	AT.S	Argentina		0	0	0	0	0	4	4	0	0	8	9	6	0	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	
		* Brasil		58	100	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407	266	80
		Cambodia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		China, People's Republic of		0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	4	5	10	1	13	19	6	6
		Chinese Taipei		145	136	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	117	89	151
		Cuba		212	116	45	112	153	216	192	62	24	22	6	10	10	0	0	0	0	0	0	0	0	0	0	0	
		Côte D'Ivoire		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	5	1	2	2	3	1
		EC.España		0	0	0	0	0	0	0	0	1	1	0	9	4	8	0	18	32	3	4	45	68	18	2	3	45
		EC.Portugal		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
		Gabon		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	0	0	
		Ghana		6	45	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2	1	1
		Honduras (observed 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		7	25	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	41	6	13	11
		Korea, Republic of		0	36	57	9	44	225	34	25	17	53	42	56	1	4	20	20	52	18	0	0	0	0	0	11	40
		NEI-1		0	0	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	0	0	0	0	0	0	
		Panama		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Philippines		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	45	0	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	2	0	

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		U.S.S.R.	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	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	0	0	0	0	0	
	UNCL area	Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	14	0	0	1	
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France+España	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	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	
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	
		Honduras (observed 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	3	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
		Uruguay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Discards	AT.N	U.S.A.	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33	17	27
	AT.S	U.S.A.	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 area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	

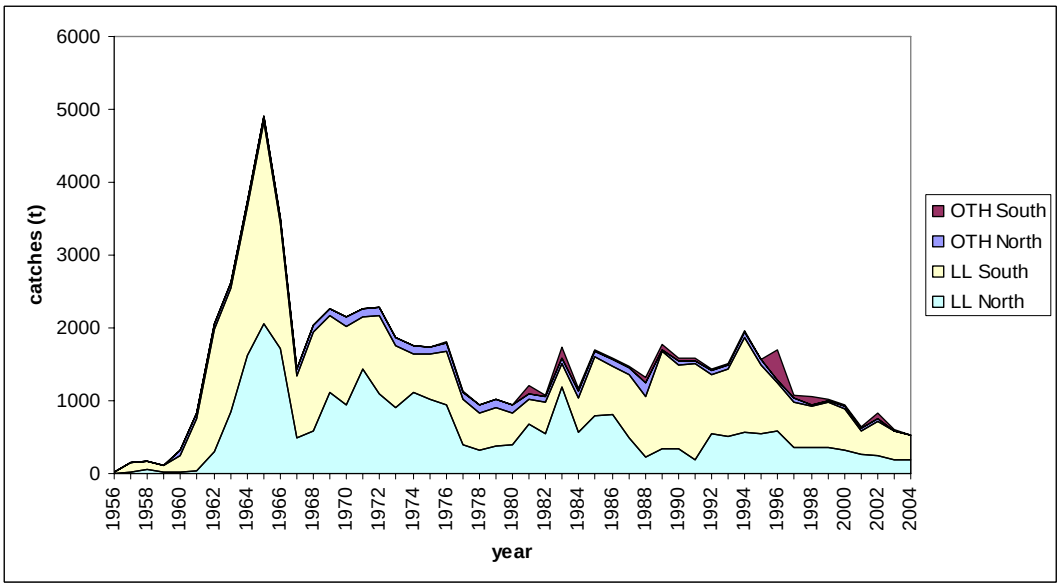
Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).

* Includes live discards.



WHM - 1956-2003

WHM- Figure 1. Geographical distribution of white marlin catches for the period 1956-2003.



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 and North Atlantic.

8.8 SAI - SAILFISH/SPEARFISH

No new sailfish or spearfish assessments were conducted in 2005.

SAI-1. Biology

Sailfish *(Istiophorus platypterus=I. albicans)* and longbill spearfish *(Tetrapturus pfluegeri)* have a pan-tropical distribution (**SAI-Figure 1**). No scientific documents related to either sailfish or spearfish biology were presented during the 2005 SCRS.

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.

SAI-2. Description of the fisheries

The recent major catches (landings plus dead discarded catch) of sailfish in both the West and East Atlantic result from the coastal fisheries. 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, the Caribbean Sea and off West Africa.

The overall trend in Atlantic catches is very much governed by the large catches from coastal fisheries off West Africa (**SAI-Figure 2**) **(SAI-Table 1)**. Recently, catches from the west are larger than those from the east. However this may be partially due to 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. Sailfish/spearfish catches for 2003 were 2,651 t with 1,320 t from the East and 1,301 t from the West. Catches for 2004, that are preliminary, were 2,167 t with 1,088 t from the East and 1,017 t from the West. Some of these catches are of spearfish because some countries continue to combine in their report the catches of these two species. No new attempts to separate the catches of these two species have been done since 2001.

Large catches of unclassified billfish continue to be reported to the Committee. The 2001-2004 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.

Mediterranean spearfish catches are generally lacking but some catches have been specifically reported since 2002. Overall, catches of sailfish, spearfish and Mediterranean spearfish are probably under-estimated.

SAI-3. State of the stocks

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

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

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

There is no new information available to change the outlook as presented in the 2001 report. It is unknown if the western or eastern sailfish stocks are undergoing over-fishing ($F>F_{MSY}$) or if the stocks are currently over-fished

($B<B_{MSY}$) and for these reasons the outlook for future conditions of the stocks are best interpreted based on the recent trends of CPUE and catch.

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. 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. 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 2004. 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 by species 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

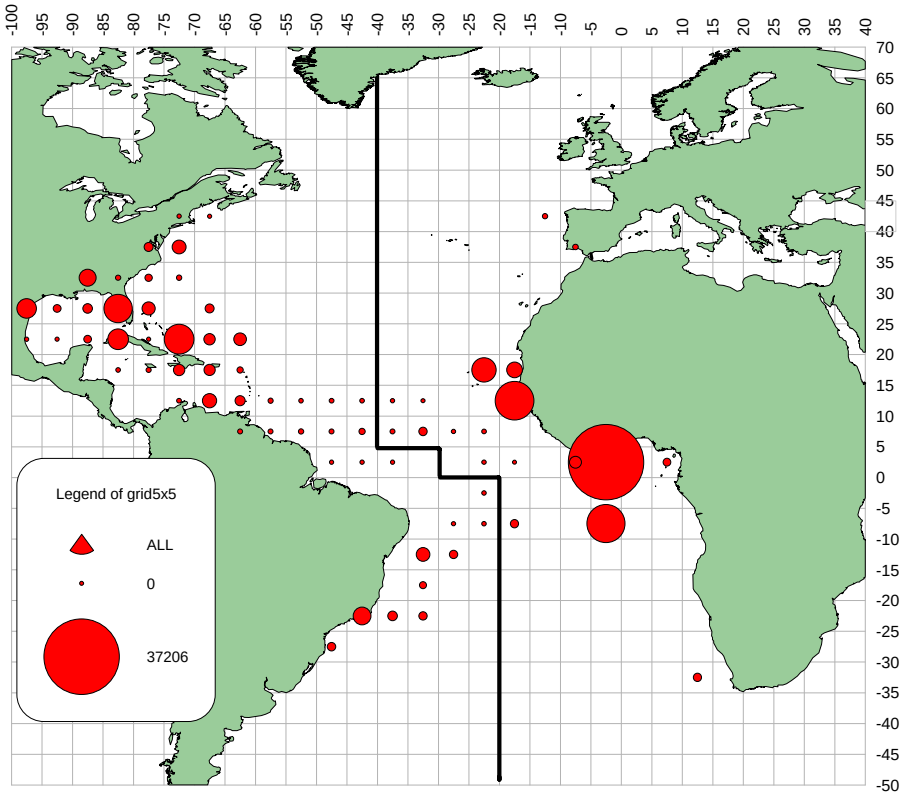
[1] Estimated yield includes that carried over from previous years.
[2] Recent yield (2000) was estimated during the 2001 sailfish assessment. To estimate the 2001-2004 yield, catches of sailfish and spearfish would have to be separated. A separation similar to the one conducted in the 2001 assessment has not yet been conducted.

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

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL			3006	3187	3995	4883	3713	3421	3386	3737	3358	2729	3540	2678	3045	3923	2471	2815	3099	2439	2884	2520	2508	2328	3097	2651	2167
	AT.E		2099	2131	2876	3687	2492	2328	2105	2566	2064	1664	2314	1482	1706	2473	1206	1559	1927	1292	995	1209	1004	1043	1088	1320	1088
	AT.W		907	1056	1119	1196	1221	1093	1281	1171	1294	1065	1225	1197	1339	1450	1265	1256	1162	1147	1888	1311	1503	1271	1977	1301	1017
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	14	32	30	62
Landings	AT.E	Longline	151	202	309	270	224	148	140	112	126	152	153	57	51	523	178	240	164	213	198	265	165	159	349	284	241
		Sport (HL+RR)	325	497	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407	0	0	0	
		Other surf.	1623	1432	1999	2911	2107	1940	1394	1870	1401	1067	1143	918	917	1117	801	732	1232	524	535	537	433	884	738	1036	847
	AT.W	Longline	360	408	471	320	512	506	489	451	558	417	382	241	371	657	552	386	346	226	1031	452	770	801	1264	855	650
		Sport (HL+RR)	368	561	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103	0	33
		Other surf.	179	87	173	141	173	274	295	187	208	238	514	521	599	498	468	484	507	503	553	615	602	401	603	440	327
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30	5	57
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	12	2	25	5
Discards	AT.W	Longline	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7
	AT.W	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 area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E	Belize (Observed 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	
		Benin	0	36	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	0	0	0	
		Cape Verde	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	5	9	4	5	11	4	4
		Chinese Taipei	5	12	67	20	8	9	1	0	0	7	13	0	0	420	101	155	65	150	117	178	120	0	124	74	33
		Cuba	79	79	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533	0	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	65	121	73
		EC.España	0	0	10	0	4	7	9	0	28	14	0	9	2	30	7	13	25	26	18	19	8	148	188	183	148
		EC.France+España	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.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	11	3	8	7	13
		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	1
		Gabon	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	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529	551	503
		Honduras (observed 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	33	50	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	17	18	51
		Korea, Republic of	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	0	0	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	11	15	10	10	10	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0	0	0	
		Senegal	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	266	138	361	263
		St. Vincent and Grenadines	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	2	4	1	1	3	1	0	0	0	0	0	0	0	
		U.S.S.R.	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	23	20	16	13	9	5	10	10	10	10	10	10	10	10	0	0	0	
		Barbados	0	0	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44	0	0	0	
		Brasil	231	64	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	598	412	547	585	534
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	9	4	3	1	0	1
		Chinese Taipei	36	81	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22	0	70	25	16
		Cuba	119	134	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	40	28	196	208	68	32	18	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
		Dominican Republic	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	81	260	91	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	6	7	5	3	36	3	15	20	6	14	277	471	196	125
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2	12	12
		Grenada	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	151	171	112
		Japan	22	44	135	22	34	38	28	6	22	22	25	73	1	2	8	2	4	17	3	10	12	3	3	8	4
		Korea, Republic of	51	41	19	0	52	72	14	1	0	17	25	0	3	0	8	8	22	8	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	19	0	9	646	40	118	36	34	45	51
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	30	30	0	0	0	0	0	0	
		Netherlands Antilles	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	0	0	131	3	86
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Trinidad and Tobago	0	0	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	0	4	3	7	6	8	10
		U.S.A.	308	533	452	734	495	282	462	454	451	324	242	343	294	202	179	345	231	349	267	163	76	58	103	0	33

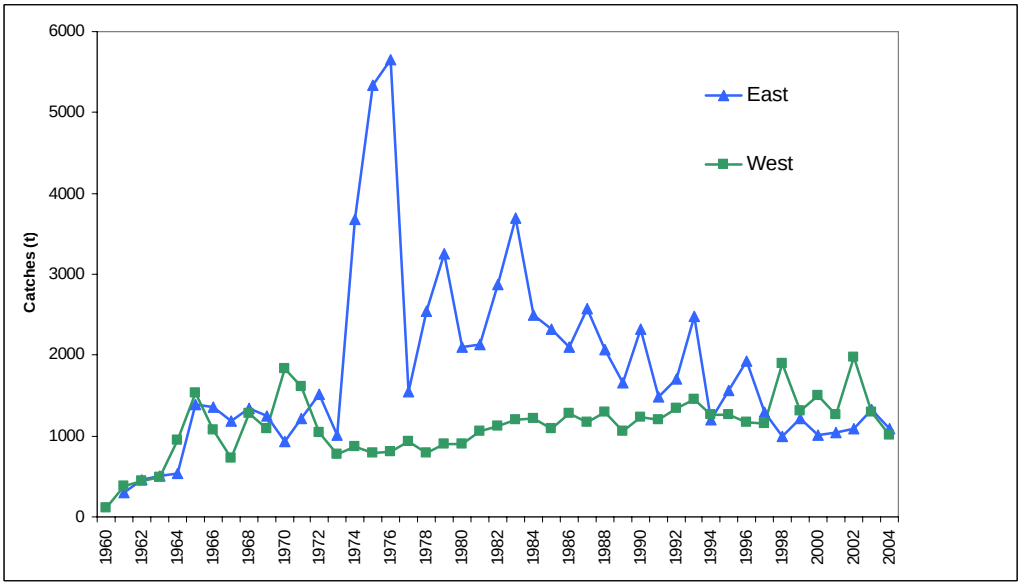
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Venezuela	58	72	57	119	81	81	77	80	22	24	24	65	71	206	162	103	165	185	258	179	93	126	159	133	24
	UNCL area	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	2	2	
		Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57
		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	5	5
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	
		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	2	30	0	
Discards	AT.W	U.S.A.	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7	5	7
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: Shaded cells were obtained from FAO-ICCAT comparative analysis (SCRS/2005/089).



SAI - 1950-2003

SAI. Figure 1. Geographical distribution of sailfish/spearfish catches for the period 1950-2003.



SAI-Figure 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 1956-2004 for the east and west stocks.

8.9 SWO-ATL-ATLANTIC SWORDFISH

The last assessment for Atlantic swordfish was conducted in 2002. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic swordfish should consult the report of the 2004 SCRS meeting (ICCAT 2005).

Other information relevant to Atlantic swordfish is presented elsewhere in this SCRS Report: Advice relevant to Resolution [02-04] is provided in Section 16. The 2006 Atlantic Swordfish Work Plan in support of the next stock assessment is presented in **Appendix 13**. Recommendations pertinent to Atlantic swordfish are presented in Section 15.

SWO-ATL-1. Biology

Five scientific documents related to SWO biology were presented to the 2005 SCRS. The results of the research presented are generally consistent with the basic assumptions used by the SCRS in the last assessment. A Workshop on swordfish stock structure is scheduled to take place in Crete in early 2006 and it is expected that research progress on this issue will be reported upon at that meeting.

SWO-ATL-2. Fishery indicators

Updated information on Atlantic swordfish catch and catch distribution is provided in **SWO-ATL Table 1** and **SWO-ATL Figures 1 and 2**.

As a result of ICCAT and domestic regulatory recommendations, there were several recent developments in the fisheries of some nations: 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; 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 the Canadian directed swordfish longline fishery has finished at the end of August from 1999-2000 due to reduced quota. Since 2002, the season was extended to November due to the introduction of an Individual Transferable Quota system. 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 which has increased efficiency per hook. One concern of all these developments is the effect on the data available, its continuity and complexity and therefore its interpretation.

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 and the newly implemented swordfish statistical document information has not yet been fully evaluated for developing these estimates.

Total Atlantic. The total Atlantic estimated catch of swordfish (North and South, including discards) reached an historical high of 38,624 t in 1995 **(SWO-ATL Table 1** and **SWO-ATL Figure 2**). The 2004 reported catch was about 25,000 t. A substantial number of countries have reported their 2004 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 12,300 t **(SWO-ATL Table 1** and **SWO-ATL Figure 2)**, and the reported landings plus discards have been below this level since 1998, in response to ICCAT regulatory Recommendations. In 2004, the provisional landings and discards of about 12,300 t represent a nearly 40% decrease in reported catches below the 1987 peak in North Atlantic landings (20,236 t). 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 2003, the 12,553 t reported catches were about 10% lower than the 2002 reported level. The reported 2004 catch is 12,779 t, and should be considered provisional and probably an underestimate.

Discards. Only the U.S. (1991-2004), Canada (1997-2004), 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

North Atlantic

The 2002 assessment indicated that 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-ATL Figure 3)**. The 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-ATL Figure 4)**, but the most recent years reports 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 and beyond 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 toward the B_{MSY} level under those catch levels. The TAC set for 2003-2005 is 14,000 t [Rec. 02-02].

Estimates of abundance of newly recruiting swordfish (age 1) gradually increased in the early 1980s, shifting to a somewhat higher level from 1985 to 1989 **(SWO-ATL 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 of South Atlantic swordfish 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.

For the 2002 assessment, 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-ATL 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.

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

SWO-ATL-4. 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 2004 **(SWO-ATL Table 1)**.

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 in 2002 were about 9,000 t and the estimated discards were about 535 t. The total allowable catch in the North Atlantic in 2003 was 14,000 t (13,900 t retained and 100 t discarded). The reported landings in 2003 were about 10,800 t and the estimated discards were about 460 t. The total allowable catch in the North Atlantic in 2004 was 14,000 t. The reported landings and discards in 2004 were about 12,300 t. Reports for 2004 are considered provisional and subject to change.

The total allowable catch in the South Atlantic in 2002 was 14,620 t. The reported landings for 2002 were about 14,000 t and reported discards were 1 t. The total allowable catch in the South Atlantic in 2003 was 15,631 t. The reported landings and discards for 2003 were about 12,300 t. The total allowable catch in the South Atlantic in 2004 was 15,776 t. The reported landings and discards for 2004 were about 12,800 t. Reports for 2004 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 2004.

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 had 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. A Workshop on swordfish stock structure is scheduled to take place in Crete in early 2006 and it is expected that research progress on this issue will be reported upon at that meeting.

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 (through 2004) CPUE analysis from the U.S. 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.

ATLANTIC SWORDFISH SUMMARY

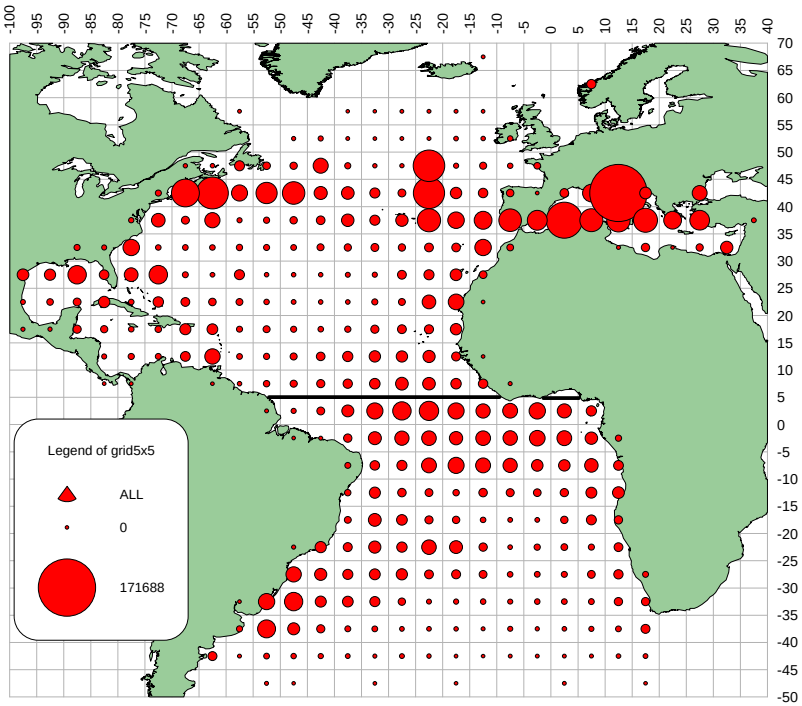
	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,340 t (11,580-15,530)[4]	Not estimated
Current (2004) Yield[2]	12,283 t	12,779 t
Current (2002) Replacement Yield[3]	about MSY	Not estimated
Relative Biomass (B_{2002}/B_{MSY})	0.94 (0.75 - 1.24)	Not estimated
Relative Fishing Mortality		
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.
[3] For next fishing year.
[4] 80% confidence intervals are shown.

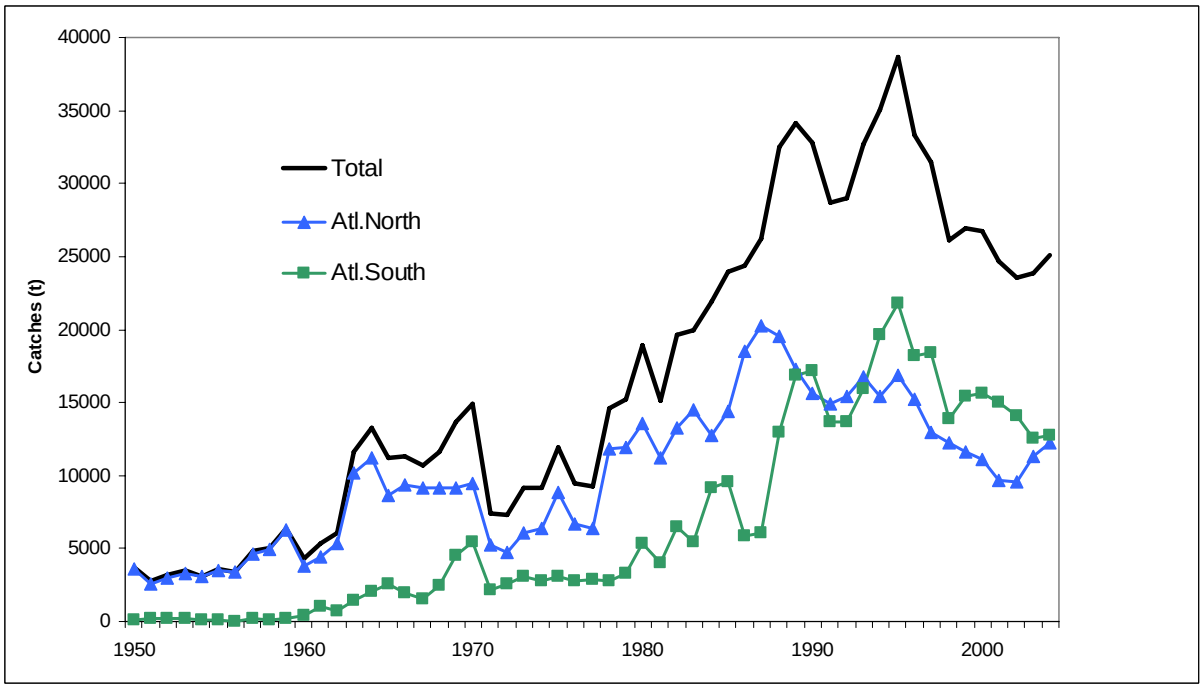
SWO ATL-Table 1. Estimated catches (t) of Atlantic swordfish by major area, gear and flag.

			1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL			18881	15155	19662	19929	21930	23969	24380	26266	32469	34098	32796	28647	29027	32659	35104	38624	33324	31432	26101	26963	26689	24690	23596	23856	25173
	AT.N		13558	11180	13215	14527	12791	14383	18486	20236	19513	17250	15672	14934	15394	16717	15475	16844	15172	12997	12195	11590	11080	9646	9552	11303	12283
	AT.S		5323	3975	6447	5402	9139	9586	5894	6030	12956	16848	17124	13713	13633	15942	19629	21780	18152	18435	13906	15373	15609	15007	14044	12553	12779
	UNCL area		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	0	112
Landings	AT.N	Longline	12831	10549	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8401	8632	9986	11550
		Other surf.	727	631	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	687	385	855	317
	AT.S	Longline	5179	3938	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13720	14819	15449	14301	13646	11760	12322
		Other surf.	144	37	103	95	219	723	943	584	552	450	419	426	460	395	2264	974	352	175	176	548	158	706	398	793	456
	UNCL area	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	0	4
		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	108
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	778	553	527	457	410
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8	5	7
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1
		Other surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	UNCL area	Longline	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	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	117	0	0	0	
		Canada	1885	561	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959	1285	1203
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90	316	56
		Chinese Taipei	134	182	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	310	257	30
		Cuba	278	227	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10	0	
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		EC.Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.España	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957	4586	5376
		EC.France	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74	169	102
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5	12	1
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC.Poland	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	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	766	1032	1320
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0	0	221
		FR-Saint Pierre et Miquelon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	39	
		Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	0	
		Grenada	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54	88	73
		Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
		Japan	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0	0	640
		Korea, Republic of	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0	0	
		Liberia	5	38	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	0	0	
		Maroc	136	124	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223	329	335
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34	32	44
		NEI-1	0	0	0	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	12	0	0	0	0	14	3	131	190	185	43	35	111	0	0	0	0	0	0	0	0	0	0	
		Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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	1	4	44	5
		Rumania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Senegal	0	0	0	0	0	0	0	0	0	1	0	6	6	0	0	0	0	0	0	0	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	
		Sierra Leone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	0	0	7	
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
		Trinidad and Tobago	0	0	0	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92	78	83
		U.S.A.	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2384	2513	2330
		U.S.S.R.	21	0	69	0	16	13	18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	5	5	3	3	2	0	0	
		Venezuela	192	24	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34	45	46
	AT.S	Angola	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Argentina	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	0	0	5	0	0	
		Belize (Observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0	0	
		Benin	0	18	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	0	0	
		Brasil	1582	655	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910	2920	2998
		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	6	0	0	0	0	
		China, People's Republic of	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	534	344	200	423	353	278
		Chinese Taipei	702	528	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1164	1254	745

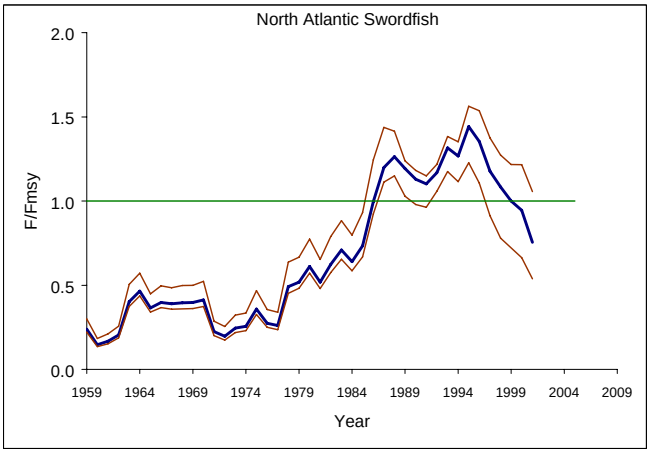
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Cuba	316	147	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0	0	
		Côte D'Ivoire	0	0	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19	43	29
		EC.España	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741	4527	5483
		EC.France+España	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.Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	0	0	
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380	354	345
		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	
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	
		Ghana	110	5	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372	734	343
		Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	
		Honduras (observed by Sta. Helena)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0	0	
		Japan	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	791	684	902	972	523
		Korea, Republic of	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2	24	70
		Liberia	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	856	439	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730	469	751	504	191	549
		Nigeria	0	0	0	83	69	0	0	0	0	0	0	0	3	0	857	0	9	0	0	0	0	0	0	0	
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	0	0	
		Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	8	1
		S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	0	0	
		Seychelles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	
		South Africa	31	9	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	240	143	328	547	649	293	295
		Togo	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	0	0	0	0	0	0	0	
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	396	160	179	142	43	200	21	15
		U.S.S.R.	154	40	26	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK.Sta. Helena	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	
		Uruguay	0	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713	789	768	850	1105
	UNCL area	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	108
		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	22	0	0	
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Discards	AT.N	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33	79	45
		Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239	239	239	102	102
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	293	263	281	270
	AT.S	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	0	0	1
	UNCL area	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	

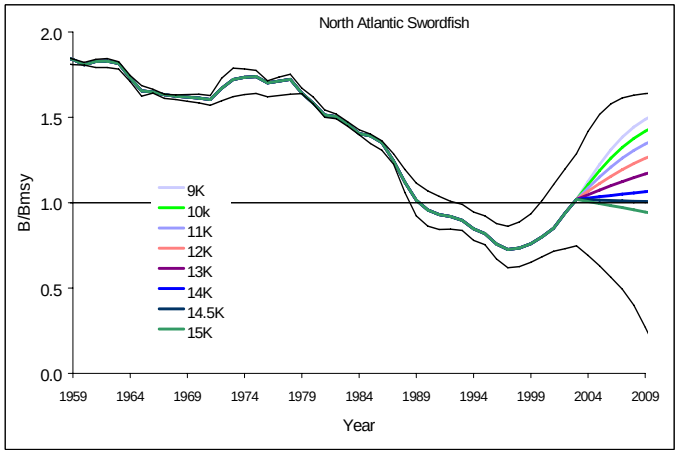


SWO-ATL Figure 1. Geographical distribution of swordfish catches for the period 1950-2003.

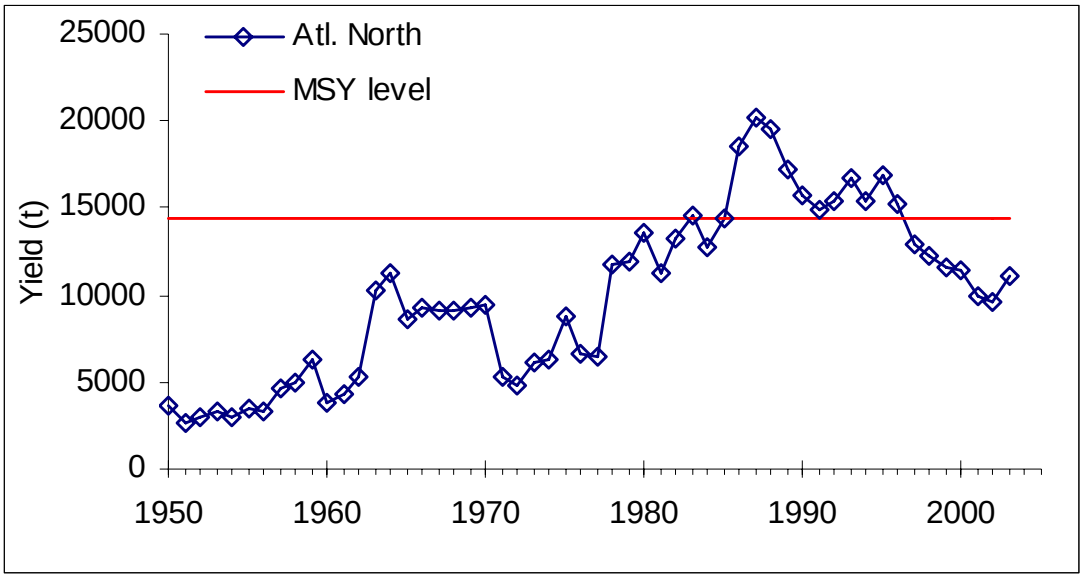


SWO-ATL Figure 2. Reported catches of Atlantic swordfish (in t), including discards for 1950-2004.

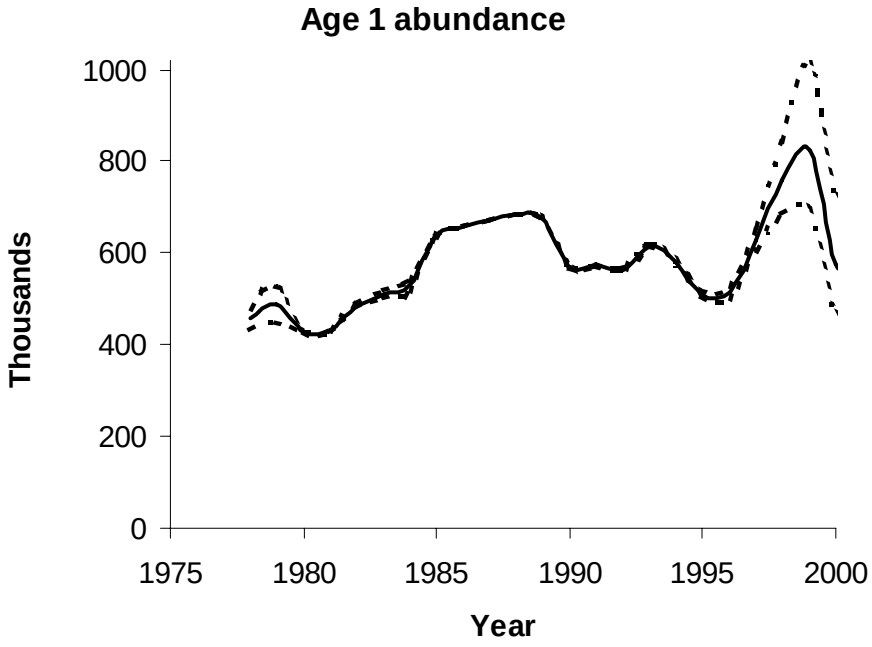




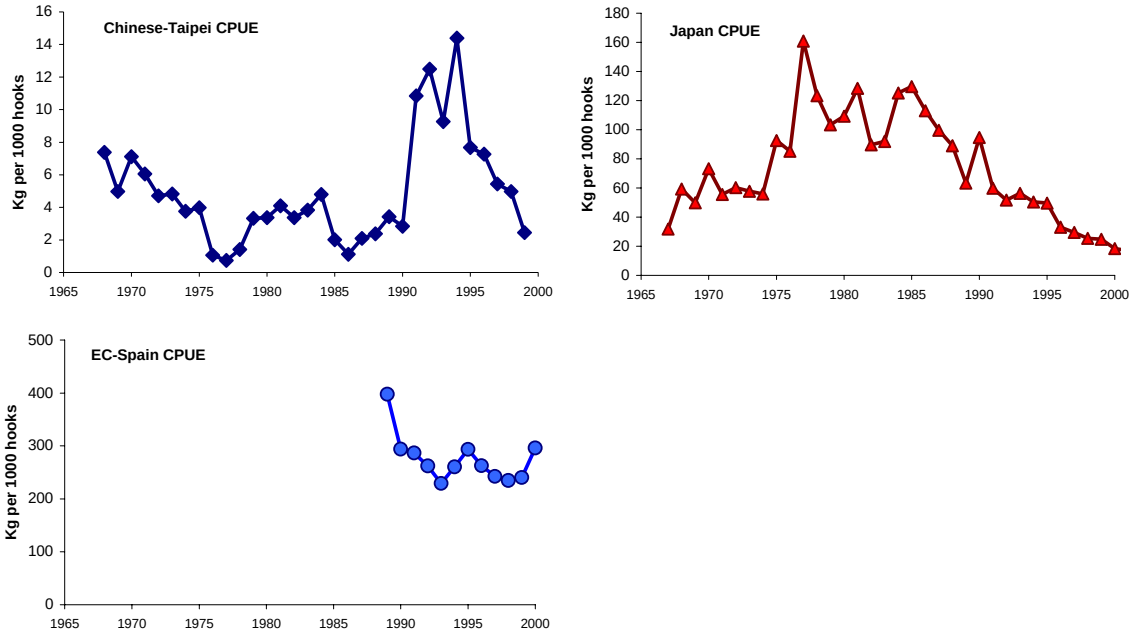
SWO-ATL-Figure 3. North Atlantic swordfish assessment results. Left panel: Estimated fishing mortality rate relative to F_{MSY} (F/F_{MSY}) for the period 1959-2001 (median with 80% confidence bounds based on bootstrapping are shown). Right panel: Estimated biomass relative to biomass at MSY (B/B_{MSY}) 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 Figure 4. Annual yield (t) for North Atlantic swordfish relative to the estimated MSY level.



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

8.10 SWO-MED – MEDITERRANEAN SWORDFISH

The most recent assessment was conducted in 2003, making use of catch and effort information through 2001. The present report focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Mediterranean swordfish should consult the report of the 2004 SCRS meeting (ICCAT 2005).

SWO-MED-1. Biology

No documents on Mediterranean swordfish biology were presented during the 2005 meetings. A workshop on swordfish stock structure is scheduled for early January 2006 and research progress on relevant aspects will be presented in future reports.

SWO-MED-2. Fishery indicators

Catch levels are rather stable in the last decade fluctuating between 12,000-16,000 t. Those levels are relatively high similar to those of bigger areas such as the North Atlantic. Updated information on Mediterranean swordfish catch by gear type is provided in **SWO-MED Table 1** and **SWO-MED Figure 1**. Total 2004 catch is estimated to exceed 13,000 t but a final figure cannot be given as the currently available Task I data do not include all Mediterranean countries. The biggest producers of swordfish in the Mediterranean Sea in the recent years are EC-Italy, Morocco, EC-Greece and EC-Spain. Also, Algeria, EC-Cyprus, EC-Malta, Tunisia, EC-Portugal and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Israel, Lebanon, Egypt, Monaco and Syria, but the data are not reported to ICCAT or FAO.

The main fishing gears used are surface longline and gillnets. Minor catches are also reported from harpoon, trap and recreational fisheries. Surface longlines are used all over the Mediterranean, while gillnets are mostly employed in Italy, Morocco and Turkey. There are also other countries known to be fishing with gillnets but not reporting their catches. However, following ICCAT recommendations for a general ban of driftnets in the Mediterranean, the size of the gillnet fleet has a clear decreasing trend.

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.

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

SWO-MED-3. State of the stocks

The 2003 assessment indicated the presence of a stable situation in terms of recruitment, and total and spawning biomass (**SWO-MED-Figures 2, 3**). These findings suggest that the current exploitation level is sustainable, in the short-term. However, the lack of sufficient historical data did not allow the determination of stock status relative to MSY benchmarks. The VPA analysis has also suggested that recent F estimates were higher than the calculated Y/R and SPR benchmarks.

The Committee noted the large catches of small size swordfish, i.e., less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches (**SWO-MED-Figure 4**). Fish less than 3 years old represent 50-70% of the total yearly catches.

SWO-MED-4. Effects of current regulations

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

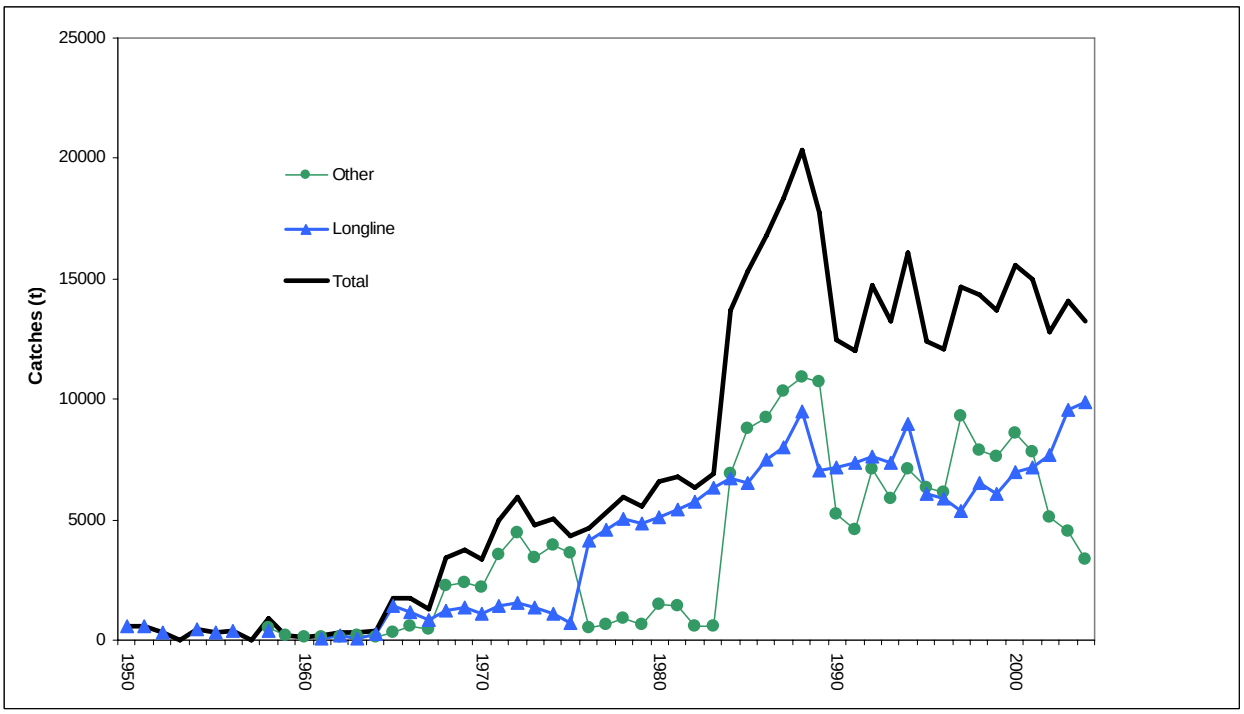
In past meetings, the Committee has reviewed the various measures taken by member countries and noted the difficulties in implementing some of the management measures, particularly that of minimum landing size.

MEDITERRANEAN SWORDFISH SUMMARY	
Maximum Sustainable Yield	Not estimated
Current (2004) Yield[1]	13,222 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.

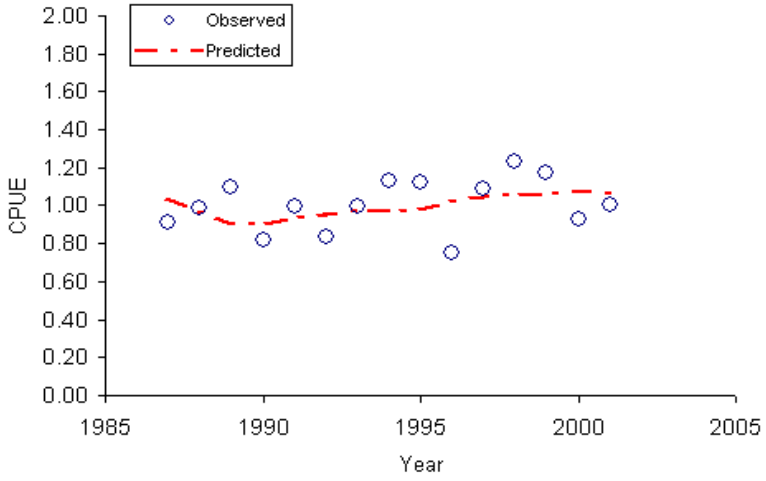
[1] Provisional, and subject to revision.

SWO MED-Table 1. Estimated catches (t) of swordfish in the Mediterranean Sea.

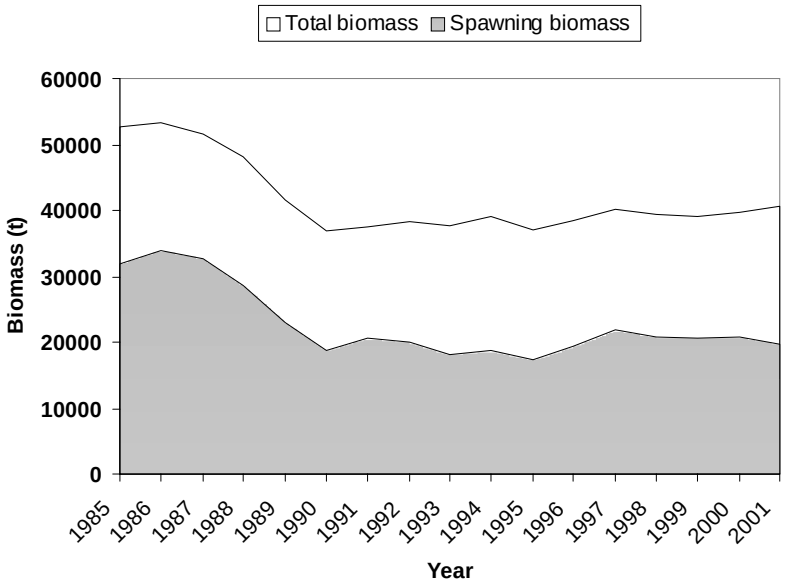
		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL		6579	6813	6343	6896	13666	15292	16765	18320	20365	17762	12441	11997	14709	13265	16082	12430	12053	14693	14369	13699	15572	15006	12803	14079	13222
Landings	Longline	5115	5418	5770	6313	6749	6493	7505	8007	9476	7065	7184	7393	7631	7377	8985	6084	5884	5389	6496	6097	6963	7180	7696	9546	9872
	Other surf.	1464	1395	573	583	6917	8799	9260	10313	10889	10697	5257	4604	7078	5888	7097	6346	6169	9304	7873	7602	8609	7826	5107	4534	3341
Discards	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Landings	Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	0	0	
	Algerie	650	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814	0	564
	Chinese Taipei	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	10	20	0	0	0	0	
	EC.Cyprus	72	78	103	28	63	71	154	84	121	139	173	162	56	116	159	89	40	51	61	92	82	135	104	47	49
	EC.España	750	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498	306	950
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27	0	19
	EC.Greece	0	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	1680	1230	1120
	EC.Italy	4143	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	6725	5286	6104	6104	6312	7515	6388	3539	8395	6942
	EC.Malta	222	192	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	257	163	195
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8	1	120
	Japan	1	0	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	4	2	1	0	0	
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	0	0	
	Maroc	0	0	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379	3300	3253
	NEI	728	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	0	0	
	Tunisie	0	7	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	1138	288	
	Turkey	13	70	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	373	360	360	350	
Discards	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9



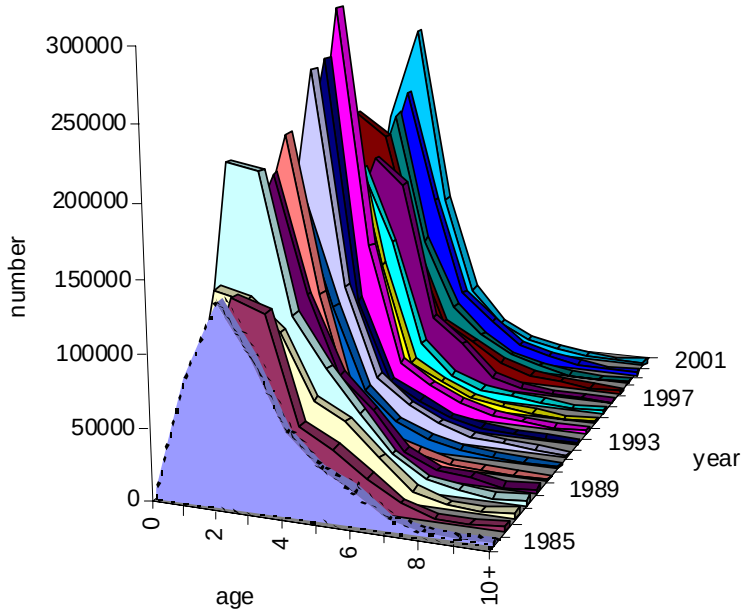
SWO-MED-Figure 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2004.



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



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



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

8.11 SBF - SOUTHERN BLUEFIN TUNA

A review of fisheries indicators was conducted by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) Stock Assessment Group during 2005, results of which are summarized below. This report also updates description of fisheries and state of stock, and provides fishery and catch information.

SBF-1. Biology

Southern bluefin tuna (*Thunnus maccoyii*) are found in 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, south-east 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 2m and a weight of over 200kg. Direct ageing using otoliths indicates that a significant number of fish bigger than 160cm 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, 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 southern bluefin tuna do not mature younger than 8 years (155cm 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.

SBF-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 81,605t in 1961 (**SBF-Figure 1**). The current (2004) total catch is about 13,490t (preliminary data), continuing a declining trend in total catches from a recent peak of 19,529t in 1999, 16,026t in 2001, 15,212t in 2002 and 14,042t in 2003. Over the period 1952 - 2003, 79% of the catch has been made by longline and 21% using surface gears, primarily purse-seine and pole&line (**SBF-Figure 1**). The proportion of catch made by 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 a wide age range of fish) recorded its peak catch of 77,927t in 1961 and the Australian surface fishery catches of young fish peaked at 21,501t in 1982 (**SBF-Figure 3**). New Zealand, the Chinese Taipei and Indonesia have also exploited southern bluefin tuna since the 1970s - 1980s, and Korea started a fishery in 1991.

On average 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-Table 1** and **SBF-Figure 2**). The Atlantic Ocean catch has varied widely between about 300t and 8,200t since 1968 (**SBF-Figure 2**), averaging about 1,000t over the past two decades. This variation in catch 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**). The Indian Ocean catch has declined from about 54,000t to 11,000t, averaging about 14,600t, and the Pacific Ocean catch has ranged from about 1,200t to 19,000t, averaging about 2,100t, over the same periods.

SBF-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 stock status was reviewed at the 10th meeting of the CCSBT Scientific Committee in 2005. Assessments using the southern bluefin tuna Operating Model suggest that the southern bluefin tuna spawning

biomass is at a low fraction of its original biomass and well below the 1980 level (**SBF-Figure 10**). The stock is estimated to be well below the level that could produce maximum sustainable yield. Rebuilding the spawning stock biomass (**SBF-Figure 11**) would almost certainly increase sustainable yield and provide security against unforeseen environmental events that might affect recruitment or productivity. Assessments estimate that recruitment in the 1990s fluctuated with no overall trend. Recruitments in the last decade are estimated to be well below the levels in the period 1950-1980.

Analysis of several independent data sources (**SBF-Figure 7** and **SBF-Figure 8**) and the operating model indicate very low recruitments in 2000 and 2001. There is some evidence that the 1999 cohort is relatively weak and that the 2002 cohort is unlikely to be as strong as the average of those estimated during the 1990s. Other indicators show that the Indonesia longline fishery on spawning fish catches fewer older individuals (**SBF-Figure 9**). One plausible interpretation is that the spawning stock has declined in average age and may have declined appreciably in abundance. The decline in average age may be due to the disappearance of older fish, a pulse of younger fish entering the spawning stock, or a combination of the two factors. A pulse of younger fish entering the spawning stock is consistent with the assessment model output which suggests that the spawning stock has been largely stable over the last decade and has increased slightly over the last four years.

Given all the evidence, it seems highly likely that current levels of catch will result in further declines in spawning stock and exploitable biomass, particularly because of recent low recruitments (**SBF-Figure 11**).

SBF-4. Current management measures

Southern bluefin tuna were 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 38,650t for the 1984/85 season. The combined quota for these three countries was maintained at 11,750t from the 1989/90 season through to 2002/03. Following increases in membership of the CCSBT (Republic of Korea, and the Chinese Taipei joined in 2001 and 2002 respectively), the CCSBT extended the following national catch limits for 2003/04 to 2004/05:

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

An additional catch limit of 900 tonnes has also been set in 2004/05 for cooperating non-members, of which 50 tonnes was allocated to the Philippines (which was recently admitted as a cooperating non-member) and 800 tonnes set aside for Indonesia should it become a cooperating non-member

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 to be accompanied by a completed CCSBT TIS Document, endorsed by an authorised 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 members and cooperating non-members. 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 metres in length which are approved to fish for southern bluefin tuna, to be completed by 1 July 2004. The list included vessels from CCSBT members and cooperating non-members. At its annual meeting in October 2004, the CCSBT agreed to expand the list to include all of the vessels, regardless of size, that are authorised to catch southern bluefin tuna. Members and cooperating non-members are required to refuse the import of southern bluefin tuna caught by vessels not on the list.

SBF-5. CCSBT management procedure

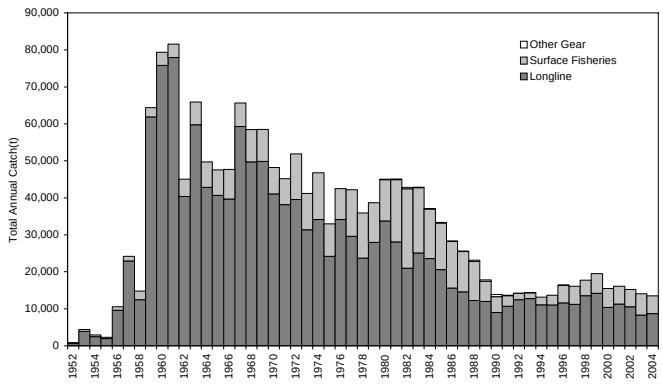
The 10th meeting of the CCSBT Scientific Committee held in 2005 finalized the development and evaluation of candidate management procedures for southern bluefin tuna, and has recommended a final management procedure, implementation schedule and initial catch reduction for consideration by the CCSBT.

SOUTHERN BLUEFIN TUNA SUMMARY (global stock)	
Maximum Sustainable Yield	Not estimated
Current (2004) Yield	13,490 t (preliminary)
Current Replacement Yield	Less than 15,000 t
Relative Biomass	SSB_{2004}/SSB_{1980} 0.14 - 0.33[1] SSB_{2004} / SSB_{K} 0.05 - 0.12
Current Management Measures	Global quota of 14,030t (Australia, Chinese Taipei, Republic of Korea, Japan, and New Zealand) plus 900 t provision for cooperating non-members.

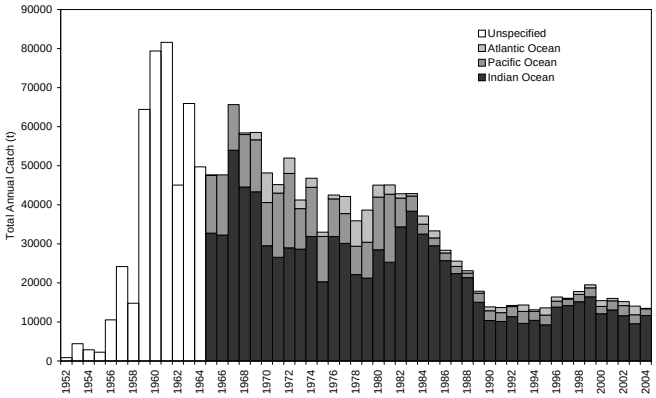
[1]Estimates calculated using the reference set operating model adopted for the development of the CCSBT management procedure; ranges indicated refer to 90% probability intervals.

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

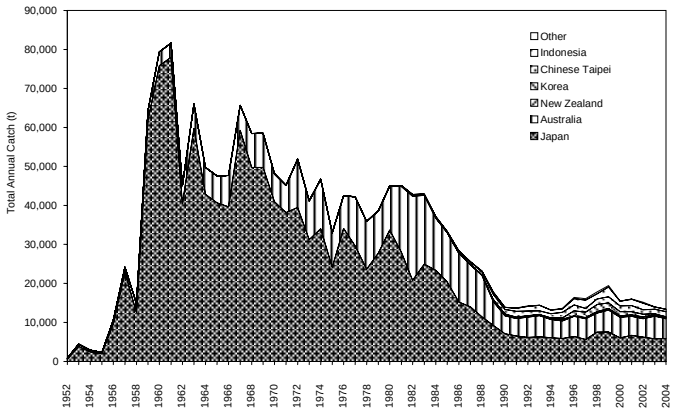
		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
Atlantic																										
	Total Catch	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2199	104
	By Gear																									
	Longline	3086	2400	1114	604	2082	1828	650	1330	602	513	1004	1313	300	1612	483	1845	1040	278	738	819	1470	640	1041	2199	104
	By Flag																									
	Japan	3086	2365	1104	573	2082	1733	434	1228	573	493	987	1080	253	1425	420	1237	1015	189	649	689	1203	327	909	1932	59
	Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	80	7	24	0	0	47	100	242	90	116	96	5
	Chinese Taipei	0	35	9	30	1	95	216	102	28	19	17	233	46	108	56	584	24	89	42	30	24	223	16	170	18
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23
Indian																										
	Total Catch	28463	25299	34347	38315	32491	29520	25735	22380	21354	15020	10400	10110	11328	9631	10429	9264	13812	14160	15137	16406	12085	13071	11570	9529	11629
	By Gear																									
	Longline	20602	17355	15139	21522	19192	16864	13165	11489	10530	9281	5781	7146	9664	8077	8319	6629	9064	9343	10942	11059	6953	8304	6887	3737	6795
	Purse Seine	107	420	5489	5083	4339	5179	6342	5411	2820	1626	2511	1034	22	536	1269	1840	3099	2991	3555	5325	5132	4767	4683	5792	4834
	Pole and Line	7754	7524	13708	11698	8960	7410	6147	5393	7770	3794	1803	1823	1639	1018	841	795	1649	1826	640	22	0	0	0	0	0
	Unclassified	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
	Gillnet	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0	0
	By Flag																									
	Australia	7860	7944	19198	16781	13299	12589	12489	10805	10590	5438	4335	3876	4568	4513	4246	3362	4893	4910	4353	5448	5147	4792	4693	5813	4836
	Japan	20526	17284	14966	21391	18935	16780	12938	10946	9754	7536	4383	4137	4238	2869	4132	3684	4248	4500	5838	5126	3370	4453	3153	1926	4652
	Korea	0	0	0	0	0	0	0	0	0	0	0	15	41	12	130	341	1320	1424	1749	1361	893	754	630	155	126
	Chinese Taipei	64	56	173	131	243	146	298	608	828	1376	1160	1227	1176	850	963	848	1442	783	1397	1483	1424	1357	1121	957	1278
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	80	17	43	79	65	58
	Indonesia	5	1	2	5	11	3	7	14	180	568	517	759	1232	1370	904	829	1614	2210	1324	2504	1203	1632	1691	564	677
	Others Unclass.	7	14	9	7	3	2	3	7	2	103	4	97	73	17	54	201	295	333	471	403	31	41	203	48	2
Pacific																										
	Total Catch	13505	17405	7327	3963	2516	1977	1934	1866	1189	2310	2467	2269	2588	3102	2241	2528	1503	1638	1901	2305	1918	2314	2602	2314	1757
	By Gear																									
	Longline	10041	8333	4719	2916	2312	1883	1810	1791	1095	2157	2183	2233	2503	3082	2234	2505	1460	1579	1857	2300	1917	2314	2601	2314	1755
	Purse Seine	1929	6332	1342	790	105	0	34	0	0	0	0	0	0	0	0	0	22	7	29	0	0	0	0	0	0
	Pole and Line	1405	2567	961	125	6	0	8	16	0	13	0	0	33	0	3	0	10	16	0	0	0	0	0	0	0
	Troll	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0	1
	Unclassified	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
	Handline	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0	1
	By Flag																									
	Australia	3335	8899	2303	914	112	0	42	16	1	680	251	613	680	860	454	1145	236	406	543	104	110	61	19	14	226
	Japan	10041	8332	4719	2916	2312	1883	1810	1791	1095	1193	1686	1260	1630	2024	1510	946	1129	898	1013	1740	1427	1894	2130	1904	1136
	New Zealand	130	173	305	132	93	94	82	59	94	437	529	164	279	217	277	436	139	334	337	461	380	358	450	390	393
	Korea	0	0	0	0	0	0	0	0	0	0	0	232	0	0	0	0	0	0	0	0	0	1	0	3	0
	Chinese Taipei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	2	2
	Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0
	Others 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	1
All Oceans																										
	Total Catch	45054	45104	42788	42881	37090	33325	28319	25575	23145	17843	13870	13691	14217	14344	13154	13637	16356	16076	17776	19529	15472	16026	15212	14042	13490
	By Gear																									
	Longline	33729	28088	20971	25042	23586	20575	15625	14609	12227	11950	8968	10692	12467	12770	11036	10979	11564	11200	13537	14177	10339	11259	10528	8250	8654
	Purse Seine	2036	6752	6831	5872	4444	5179	6376	5411	2820	1626	2511	1034	22	536	1269	1840	3121	2998	3584	5325	5132	4767	4683	5792	4834
	Pole and Line	9159	10091	14670	11823	8967	7410	6155	5409	7770	3807	1803	1823	1673	1018	844	795	1659	1843	640	22	0	0	0	0	0
	Trol	0	0	0	0	0	0	0	0	0	31	21	1	4	0	0	8	3	31	13	3	1	0	1	0	1
	Handline	130	173	305	132	93	94	82	59	94	109	263	35	48	20	4	15	8	5	2	2	0	0	0	0	1
	Gillnet	0	0	11	12	0	67	81	87	234	319	305	107	3	0	0	0	0	0	0	0	0	0	0	0	0



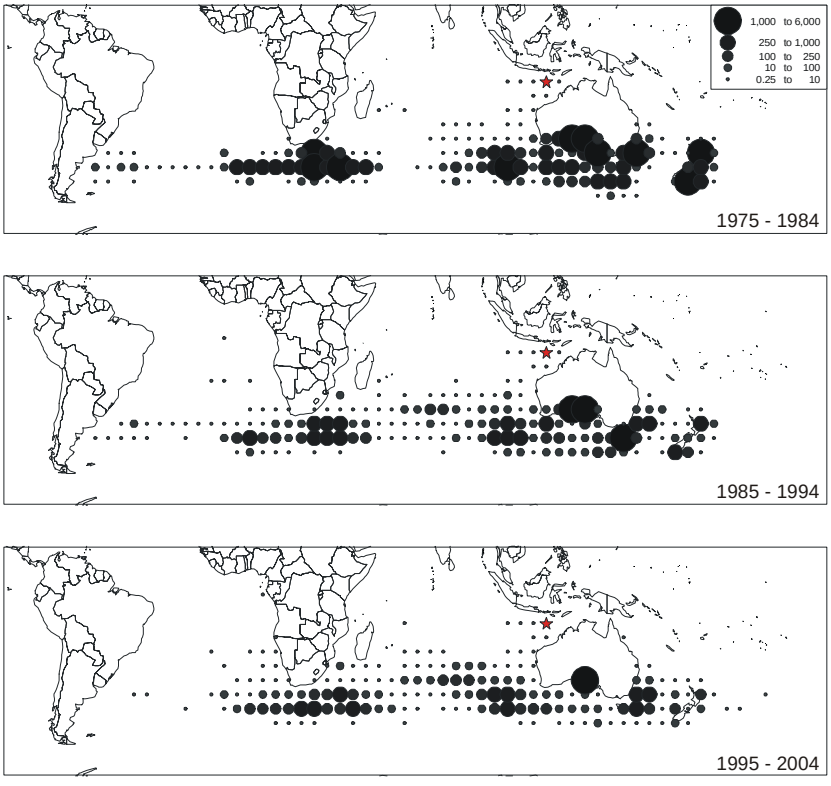
SBF-Figure 1. Global southern bluefin tuna catches by fishing gear (t), 1952 to 2004.



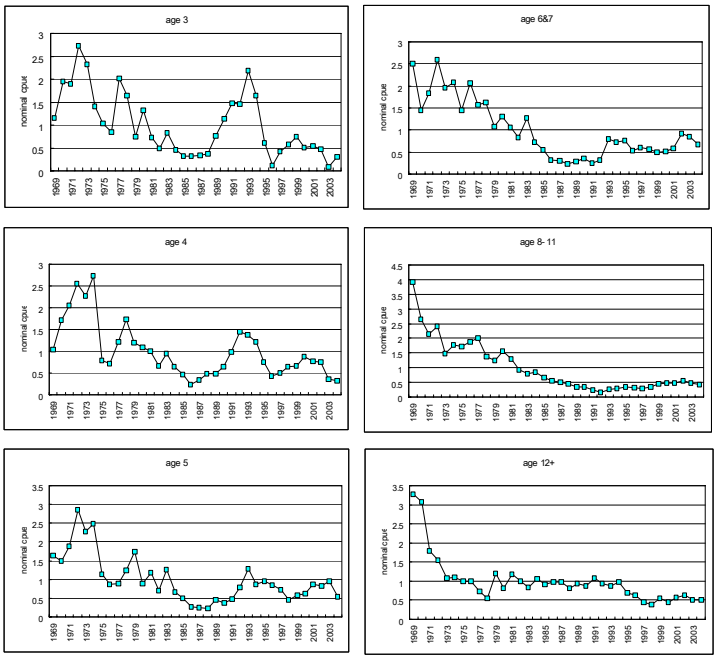
SBF-Figure 2. Southern bluefin tuna catches by ocean (t), 1952 to 2004.



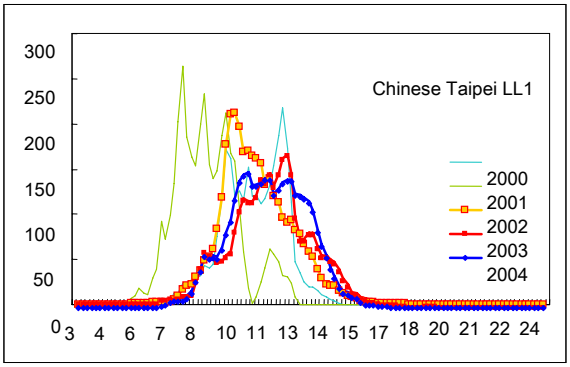
SBF-Figure 3. Total annual southern bluefin tuna catch (t) by flag, 1952 to 2004.



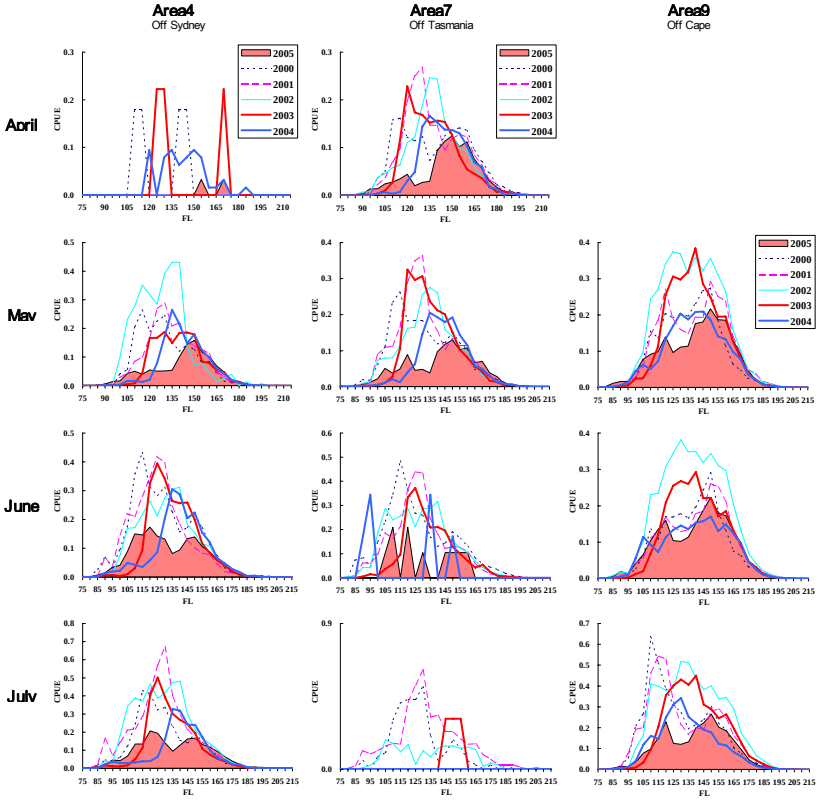
SBF-Figure 4. Geographic distribution of average annual southern bluefin tuna catches (t) by CCSBT members and cooperating non-members over the decades 1975-1984, 1985-1994 and 1995-2004 per 5° block by oceanic region. The area marked with a star is an area of significant non-member catch. Block catches averaging less than 0.25 tons per year are not shown.



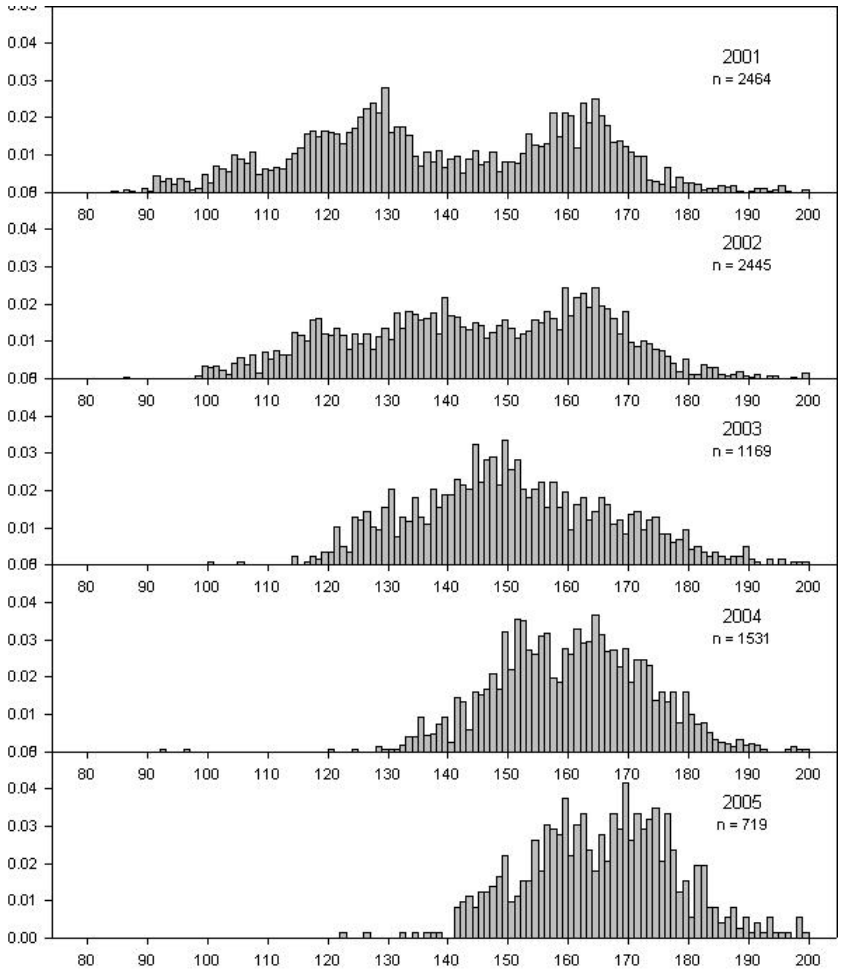
SBF-Figure 5. Trends in nominal catch rates (numbers per 1000 hooks) of southern bluefin tuna by age group (ages 3, 4, 5, 6-7, 8-11 and 12+) caught by Japanese longliners operating in CCSBT statistical areas 4-9 in months 4-9.



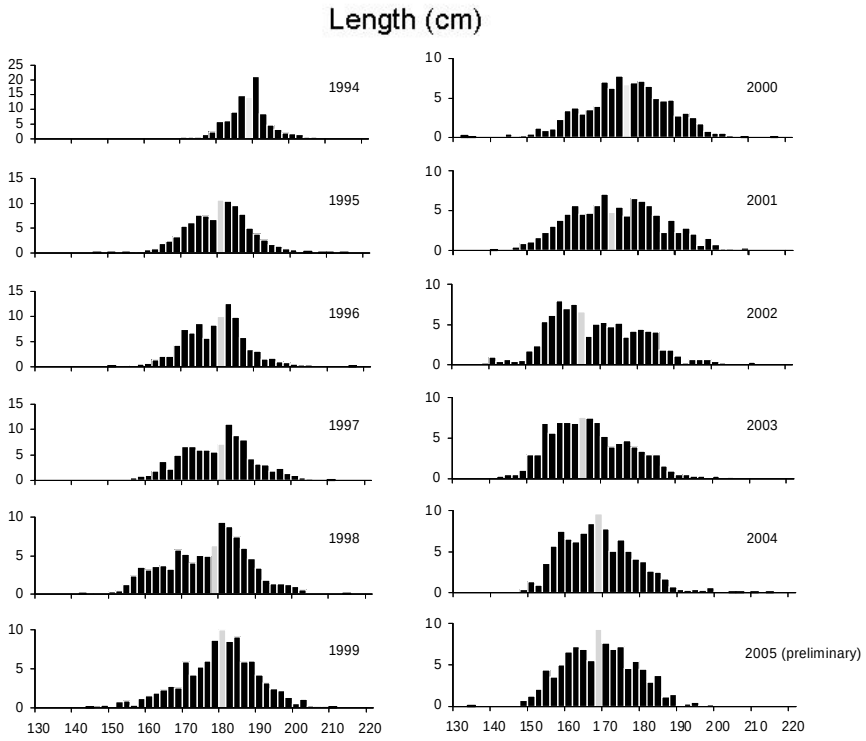
SBF-Figure 6. Changes in the size composition of the seasonal Chinese Taipei southern bluefin tuna longline target fishery (This figure may be revised in the future due to a new criterion for subdividing Chinese Taipei's catch into LL1 and LL2).



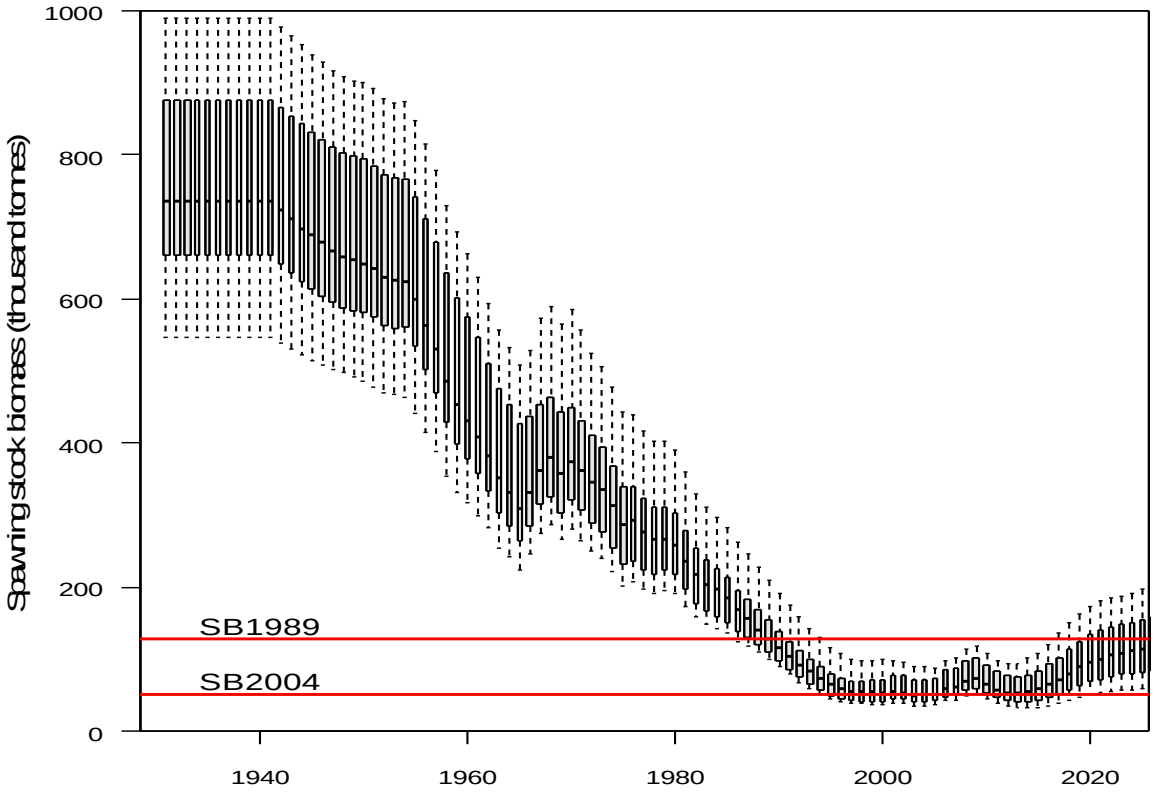
SBF-Figure 7. Size composition of nominal CPUE of Real Time Monitoring Program data for the Japanese longline fishery for five recent years, by month and area.



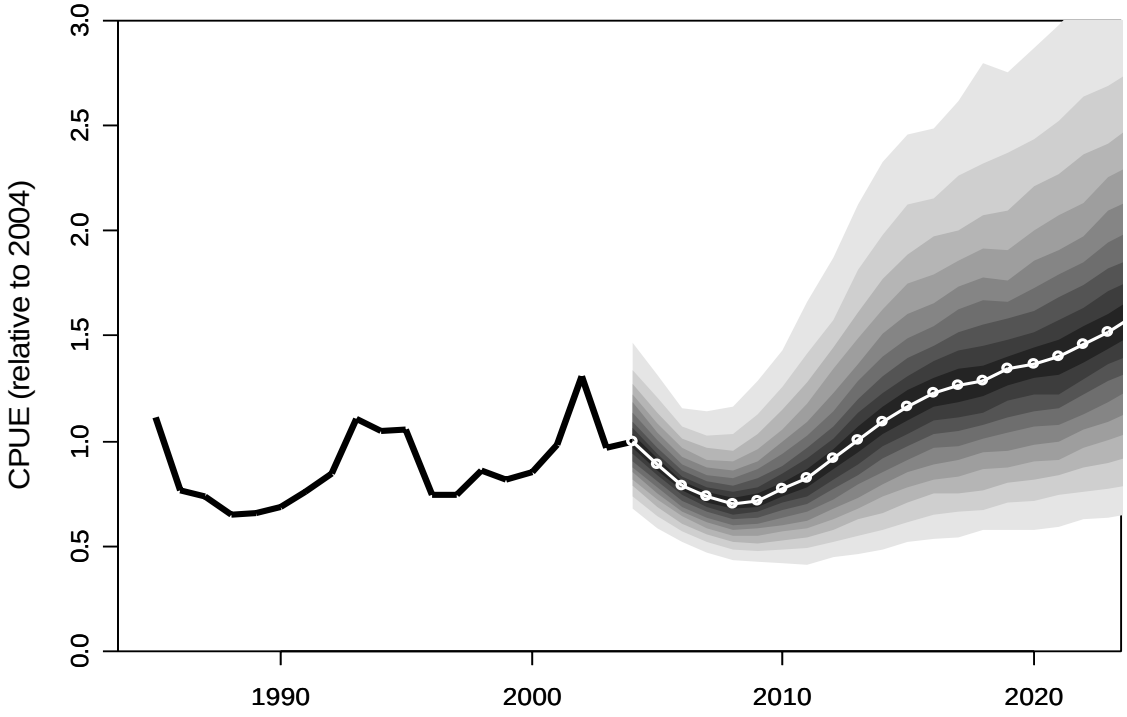
SBF-Figure 8. Proportion at length of southern bluefin tuna from the New Zealand charter fleet for 2001 to 2005. Data for 2005 are based on about 75% of the catch.



SBF-Figure 9. Length frequency (2cm intervals) of southern bluefin tuna by spawning season from the Indonesian spawning ground longline fishery. The grey bar shows the median length class. A spawning season is defined as July 1 of the previous year to June 30 of the given year. The pale bar represents the median length.



SBF-Figure 10. Historical and projected spawning biomass under the recommended southern bluefin tuna management procedure and implementation schedule. Lines indicate the median spawning biomass in 1989 and in 2004.



SBF-Figure 11. SBF historical (solid line) and projected CPUE (relative to the median value in 2004) for the recommended southern bluefin tuna management procedure, implementation schedule and 5000 t catch reduction in 2006.

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

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

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean and some even in the Mediterranean Sea and the Black Sea. They often form large schools with other small sized tunas or related species in coastal and high seas waters. They have a varied diet with a preference for small pelagics (e.g., clupeids, mullets, carangids and ammodytes), crustaceans, mollusks and cephalopods. The reproduction period varies according to species and spawning generally takes place near the coast, where the waters are warm. The growth rate currently estimated for these species is very rapid for the first two or three years, and then slows as these species reach size-at-first maturity.

New information has been presented on the catch composition of bonito in the Tyrrhenian Sea, the Straits of Sicily, Spanish Mediterranean and the southern coast of Portugal, including updated size-weight relationships. In the case of the Spanish and Portuguese area this information has also been presented for bullet tuna (*Auxis rochei*), Atlantic black skipjack (*Euthynnus alletteratus*), and bonito *(Sarda sarda)*.

As regards bullet tuna (*A. rochei*) in the southwestern Mediterranean, information was expanded on biological parameters, with preliminary estimates on fecundity.

At present no new information is available for the rest of species that comprise this group.

SMT-2. Description of the fisheries

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

SMT-Table 1 shows historical landings of small tunas for the 1980 to 2003 period. This table does not include species reported as “mixed” or “unidentified”, as was the case in previous years, since these categories include large tuna species. There are more than 10 species of small tunas, but only five of these account for 86% of the total reported catch by weight each year. These five species are: Atlantic bonito *(Sarda sarda)*, frigate tuna *(Auxis thazard* which may include some catches of *Auxis rochei)*, Atlantic black skipjack *(Euthynnus alletteratus)*, king mackerel *(Scomberomorus cavalla)*, and Atlantic Spanish mackerel *(Scomberomorus maculatus)* **(SMT-Figure 2)**. In 1980, there was a marked increase in reported landings compared to previous years, reaching a peak of about 139,412 t in 1988 **(SMT-Figure 1)**. Reported landings for the 1989-1995 period

decreased to approximately 87,941 t, and then an oscillation in the values in the following years up to 2001 is observed, when the catch was 84,093 t. This decrease seems to be related to unreported catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch.

A preliminary estimate of the total nominal landings of small tunas in 2003 is 65,941 t. The Committee pointed out the relative importance of small tunas fisheries in the Mediterranean Sea, which account for 26% of the total reported catch in the 1980-2003.

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

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

SMT-3. State of the stocks

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

Generally, current information does not allow the Committee to carry out an assessment of stock status of the majority of the species. However, the information available for the major part of the stocks suggests that 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 the small tunas fisheries are very diverse and complex, involving both artisanal and industrial fisheries that employ a large variety of gears, as well as different types and sizes of vessels. The results also indicate that data collection and research, including size sampling, age and growth research, and studies on maturity and tagging, are being conducted by several countries. However, the results of these studies are often not reported to ICCAT.

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

SMT-5. Effects of current regulations

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

SMT-6. Management recommendations

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

SMT-Table 1. Estimated landings (t) reported to ICCAT for small tunas species in 1980-2004, by region and flag.

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
BLF TOTAL			1175	1973	1941	1738	1908	1403	2822	3462	3322	2834	3888	4202	4353	3535	2719	4051	4488	3027	3238	3185	2358	4034	4756	1303	1516
Thunnus atlanticus		Brasil	181	85	89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669	1	118
		Combined NEI	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
		Cuba	0	721	622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0	0	0
		Dominica	0	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	54	78	42	25
		Dominican Republic	125	124	144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0	0	0
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0	0	0
		EC.France	740	761	842	809	821	755	729	669	816	855	865	1210	1170	1140	1330	1370	1040	1040	1040	1040	1040	1040	1040	0	0
		Grenada	68	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255	335	268
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0	0	0
		Liberia	0	0	0	0	0	0	0	0	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	10	9
		Netherlands Antilles	55	55	55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24	0	0
		Sta. Lucia	0	0	0	0	0	0	0	2	1	1	17	14	13	16	82	47	35	40	100	41	45	108	96	169	96
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
		U.S.A.	0	139	41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	334	414	264
		UK.Bermuda	6	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	5	9	0
		Venezuela	0	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1902	1210	319	732
BLT TOTAL			0	0	0	0	0	0	2	0	357	723	3634	2206	814	394	177	100	0	0	28	579	1230	1577	950	1348	402
Auxis rochei		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166	231	300
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468	128	102
		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
		Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989	0
	*	Turkey	0	0	0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316	0	0
		U.S.A.	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.S.R.	0	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BON TOTAL			31115	38927	41106	42386	21907	24905	21320	29712	46382	29721	28941	33561	22025	30584	21505	20841	24585	24511	39925	36128	28287	28298	25399	14099	7001
Sarda sarda	ATL total		12568	10760	12169	6840	6849	6946	5892	7395	22354	17766	6844	8306	6914	4587	5823	5652	7390	10433	10195	7958	6316	6062	9683	2982	2706
		Angola	377	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118	0	0
		Argentina	2600	846	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	138	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	0	0	0	1	2	2	0
		Benin	19	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brasil	0	0	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0	0	0
		Bulgaria	75	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cuba	0	0	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0	0	0
		EC.España	220	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	5	23	9
		EC.Estonia	0	0	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France	508	502	587	547	569	492	431	331	395	427	430	820	770	1052	990	990	610	610	610	24	32	0	18	0	0
		EC.Germany	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38	0	0
		EC.Greece	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.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48
		EC.Latvia	0	0	0	0	0	0	0	0	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	793	0	0
		EC.Poland	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0
		EC.Portugal	13	31	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61	40	50
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0
		Georgia	0	0	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Germany Democratic Rep.	288	440	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ghana	77	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	52	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	14	16	7	10	10	0	0
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
		Maroc	312	477	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019	928	989
		Mexico	271	408	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	1632	1861	1293	1113	1032	1238	1066
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
		Rumania	64	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441	461	16
		Senegal	140	1327	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441	0	159
		Sierra Leone	57	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	11	245	44	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	15	18
		Sta. Lucia	0	0	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0	0	1
		Togo	0	0	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0	0	0

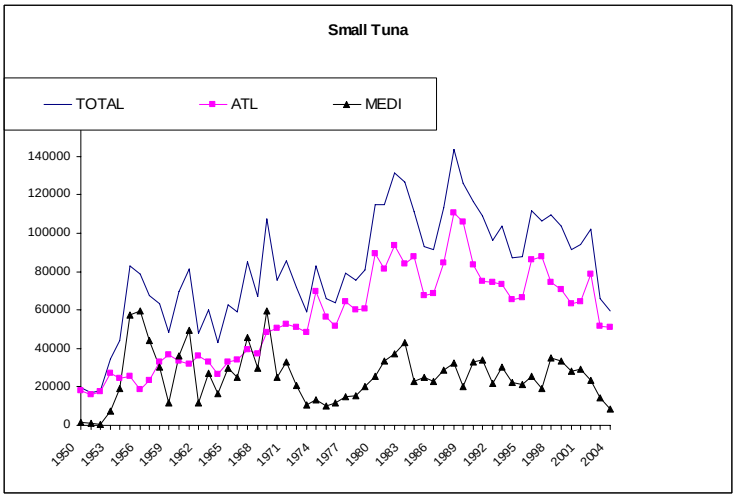
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	452	188	280
		U.S.A.	198	333	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	139	44	70
		U.S.S.R.	6433	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	1385	985	0	0	25	0	0	0	0	342	2786	1918	1114	399	231	1312	30	0
		Uruguay	3	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Venezuela	861	833	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61	13	0
	MED total		18547	28167	28937	35546	15058	17959	15428	22317	24028	11955	22097	25255	15111	25997	15682	15189	17195	14078	29730	28170	21972	22236	15716	11117	4295
		Albania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
		Algerie	640	740	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597	0	609
		Bulgaria	13	191	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35	0	0
		Combined NEI	295	274	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	0	0	0	0	0	0	0
		Croatia	0	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	0	0	0	0	0
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10	10	6
		EC.España	480	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461	544	272
		EC.France	0	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27	0	0
		EC.Greece	809	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420	1538	1321
		EC.Italy	1180	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579	2091	2009
		EC.Malta	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0	0	0
		Egypt	3	2	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0	0	0
		Maroc	62	309	71	92	75	57	51	127	108	28	69	69	31	25	93	37	67	45	39	120	115	5	61	85	78
		Tunisie	700	381	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1112	848	0
		* Turkey	14292	23174	23397	29034	7220	12281	10756	16793	17613	4667	14737	19151	8863	19548	10093	8944	10284	7810	24000	17900	12000	13460	6286	6000	0
		Yugoslavia (Ex.)	72	39	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	45	0	3	2	6	10	12	12	14	17	17	0	0	0
BOP TOTAL			698	1448	584	38	49	133	87	564	1482	1116	457	588	600	601	775	640	2136	476	159	844	1193	984	917	729	513
Orcynopsis unicolor	ATL total		698	1448	584	38	49	124	86	538	1474	1109	420	487	424	349	599	525	2004	249	29	627	1048	830	780	706	506
		Benin	1	2	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0	0	0
		EC.Portugal	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Maroc	596	968	483	0	0	83	33	487	1422	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780	706	503
		Mauritania	101	478	99	37	40	40	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	MED total		0	0	0	0	0	9	1	26	8	7	37	101	176	252	176	115	132	227	130	217	145	154	137	23	7
		Algerie	0	0	0	0	0	0	0	0	0	0	0	87	135	198	153	92	119	224	128	216	135	145	128	0	0
		Libya	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0
		Maroc	0	0	0	0	0	9	1	26	8	7	37	14	1	14	23	23	13	3	2	1	10	9	9	20	7
		Tunisie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
BRS TOTAL			5617	5841	6019	6632	8129	3501	6549	6212	9510	10778	7698	8856	6051	8049	7161	7006	8435	8004	7923	5754	4785	4553	7750	5136	3410
Scomberomorus brasiliensis		Brasil	2826	3466	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071	2881	814
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441	388	494
		Trinidad and Tobago	0	0	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472	1867	2103
		Venezuela	2791	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766	0	0
CER TOTAL			604	628	687	677	680	574	500	392	219	234	225	375	390	450	490	429	279	250	250	0	3	5	1	2	1
Scomberomorus regalis		Dominican Republic	104	106	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0	0	0
		EC.France	500	522	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	0	0	0	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	1	2	0
FRI TOTAL			20912	15913	25240	21690	25903	22876	20306	23407	25151	21416	23333	15425	8027	11210	10477	9861	17808	16513	14440	12608	12299	14457	15474	4871	6611
Auxis thazard	ATL total		16960	12235	19197	15870	19566	17636	15249	19667	19025	15029	14973	8854	3126	8183	5354	5560	11899	13449	12160	10548	9613	10223	10375	2421	2840
		Angola	256	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38	0	0
		Benin	37	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Brasil	0	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117	860	414
		Bulgaria	3	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cape Verde	0	0	0	0	0	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	206	0	0
		Combined NEI	0	0	0	333	46	0	0	17	381	155	237	1	4	32	68	62	180	120	309	491	291	420	186	69	1024
		EC.España	6260	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438	635	34
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.France	0	0	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91	0	168
		EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC.Portugal	0	0	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5	4	6
		Germany Democratic Rep.	0	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Ghana	7566	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Grenada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
		Maroc	968	1267	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441	184	542
		Mixed flags	0	1856	1984	2800	0	0	0	0	0	0	0	0	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768	0	0
		Netherlands Antilles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710	507	0
		Panama	0	0	0	0	0	0	0	0	0	0	0	243	57	118	341	327	240	91	0	0	0	0	0	0	0
		Rumania	0	0	0	0	0	0	51	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	3249	1441	220	505	456	46	500	761	477	0	0	300	50	56
		S. Tomé e Príncipe	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0	0	0
		Senegal	0	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0	0	0
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	245	0	0	0	414
		U.S.S.R.	694	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	48	0	43	0	0
		Venezuela	1176	944	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	444	32	113	182
	MED total		3952	3678	6043	5820	6337	5240	5057	3740	6126	6387	8360	6571	4901	3027	5123	4301	5909	3064	2280	2060	2686	4234	5099	2450	3771
		Algerie	0	0	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481	0	391
		Croatia	0	0	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0	0	0
		EC.España	2120	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493	495	1009
		EC.France	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0	0	0
		EC.Greece	0	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120	246	226
		EC.Italy	1376	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452	1463	1819
		EC.Malta	18	4	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0	0	0
		Maroc	10	14	77	57	52	48	175	178	811	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621	246	326
		Tunisie	409	237	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	26	87	38	7	2292	932	0	0
		Yugoslavia (Ex.)	19	14	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	13	1	0	0	2	6	6	6	7	8	8	0	0	0
KGM TOTAL			15656	18513	18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12439	14462	13868	14916	17775	19712	16392	17678	16161	15349	17277	15855	12667
Scomberomorus cavalla		Antigua and Barbuda	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
		Brasil	1598	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316	3311	247
		Dominica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	35	2	0	0	0
		Dominican Republic	0	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226	0	0
		Grenada	25	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5	0	0
		Guyana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267	390	312
		Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0
		Mexico	1946	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	3583	4121	3688	4200	4453	4369	4564
		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	1	4	0	0	9	1	1	0	1
		Trinidad and Tobago	0	0	0	20	43	11	38	82	752	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457	802	578
		U.S.A.	10726	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	6081	6983	6966
		UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		Venezuela	1361	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424	0	0
KGX TOTAL			214	339	283	20	485	22	149	261	491	105	131	225	266	301	508	512	824	156	251	1	229	48	0	15	0
Scomberomorus spp		Barbados	0	0	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	0	0	0	0	0	0	0	0
		Colombia	73	160	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	0	0	0	0	0	0	0	0
		Cuba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0	0	0	0	0	0
		Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	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	155	0	0	44	48	0	0	0
		Puerto Rico	0	0	0	0	0	0	0	0	0	0	0	0	53	84	86	134	106	0	0	0	0	0	0	0	0
		Russian Federation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	15	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0	0	0
		Sta. Lucia	0	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0	0	0
		Trinidad and Tobago	141	179	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Ukraine	0	0	0	0	0	0	0	0	0	0	0	94	0	0	0	0	0	0	0	0	0	0	0	0	0
LTA TOTAL			19214	13847	15839	22214	20625	12896	8809	19741	25135	29855	14359	10910	21554	13682	11607	12026	14786	14147	14511	13340	13737	12994	16840	11060	11474
Euthynnus alletteratus	ATL total		16440	12401	13359	20653	18975	10856	6643	17317	22730	27820	11742	8587	19798	12416	10402	10124	12667	12543	11597	10465	10443	10131	14198	10377	11237
		Angola	1328	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132	0	0
		Argentina	0	0	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Benin	24	40	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69	0	0
		Brasil	0	45	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615	0	320
		Cape Verde	128	236	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	108	0	0
		Combined NEI	0	0	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33	2	0
		Côte D'Ivoire	177	0	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0	0	0
		Cuba	131	53	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0	0	0
		EC.España	485	7	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8	1	489
		EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0

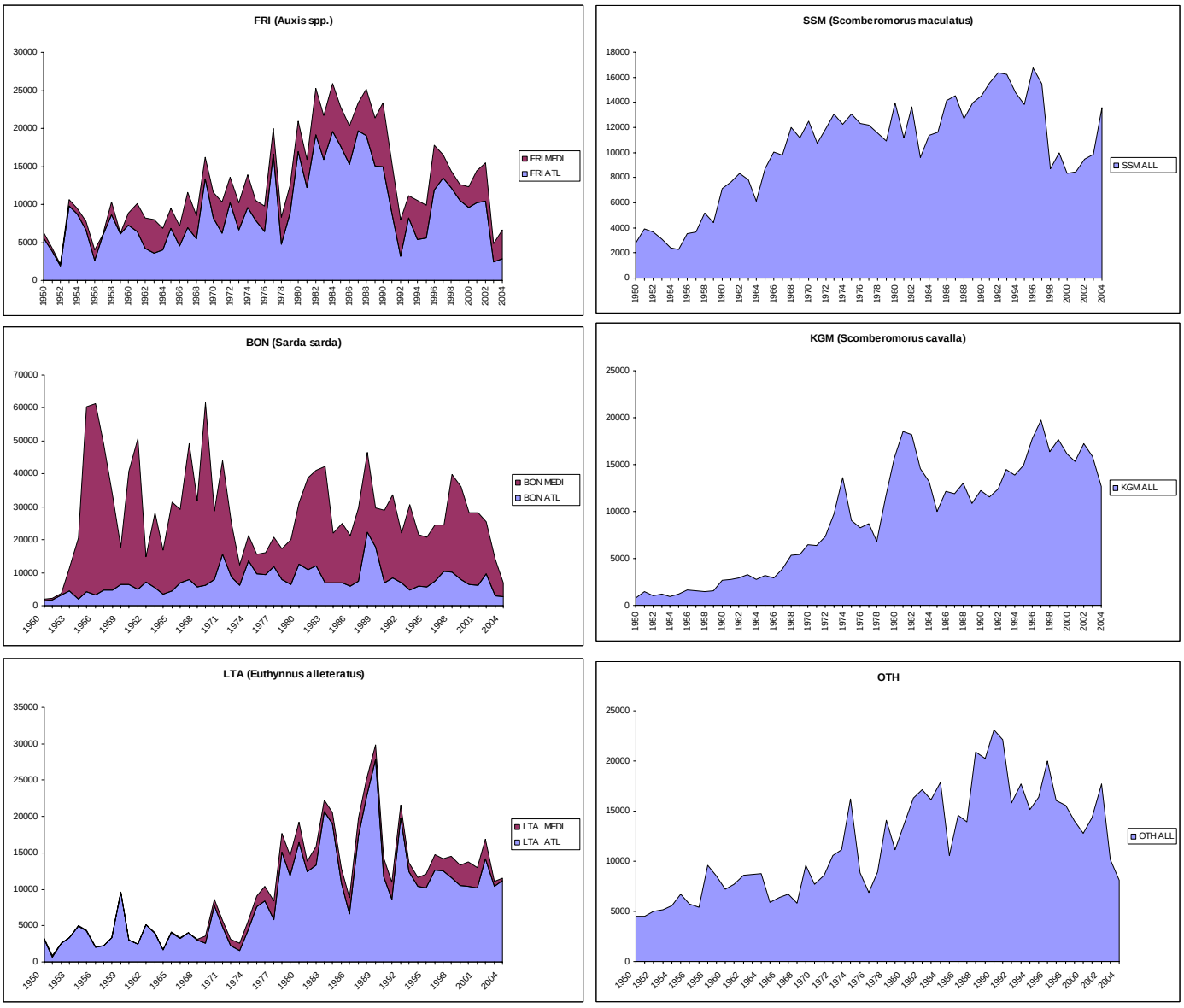
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	EC.France	0	1098	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	696	631	610	613	0	10
	EC.Germany	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Poland	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Portugal	121	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2	16	19
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	18	159	301	213	57	173	0
	Germany Democratic Rep.	0	0	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ghana	4134	3287	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768	8541	7060
	Israel	227	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Maroc	16	19	26	19	15	447	47	108	49	14	367	57	370	44	43	230	588	195	189	67	101	87	308	76	91
	Mauritania	31	86	77	54	60	60	50	50	50	50	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mixed flags	0	0	0	0	0	0	0	0	0	0	0	0	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681	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	9	0
	Panama	58	36	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0
	Rumania	9	12	291	216	266	126	81	7	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Russian Federation	0	0	0	0	0	0	0	0	0	0	0	617	306	265	189	96	49	0	88	0	0	0	74	13	0
	S. Tomé e Príncipe	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0	0	0
	Senegal	2444	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1097	1094	1094	0	1865
	South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	2	2	2	0	1	10	1	1
	U.S.A.	88	97	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1366	1492	1382
	U.S.S.R.	6307	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.Bermuda	11	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	5	4	0
	Venezuela	721	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254	50	0
MED total		2774	1446	2480	1561	1650	2040	2166	2424	2405	2035	2617	2323	1756	1266	1205	1902	2119	1604	2914	2875	3294	2863	2642	682	237
	Algerie	0	0	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148	0	158
	Combined NEI	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0	0	0
	Croatia	0	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0	0	0
	EC.Cyprus	17	22	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	16	19	19	19	0	0
	EC.España	800	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32	0	41
	EC.Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	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	16	24	38
	EC.Malta	0	0	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0	0	0
	Israel	105	35	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119	0	0
	Libya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4	0	0
	Maroc	0	61	12	0	1	0	0	0	12	0	16	0	0	0	0	1	0	1	14	8	0	0	3	1	0
	Palestinian Territory, Occupied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	129	0	0
	Syrian Arab Republic	80	73	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	330	0	0
	Tunisie	1772	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	960	657	0
	* Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750	0	0
	Yugoslavia (Ex.)	0	0	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yugoslavia Fed.	0	0	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0	0	0
MAW TOTAL		4921	3156	5312	4716	4498	3989	3292	1799	3915	2934	5610	4025	1527	1775	1270	1264	1316	871	1108	727	748	727	1067	12	375
Scomberomorus tritor	Angola	70	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Benin	35	60	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205	0	0
	EC.Estonia	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Latvia	0	0	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Lithuania	0	0	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	298	0	0
	Gabon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	0	0	0	0	0
	Germany Democratic Rep.	0	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Ghana	4412	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0	0	0
	Russian Federation	0	0	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	0	0	0	0	0	0	0	0
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0
	Senegal	404	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522	0	375
	U.S.S.R.	0	0	602	1170	223	206	219	28	143	195	1240	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	90	0	0	0	0	0	0	0	21	0	42	12	0
SSM TOTAL		13945	11164	13633	9574	11362	11590	14117	14531	12712	13946	14500	15546	16346	16231	14777	13857	16725	15501	8723	9973	8336	8492	9461	9853	13582
Scomberomorus maculatus	Colombia	213	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0	0	0
	Cuba	578	657	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0	0	0
	Dominican Republic	479	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158	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	265	0	0
	Grenada	1	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1	0	0
	Mexico	5908	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	5483	6431	4168	3701	4350	5242	3641

		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	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	5330
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27	0	0
	Trinidad and Tobago	1337	939	1218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.A.	5429	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	4660	4611	4611
WAH TOTAL		610	2920	2280	2366	2159	920	1151	1235	1612	1507	1470	1687	1807	2571	2104	2362	2515	3085	2483	2943	2020	2296	2253	1658	1887
Acanthocybium solandri	Antigua and Barbuda	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
	Aruba	115	115	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50	0	0
	Barbados	116	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0	43	0
	Benin	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Brasil	1	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0	405	519
	Cape Verde	24	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	552	0	0
	Dominica	0	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	11	37	10	6
	Dominican Republic	0	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35	0	0
	EC.España	0	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46	48	305
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Grenada	25	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59	44	0
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
	Netherlands Antilles	215	215	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230	0	0
	S. Tomé e Príncipe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52	0	0
	Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	6
	Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	St. Vincent and Grenadines	0	0	0	0	0	0	0	0	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17	40	60
	Sta. Lucia	0	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217	169	232
	Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	118	1	0	0	0	0	1	1	1	2	1	9	7	6
	U.S.A.	0	0	0	0	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	846	789	710
	UK.Bermuda	46	24	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	91	87	0
	UK.British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK.Sta Helena	10	12	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	0	0	0	0	0	0	0	0
	UK.Turks and Caicos Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Venezuela	57	77	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13	9	7

* Turkey reported during the Plenary the following catches. BON 5701 (t) - BLT 284 (t) - LTA 560 (t)



SMT-Figure 1. Estimated landings (t) of small tunas (combined) in the Atlantic and Mediterranean, 1950-2004. The data for the last years are incomplete. The continuous line represents the total, the line with squares represents the Atlantic, and the line with triangles represents the Mediterranean.



SMT-Figure 2. Estimated landings (t) of the major species of small tunas in the Atlantic and Mediterranean, 1950-2004. The data for the last years are incomplete.

8.13 SHK - SHARKS

The last assessments for Atlantic blue and shortfin mako sharks were conducted in 2004. This document focuses on changes that may have taken place since then; readers interested in a more complete summary of the state of knowledge on Atlantic blue and shortfin mako sharks should consult the report of the 2004 SCRS meeting. Within the Detailed Report of the stock assessment session (Anon 2005c) is a complete discussion of the uncertainties about stock structure, movements, life history and characteristics of some of the fisheries affecting these stocks.

Other information relevant to Atlantic sharks is presented elsewhere in Section 16 of this SCRS Report: Responses to Commission on (1) shark fin ratios (see section 16.5) and (2). Recommendation for management alternatives (see section 16.6).

SHK-1. Fishery indicators

Previous reviews of the shark data base resulted in recommendations to improve the data reporting for sharks, but a large improvement in the quantity and quality of the overall shark catch statistics data base has not yet resulted. Reported catches are presented in **SHK-Table 1**. This information is considered very incomplete and inadequate for stock assessment purposes. In view of the very incomplete nature of the catch reporting to the Secretariat, the 2004 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 (**SHK-Figure 1**), although highly uncertain, were used as a tentative basis for stock assessment model applications that require information on both catch and effort.

The Committee 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.

SHK-2. Blue shark

For both North and South Atlantic blue shark, the current biomass appears to be above the biomass that would support MSY. In many of the model runs conducted, stock status appeared to be close to unfished biomass levels. The results are highly conditional on the assumptions made. Those assumptions include (i) estimates of historical shark catch, (ii) the relationship between catch rates and abundance, (iii) the initial state of the stock in 1971, and (iv) various life-history parameters. A full evaluation of the sensitivity of model outcomes to these assumptions was not possible at the meeting and such studies should be carried out before drawing stronger conclusions.

SHK-3. Shortfin mako shark

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

SHK-4. Management Recommendations

The Commission directed in [Rec. 04-10] that in "2005, the SCRS shall review the assessment of shortfin mako sharks (*Isurus oxyrinchus*) and recommend management alternatives for consideration by the Commission." This review was undertaken and as the Committee cannot rule out the possibility that the current shortfin mako shark biomass in the North Atlantic is below the biomass that can support MSY. Should the Commission wish to improve the status of this stock, measures to reduce fishing mortality should be taken. Shortfin mako sharks are taken in a broad range of fisheries, both as targeted catch and as bycatch, and our knowledge of overall catch levels is inadequate. As such, there is no basis for recommending catch limits for this stock .Although technical measures such as modifications to fishing gear, restrictions on fishing areas and times, minimum or maximum sizes for allowable retained catch might prove beneficial, without more detailed information gathered through research programs designed to estimate the potential benefits of such measures, the Committee recommends that reductions in fleet capacity and effective effort could provide the most direct benefit to shortfin mako sharks.

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

			1981	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL			204	9	613	121	380	1162	1467	867	832	2348	3533	2343	7879	8310	8422	9036	36895	33211	34208	33464	34315	31424	34550	34580
Longline	Landings	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	743	1103	0	179	1689	2173	1966	2160	1568
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	275	12	10	4	53	18	0	5	6	0
		Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	750	420	600	0
		EC.Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	3	6
		EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29917	28137	29005	26046	25110	21037	22601	24682
		EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32
		EC.Portugal	0	0	0	0	0	0	0	0	0	1387	2257	1583	5726	4669	5569	5710	3966	3318	3337	4220	4713	4602	6926	3586
		* Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	2596	1589	1044	996	850	893	494	532	742	830	1473
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2213	0	1906
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177	22	0	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	21	0	82	63	232	128
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	2
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	8	8	4	6	1	3	0	1	3	0	1	7
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0
		Uruguay	0	0	0	0	0	0	0	0	0	0	8	84	15	93	64	252	286	242	126	119	59	159	620	492
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
	Discards	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	526	421	480	741	772	184	1136	572	618	609	185	173	97	137	105	68	0	63
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0
Other surf.	Landings	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	27	0	0	0	0	0
		Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	99
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0
		EC.Denmark	0	0	0	0	0	0	0	0	2	2	1	1	0	1	2	3	1	1	0	2	1	13	0	0
		EC.France	0	9	8	14	39	50	67	91	79	130	187	276	322	350	266	278	213	163	0	395	207	109	0	98
		EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	9	66	11	0	0
		EC.Italy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81
		EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	561	302
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12	0	0	1	0	12	9	6	0	0
		Senegal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	456	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		U.S.A.	204	0	605	107	341	1112	874	355	271	87	308	214	672	21	19	277	210	252	217	291	39	0	0	0
	Discards	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	22	4	0	0	0	0	1
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0

* SCRS/2005/074 provided slightly revised estimates for the 2000-2004 period which will be incorporated into the ICCAT database.

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

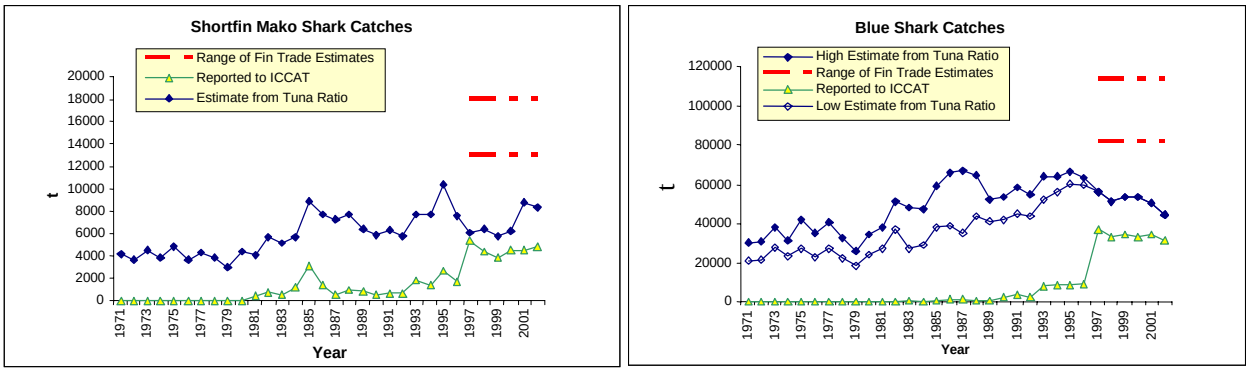
			1981	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL			406	705	488	1131	3065	1344	501	819	688	486	538	511	1824	1352	2646	1680	5300	4105	3731	4366	4522	4794	6275	4790
Longline	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	190	0	27	219	409	226	283	177
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	56	99	55	54	59	60	61	63	69
		China, P.R.	0	0	0	0	0	0	0	0	0	0	0	0	34	45	23	27	19	74	126	306	22	208	260	0
		* EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3777	3347	2895	2679	2921	2859	3226	2791
		EC.Portugal	0	0	0	0	0	0	0	0	0	193	314	220	796	649	749	785	519	424	446	706	523	471	1781	411
		** Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	248	0	0	0	0	0	0	0
		Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	16	0	10	6
		Namibia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	459	0	509
		Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	13	0	77	19	138	126
		Trinidad and Tobago	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	278	310	281	233	244	0	0	2	181	167	142	0
		Uruguay	21	92	120	202	118	48	39	24	18	25	14	15	29	12	21	24	28	21	43	63	70	58	239	275
		Venezuela	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
	Discards	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		U.S.A.	0	0	0	0	0	0	0	0	0	0	0	26	20	18	28	0	0	0	0	0	0	0	0	0
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Other surf.	Landings	Brasil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61
		Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	11	11	15	17	20	10	17	10	10
		Côte D'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	10	9	15	0	30	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	93	74
		EC.United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	1	0	0
		South Africa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
		St. Vincent and Grenadines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
		U.S.A.	385	613	368	929	2947	1296	462	795	670	268	210	250	667	317	1422	232	164	148	69	290	215	248	0	221
		UK.Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0

* SCRS/2005/059 provided information on an estimated time-series of catch which has yet to be incorporated into the ICCAT database.

** SCRS/2005/074 provided slightly revised estimates for the 2000-2004 period which will be incorporated into the ICCAT database.

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

		1980	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
TOTAL		1594	1370	584	1141	706	664	706	813	957	971	1282	1944	2588	1889	2676	2121	1548	1859	1468	1143	1449	974	791	297	710
Longline	Canada	1	0	1	9	20	26	24	59	83	73	78	329	813	919	1575	1351	1045	1322	1055	956	899	491	224	130	220
	Chile	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
	EC.España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	27	0	0	0	0	0	0
	EC.France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	EC.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	1
	EC.Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	10	101	54
	Faroe Islands	425	344	259	256	126	210	270	381	373	477	550	1189	1149	165	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	8	18	0	0	0	0	0	0	0
	Norway	0	0	0	0	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	0	0
	U.S.A.	0	0	0	0	0	0	0	1	0	1	1	4	4	50	108	35	78	56	9	0	1	0	1	0	1
	UK.Falklands	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	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	5	14	3	4	0	8	34	8
Other surf.	Benin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0
	Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	12	15	9	3	8	12	13	12
	Chile	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.Denmark	176	158	84	45	38	72	114	56	33	33	46	85	80	91	93	86	72	69	85	107	73	76	42	0	0
	EC.España	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	31	0	0	0	0	0	0	0	0
	EC.France	896	768	199	791	411	254	260	280	446	341	551	300	496	633	820	565	267	315	219	0	410	361	461	0	228
	EC.Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	1	3	0	0
	EC.Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	1	6	3	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	1
	EC.Poland	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
	EC.Portugal	0	0	0	0	0	0	0	3	3	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC.Sweden	8	5	6	5	9	10	8	5	3	3	2	2	4	3	2	2	1	1	1	1	1	1	0	0	0
	EC.United Kingdom	3	2	1	2	5	12	6	3	3	15	9	0	0	0	0	0	0	0	1	6	8	12	10	0	0
	Faroe Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	44	8	9	7	10	0	0	0	0	0
	Iceland	1	0	1	0	1	0	0	0	0	0	0	0	1	3	4	6	5	3	4	2	2	3	2	0	0
	Japan	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
	Norway	84	93	33	33	0	80	24	25	11	25	43	32	41	24	24	26	28	17	27	32	22	6	6	19	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	0
	U.S.A.	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	4	3	0	1	0	0	0
	UK.Falklands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0



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

9. Report of inter-sessional meetings

9.1 Third meeting of the ad hoc GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean

The third and final meeting of this joint working group took place in March, 2005, in Rome, Italy. The main outcome of the meeting was the completion of Guidelines **(Appendix 7)** that cover diverse aspects related to the various components of bluefin farming as it is currently practiced: Capture in the wild, transport/transfer to cages, farming/fattening, and harvesting/marketing. A detailed report of the meeting was published in FAO 2005.

The Committee noted that many recommendations contained in the Guidelines related to the collection of statistics and to the strengthening of the ICCAT BFT Statistical Document Program. The Committee also noted that many of these have already been addressed or are being addressed by the Commission, through the adoption of the *Recommendation by ICCAT on Bluefin Tuna Farming* [Rec. 04-06] and through the Working Group to Improve the Statistical Document Programs.

9.2 Data preparatory meeting for the 2006 Billfish Assessment

At its 2004 meeting, the Commission decided that the next assessments of Atlantic blue and white marlin would take place in 2006. Given that there are important uncertainties regarding basic data and the appropriateness of models for estimating relative abundance, the SCRS decided to hold a data-preparatory meeting. The main objectives of this meeting were: (1) to update the available information for these two species, with emphasis on the data that will be used for the 2006 stock assessment, especially relative abundance indices, catch at length, and biological parameters; and, (2) to review progress made to-date on research related to the estimation of relative indices of abundance for longline-caught billfishes.

Data

The Committee notes that the basic catch statistics for many fleets contain values that appear to be anomalous. An analysis of the available time series was carried out to identify outliers, by fleet. This exercise identified a number of problems with the data and a number of improvements which might better take into account changes in effort, targeting, fleet size and other factors. The report of the Meeting highlights specific work that should be done to improve the estimates of marlin catches for Barbados, Benin, Brazil, China, Chinese Taipei, Cuba, Côte d'Ivoire, EC-Spain, Ghana, Grenada, Korea, Panama, USSR, Trinidad and Tobago, U.S.A. and Venezuela. The Committee recommends that these parties take the necessary steps to achieve these improvements as soon as possible.

Another diagnostic that was examined was the ratio of reported blue marlin and white marlin weight to the catch weight of major tuna species for each longline fleet. Analysis of this information was recommended as a potential method for constructing alternative time series of catch estimates, especially for fleets with incomplete time series for marlins. The estimated ratios were applied to those flags that reported some marlin landings but not for all years; no adjustment was made for flags that never reported marlin landings and this issue should be further investigated. **Figure 9.2** shows the reported and adjusted marlin landings by year. While this was done in a preliminary way for longline, The Committee recommends that the approach be pursued for other gear types and that research into alternative data imputation methods also be pursued.

Concerning relative abundance data, the Committee reviewed the indices that were used in the last marlin assessments (in 2000 and 2002 for blue marlin and white marlin, respectively) and the indices that were prepared for the Meeting. After comparing the availability of CPUE series to the relative magnitude of marlin catches, the Committee concluded that indices from certain fleets that have not been available in the past could contribute important information to the assessment (e.g., EC-Spain longline for white marlin; Ghanaian and Côte d'Ivoire gillnet, China and EC-Spain longline for blue marlin). The Committee recommends that these parties carry out the necessary analyses to provide relative abundance estimates for the 2006 assessment.

Biology/behavior

Several documents presented data regarding habitat utilization from pop-up archival tags, including temperature and depth data. From these papers, it was concluded that marlin range into greater depths and cooler temperatures than previously thought. Regional differences in habitat use and large variation between and within

individuals make generalizations difficult. FADs may also influence behavior and habitat use, particularly of blue marlin, so understanding those effects would be useful. In order to develop a successful habitat-based method for standardizing CPUE, data on behavior, as well as time-at-depth is necessary. Experimental longline sets with TDRs and hook-timers to determine when and where billfish are caught can be used to infer behavior.

Habitat and CPUE standardization

Two alternative methods for CPUE standardization have been applied in the past to blue marlin LL data and resulted in very different trends: traditional GLM approaches, and so-called "habitat based standardization" (HBS). In 2003, the Methods Working Group met at the request of the Committee to evaluate models that can properly incorporate habitat information in the process of relative abundance estimation. That meeting resulted in a number of recommendations for research and for using simulation tools for testing the performance of alternative CPUE standardization methods. Subsequently, research was carried out and initial simulation tests prepared, and presented at the Meeting.

The Committee examined the simulation results obtained to-date and concluded that none of the methods (both GLM and HBS) that had been applied extracted the correct long-term simulated biomass trajectory for any of the scenarios. The Committee made a number of recommendations to continue this work with the aim to obtaining more conclusive results.

Conclusions

The Committee noted that the results of current simulations and the attempts at developing standardization techniques that accurately estimate relative abundance indices from longline data suggest that our methods are not yet in a state that can produce substantial improvements from those used in the last marlin assessments. Therefore the group notes that during the 2006 assessment it is unlikely that any estimates of stock productivity will be much different from those obtained during the previous assessments.

On the other hand, the current analyses suggest that examination of the recent trends in relative abundance might provide estimates of large changes in population trends for the recent years. Such trends are of great interest to the group because they may be able to reveal whether marlin stocks are responding to recent conservation measures imposed by ICCAT. These measures have increased the uncertainty in the level of catches for certain fisheries. During the 2006 assessment the Committee can evaluate such trends and quantify the precision of such estimates, therefore providing the basis for future evaluation of the success of the attempts of rebuilding the marlin stocks. In the 2006 assessment, the number of years since [Rec. 00-13] entered into effect will be limited.

In view of the assessment timetable established by the Commission, the Committee is concerned that some of the simulation model improvements listed in the Meeting report cannot be achieved within the next year (particularly those aspects related to parameterizations based on real data). Without improved knowledge on how to obtain reliable abundance indices from longline data, the Committee's ability to provide long-term management advice to the Commission will be curtailed.

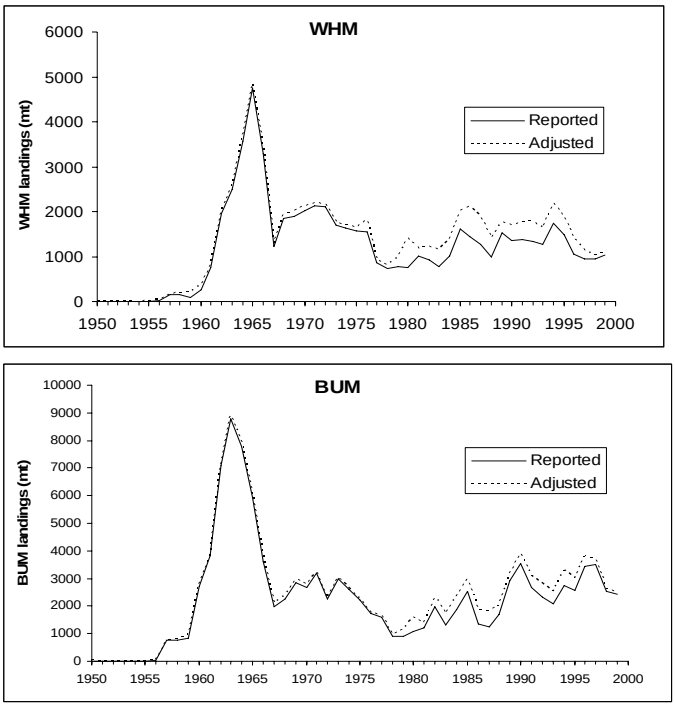


Figure 9.2. Reported and adjusted marlin landings by year based on ratio analyses; averages were only applied where there was missing information.

9.3 Planning Meeting for Bluefin Tuna Research

A Planning meeting on bluefin tuna research was held at the ICCAT Headquarters in June, 2005. The meeting was held to address various questions that have been posed by the Commission, primarily through its Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies. A detailed report of the meeting is contained in SCRS/2005/011. The relevant responses to the Commission are contained in Section 16 of this Report.

9.4 Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas

The Workshop took place on July 4-8, 2005 in Madrid, Spain, with the main objective of evaluating alternative measures to reduce mortality of juvenile tropical tunas, including the overall impact of such measures on tropical tuna fisheries. In addition, the Workshop examined the potential impact of the closed area/season established by [Rec. 04-01]; a summary report of that evaluation is presented under Agenda item 16.1.

In its evaluations, the Workshop used the data available in the ICCAT databases. The Workshop noted that its ability to carry out exhaustive analyses was constrained by the aggregated nature of the available data, and by differences in the temporal and spatial resolution of reported longline and surface fisheries data. Furthermore, there is substantial uncertainty concerning natural mortality and migrations, parameters which are fundamental to these evaluations; increased research (e.g., through tagging) would improve the precision of the estimates of these parameters and therefore improve the scientific advice.

Minimum size limits

Until 2005, there was a 3.2 kg minimum size limit (with 15% tolerance in numbers) for yellowfin and bigeye; the bigeye minimum size limit is being replaced with other measures in [Rec. 04-01], but the yellowfin limit remains in force. Compliance with these size limits has never been effectively achieved, largely due to the characteristics of the purse seine gear and operations, which is the principal source of fishing effort on juveniles. The Workshop noted that maintaining a minimum size limit for yellowfin but not for bigeye is impractical because juveniles of the two species are caught together by surface fleets, and may result in data misreporting. It should be kept in mind that the previous bigeye minimum size was implemented in order to avoid this type of misreporting which was observed after the implementation of this measure on yellowfin.

Assuming a 100% reduction of F at age 0, the long-term effect would result in an increase of yield per recruit less than 15% (bigeye) and 6% (yellowfin) and a spawning stock biomass per recruit less than 19% (bigeye) and 2% (yellowfin).

Temporal restrictions on specific fisheries

The Workshop grouped the available catch data into different size categories for two major types of surface fisheries: the FAD-based purse seiners (including Ghanaian baitboats), and the baitboat fishery based at Dakar. The Workshop concluded that seasonal closures of the Dakar based BB fisheries would have minor reductions in mortality of juvenile bigeye and yellowfin; the reductions in juvenile mortality would be greater (in the order of 25% per quarter) with restrictions on the FAD fishery, especially during the first semester.

Quota implementation

In order to consider the potential effect on juvenile mortality of the full implementation of the catch limits imposed on CPCs by [Rec. 04-01], the Workshop examined the implied catch limits by gear. Since each CPC employs different gear(s), each of which has a different selectivity pattern, adherence to the new catch limits could result in a new overall selectivity pattern. The Workshop concluded that, under certain assumptions of effort distribution between CPCs, catches for purse seine and baitboat gears would expected to increase somewhat, while longline catches would remain at about the same level. Since baitboats and purse seiners have a higher selectivity for juvenile bigeye tuna than do longliners, the expected result is an increase in juvenile fishing mortality rates. However, it is anticipated that this direct effect will be minor, as the quota is referenced to a time period when fishing effort was double the present one.

The Workshop also noted that any attempt to manage through catch limits will be hampered by the fact that catches by species cannot presently be tracked on a real-time basis. Currently, the species composition of the catches is not finalized until analyses are conducted after the end of the year.

Time/area closures

The Workshop analyzed catch of bigeye tuna and yellowfin tuna below 3.2 kg for two periods: pre-moratorium (1993-1996) and moratorium (1998-2001). In each period, the proportions of juvenile bigeye tuna and yellowfin tuna in the catch were calculated by 5° grid and quarter, and ranked. The analyses showed that in the recent time period most of the small yellowfin and bigeye catch comes from 20ºW to 10ºE longitude and 0º to 5ºN latitude, *i.e.* within the moratorium area established in [Rec. 99-01], but largely outside of the area closure established in [Rec. 04-01] (known as "Piccolo" area) (**Figure 9.4**).

Changes in selectivity through methodological/technological improvements

A number of potential strategies and technological improvements were discussed, including: Improvements in the resolution of acoustic data (better identification of sizes and species), improved knowledge of species composition of fish schools based upon time of day of a set, improved knowledge of depth stratification by species, limiting the number of sets on FADs, and physical modifications to the purse seine gear. These are the subject of current or planned research activities.

Recommendations

The Workshop made several recommendations, three of them being important and of general relevance:

1. In order to suppress the discrepancy in temporal and spatial resolution between longline and surface fisheries, all industrial fleets should report Task II statistics by month and 1°x1º squares. This would facilitate the evaluation of the potential impact of management measures such as spatio-temporal closures.

2. If a minimum size limit is to be implemented, it should apply to both yellowfin and bigeye tuna. Similarly, if the bigeye size limit is suppressed, the Workshop strongly recommends that the size limit for yellowfin also be suppressed.

3. The Workshop encourages all Contracting Parties to fulfil the data requirements laid out by the Convention and that data reported to the Secretariat contains as much spatial and temporal information

as is possible to gather. Evaluation of spatio-temporal closures and similar management measures relies on the availability and quality of catch and effort data, and on the precise description of its origin in both time and area.

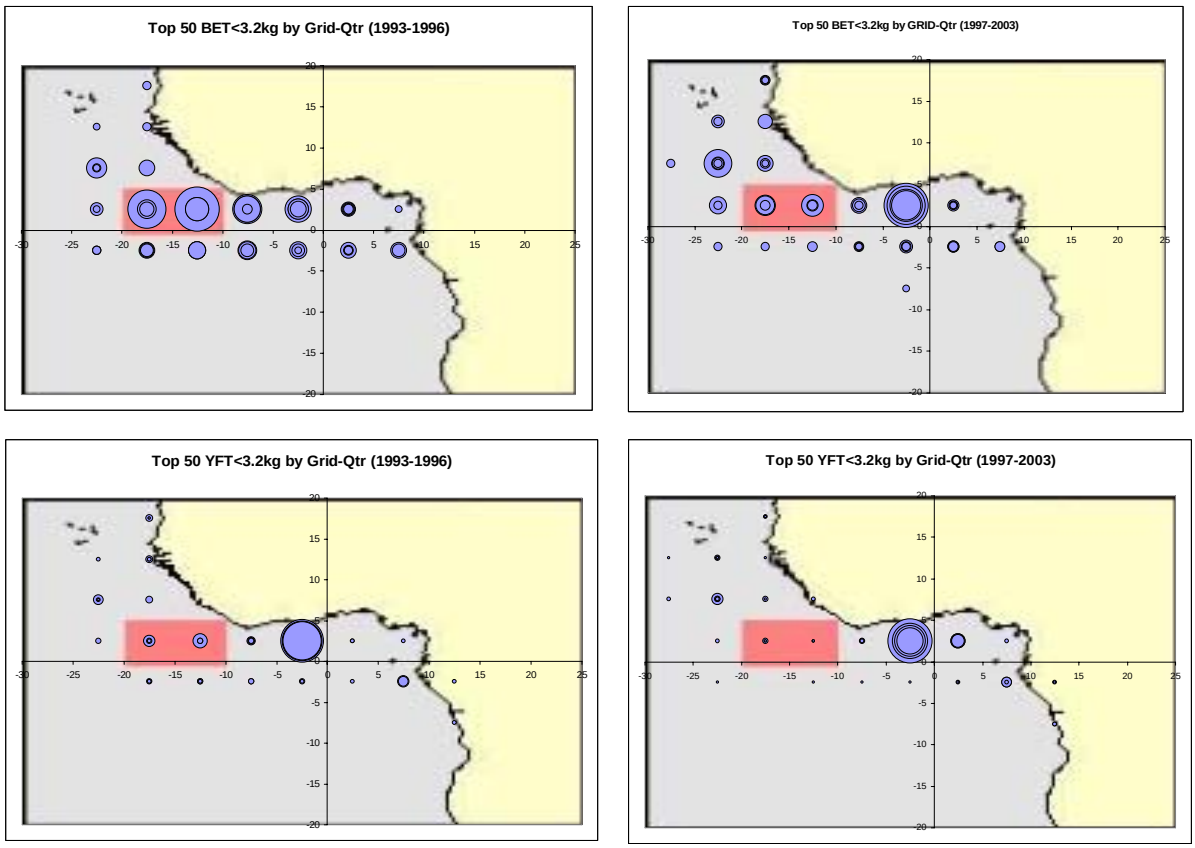


Figure 9.4. Location of the highest concentrations of bigeye and yellowfin tuna below 3.2 kg. The circles are proportional to the frequency of occurrence of 5ºx5º grids/quarters with a high proportion of small bigeye tuna and yellowfin tuna in the period 1997-2003. The shaded area shows the location of the one-month closure in [Rec. 04-01].

10. Report of special research programs

10.1 Bluefin Year Program (BYP)

Dr. G. Scott, Program Coordinator for the West Atlantic, presented a report on the activities of the Bluefin Year Program (BYP) that were carried out in 2004 and 2005, as well as the research plan and corresponding budget for 2006.

The report was adopted and is attached as **Appendix 8**.

Dr. Scott informed that the detailed report had not been updated, but that it would be done in the near future. He also pointed out that should the Bluefin Tuna Research Program be approved, the BYP activities would be included in that Program.

10.2 Enhanced Research Program for Billfish (ERPB)

The report of the Enhanced Research Program for Billfish, together with the proposed budget for 2006, was presented by the West Atlantic Coordinator, Dr. E. Prince.

The report was adopted and is attached as **Appendix 9**.

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

The Convener of the Sub-Committee on Statistics, Dr. P. Pallares, presented the report of the meeting. The Committee appreciated the improvements made during the year concerning the content and presentation of the statistics as well as the improvements in the publication. In particular, the new format of the *Statistical Bulletin* was highly acclaimed. The pertinent recommendations of this Sub-Committee are listed under Agenda item 15 of this report and in the Report of the Sub-Committee on Statistics, which is attached as **Appendix 10**.

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

Dr. G. Scott, the Convener of the Sub-Committee on By-catches, presented the report, which is attached as **Appendix 11**.

The pertinent recommendations of this Sub-Committee are listed under Agenda item 15 of this report.

13. Report of the Sub-Committee on Environment

The Report of the Sub-Committee on Environment, which is attached as **Appendix 12**, was presented by the Convener, Dr. J. M. Fromentin.

The Committee discussed the proposal presented by the Convener concerning a new structure model for the Sub-Committees on By-catches and on Environment. The new model, focused on the ecosystem, proposes the merging of both Sub-Committees into a single group. The Committee agreed with the focus and recommended developing terms of reference based on the proposal.

The Committee congratulated Dr. E. Prince for the presentation he made about habitat compression during the meeting of the Sub-Committee.

The pertinent recommendations of this Sub-Committee are listed under Agenda item 15 of this report.

14. Consideration of plans for future activities

14.1 Inter-sessional meetings proposed for 2006

The upcoming year will be very busy with stock assessments currently scheduled for North Atlantic swordfish, South Atlantic swordfish, East Atlantic bluefin tuna, West Atlantic bluefin tuna, blue marlin and white marlin and with data preparatory meetings scheduled for albacore and tropical Species Groups. Furthermore, there is a swordfish stock structure Workshop scheduled for early 2006 to address issues raised by the Commission. The 2006 assessment schedule is quite aggressive and will require national scientific delegations to conduct extraordinary preparations during the next year to meet the demands for each of the assessments. The Group noted that the number of assessments scheduled is 50% more than the SCRS has previously identified as the level that might be maximally expected during any one year. Due to the heavy work load specified by the Commission for 2006, it is unlikely that each assessment will be able to fully accommodate catch and effort data through 2005, since it will not be possible to conduct all the scheduled assessments sufficiently late in the year to allow all fleets to fully process their estimates of catch and effort for 2005. The intersessional meeting schedule thus far proposed for 2006 follows:

Meeting	*Proposed dates*	*Venue*	*Mandate*	*Notes*
SWO Stock Structure	March 2005	Crete		Originally scheduled for January 2006, but several delegations have indicated greater participation could be possible if the meeting were held somewhat later in 2006.
Tropicals Data Review	Mid-April to mid-May 2006	Possibly France		Updated review of catch at size and catch/effort, especially regarding juvenile tuna mortality.
BFT-E and BFT-W	Late May 2006	Madrid	[Rec. 04-05]	Full catch and effort for 2005 for eastern fisheries unlikely to be available, evenif held in September.
BUM and WHM Assessment	Mid-June 2006	Madrid	[Rec. 04-09]	Complete 2005 catch and effort data unlikely to be available, even if held in September.
ALB-N and S Data Preparatory	Early July 2006	Madrid		Preparations necessary for conduct of 2007 stock assessment.
SWO-N and S Assessment	Early September 2006	Madrid	[Rec. 03-03]	September is the earliest date when complete 2005 catch and effort from the majority of the fleets could be available.

Even if assessments are not periodically requested by the Commission (or accepted when they have been proposed by the SCRS), the Committee considers that it is its responsibility to carry out regular monitoring (annually inasmuch as possible) of the development of the fisheries and to routinely conduct the necessary analyses that will permit formulating advice on the most recent state of the stocks for which it is responsible. This is, in particular, the case when the available evidence is contradictory or indicative of poor stock status.

14.2 Date and place of the next meeting of the SCRS

It was agreed that the next meeting of the Standing Committee on Research and Statistics will be held in Madrid, October 2 to 6, 2006.

15. Recommendations

Note: Recommendations with direct implications to the regular Commission budget are identified with an asterisk **(*)**.

15.1 Tropical species

The Tropical Species Working Group recommends that tagging programs be continued in the future, as they provide essential information for evaluation, and consequently to enhance answers to the questions posed by the Commission.

The last skipjack assessment was done in 1999, using data up to 1998. For future work, the Tropical Species Working Group recommends that the Secretariat update the skipjack catch-at-size dataset, following the procedures defined in 1999, in collaboration with the skipjack species group rapporteur. To do so it is fundamental that the major countries with skipjack catches report catch-at-size data two weeks before the meeting.

In order to eliminate the discrepancy in temporal and spatial resolution between longline and surface fisheries, all industrial fleets should report Task II statistics by month and 1°x1º squares. This would facilitate the evaluation of the potential impact of management measures such as spatio-temporal closures.

If a minimum size limit is to be implemented, it should apply to both yellowfin and bigeye tuna. Consequently, if the size limit on bigeye is eliminated, the Tropical Species Working Group strongly recommends that the size limit for yellowfin also be eliminated.

The Tropical Species Working Group encourages all Contracting Parties to fulfill the data requirements laid out by the Convention and that data reported to the Secretariat contains as much spatial and temporal information as

is possible to gather. Evaluation of spatio-temporal closures and similar management measures relies on the availability and quality of catch and effort data, and on the precise description of its origin in both time and area.

Due to the multi-specific nature of fisheries that catch bigeye, yellowfin and skipjack (especially surface fisheries), the analysis of the potential impact or the realized effectiveness of single-species regulations is difficult to ascertain. The Tropical Species Working Group recommends that the development of methods that take into account multi-species fisheries be intensified.

Although tuna stocks, fisheries and markets are very similar world wide, tuna stock status tends to be evaluated independently by the various tuna commissions. It is recommended by the Tropical Species Working Group that for future stock assessments, ICCAT working groups should have access to the most recent analyses (hypothesis, methods and results) from other tuna commissions in other oceans, as this external information could be highly valuable in the improvement of the ICCAT assessments.

15.2 Albacore

The Committee appeals to major fisheries fishing for North Atlantic albacore to ensure that historic and future Task I data are provided by gear-type as well as the corresponding Task II data.

The Committee reiterates the need for all countries fishing for Mediterranean albacore stock to report Task I and Task II data.

15.3 Bluefin tuna

The SCRS has developed a proposal for Bluefin Tuna Research which encompasses necessary research activities of coordination, compiling and collection of basic data, stock structure and dynamics**,** environmental variability, and modeling. At the request of the Commission, the SCRS prioritized these research activities (see section 16.7).

(*) The SCRS strongly recommends that this prioritized research program in all of its aspects be implemented.

Additionally, it should be reiterated that collection and reporting of catch and effort is a basic responsibility. Past failures to meet obligations have led to extreme uncertainties in even the basic level of catch and its composition for bluefin, especially in the Mediterranean.

15.4 Swordfish

The SCRS reviewed discrepancies between FAO and ICCAT data for swordfish identified in SCRS/2005/089. While there appear to be substantial landings of swordfish that could be incorporated into the ICCAT data base, the group recommended that the Secretariat first request clarification from the countries involved about the reasons for these discrepancies before further considering incorporation of these data into the ICCAT data base. A preliminary evaluation of these discrepancies was presented to the SCRS and is available from the Secretariat.

In preparation for the 2006 assessment the Committee recommends all Contracting Parties address to the Swordfish Work Plan for 2006 (see **Appendix 13**).

The 2003 assessment indicated that the current exploitation level for Mediterranean swordfish may be sustainable in the short-term, but that recent fishing mortality rates were well above the levels traditionally taken as appropriate to achieve MSY for most stocks. Accordingly, the Committee remains concerned abut the high levels of fishing mortality estimated for Mediterranean swordfish.

15.5 Billfish

A number of research recommendations are made in preparation for the marlin assessments of 2006, implementation of many of these are tied to obtaining sufficient funds for the Enhanced Research Program for Billfish (ERPB). The Committee recommends that the Commission provide the funds requested for the ERPB (*).

- Countries where moored FADs are been used to capture pelagic fish should aim to quantify marlin catches made around these.

- Catches of unclassified billfish continue to be reported to the Committee. The Committee recommends that, in the future, every effort should be made to report catches by species for all fisheries and to separate historical catches of unclassified billfish that remain in the ICCAT database.

- The Committee recommends that at the 2006 marlin assessment analyses should focus on:
  - Examination and interpretation of recent trends in relative abundance.
  - Quantitatively describe the likelihood of being able to detect any current and future rebuilding of marlin stocks.

The Committee continues to encourage the collection of biological statistics, like size frequencies, especially for those fisheries were the current available size information is limited such as for many artisanal fisheries.

15.6 Sub-Committee on By-catch

The Committee endorses the recommendations made in the report of the Sub-Committee on By-catch. The following is a list of recommendations with financial or policy implications reported by the Sub-Committee on By-catches in 2005.

- The Committee recommends that the SCRS develop a proposal for reorganizing the Sub-Committees on By-Catch and on Environment over the next year. The proposal should include: (1) an ecosystem /environment/by-catch Sub-committee whose mandate is the implementation of ecosystemic approaches into the SCRS's research, science and scientific advice; and (2) a shark working group which maintains by-catch data collection and by-catch monitoring activities. Terms of reference should be developed for the new organizational structure.

- (*) The Committee recommends that the Commission hire 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. It is important to provide a basis for quantifying by-catch levels.

- The Commission has started to take measures to reduce fishing capacity, which may indirectly help reduce the magnitude of by-catch species such as sharks, turtles and birds. The Committee recommends that mitigation measures which have been demonstrated to reduce or eliminate interactions of by-catch species with tuna fisheries should be instituted by CPCs. The Committee also encourages further research into fishing gear modifications that can lead to reductions in by-catch.

15.7 Sub-Committee on Environment

The Committee recommends that the GAO software be updated for better spatial and temporal coverage. For this purpose, it recommends that an expert be contracted for a period of two months at an estimated cost of €5,000 for 2006.

15.8 Sub-Committee on Statistics

- The Committee recommends reporting the total catches from the entire Atlantic in the traditional format and deadline as well as the Task II data. The Committee recommended that the countries also submit Task I catches by 5x5 areas, gears and calendar quarters as a Task I supplement. If the countries can not

disintegrate the total catch in these strata, the finest strata as possible can be adopted for this purpose (e.g. 5x10 or 5x5 biannual).

- Considering that in 2006 several assessments will be conducted, the Committee recommends that data be reported at least two weeks before the meetings.

- Taking into account the diversity of ways in which tagging data are reported to ICCAT, the Committee recommends that a protocol for presenting tagging data be analyzed, similar to the ones used for Task I and Task II. This should be carried out by the Secretariat, in consultation with the Tagging Group (see Section 17).

- The Committee urges the scientists to collaborate in improving the Task II information, placed on the ICCAT web site in 2005, which at times are somewhat incomplete, questionable and/or uncertain.

- (*) Noting that there were historical data previously used by SCRS working groups to do their yearly stock assessments and not available in the present ICCAT database, or existing in other sources. The Committee recommends that the ICCAT Secretariat initiate a “data recovery plan”. This plan should target (1) the identification and (2) the recovery of historical tuna data that are not presently available in the ICCAT database. In addition, the Committee recommends that part of the Data Fund be used to start this work.

15.9 General recommendations

(*) The Committee recommends that external experts be called to participate as peer reviewers in the three stock assessment meetings that will take place in 2006 and that funding be provided for this purpose.

The Committee recommends that contracting parties make voluntary financial or in-kind contributions for the completion of the revised ICCAT Manual in 2006.

Noting that regular stock assessments are critical for sustainable management of fishery resources and considering the length of time that has passed for some ICCAT stocks since the last assessment, the Committee will reinstitute a schedule of assessments fro the next 2-5 year period. This schedule will be developed in 2006, and while intended to provide a regular schedule of monitoring, will also be flexible to accommodate unforeseen issues. The Committee strongly recommends that the Commission support and respect this schedule for stock assessment.

16. Responses to the Commission’s requests

16.1 Impact of the season/area closure on the stocks [Rec.04-01]

The 2004 *Recommendation by ICCAT on a Multi-Year Conservation and Management Program for Bigeye Tuna* [Rec. 04-01] mandated the SCRS to "examine in 2005 the impact on stocks of [a closure to purse seine and baitboat fishing during the month of November in the area between 0º-5ºN and 10º-20ºW], and shall recommend the necessary modifications that would improve its effectiveness and review possible modifications to be applied to the closure."

The Committee analyzed the Recommendations adopted by the Commission concerning bigeye tuna management measures and expressed its regret and surprise that this decision was made without scientific advice and without taking into account analyses of the moratorium conducted by the SCRS in the past. In insisting on the risks involved in such a decision, the Committee requests that the Commission take scientific advice into consideration before taking any decisions that may have a direct impact on the stocks.

The Committee noted that its ability to examine the real impact of the closure was limited because the closure had not been implemented yet (the first closure would take place in November 2005, after the SCRS meeting). Ideally, evaluating the potential effect of a spatio-temporal closure of this sort requires data on catch, effort, and size distribution of catches by fleet in fine detail, both in time and space. The Committee emphasizes that it is essential for CPCs to comply with their data collection and reporting requirements.

Furthermore, the Committee notes that there is substantial uncertainty concerning natural mortality and migrations, parameters which are fundamental to the evaluation of the overall impact of the closure on the stocks. Increased research (e.g., through tagging) would improve the precision of the estimates of these parameters and therefore improve the scientific advice.

Figure 16.1 shows the moratorium area established previously by the 1999 *Recommendation by ICCAT on the Establishment of a Closed Area/Season for the Use of Fish-Aggregation Devices (FADs)* [Rec. 99-01] as well as the so-called "Piccolo" area, the closure established by [Rec. 04-01].

The Committee compared mean catches of yellowfin, bigeye and skipjack made by purse seiners and baitboats in the moratorium area during the 1993-1996 and 1998-2004 periods. From this, the effect of replacing the [99-01] moratorium with the [04-01] time/area closure was estimated as the difference between the catch before and during the moratorium, and the mean catch obtained in the "Piccolo" area in the 1993-1996 period. This difference was corrected by the observed changes in effective effort, calculated from the difference between periods (26% reduction for the EC-PS fleet, and a 122% increase in catch by Ghana; in terms of effort, a 36% reduction and a 94% increase for both PS fleets, respectively). **Table 16.1** presents a summary of the results of these calculations by gear and species. The expected effect of changing the time/area closure is an increase in juvenile catches.

An evaluation of catch-at-size data by quarter and by 5^{o} grid determined that the highest catches of juveniles was occurring in the grid 0-5^{o}N to 0-5^{o}W during the first quarter, and not in the Piccolo area. Evaluating a one-month closure of this alternative area on catches of juveniles demonstrated that even full compliance was likely to generate larger catches than were taken during the previous moratorium. Larger areas and longer time periods could be further evaluated, but none of the closures analyzed thus far are more effective than the closed area defined in [Rec. 99-01].

In surface area, "Piccolo" represents approximately 21% of the area contained in [Rec. 99-01]. Considering that the new seasonal closure is one-third of the duration of the [Rec. 99-01] closure, the effective time-area extent of the new closure is approximately 7% of the previous moratorium. Therefore, the projected increase in juvenile catches is not surprising.

Table 16.1 Increases in catch (t) by fleet expected from the implementation of the time/area closure in [Rec. 04-01], and as a percentage of the total catches by surface fleets in 2003. Ghanaian catches were not split by species as doubts exist on the reliability of the reported species composition for small tuna.

	Species							
Fleet	*YFT*		*BET*		*SKJ*		*Combined*	
EC PS	1708	1.78%	3260	12.10%	10311	7.45%	15279	5.84%
Ghana PS+BB							5596	2.05%
All fleets							20601	7.78%

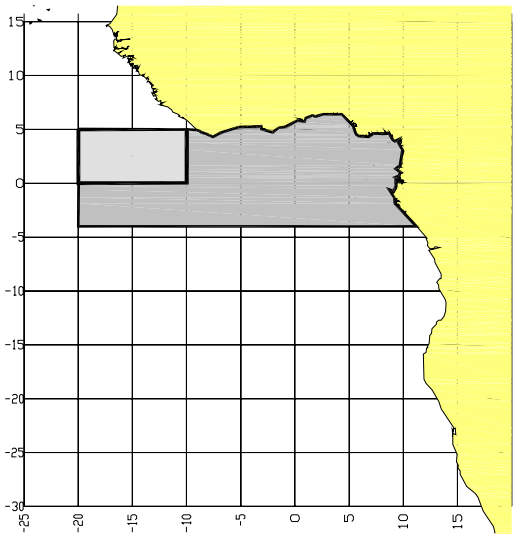


Figure 16.1. Spatial extent of the area closure in [Rec. 04-01] (smaller rectangle, light gray) and the moratorium area in [Rec. 99-01] (larger area, dark gray).

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

The Committee noted that the Commission established a new minimum size recommendation [Rec. 04/07]. Additionally, in response to [Rec. 02-09] a plan to reduce the catches of small fish in the Atlantic and Mediterranean was introduced by several EC countries and Croatia. The Committee will evaluate the effectiveness of these plans when conducting the next assessment. However, preliminary analyses were done for this meeting.

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

The *2002 Resolution by ICCAT for the Evaluation of Small Swordfish Mortality* [Res. 02-04] asked that the SCRS "monitor and analyze the effects on the mortality of immature swordfish, the stock, and fishing activities of the new management measures for North Atlantic swordfish for 2003 and 2004" and report to the Commission in 2005.

According to the management plan for the stock (*Recommendation by ICCAT Relating to the Rebuilding Program for North Atlantic Swordfish* [Rec. 02-02]), the SCRS should have conducted an assessment in 2005. However, the assessment schedule was later changed to 2006 (*Recommendation by ICCAT to Amend the Rebuilding Program for North Atlantic Swordfish and South Atlantic Swordfish* [Rec. 03-03]).

The Committee therefore believes that it would be more appropriate to carry out the evaluation of immature swordfish mortality in 2006, in synchrony with the stock assessment. The Swordfish Work Plan for 2006 **(Appendix 13)** includes plans to update the catch-at-size database in order to enable this evaluation.

16.4 Consideration of recommendations from the 3rd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies

The 3rd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies (Fukuoka, Japan, April 20-23, 2005) recommended that the SCRS undertake numerous evaluations of alternative management strategies. Some of those evaluations could be conducted currently and preliminary results are reported here. Others must wait until the next bluefin stock assessment is completed and then evaluations may be made in the context of those assessment results. Finally, some evaluations cannot reasonably be completed until adequate long term research is done.

The current evaluations examined the effectiveness of minimum sizes in the east and the potential for spawning area closures. The current evaluations are limited by the lack of catch-at-size data by area, gear and time period, especially in the Mediterranean. Additionally, the current resolution of the ICCAT data does not permit precise estimation of potential improvements in stock status and in the fisheries. The landings information in the Mediterranean will continue to be monitored. The adequacy of farming and trade records will continue to be evaluated in the future. A thorough review of the use of these data and additional methodologies for estimating unreported catch should be undertaken in advance of the next assessment.

Potential effectiveness of minimum sizes

For the eastern stock, [Rec. 04-07] established new minimum size limits of 10 kg and 6.4 kg (with no tolerance) in the Mediterranean and eastern Atlantic, respectively. Because these new limits only entered into force in June 2005, it is too early to evaluate them with observed results. The Committee therefore carried out theoretical yield-per-recruit (YPR) calculations to address the long term potential impact of these limits.

The YPR analyses were based on the fleet-specific selectivity patterns for the early 1990s that were estimated in the last (2002) assessment, which reflect the size limits that were in force at that time (i.e., from [Rec. 74-01]). The Committee then calculated the changes in equilibrium yield-per-recruit and spawning-biomass-per-recruit that would result from applying different selectivity patterns that reflected different size limits. The Committee also examined different levels of implementation error (see **Table 16.4**). The results suggest that the new size limits could increase yield and spawning biomass per recruit substantially compared to the early 1990s situation (Y/R and S/R could increase by 8.8% and 16.5% respectively). However, these potential benefits could be foregone if the size limits are implemented with error. It is also evident from these analyses that these size limits alone are not sufficient to achieve MSY biomass levels.

Table 16.4. Long-term yield and spawning biomass per recruit (S/R) for BFT-East resulting from different size limits with varying levels of implementation error (but at current effort levels). Percent differences are relative to the first row.

Regulation	*Error*	*Y/R*	*(% diff)*	*S/R*	*(% diff)*
[74-01]	Unknown	10.92		67.74	
[04-07]	0	11.88	8.8	78.88	16.5
[04-07]	25%	11.62	6.5	75.94	12.1
[04-07]	50%	11.38	4.2	73.12	7.9

Potential effectiveness of spawning area closures

Bluefin spawning in the Mediterranean occurs from mid-May through mid-July and mainly during May in the Gulf of Mexico. During the spawning season, bluefin tuna concentrate in certain areas and this produces changes in catchability. Larval density distributions provide a basis for description of the known spawning areas for bluefin. Larval sampling has not yet been systematically conducted, and so important spawning locations might go unidentified.

Based on catch data, a time-area closure of the entire Mediterranean in April-June to protect spawning aggregations could result in a reduction of catch from the Mediterranean on the order of 40% (assuming that the displaced effort would not compensate). Mediterranean catches represent close to 100% of the Eastern plus Mediterranean area catch of large fish and about 60-80% of the catch of small fish of from the Eastern plus Mediterranean area. Closure of the entire Mediterranean during July-September results in a reduction of catch on the order of 30%, again presuming no compensation by the displaced effort. Such compensation would diminish the catch savings. In some cases displaced effort due to a Mediterranean closure cannot be compensated because the fisheries of some countries have no further bluefin fisheries other than those in the Mediterranean. Finer scale closures of spawning areas within the Mediterranean during the spawning season would likely result in lower potential savings in catch, but the current resolution of the ICCAT data does not permit more precise estimation of this potential.

The data indicate that the highest quarterly catch volumes from the Gulf of Mexico occur January-June. Based on these data a time-area closure of the entire Gulf of Mexico in April-June to protect spawning aggregations could result in a reduction of catch from the Gulf on the order of 65%, presuming that the displaced effort would not compensate. Closure of the entire Gulf of Mexico during quarters January-June to protect spawning age fish could result in a reduction of catch on the order of >90%. However catches in the Gulf of Mexico represent less than 10% of the overall western bluefin tuna catch of larger fish and the fisheries in the Gulf of Mexico do not solely target bluefin. Finer scale closures of spawning areas within the Gulf of Mexico during the spawning season would likely result in lower potential savings in catch, but the current resolution of the ICCAT data does not permit more precise estimation of this potential.

If the west bluefin stock does not substantially mix with the east, then closure of the Gulf of Mexico during spawning times (and with effort in other areas and times remaining the same) would be expected to increase overall western spawning biomass (S/R) in the long run to about 14% more than current levels with an increase in yield (YPR) of about 9%.

If substantial mixing *does* occur, then the potential for improving the long term eastern and western stock status and eastern and western fisheries by closing both spawning areas could be larger. However, the success of these closures could only be achieved by eliminating the fishing opportunities of some countries that have no other access. We do not have good estimates of the rates of mixing as of yet.

Other management alternatives

More elaborate management strategy evaluations than those which are addressed here will have to be addressed in the context of the next stock assessment when the stock sizes and fishing mortality rates are re-estimated based upon changes in the catch, catch-at-size, catch-per-unit-effort, tagging and other relevant biological information. The data limitations, especially in the Mediterranean may limit the methods that may be used for the assessment and for analysis of management strategies. Furthermore, consensus on providing a balanced set of advice with respect to other time-area closures could not be achieved during this meeting.

Additionally, uncertainties in determining the effectiveness of alternative management strategies are likely to remain large without an investment in comprehensive long term research.
The feasibility of alternative procedures to address spatial mixing between eastern and western bluefin

The SCRS examined the feasibility of operating modeling approaches and concluded that operating models appear to be a useful mechanism for evaluating management procedures. A schedule for the development of these activities is given in SCRS/2005/011.

16.5 Review of 5% fin-to-body weight retention ratio for sharks [Rec. 04-10]

Recommendation 04-10 indicates that the SCRS shall review and report back to the Commission in 2005 the revision of the ratio between fins and onboard weight of sharks, if necessary. The SCRS reviewed three SCRS documents presented in recent years (Mejuto and García-Cortés 2004, Santos and García 2005, and SCRS/2005/086) and other available information on this issue. The two first SCRS papers included information taken by observers at sea in the EU fleet, while the last SCRS paper was a review of information available throughout the world.

A number of national or regional regulations have been laid down in recent years to ban or limit finning practices (in which the fins are retained and the rest of the body is discarded), for the purpose of promoting the use of as much of the whole body as possible of the specimens landed, according to FAO initiatives. In keeping with this, several countries have established regulations to reduce finning practices with whole body discard, requiring the necessary equivalences between the fin weight and respective body weight in the landings. However, owing to the different species of sharks that may be caught or targeted by the different fisheries of the world, which are likely to have different fin-to-body weight ratios, and the varying fish preparation and utilization criteria on board the different fleets, it would not appear to be advisable to establish universal fin-to-body weight ratios. Consequently, to be effective, these regulations must take into account the species of sharks and the fleet behavior.

In addition to compliance issues, accurate conversion factors between fin weight and landed or whole body weight could be very useful in future scientific efforts to estimate levels of catches of some of these species from fin landings and fin markets. One such exercise was already undertaken in the 2004 ICCAT assessment of blue shark, where total catches were reconstructed based on data from the Hong Kong shark fin trade. Thus, the accuracy of conversion factors is vital for estimating catches made by international fleets, including catches by national or multinational fleets (which should be accurately reported to the international fisheries bodies) or catches by important foreign fleets into national ports and markets which are normally transfer places to the final destination in Asian markets. Fin-to-body weight ratios can significantly affect the catch estimation and ultimately influence assessment results.

Definition: The commercial fin set is defined as the combination of fins which are kept for commercial purposes by fishermen in each boat/fleet. In the case of the US fleet, it generally consists of the *primary fin set* (first dorsal, two pectoral, and lower lobe of the caudal fin), whereas in the case of the European fleets it includes all the fins, including the entire tail (see **Figure 16.5**, which was extracted from Santos and García 2005.

SCRS/2003/085 used a total of 8000 records of 10 different large pelagic sharks**.** The fin-to-body weight ratios obtained suggest important differences among the ten more prevalent species in the catch. The largest mean percentage was obtained for the oceanic whitetip shark *Carcharhinus longimanus* with around 16% of the dressed body weight when using the largest sample size of 529 fish, and about 10% when considering round body weight. The mean percentage of fins for over 6,700 individuals of the blue shark *Prionace glauca* was around 14% for dressed body weight and 6.5% for round body weight. If a combination of shark species were to be considered, the percentage would, by necessity, be very close to the values obtained for the blue shark because it is clearly the most prevalent species in the large pelagic system and in the Spanish longline fleet, as well as one of the most prevalent species in the international fin markets from long-distance pelagic fleets. Fin-to-body weight ratios did not vary for a wide spectrum of sizes in *P. glauca* or *Isurus oxyrinchus*. This suggests that it is appropriate to use species-specific mean ratios for all sizes combined or to use threshold values by species or groups of species defined by means of their respective upper confidence limits for compliance purposes. The paper indicated that each national fleet may have different criteria for dressing the fish onboard. As a result, the fin-to-body weight ratios by species could be different, especially among fleets or, to a lesser extent, among boats.

Information from at-sea observers in the Portuguese surface longline fleet was provided in Santos and García 2005.

A total of 99 blue shark individuals were sampled. Individual round weight and individual fin weights were measured. The mean wet fin weight (all fins combined; Figure 1) to round body weight percentage was 6.6%.

SCRS/2005/086 a preliminary re-assessment of the validity of the 5% fin-to-dressed carcass weight ratio for sharks. The main point of this document, which conducted a review based on various fishery-dependent and fishery-independent sources that included the two documents summarized above, was to emphasize that the fin-to-weight ratios are highly variable, depending on the species, fin set used, and fin cutting technique. The main conclusion was that when using the primary fin set (composed of the first dorsal, two pectoral, and lower lobe of the caudal fin; **Figure 16.5**), as is traditional in the USA, the 5% fin-to-dressed weight ratio is generally an upper limit that is not inappropriate. However, different ratios may be appropriate for other fleets/nations that keep a different set of fins (especially those that keep the whole caudal fin as is the case in the Spanish and Portuguese surface longline fleets) or even use different cutting techniques. The paper emphasized the importance of clearly stating which fins and body weight are used in the calculation of ratios. The paper also identified some potential management alternatives, such as the use of species-specific ratios or grouping of species with similar ratios to facilitate management and reduce finning. Development of species-specific ratios was deemed especially important when used in the estimation of total catches. The document concluded by stating that the only way to avoid finning was to land sharks with all fins attached.

Conclusions

European longline fleets

Results from large sample sizes in European (both Portuguese and Spanish) surface longline fleets, indicate that for blue shark *Prionace glauca* the average percentage of all commercial fins is around 6.5% of the total round body weight and around 14% of dressed body weight, according to the dressing criteria used in both fleets. These results are consistent for all size categories. If a combination of shark species were to be considered, the percentage would necessarily be very close to the values obtained for the blue shark because it is clearly the most prevalent species in the landings of the EU surface longline fleet. However, for compliance purposes, it could be more appropriate to use threshold values by species as blue shark, or groups of species, defined by means of their respective upper confidence limit values or other metrics.

U.S. fleet

Summarized results from several studies conducted in the USA, which include a wide variety of species, mostly large coastal sharks, many of the genus *Carcharhinus*, revealed that the ratio of wet fin to dressed weight rarely exceeds 5% (only in the case of the sandbar shark *Carcharhinus plumbeus*, which is one of the main species caught by the U.S. bottom longline fleet). The fins retained in U.S. fisheries generally consist of the first dorsal, two pectoral, and lower lobe of the caudal fin only. The aggregated wet fin to dressed body weight ratio obtained from the bottom longline directed shark fishery observer program for all species combined and averaged over six years of data (n>27000) was 4.9%. Aggregated data from limited additional sampling of a single commercial fishing vessel targeting large coastal sharks resulted in a very similar ratio (4.5% of wet fin to dressed carcass weight). It must be pointed out that the averages derived in several studies in the USA represent unweighted means, i.e., they were not weighted by the relative contribution of each species in the catch. In all, based on the available data, the 5% ratio presently in effect in the United States appears to be an upper limit, with most species exhibiting lower ratios (with the notable exception of the sandbar shark). This means that finning can occur when species with lower ratios are caught. Use of species-specific values or values for groups of species with similar ratios would be preferable but may be hard to implement from a management perspective. The preferred alternative to avoid finning and circumvent the imposition of ratios would be to land shark carcasses with fins attached.

General conclusions

The different criteria for cutting fins, dressing the fish, and drying the fins onboard by the different fleets, as well as the fins or part of fins that are retained, explain the vastly different ratios obtained for the same species when comparing European fleets, US fleets, and other ratios reported in the literature from other fleets. It also makes it very difficult and inaccurate to apply a single, universal numerical ratio without full knowledge of the methods used by each fleet, particularly when this ratio is defined in terms of weights that have already been processed

(dressed, gutted, etc.), or fins in varying stages of drying, or when only some of the fins or parts of fins are included in the calculations.

The lack of precaution in making these comparisons has, on occasion, led to incorrect conclusions or inferred apparent numerical discrepancies among authors that might not exist. Apart from minor methodological differences among authors, these apparent numerical inconsistencies in the ratio of fin weight to body weight are more likely to be an indication that the different authors/fleets are not using the same fins, or cutting the fins or dressing the animals in the exact same way. An example is that the weight of shark fins has often been cited as only accounting for 1 to 5 percent of the dressed body weight, but this range only applies to *the primary fin set* (first dorsal, two pectoral, and lower lobe of the caudal fin) for a large group of species. When considering *all commercial fins* in oceanic large pelagic sharks this ratio can reach 14% of the dressed body weight, as found for the blue shark in the European surface longline fleet.

The SCRS thus recommends that conversion factors between fins and body weights be developed and implemented on a species- and/or fleet-specific basis.

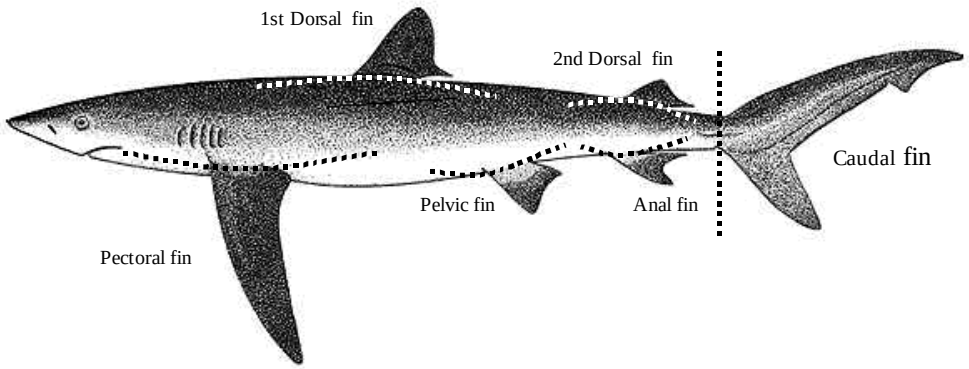


Figure 16.5. Shark fin nomenclature as reported in Santos and García 2005. Pectoral and pelvic fins are paired fins. The exact cutting procedure may vary by fleet.

16.6 Review of shortfin mako assessment [Rec. 04-10]

The Commission directed in [04-10] that in "2005, the SCRS shall review the assessment of shortfin mako sharks (*Isurus oxyrinchus*) and recommend management alternatives for consideration by the Commission." This review was undertaken as the Committee cannot rule out the possibility that the current shortfin mako shark biomass in the North Atlantic is below the biomass that can support MSY. Should the Commission wish to improve the status of this stock, measures to reduce fishing mortality should be taken. Shortfin mako sharks are taken in a broad range of fisheries, both as targeted catch and as by-catch in multi-species fisheries, and our knowledge of overall catch levels is inadequate. As such, there is no basis for recommending catch limits for this stock .Although technical measures such as modifications to fishing gear, restrictions on fishing areas and times, minimum or maximum sizes for allowable retained catch might prove beneficial, without more detailed information gathered through research programs designed to estimate the potential benefits of such measures, the Committee recommends that reductions in fleet capacity and effective effort could provide the most direct benefit to shortfin mako sharks.

16.7 Review and Prioritization of Proposed Bluefin Tuna Research Program

Following from the 3rd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies (Fukuoka, Japan, April 20 to 23, 2005), at which it was recommended "that the research efforts needed to be better harmonized and coordinated and that the SCRS should establish priorities within its proposed research program and in this regard should inform the Commission on the feasibility of operational models to take account of mixing," a previous research plan (Anon 2004a) was reviewed in the context of ongoing and recent national and BYP-sponsored bluefin research as well as new research activities reported at the meeting.

At the outset of this review, it was reiterated that collection and reporting of catch and effort is a basic responsibility of the CPCs. Past failures to meet these basic obligations have led to extreme uncertainties in even the basic level of catch and its composition for bluefin (and other species), especially in the Mediterranean.

The Committee was informed of a large-scale tagging program (in excess of €1,000,000) co-funded by the European Commission and EU Members which will be undertaken in 2005/2006. The main component of the program is electronic tagging of adult bluefin in the Mediterranean and eastern Atlantic. It was noted that this level of funding is in line with the research plan presented in Anon 2004a and should provide useful results for further addressing stock dynamics hypotheses raised on the basis of electronic tagging of bluefin in the western Atlantic (Block *et al.*, Nature, 2005). Initiation of this project permits large reduction in the estimated costs of conducting the Research Plan outlined in *op. cit.* and the Prioritized Research Plan presented in **Table 16.7** reflects both this and the prioritization scheme agreed by the Committee. Additional cost savings are based upon the assumption that implementation of the Madrid Protocol will provide the Secretariat with sufficient flexibility to cover the additional data base management costs expected to accrue due to the research program. Within the Prioritized Research Plan, priority rank 1 was placed on Plan elements that are essential to addressing the most important uncertainties relative to the Atlantic and Mediterranean bluefin resource status. Priority rank 2 was assigned to Plan elements which are desirable in the short-term to address Commission concerns while priority rank 3 was placed on elements which are desirable in the longer-term.

Table 16.7. Prioritized Atlantic Bluefin Tuna Research Program Plan.

Item	*Anticipated leadership*	*Research timeframe[A]*	*Cost Estimate[B]*			*Priority[C]*
			Set-up year	*Year 1*	*Annual costs thereafter*	
COORDINATION						
Hiring of Scientific Coordinator[D]	Secretariat/SCRS	On-going	€100,000	€100,000	€100,000	1
Travel and scientific coordination[E]	Coordinator	On-going	€60,000	€60,000	€40,000	1
Data Management Costs	Secretariat	On-going	In-kind, estimated at €40,000	In-kind, estimated at €161,500	In-kind, estimated at €148,500	1
RESEARCH						
1. Basic data						
Catch estimation methodologies and basic catch - statistical uncertainties, farming; substitution of size data; inventory of fisheries[F]	Coordinator and BFT Rapporteurs	Multi-year	--	€150,000	€150,000	1
Ageing of the catches[G]	Coordinator, National Scientists	Multi-year	€100,000	€20,000	€20,000	3
Effort, CPUE, and fishery independent abundance indices - Development methods manual - Experimental design for coord. surveys[G]	Coordinator and Chairman of Methods WG, National Scientists	1 year	€20,000	--	--	1
Reproductive biology[H] - Coordination meetings among labs - Invest in new techniques - Continue traditional sampling	Coordinator & National Scientists	Multi-year	--	€100,000	€100,000	2
Natural mortality	Coordinator & National Scientists	Multi-year	--	In-kind	In-kind	3
Data Rescue[I]	Coordinator & National Scientists	2 year (2nd-3rd)	--	€75,000	€75,000	2
2. Stock structure and dynamics						
Tagging[J,K]						
- Genetic tagging feasibility[L]	Coordinator & National Scientists	1 year feasibility with follow-on if successful	€25,000	--	--	1
- Conventional/genetic tagging[J]	Coordinator & National Scientists	At least two years of tagging			€250,000	2
- Electronic tagging[K]	Coordinator & National Scientists	At least two years of tagging			€500,000	2
Biological markers - Coordination meetings among labs - Invest in new techniques - Continue traditional sampling	Coordinator & National Scientists	Multi-year	--	€100,000	€100,000	1

3. Environmental variability						
- Procurement, implementation and management of large oceanographic databases[M]	Coordinator, Environment WG, Contract	2 years	--	--	--	3
- Spawning/reproduction	Coordinator, Environment WG, Contract	Multi-year		€15,000	€15,000	3
- Larvae and recruitment	Coordinator, Environment WG, Contract	Multi-year		€15,000	€15,000	3
- Catches or CPUEs	Coordinator, Environment WG, Contract	Multi-year		€15,000	€15,000	2
- Abundance of forage species	Coordinator, Environment WG, Contract	Multi-year		€15,000	€15,000	3
4. Models						
Models of underlying biological and fishery dynamics - Hardware, software and contracts	Coordinator, National scientists and BFT Rapporteurs	3-4 years	€120,000	€90,000	€30,000	1
Assessment models	Coordinator, National scientists and BFT Rapporteurs	3-4 years		€75,000	€30,000	3
Assessment models & management procedures and scenarios	Coordinator, National scientists and BFT Rapporteurs	3-4 years		€105,000	€120,000	2
Overhead @ 5%	Secretariat		€21,250	€46,750	€78,750	

Total Priority 1	**€341,250**	**€525,000**	**€441,000**
Total Priority 1&2	**€41,250**	**€834,750**	**€,554,000**
Total Priority 1,2 & 3	**€446,250**	**€981,750**	**€,653,750**

[A] Multi-year research time-frames imply that the immediate time-frame required is not obvious but these research elements will be re-evaluated and re-prioritized after 3 years of the Program.

[B] Funds requested do not include in-kind cost estimates, including the additional data management costs to the Secretariat implied by the proposed research activities. These costs are assumed to be appropriately addressed through the Secretariat's operating budget.

[C] Priority rank 1 was placed on Plan elements that are essential to addressing the most important uncertainties relative to the Atlantic and Mediterranean bluefin resource status. Priority rank 2 was assigned to Plan elements which are desirable in the short-term to address Commission concerns while priority rank 3 was placed on elements which are desirable in the longer-term.

[D] Includes salary and benefits.

[E] Includes considerable East Atlantic coordination to collect samples: about 20% of one person's time as an in-kind contribution, plus 10,000 Euros for travel for this advisor.

[F] Progress on substitution of size data has been realized and reported in Anon 2005b.

[G] Initiated under BYP at low level; progress expected to be much slower than outlined in Anon 2005c.

[H] Addressed through a variety of Programs including BFTMED, FAO sub-Regional projects, BYP, etc.

[I] Reclamation and computerization of historical data useful for evaluating changes in long-term productivity, growth, etc.

[J] €250,000 for conventional/genetic tagging allocating between research elements depending upon feasibility study results.

[K] Recent expenditures now exceed €5M (mostly in the western Atlantic) and includes in excess of €1M for eastern Atlantic and Mediterranean electronic tagging starting in 2005/2006. That level is in line with recommendations in SCRS/2003/014, but without the anticipated coordination through SCRS which may result in a slower return on investment; priority set at 2 and shall be reevaluated as more recent results become available. Anticipated cost of €500,000 for electronic tagging in different areas and for smaller size fish.

[L] A technique that uses genetic markers (DNA) as individual tags. Such a method may avoid post-release mortality effects and difficulties related to reporting rates. See, for example, Pasboll *et.al* (1997).

[M] This Plan element has been accomplished through national contributions.

17. Other matters

17.1 Operating Fund

The Committee expressed concern that its recommendations that have financial implications usually reach the Commission after a draft budget has already been prepared for the following year. Because of this, the Commission should consider the establishment of an Operating Fund to anticipate priority requests from SCRS.

17.2 Proposal for the creation of a Group on Tagging Information

Objective: The objective of this group is to channel and make use of the experience of the scientists so that it is available for new tagging activities.

Comprised of SCRS scientists who have ample experience in tagging. This group will collaborate directly with the ICCAT Secretariat staff.

Tasks assigned to the group:

- Provide information on the types of tags used, according to the species and their size, and the types of applicators.
- Provide information on how to manipulate the fish during tagging to avoid harming the fish, according to the characteristics of each species.
- Indicate the type of information that should be collected from the fish tagged and the most adequate tools to use.
- Standardize the tag rewards.
- Collect information on on-going tagging programs and publicize tagging activities.
- Collaborate with the Secretariat in the maintenance and improvement of the database.
- Transmit information on the design of the tagging activity based on the objectives.
- Transmit information on the preliminary work concerning tagging, for example, double tagging with different types of tags, injuries produced by the tagging, etc.).
- Transmit information on the computer models and applications available for the exploitation of the data (migratory routes, mortality, growth, population size, etc.).
- Cooperate with other tuna commission to exchange information on tagging and tagging results.

17.3 Critique of scientific paper

The EC presented the possibility that the Committee respond to the conclusions of the article by (Myers and Worm, *Nature, 2003*) concerning the state of the stocks of tunas and tuna-like fish, prepared based on the trends of the standardized longline catch rates, which questions many of the conclusions reached by the SCRS in the past. From the basis that the Committee's work is directed at advising the Commission, discussion ensued on whether the Committee should get involved, at this level, in the scientific community and what mechanisms could be developed to respond to articles of this type. ICCAT scientists who have expertise on this matter are invited to respond on an individual basis.

17.4 Peer reviewed journal and dissemination of scientific results

The Committee again discussed the possibility of creating a peer reviewed journal, separately from the *Collective Volume* series, where selected articles and stock assessments could be published. It was suggested that such a journal should include mechanisms to ensure broad access for all ICCAT scientists. It was agreed that this subject should be debated more fully at the 2006 SCRS, including financial implications. Discussion also took place on the possibility of searching for mechanisms whereby the scientific results are more extensively known, for example, by press releases. The Committee decided to recommend that these and other possibilities be evaluated as concerns their financial impact.

17.5 Collaboration with GFCM

The Representative of GFCM expressed the interest that this Commission accords to collaboration with GFCM and announced that the meeting of the Scientific Consultation Committee will take place in Tirana (Albania) October 25 to 28.

The Committee was informed of the proposal to establish a permanent GFCM/ICCAT working group. The Committee recognized that, from a scientific point of view, any collaboration among organizations with coinciding objectives is always positive, as has been the case with the GFCM since 1993. However, the form in which this is proposed to be structured has potential conflict with the mandate of SCRS. The Committee considered that the proposal by GFCM merits profound examination by ICCAT, taking into account the mandate of both organizations.

17.6 Review of RFMOs

The Committee was informed of a discussion by COFI to carry out a performance assessment of regional fisheries organizations. Discussion ensued on whether, from a scientific perspective, such revisions could serve as a basis to improve the transparency of the scientific processes used in the different RFMOs.

17.7 Convention anniversary

The Committee was informed that next year marks the 40th anniversary of the signing of the Commission's Convention. The Committee discussed various ideas to mark this occasion, the majority concerning some type of special publication and/or holding a commemorative symposium.

17.8 Tuna predation

The Committee was informed of the existence of lines of investigation on the predation of catches by mammals and sharks. This phenomenon affects fundamentally longline and, depending on the area and season of the year, it could have a strong impact on catches. The Committee recognized that, up to now, few research efforts have been made on this subject in the Convention area, although countries such as Brazil, Italy or Uruguay are carrying out research projects and they could presents results in the future. The Committee suggested that data on predation be submitted to the 2006 meeting.

17.9 CLIOTOP

The Committee noted that GLOBEC has recently approved a 10-year international research plan on the dynamics and exploitation of pelagic ecosystems worldwide (the CLIOTOP programme) and that the Science Plan of this programme is now available on the GLOBEC web site. This multidisciplinary research programme is of great potential interest for SCRS because of the wide scope of this programme, describing and modelling the biology and behaviour of large predators, the dynamics of trophic interactions, and the effect of the environment on pelagic ecosystems. It is therefore recommended that SCRS should promote an active cooperation and exchange of information with GLOBEC and its CLIOTOP programme.

17.10 Officers Meeting

The Chairman of the SCRS informed that a meeting of Officers had been held on October 1, 2005. The conclusions of this group assisted in the development of the meeting of the Committee and discussed the various Agenda items.

18. Election of the SCRS Chairman

Dr. G. P. Scott was elected Chairman of the SCRS for the next two years. The Committee was pleased about the election and offered its full support to the newly elected Chairman. Dr. Scott thanked the Committee for their confidence in him and recognized the excellent work carried out by Dr. Pereira during his tenure. The Executive Secretary joined the Committee in praising Dr. Pereira for his excellent work as SCRS Chairman and for the professional working relationship maintained with the Secretariat. He also congratulated Dr. Scott on his election and reassured him of the full logistical support that the Secretariat would continue to provide to ensure an efficient coordination of scientific activities.

19. Adoption of the Report and closure

The SCRS Report was adopted by the Committee.

The SCRS Chairman thanked the participants, the interpreters and the Secretariat for contributing to the success of the meeting and adjourned the 2005 SCRS Meeting.

Appendix 1

AGENDA

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 concerning statistics 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
9. Report of inter-sessional meetings
   - 9.1 Third Meeting of the Ad hoc GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean
   - 9.2 Data-Preparatory Meeting for the 2006 Billfish Assessment
   - 9.3 Planning Meeting for Bluefin Tuna Research
   - 9.4 Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas
10. Report of Special Research Programs
    - 10.1 Bluefin Year Program (BYP)
    - 10.2 Enhanced Research Program for Billfish
11. Report of the Meeting of the Sub-Committee on Statistics
12. Report of the Sub-Committee on By-catches
13. Report of the Sub-Committee on Environment
14. Consideration of plans for future activities
    - 14.1 Inter-sessional meetings proposed for 2006
    - 14.2 Date and place of the next meeting of the SCRS
15. Recommendations

15.1 Tropical species
15.2 Albacore
15.3 Bluefin tuna
15.4 Swordfish
15.5 Billfish
15.6 Sub-Committee on By-catch
15.7 Sub-Committee on Environment
15.8 Sub-Committee on Statistics
15.9 General recommendations

16. Responses to Commission's requests
    - 16.1 Impact of the season/area closure on the stocks [Rec. 04-01]
    - 16.2 Review of catches of juvenile bluefin tuna in the Mediterranean [Rec. 02-09]
    - 16.3 Evaluation of the mortality of immature N. Atlantic swordfish [Rec. 02-04]
    - 16.4 Consideration of recommendations from the 3rd Meeting of the Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies
    - 16.5 Review of 5% fin-to-body-weight retention ratio for sharks [Rec. 04-10]
    - 16.6 Review of shortfin mako assessment [Rec. 04-10]
    - 16.7 Review and prioritization of proposed Bluefin Tuna Research Program
17. Other matters
    - 17.1 Operating Fund
    - 17.2 Proposal for the creation of a Group on Tagging Information
    - 17.3 Critique of scientific paper
    - 17.4 Peer-reviewed journal and dissemination of scientific results
    - 17.5 Collaboration with GFCM
    - 17.6 Review of RFMOs
    - 17.7 Convention anniversary
    - 17.8 Tuna predation
    - 17.9 CLIOTOP
    - 17.10 Officers Meeting
18. Election of the SCRS Chairman
19. Adoption of report and closure

Appendix 2

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Appendix 3

LIST OF DOCUMENTS

Number	*Title*	*Author(s)*	*Subject*
SCRS/2005/010	Report of the Data Preparatory Meeting for the 2006 Billfish Assessment (Natal-RN, Brazil, May 9-13, 2005).	Anon.	BIL
SCRS/2005/011	Report of the Planning Meeting for Bluefin Research (Madrid, Spain, June 27-30, 2005).	Anon.	BFT
SCRS/2005/012	Report of the Workshop on Methods to Reduce Mortality of Juvenile Tropical Tunas (Madrid, Spain, 4-8 July, 2005).	Anon.	TROP
SCRS/2005/025	Standardized catch rates for blue marlin *(Makaira nigricans)* and white marlin *(Tetrapturus albidus)* from the Venezuelan pelagic longline fishery off the Caribbean sea and the western central Atlantic: period 1991-2004.	AROCHA, F., M. Ortiz.	BUM, WHM
SCRS/2005/026	Catch rates for white marlin *(Tetrapturus albidus)* and blue marlin *(Makaira nigricans)* from the small-scale fishery off La Guaira, Venezuela: Period 1991-2004.	AROCHA, F., L. Marcano, K. Kleisner y D. Die.	WHM, BUM
SCRS/2005/027	Evaluating CPUE standardization models with simulated catch and effort data from pelagic longline fisheries of Atlantic billfishes.	ORTIZ, M.	BIL
SCRS/2005/028	Integrating habitat-based CPUE standardization into assessment models for Atlantic billfishes.	BABCOCK, E.A.	BIL
SCRS/2005/029	Hook time at depths for experimental longline sets in the windward passage in 2003.	RICE, P., C. P.P. Goodyear, J. Serafy, D. Snodgrass and E. Prince.	BIL
SCRS/2005/030	Updated white marlin *(Tetrapturus albidus)* and blue marlin *(Makaira nigricans)* catch rates from the U.S. recreational tournament fishery in the northwest Atlantic and the U.S. Gulf of Mexico, 1973-2004.	DIAZ, G.A. and M. Ortiz.	WHM, BUM
SCRS/2005/031	Updated white marlin *(Tretapturus albidus)* and blue marlin *(Makaira nigricans)* catch rates from the U.S. pelagic longline fishery in the northwest Atlantic and Gulf of Mexico.	DIAZ, G.A. and M. Ortiz	WHM, BUM
SCRS/2005/032	Simulated Japanese longline CPUE for blue marlin and white marlin.	GOODYEAR, C.P.	BUM, WHM
SCRS/2005/033	Survival of white marlin *(Tetrapturus albidus)* released from commercial pelagic longline gear in the western North Atlantic.	KERSTETTER, D.W. and J.E. Graves.	WHM, BUM
SCRS/2005/034	Habitat utilization and vertical movements of white marlin *(Tetrapturus albidus)* released from commercial and recreational gear in the western North Atlantic Ocean: inferences from short-duration pop-up archival satellite tags (PSATs).	HORODYSKY, A.Z., D.W. Kerstetter, and J.E. Graves.	WHM
SCRS/2005/035	Temperature-depth habitat utilization of blue marlin monitored with PSAT tags in the context of simulation modeling of pelagic longline CPUE.	GOODYEAR, C.P., J. Luo, E. Prince, and J. Serafy.	BUM, WHM
SCRS/2005/036	Atlantic blue marlin *(Makaira nigricans)* and white marlin *(Tetrapturus albidus)* by-catch of the Japanese pelagic longline fishery, 1960-2000.	SERAFY, J., G. Diaz, E. Prince, E. Orbesen and C. Legault.	BUM, WHM
SCRS/2005/037	Vertical habitat utilization by large pelagic animals: A quantitative framework and numerical method for use with pop-up satellite tag data.	LUO, J., E. Prince, P. Goodyear, B. Luckhurst, and J. Serafy.	BIL
SCRS/2005/039	Movements and spawning of white marlin *(Tetrapturus albidus) and* blue marlin *(Makaira nigricans)* off Punta Cana, Dominican Republic.	PRINCE, E.D., R.K. Cowen, E.S. Orbesen, S.A. Luthy, J.K. Llopiz, D.E. Richardson, and J.E. Serafy.	WHM, BUM
SCRS/2005/040	Influence de l'upwelling sur l'abondance des marlins dans les eaux côtières ivoiriennes.	N'GORAN YA, N.	BIL
SCRS/2005/041	Captures des istiophoridés par la pêcherie artisanale ivoirienne et effort de pêche de 1988 à 2004.	N'GORAN YA, N. and J.B. Amon Kothias.	BIL

SCRS/2005/042	Vertical distribution of blue marlin *(Makaira nigricans)* released from the commercial longline fisheries by the observer program during 2002 and 2003.	SAITO, H. and K. Yokawa.	BUM
SCRS/2005/043	Vertical distribution pattern of CPUE of white marlin and blue marlin estimated with data of the time, depth, and temperature recorder collected through a longline research cruise of Shoyo-maru in 2002 in the tropical Atlantic.	YOKAWA, K. and H. Saito.	BUM, WHM
SCRS/2005/044	Current efforts to develop an age and growth model of blue marlin *(Makaira nigricans)* and white marlin *(Tetrapturus albidus)*.	DREW, K., D. Die, F. Arocha	BUM, WHM
SCRS/2005/045	Billfish catches and updated statistical information, 1980-2003.	BANNERMAN, P.O. and N.Y. N'Goran	BIL
SCRS/2005/046	Standardized CPUE for the blue marlin *(Makaira nigricans)* caught in the west of South Atlantic.	ANDRADE, H.A.	BUM
SCRS/2005/047	Premier éléments sur la biologie et la pêche du marlin bleu *(Makaira nigricans)* autour des DCP ancrés en Martinique.	REYNAL, L., A. Monthieu, J. Chautrel, A. Lagin, J.J. Rivoalen, M.H. Norbert, et M. Doray.	BUM
SCRS/2005/048	Bayesian generalized linear models to standardize and impute missing data in the Atlantic bluefin tuna *(Thunnus thynnus thynnus)*Task 2 catch and effort database.	SHEMLA, A. and M. K. McAllister	BFT
SCRS/2005/049	Preliminary approach to the experimental design of tagging campaigns for estimation of movement rates of East Atlantic bluefin tuna.	ARREGUI, I., H. Arriz	BFT
SCRS/2005/050	Size limits regulation for tuna: Should we also consider the protection of large fish?	FROMENTIN, J-M	BFT, GEN
SCRS/2005/051	Informe sobre las actividades de investigación sobre atún rojo desarrolladas por el Instituto Español de Oceanografía en el Mediterráneo dentro del programa BYP de ICCAT.	DE LA SERNA, J.M., A. Garcia, A. Garcia, J.M. Ortiz de Urbina, D. Macias	BFT
SCRS/2005/052	Estimated growth rate of skipjack tuna *(Kasuwonus pelamis)* from tagging surveys conducted in the Senegalese area (1996-1999) within a meta-analysis framework.	HALLIER, J.P. and D. Gaertner	SKJ
SCRS/2005/053	Are natural and fishing mortalities comparable for tropical tunas? A multi-specific approach with tagging data.	GAERTNER, D., F.X. Bard, and J.P. Hallier	TROP
SCRS/2005/054	Statistiques de la pêcherie thonière européenne et assimilée durant la période 1991-2004.	PIANET, R, P. Pallarés, V. Nordström, A. Hervé, A. Delgado, J. Ariz et R. Sarralde	TROP
SCRS/2005/055	Statistiques de la pêcherie thonière FIS durant la période 1991-2004.	PIANET, R, V. Nordström, A. Hervé, N. N'Goran Ya et Y. Diatta.	TROP
SCRS/2005/056	Estadísticas españolas de la pesquería atunera tropical, en el océano atlántico, hasta 2004.	ARIZ, J., P. Pallarés, J.C. Santana, R. Delgado de Molina, R. Sarralde y A. Delgado de Molina	TROP
SCRS/2005/057	Datos estadísticos de la pesquería de túnidos de las Islas Canarias durante el periodo 1975 a 2004.	DELGADO DE MOLINA, A., R. Delgado de Molina, J.C. Santana y J. Ariz	TROP
SCRS/2005/058	Evolución de las capturas de juveniles de rabil y patudo desde la extensión de la pesca sobre objetos balizados.	PALLARES, P., R. Pianet, A. Delgfado de Molina, J. Ariz, R. Sarralde	YFT, BET
SCRS/2005/059	Re-estimation of shortfin mako shark catches by Japanese tuna longline vessels in the Atlantic Ocean.	MATSUNAGA H. and Y. Takeuchi	BYC
SCRS/2005/060			
SCRS/2005/061	A reanalysis of North Atlantic albacore catch at age.	ARRIZABALAGA, J.	ALB
SCRS/2005/062	Report on the 2004/2005 moratorium on the use of fish aggregating devices (FADS) on tuna fishing - Ghana.	BANNERMAN, P.O.	TROP
SCRS/2005/063	A possible framework for estimating the effect of the replacement of the FAD moratorium with a time-area closure on catches of Atlantic tropical tunas.	CASS-CALAY, S.L., E.N. Brooks, C.A. Brown, and G.P. Scott	TROP

SCRS/2005/064	Standardized catch rates for white marlin *(Tetrapturus albidus)* from the Venezuelan artisanal pelagic longline fishery off the Caribbean Sea and adjacent areas: Period 1992-2003.	AROCHA, F., A. Larez, J. Marcano, A. Barrios, X. Gutierrez, D. Debrot and M. Ortiz.	BIL
SCRS/2005/065	Oilfish and shark by-catches of the Greek swordfish fishery in the eastern Mediterranean; a preliminary analysis applied to "presence-absence" data.	TSERPES, G., G. Tatamanidis, and P. Peristeraki	BYC
SCRS/2005/066	Análisis de la pesquería mexicana del atún en el Golfo de México, 2004.	SOLANA-SENSORES, R. and K. Ramírez-López	YFT
SCRS/2005/067 REV	Effect of minimum size regulations on east bluefin tuna (*Thunnus thynnus* L.) yield per recruit.	RESTREPO, V., H. Arrizabalaga, J.M. Ortiz de Urbina, and J-M. Fromentin	BFT
SCRS/2005/068	Revision of South Africa's longline catch record (1997-2003).	SMITH, C.D., and L.A. Janson	GEN
SCRS/2005/069	Informe sobre el programa de observadores a bordo de la flota atunera uruguaya (1998-2004).	MORA, O. y A. Domingo	GEN
SCRS/2005/070	La flota atunera uruguaya: evolución y tendencias (1981-2004).	MORA, O. y A. Domingo	GEN
SCRS/2005/071	Captura incidental de tortugas marinas con palangre pelágico en el Atlántico Sur por las flotas de Brasil y Uruguay.	DOMINGO, A., G. Sales, B.B. Giffoni, P. Miller, y M. Laporta, G. Maurutto	BYC
SCRS/2005/072	Distribution of albatrosses and petrels in the Atlantic Ocean and overlap with ICCAT longline fisheries.	Birdlife Intl.	BYC
SCRS/2005/073	Activity of the Spanish surface longline fleet catching swordfish *(Xiphias gladius)* during the year 2003 in the Atlantic Ocean.	GARCÍA-CORTÉS, B., J. Mejuto, J.M. de la Serna, A. Ramos-Cartelle	SWO
SCRS/2005/074	Scientific estimations of by-catch landed by the Spanish surface longline fleet targeting swordfish *(Xiphias gladius)* in the Atlantic Ocean: 2000-2004 period.	MEJUTO, J., B. García-Cortés, J. M. de la Serna, A. Ramos-Cartelle	BYC
SCRS/2005/075	Observations on the catches of small tunas from a tuna trap fishery off the Algarve (southern Portugal).	NEVES DOS SANTOS, M., and A. Garcia	BFT
SCRS/2005/077	Recreational tag releases as predictors of seasonal patterns of local marlin abundance.	GOODYEAR, C.P.	BIL
SCRS/2005/078	Virtual population analyses of Atlantic bluefin tuna *(Thunnus thynnus)* that include information from electronic pop-off tags.	PORCH, C.E.	BFT
SCRS/2005/079	Further analyses of time-area closures and their potential to reduce juvenile mortality of Atlantic tropical tunas.	BROOKS, E.N., and I. Mosqueira	TROP
SCRS/2005/080	Performance diagnostics for the longline CPUE simulator.	GOODYEAR, C.P.	GEN
SCRS/2005/081	Population analysis of North Pacific albacore based on an age-structured assessment program (ASAP) model.	CRONE, P.R., R. J. Conser, J. D. McDaniel	ALB
SCRS/2005/082	Progress of the ICCAT Enhanced Research Program for Billfish in the Western Atlantic Ocean during 2005.	PRINCE, E.	BIL
SCRS/2005/083	Evaluation of population structure and mixing rates of Atlantic bluefin tuna from chemical signatures in otoliths.	ROOKER, J., Secor, D. G. De Metrio, E. Rodríguez-Marín	BFT
SCRS/2005/084	Possible Impacts of Alternative Management Scenarios for Atlantic Bluefin Tuna.	POWERS, J.E., C.E. Porch, and G.P. Scott	BFT
SCRS/2005/085	Standardized catch rates by sex and age for swordfish *(Xiphias gladius)* from the U.S. longline fleet 1981-2004.	ORTIZ, M.	SWO
SCRS/2005/086	Preliminary re-assessment of the validity of the 5% fin to carcass ratio for sharks.	CORTES, E. and J.A. Neer	BYC
SCRS/2005/087	Quantity or Quality: The Condition of Bluefin Tuna and its Relationship to Prey Characteristics in the southern Gulf of St. Lawrence, Canada.	PAUL, S.D., and J.D. Neilson	BFT
SCRS/2005/088	Summary of Ongoing Canadian Bluefin Tuna Sampling Activities Supported by the ICCAT Bluefin Tuna Year Program.	SMITH, S.C., J.D. Neilson, S.D. Paul	BFT
SCRS/2005/089	Discrepancies between the FAO and ICCAT databases for catches of major tuna species in the Atlantic Ocean.	GARIBALDI, L, and P. Kebe	GEN

SCRS/2005/090	Trace element concentrations in swordfish (*Xiphias gladius* L. 1758) and blue shark (*Prionace glauca* L. 1758).	BRANCO, V, M. Neves dos Santos, A. Garcia, C. Vale	SWO
SCRS/2005/091	Bluefin tuna *(Thunnus thynnus* L.*)* catch composition in the Tyrrhenian Sea and in the Strait of Sicily in 2004.	DI NATALE A., A. Mangano,, A. Asaro, B. Bascone, A. Celona, M. Valastro , R. Vassallo Ajus	BFT
SCRS/2005/092	Swordfish *(Xiphias gladius* L.*)* catch composition in the Tyrrhenian Sea and in the Strait of Sicily in 2004.	DI NATALE A., A. Mangano, A. Asaro, M. Bascone, A. Celona, M. Valastro	SWO
SCRS/2005/093	Atlantic bonito *(Sarda sarda)* catch composition in the Tyrrhenian Sea and in the Strait of Sicily in 2004.	DI NATALE A., A. Mangano, A. Celona, E. Navarra, M. Valastro	SMT
SCRS/2005/094	Size frequency composition of the albacore *(Thunnus alalunga)* catches in the Tyrrhenian Sea and in the Strait of Sicily in 2004.	DI NATALE A., A. Celona, A. Mangano, M. Valastro	ALB
SCRS/2005/095	Report of the observer program for the Japanese tuna longline fishery in the Atlantic Ocean from August 2004 to January 2005.	MATSUMOTO, T.	GEN
SCRS/2005/096	Multi-species assessment of tunas caught in the tropical Atlantic purse seine fishery: Effects of uncertainty in the species composition.	SOTO, M., I. Mosqueira, D. Die, D. Gaertner , Pilar Pallarés	TROP
SCRS/2005/097	An overview of yellowfin tuna stocks, fisheries and stock status worldwide	FONTENEAU, A.	YFT
SCRS/2005/098	Ecosystem Approach to Fisheries: a brief overview and some considerations for its application in ICCAT.	FROMENTIN, J-M, A. Fonteneau, and V. Restrepo	GEN, ENV
SCRS/2005/099	Actividad de los observadores en la flota atunera española de cerco en el océano Atlántico desde 2001 al 2005.	SARRALDE, R., J. Ariz, A. Delgado de Molina, P. Pallarés y J.C. Santana	GEN
SCRS/2005/100	Bluefin tunas *(Thunnus thynnus)* gros geniteurs de plus de 100 kilos.	ORDAN, M.	BFT
SCRS/2005/101	Manual de muestreo en puerto de túnidos tropicales en los océanos Atlántico e Índico.	IEO, IRD	TROP
SCRS/2005/102	A preliminary approach to the bullet tuna *(Auxis rochei)* fecundity in the Spanish Mediterranean.	MACIAS, D. Lema, L. Gómez-Vives M.J., & de la Serna, J.M.	SMT
SCRS/2005/103	Some biological aspects of small tunas (*Euthynnus alletteratus*, *Sarda sarda* and *Auxis rochei*) from the south western Spanish Mediterranean traps.	MACIAS, D; Lema, L.; Gómez-Vives M.J., Ortiz de Urbina J.M & de la Serna, J.M	SMT
SCRS/2005/104	Statistics of the Spanish albacore *(Thunnus alalunga)* surface fishery in the northeastern Atlantic in 2004.	ORTIZ DE ZARATE, V., S. Barreiro and C. Rodríguez-Cabello	ALB
SCRS/2005/105	Analysis of aggregated fishing data using delta Generalized Linear Models: White marlin *(Tetrapturus albidus)* caught by the Brazilian longline fleet.	ANDRADE, H.A.	BIL
SCRS/2005/106	Bluefin tuna (*Thunnus thynnus* L.) size composition in cages from Tyrrhenian Sea and Strait of Sicily in 2004.	DI NATALE, A., A. Mangano, R. Vassallo Ajus	BFT
SCRS/2005/107	Bluefin tuna *(Thunnus thynnus)* tagging survey in the Bay of Biscay in summer 2005.	RODRIGUEZ-MARIN, E., C. Rodríguez-Cabello, Santiago Barreiro, M. Quintans, J. Valeiras, M. Ruiz, H. Arrizabalaga, J.M. De la Serna and J.L. Cort	BFT
SCRS/2005/108	Metazoan ectoparasites of bluefin tuna *(Thunnus thynnus)* juveniles caught in the Bay of Biscay.	BARREIRO, S., T. Ruiz, E. Rodrigue-Marin and E. Carbonell	BFT

SCRS/2005/109	Ageing comparison from vertebrae and spines of bluefin tuna *(Thunnus thynnus)* coming from the same specimen.	RODRIGUEZ-MARIN, E., D. Olafsdottir, J. Valeiras, M. Ruiz, V. Chosson-Pampoulie and C. Rodríguez-Cabello	BFT
SCRS/2005/110	Archival tagging of albacore tuna *(Thunnus alalunga)* in the North Atlantic, A pilot study.	COSGROVE, R., I. Arregi and H. Arrizabalaga	ALB
SCRS/2005/111	Situation de la pêcherie de l'espadon des côtes marocaines *(Xiphias gladius)*.	IDRISSI, M. et N. Abid	SWO
SCRS/2005/112	Why the number of hooks per basket (HPB) is not a good proxy indicator of the maximum fishing depth in drifting longline fisheries?	BACH P. , P. Travassos, D. Gaertner	GEN
SCRS/2005/113	Preliminary analysis on biological characteristics of bigeye tuna (*Thunnus obesus*) based on observer's data available from the 2004-2005 survey in the western Atlantic Ocean.	XU, Liuxiong, G. Zhu, L. Song, W. Jiang	BET
SCRS/2005/114	Report on research activities on bluefin tuna tagging within growth-out farming cages.	TICINA, V., Leon Grubisic, Ivan Katavic, Vlasta Franicevic and Vanja Emric Ticina	BFT

Appendix 4

OPENING ADDRESS

By Mr. Driss Meski, ICCAT Executive Secretary

Allow me first to welcome you to Madrid and express the great pleasure the Secretariat has to see you once again on occasion of the meeting of the Scientific Committee. I would like to reiterate the full support of the Secretariat to assure you of its best services so that the work of your meeting is carried out under optimum conditions to achieve the objectives that have been assigned to you.

As has already been announced by means of the ICCAT web site, 2005 has been overshadowed by two sad events for the ICCAT Scientific Committee, with the passing away of two of our distinguished scientists, Drs. Xavier Bard of IRD France and N'Goran Ya Nestor of Côte d'Ivoire. Throughout their lives they have contributed significantly to ICCAT's Scientific Committee.

Dr. Bard, whose active participation in the work of the SCRS dates back to 1972, was the author or collaborated with other scientists in more than 72 scientific documents, mainly concerning tropical species. His contribution to the work of ICCAT will be remembered in the annals of our organization.

Although Dr. N'Goran's participation in the work of the Scientific Committee was more recent, he played an important role in the coordination of research work on billfish for Africa.

These late scientists will be dearly missed by their families as well as the ICCAT scientific family.

This loss will be deeply felt by the Oceanographic Center of Abidjan and the IRD where they worked and also by the Tropical and Billfish Species Groups of your Committee where their scientific knowledge on the tropical tunas, albacore and billfish fisheries was greatly valued. On behalf of the Commission and the Secretariat, I would like to reiterate my profound sympathy and condolences to their families, their countries, their friends and their colleagues.

I would like to leave it up to the Committee to find the best way to pay tribute to these two distinguished scientists.

As I have already pointed out, everyone is waiting for the results of the work of your meeting. I am sure that the discussions that you had last week and those that you will be have throughout this week will result in unanimous conclusions, something that has always characterized the meetings of our organization.

The Secretariat is at your disposal to support you logistically and provide anything that you need in your work.

To provide you with access to the files and for easily sharing them amongst you, a local network with Internet access is available for your use.

I wish you all a successful meeting. Thank you.

Appendix 5

REPORT OF THE INFORMAL GROUP ON THE COORDINATION OF FUNDS

There are currently two distinct funds of support for scientists to help Contracting Parties comply with their obligations to collect data: the Japan Data Improvement Project (JDIP) and the Data Fund (established by [Res. 03-21] and, up to now, financed by the United States). In addition, the funds dedicated to the improvement of statistics within the special research programs on bluefin tuna (BYP), billfish (ERPB), as well as the balance of the BETYP program, should be considered as sources of support for ICCAT's statistical and scientific work. The objectives of these funds are very similar: Basically, they have been established for the improvement in the collection and processing of statistics and to improve the scientific participation in the species groups and the meetings of the Committee.

There is a Steering Committee within the JDIP that evaluates the proposals and monitors the funds. This Committee has developed a protocol for the submission of proposals and the release of funds. However, the allocation and monitoring of the other funds do not have a structure that is as formal and clearly defined as the JDIP.

The Group considers it important that there be a basic level of coordination and monitoring to assure that the different funds are utilized in an efficient manner and in accordance with the needs of the Committee. For this, the following is recommended:

- That each year the SCRS develop a list of prioritized objectives to be charged to these funds. The list would be accompanied by the corresponding budget and the estimated duration for each of the objectives **(Table 1)**. This list should take into account specific requests from donors, if any.

- That a Steering Committee be established, common for the different funds, that would be comprised of the SCRS Chairman, The Convener of the Sub-Committee on Statistics and the Secretariat (these are already part of the JDIP Steering Committee). This Committee could be expanded to more members, depending on the type of funds or the program. Likewise, the Committee would be expanded to include the species rapporteurs, project coordinators, etc. depending on the case.

- That protocols be established for the submission of proposals and the release of funds for the programs that do not yet have such protocols (e.g., BYP, ERPB, Data Fund).

The Group also discussed the suitability of establishing criteria to evaluate the results, while aware of the difficulty this implies in some cases.

Table 1. List of 2006 priorities and possible contributions (in Euros).

Item	*JDIP*[(1)]	*Data Fund*	*BETYP*	*BYP*[(2)]	*ERPB*[(2)]	*Total*
Field Manual	10,000	20,000	20,000[(3)]			50,000
Travel assistance	11,000	11,000				22,000
Observer programs		20,000				20,000
Data collection	10,000			72,500	19,600	102,100
Conventional tagging		2,000			500	2,500
Historical data recovery		20,000				20,000
Training courses	35,000					35,000
Archival BFT-Japan tag rewards			20,000[(4)]			20,000
TOTAL	66,000	73,000	40,000	72,500	20,100	**271,600**

[(1)] Already committed.
[(2)] Requires budget approval by the Commission in 2005.
[(3)] Requires approval from EC.
[(4)] Requires confirmation from Japan.

Appendix 6

BASIC INFORMATION RECOMMENDED THAT SHOULD BE PRESENTED IN ANNUAL REPORTS

Species/stock		*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*
YFT	Total catch										
	Sampling rate of fishing activities										
	Number/weight of fishes sampled										

Preparation of the table:
Cover the last ten years.
Include all the species that are the target of an important fishery by the country.
Table for each stock and, if necessary, by gear.

Appendix 7

GUIDELINES ON SUSTAINABLE BLUEFIN TUNA FARMING PRACTICES IN THE MEDITERRANEAN

Prepared by the Ad Hoc GFCM/ICCAT Working Group on
Sustainable Tuna Farming/Fattening Practices in the Mediterranean

Part 1 - Introduction

1. The development of bluefin tuna (BFT) farming[1] practices in the Mediterranean since the mid-1990s has been accompanied by a series of concerns about the sustainability of this important industry and about its impacts. The price of bluefin destined for sashimi, coupled with the ability to rapidly increase the weight of wild-caught bluefin in farms, has created more demand for bluefin captured at sea and, consequently, placed greater pressure on the stock.

2. In 2002, the General Fisheries Commission for the Mediterranean (GFCM) called for the establishment of a Working Group, to be convened jointly with the International Commission for the Conservation of Atlantic Tunas (ICCAT), with a mandate to develop practical guidelines to address known problems, with emphasis on fishing and farming statistics, and to propose research needed in order to investigate potential problems.

3. The Working Group met three times between 2003 and 2005 to develop the Guidelines that are presented in this document.

Part 2 - Nature and scope

4. The farming of Atlantic bluefin in the Mediterranean Sea should be considered an activity clearly overlapping between capture fisheries and aquaculture. The potential of bluefin farming, all the perceived risks associated with it, and all matters relevant to the sustainability of this recent commercial activity, clearly encompass issues specific to both the fisheries and aquaculture sectors.

5. In the long-term, the potential sustainability of BFT farming is linked also to the research advances in the successful “domestication” of the species. Although considerable progress has been made in this regard, the economically feasible “closed-cycle” production of BFT has not been achieved yet. The Guidelines have thus been prepared based on BFT farming as currently practiced in the Mediterranean.

6. The Guidelines encompass a series of statistical, socioeconomic, biological, environmental and management issues. They have been limited to only those issues arising, or potentially arising, because of BFT farming. In other words, the Guidelines do not address the sustainability issues that could exist even without farming. The Guidelines were written by a group of experts —primarily scientists— in these disciplines.

7. The Guidelines are advisory in nature. They are intended to reinforce the basis for the regulations[2] that have already been introduced by GFCM and ICCAT for bluefin tuna in the Mediterranean, primarily for the capture fisheries component. The Guidelines could also serve as a basis for a broader management framework that takes into consideration other aspects related to the sustainability of the farming industry.

Part 3 - Guidelines

3.1 Capture fisheries

8. Farmed bluefin tuna comes from capture fisheries. The expansion of tuna farming activities in the Mediterranean has generated a growing demand of wild fish specimens. Hence, one of the main concerns about this demand is the current and potential pressure to increase fishing effort. A main step towards

[1] Tuna farming in the Mediterranean is currently practiced as capture-based aquaculture. It involves the collection of wild fish, ranging from small to large specimens, and their rearing in floating cages for periods spanning from a few months up to 1-2 years. Fish weight increment or change in the fat content of the flesh is obtained through standard fish farming practices. Confinement of captured fish during short periods of time (2-6 months) aimed mostly at increasing the fat content of the flesh, which strongly influences the prices of the tuna meat in the Japanese sashimi market, can also be referred to as "tuna fattening".

[2] Available from www.iccat.int and www.faogfcm.org. Specific regulations cited in the text are listed at the end for ease of reference.

responsible and sustainable fishing is to enforce the conservation and management measures of the Regional Fishery Management Organizations, particularly ICCAT and GFCM (e.g., [Rec. 02-08]).

9. *Catches*. In order to ensure that the potential pressure to increase fishing effort due to farming is not realized, it is necessary to ensure compliance with the quotas established for the conservation of the stock. In addition, under a number of international instruments, flag States of the fishing vessels have responsibilities to collect and report catch data, irrespective of whether the fish are destined for either the market or farming.

10. *Illegal, Unreported and Unregulated fishing*. Every effort should be made to combat and eliminate Illegal, Unreported and Unregulated (IUU) fishing and farming, including through the development of a responsible trading system among countries, in order to ensure that only fish caught and farmed in accordance with agreed conservation and management rules is allowed to enter into international trade. In particular, the recommendation that ICCAT and GFCM members prohibit landings from fishing vessels, placing in cages for farming and/or the trans-shipment within their jurisdiction of tunas or tuna-like species caught by IUU fishing activities, should be enforced ([Rec. 03-16]).

11. *Other information*. The Recommendation on BFT farming ([Rec. 04-06]) specifies types of data that flag States of fishing or transfer vessels should collect and maintain (vessel logs, quantities, time and place of catch, vessel lists, etc.). In addition to these requirements, research should be conducted on methodologies to obtain accurate estimates of the size composition of the catch; such methodologies should be adopted for the collection and reporting of size composition data.

3.2 Transport and transfer

12. A critical point of this phase is the control of the amount (quantitatively and qualitatively) of fish that are transferred from the fishing gear to the transport and/or farming cages.

13. *Fish transfers*. The traceability of the transfer of live fish into cages should be ensured, particularly when different countries are involved. The ICCAT Bluefin Tuna Statistical Document Program ([Res. 94-5], [Rec. 97-04], [Rec. 03-19]) set the modality of collecting trade data but does not cover live fish transfers. The ICCAT Recommendation [03-16] prohibits the transshipment of fish caught by IUU activities. The ICCAT Recommendation [04-06] regulates the statistical data to be taken by tugs or fishing vessels and farms.

14. Research should be promoted to further develop the methods and techniques presently available for quantifying live fish (e.g. underwater video cameras or acoustic methods); standards should be agreed to and adopted as soon as possible, also to allow for fair transactions thus avoiding conflicts between vessel and farm operators.

15. *Scientific research*. The provision of fish specimens to the research community, if required, will ensure the collection of valuable scientific information on the wild BFT population that may benefit both the fishery and farming sectors. Therefore, the industry should be encouraged to facilitate the provision to the research community of specimens accidentally killed during fishing, transfer or transport, as they represent a significant biological sample from the wild stock. Furthermore, specimens collected at the beginning of the farming process will provide ‘point zero’ information required to properly evaluate the performance of the farming activity at the end of the production cycle. Areas of research could include, among others: reproduction biology, growth, mortality, genealogy, stock structure and behavior.

3.3 Farming

16. This section refers to the BFT production phase itself. The culture technique follows in some ways the traditional offshore cage system, with similar rearing structures and technical constraints. On the other hand, farming of this pelagic species raises a series of distinct issues that require particular attention.

3.3.1 Registration

17. Licenses/registration. It is essential to adopt a system to license or register farming facilities in order to comply with the requirements for listing authorized facilities in the ICCAT Recommendation [04-06], which should help prevent IUU farming. In addition, if excess farming capacity is deemed undesirable, due

consideration should be given to the magnitude of the total allowable catch established for this species in the region.

3.3.2 Socio-economic issues

18. Socio-economic issues. A preliminary socio-economic appraisal to evaluate the context in which farming takes place appears to be an important requisite. Activities linked to BFT farming should be addressed particularly in view of job opportunities.

19. Studies for integrated coastal zone management should be carried out to avoid the possibility of conflicts between the BFT farmers and other resource users including those from the tourism, other aquaculture activities, and small-scale fisheries sectors. During the site selection process in particular, it would be advisable to give considerable attention to avoidance of conflicts with other sea users; consideration should be given to making arrangements for the involvement and participation by local fishermen, e.g., in the supply of baitfish.

20. *Subsidies*. Currently, BFT farming is unquestionably tied up to the availability and exploitation of natural resources (both seed and baitfish) and the practice of subsidizing activities that utilize limited natural resources is not generally in line with sustainable management policies. In some Mediterranean countries, subsidies for aquaculture development exist including funds for BFT farming. However, it remains unclear whether these will have a positive or negative impact on the development and sustainability of the BFT industry. This important issue certainly requires further monitoring and analysis.

21. The industry, in collaboration with public authorities, should develop, apply and monitor procedures and standards which aim to guarantee appropriate labor and safety conditions in BFT farming operations.

22. The Mediterranean aquaculture sector, including BFT farming, will benefit significantly from human resource development efforts, including capacity-building and promotion of skills on good farm management, as well as training of farm technicians and other farm workers.

3.3.3 Environmental issues

23. *Feeding* – In the absence of a formulated feed, the current practice is to feed the BFT using frozen baitfish from wild stocks of different geographical origins. The main risks resulting from the use of this kind of feed could be:

    - The possible overexploitation of wild stocks of small pelagic baitfish;
    - The involuntary introduction of pathogens. Frozen allochthonous species can be vectors to pathogenic organisms as well as potential aetiological disease agents of autochthous wild populations.

24. The use of baitfish from local fisheries could represent a solution to the risk of introducing new pathogens. However, stock assessment and monitoring of local baitfish populations would be required to prevent the overfishing of these resources and, in the cases in which vessels are providing the baitfish directly to the farm without landing it, the quantities caught should be collected and reported by the flag State in order to be included in the national capture production statistics.

25. A standardized quality-control system should be developed to ensure the quality of baitfish (i.e. screened for heavy metals, PCBs, dioxin, etc.) and to ensure the absence of potential pathogens.

26. Furthermore, it appears essential that research on the nutritional requirements of BFT be promoted with the aim to develop an artificial feed capable of guaranteeing acceptable meat quality standards as required by the market.

27. In order to minimize the amount of baitfish used, and to avoid the polluting effect of uneaten food, improvement of feeding management practices is advisable.

28. Site selection, Environmental impact Assessment (EIA) and farm design. The steps of selecting an area where the farms will be located, a specific site within that area, and the evaluation of any potential environmental impacts are closely related. In addition, farm design considerations are important. Once an

area is chosen, site selection should be preceded by an EIA. Factors that should be taken into account include, but are not limited to:

- Avoiding sensitive ecological areas.
- Ensuring the presence of an adequate water current pattern to properly/effectively disperse settling/floating particles/substances/debris and sediments.
- Maintaining a safe distance from potential sources of pollution (e.g. industrial parks, urban areas) to prevent contamination of the farmed fish.
- Ensuring a safe distance between farms and river beds, in order to avoid potential problems associated with floods.
- Ensuring the development and effective implementation of site rehabilitation plans, as appropriate.
- Ensuring a minimum and safe distance between farms, as well as a minimum distance between individual cages.
- Ensuring a sufficient minimum distance between the cage bottom and the sea bed in order to allow for adequate water circulation.
- Minimizing both visual and environmental impacts through farm design.
- Avoiding the use of copper- and zinc-based antifouling on nets and mooring systems.

29. Environmental monitoring. Approval of farming concessions and licenses should be, for all intents and purposes, linked to the submission of environmental monitoring plans. While all countries involved in BFT farming in the Mediterranean have requirements for EIA and environmental monitoring of aquaculture sites, it would be useful to develop minimum standards to be applied for bluefin at a regional or national level. The Committee on Aquaculture (CAQ) of GFCM should consider the feasibility of developing such standardized guidelines. Standard analysis of the main water and sediment's physical, chemical and biological parameters at agreed distances from the farm site should be the norm, at an agreed-upon frequency. As with other aquaculture activities, the results of monitoring procedures should be transparent and available to the public. The frequency of monitoring should be controlled and closely planned with the competent local environmental authorities, and could be conducted with the assistance of accredited independent environmental monitoring and certification services.

30. Environmental monitoring might, when and as appropriate, include the monitoring of ecological effects on (i) the benthos, including changes in biodiversity parameters, and deposition; (ii) the water column and water surface; (iii) interactions with attracted species and populations.

31. Environmental monitoring guidelines may include reference to the need/opportunity for regular assessment, including meaningful quantitative and interpretative analysis of environmental impact status and trends, as well as regular updates on the use of the information thus generated. This includes information on improved management (especially production practice and farm operation; waste reduction/reuse) and contingency planning efforts.

3.3.4 Data and research

32. Farm data and records. Information concerning farming operations and environmental parameters (fish movements between cages, stocking densities at any possible given/possible time, feed application/use, effective feed consumption, temperature, dissolved oxygen, etc.) should be properly collected, recorded and made available for monitoring purposes. Respecting confidentiality requirements, this information should also be made available for research purposes.

33. Scientific research. The farming activity presents a valuable opportunity for cooperative research between the industry and the scientific community, and such collaboration should be encouraged. Furthermore, collaborative efforts should be aimed at designing experiments on live fish during farming, especially on captive behaviour, reproductive physiology, growth performance, nutritional demand and feed conversion rates. The non-marketable parts of fish that die incidentally during recruitment and/or farming should be considered as potentially suitable samples for research.

3.3.5 Animal welfare

34. Animal welfare – The welfare status of captive livestock is an important determinant of society's overall acceptance of farming technology. In general terms, the following would be advisable:

- During all phases of the production cycle, due care should be taken to avoid inflicting unnecessary stress to farmed fish. Handling of the fish should be reduced to a minimum during both fishing and transfer of the BFT into the transport or final cages.
- Setting an upper limit to the density of the cultured fish in the cages (kg/m^3). This parameter is closely related to the overall well-being of the fish in terms of its likely correlation with the incidence of pathogens, as well as with stressful conditions at high densities.
- Adequate and standard harvesting procedures should be followed to minimize the suffering of the fish, and to guarantee quality standards of the final product required by the market.

3.4 Harvesting and marketing

35. The harvesting process is the production phase in which the data that can be collected and reported for biological and statistical purposes are measurements that are not as affected by estimation error as in the capture/transfer phase. These data, along with the farming reports, can be cross-checked with the estimates of inputs, as a means for validating the initial amount of farmed fish. It is essential that the concerned local authorities survey the correct application of the ICCAT/GFCM recommendations to ensure the accuracy of reported harvest and trade data.

36. Biological samples and research. In the input phase, accidentally-killed fish represent valuable specimens for scientific purposes. However, the data on input biomass are estimates. On the other hand, during the harvesting phase, all fish are physically available, such that accurate data and biological samples can be collected from a significant number of fish. The availability of specimens for sampling and data collection would facilitate the implementation of research activities.

37. Waste management. During harvesting and processing of the fish for the market, a large amount of biological waste is produced. Unless used for research purposes, this waste should be properly stored, treated, landed and disposed of. Licensed farms should have approved waste-disposal plans, including plans for farm material subjected to renewal (e.g. nets, ropes).

38. Farm harvest data. The output data of the harvesting activity should be recorded and reported.

- For stock assessment purposes, it is important to obtain the size composition of the captured fish. Since there currently are technological difficulties for measuring the fish at the time of capture with the desired degree of accuracy and precision, it is necessary to record and report the size composition at the time of harvesting, as specified in the ICCAT recommendation [Rec. 04-06, para. 2]. Estimates of the round weight of harvested fish should also be obtained, as these data would be useful for monitoring regional farming activity and for cross-checking inputs and outputs.

- Summary information on annual inputs and outputs to farming operations should also be reported in accordance with the ICCAT Recommendation [Rec. 04-06, para. 5]. This information should be made available in round weight so that it can be analyzed with respect to catch and aquaculture statistics.

39. Trade. The traceability of all internationally-traded tuna can be accomplished with instruments such as the ICCAT Bluefin Tuna Statistical Document Program [Rec. 03-19]. However, the usefulness of this Program should be improved by amending its coverage to include international transfers of live fish, and by ensuring that all ICCAT and GFCM members submit bi-annual summaries of their imports, as required by the Program. The data collected by the Program will also provide information useful for validation and estimating unreported catches.

3.5 Summary of statistical issues

40. From the point of view of the sustainability of the bluefin resource, it is clear that a number of statistics have to be collected, reported and analyzed at the regional level, so that the stock can be assessed and managed properly. Such requirements for data collection and reporting in capture fisheries directed at BFT existed well before the practice of farming begun (e.g. in the ICCAT Convention, in various ICCAT recommendations and resolutions, in the 1995 UN Fish Stocks Agreement, in the FAO Code of Conduct for Responsible Fisheries, etc.). It is important to obtain the following:

- Accurate estimation of total weight of the catch from the wild.
- Accurate estimation of the biological characteristics of the catch (e.g. size composition).

- Accurate statistics on the origins of the catch (flag, area, season, transfer and destination).
- Accurate statistics on purse seine fishing operations (e.g. fishing effort and fishing strategy).
- Accurate estimates of input to and output from the cages, growth and conversion rates, and a brief description of the method used to measure the input.
- Information on authorized farming facilities.

41. The framework for the separation of the capture and aquaculture components of tuna farming was established by the Coordinating Working Party on Fishery Statistics (CWP). The CWP noted that "*the problem was to ensure that the weight of the captured organisms is recorded as capture fishery production and that subsequent incremental growth in captivity is recorded as aquaculture, so as to avoid partial or total double counting*".

42. The data specifically requested on the aquaculture and fisheries components should be reported by members to FAO, GFCM and ICCAT in accordance with the formats established by these organizations. It is important to stress that flag states have the responsibility to collect and report catch data for vessels flying their flag, irrespective of whether the fish are destined for canneries or farms.

43. However, the separate account of the capture and aquaculture components is often difficult to implement. The key point in the collection of statistics from tuna farming remains the measurement/estimation of the number and weight of the fish introduced in the cages.

44. When such techniques are not yet well or completely developed, and considering the uncertainties associated with quantifying fast-moving fish, it would be practical to consider additional sources of information that can be used to complement or cross-check such data. For example, the outputs from farms can be estimated quite accurately and, with a good estimate of growth rates, the initial input into the farms can be back-calculated. Similarly, trade data can be used to validate or complement output reports, although at the current time not all ICCAT Contracting Parties that import bluefin tuna (or its products) provide summaries of the Bluefin Statistical Documents to ICCAT. Thus, full implementation of the Statistical Document Program (which has been recently amended to include information on farming) will strengthen its ability to serve as a validation tool.

45. It is also necessary to ensure that standard types of measurements are used when reporting data, in order to ensure consistent interpretation and comparisons. In general, all fish measurements of weight should be reported in round weight (live weight) and all measurements of size should be reported in fork length in accordance with the ICCAT *Field Manual*. Although conversion factors and length-weight relationships are available for wild bluefin, these do not necessarily apply to farmed bluefin. Furthermore, the relationships and conversion factors may change depending on the duration of the farming operations, the feed used, and other factors. It is recommended that accurate conversion factors and relationships between measurement types be developed for the different types of farming operations.

Recommendations cited

[Res. 94-05] *Resolution by ICCAT Concerning the Effective Implementation of the ICCAT Bluefin Tuna Statistical Document Program.*
[Rec. 97-04] *Recommendation by ICCAT Concerning the Implementation of the ICCAT Bluefin Tuna Statistical Document Program on Re-export.*
[Rec. 02-08] *Recommendation by ICCAT Concerning a Multi-year Conservation and Management Plan for Bluefin Tuna in the East Atlantic and Mediterranean.*
[Rec. 03-16] *Recommendation by ICCAT to Adopt Additional Measures Against Illegal, Unreported and Unregulated (IUU) Fishing.*
[Rec. 03-19] *Recommendation by ICCAT Concerning the Amendment of the Forms of the ICCAT Bluefin/Bigeye/Swordfish Statistical Documents.*
[Rec. 04-06] *Recommendation by ICCAT on Bluefin Tuna Farming.*

Appendix 8

EXECUTIVE SUMMARY
BLUEFIN YEAR PROGRAM (BYP)

Introduction

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 2005 had been met.

The current financial status is reviewed below and recommendations are made for direct BYP-funded research, for 2006 in particular, and for the future in general. The 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 2006 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.

1. Financial report

The financial status of the BYP funds through October 5, 2005 was reviewed. With the expected 2006 Commission contribution of €37,500, the 2005-2006 BYP operating budget should be on the order of €72,500 **(Table 1)**.

2. Progress made on 2004-2005 BYP Research Plan

2.1 Western Atlantic

Canada summarized the bluefin tuna research activities funded or partially funded by the ICCAT BYP in document SCRS/2005/088. These projects were made possible by samples collected from round fish landed in the St. Lawrence bight. The BYP funds supported a biologist sampler in the main landing port to collect biological samples that have been distributed to other scientist including otoliths, hard parts for age determination, muscle, liver and gill tissue, and stomach contents for feeding and condition studies (SCRS/2005/088). Canadian scientists submitted a proposal to continue the economic support of this project through 2006 with funds from the BYP.

The United States also continued biological sampling programs through 2005. These samples are primarily sent to the South Carolina storage bank. BYP funds also support shipping and handling costs for international samples sent to the South Carolina bank.

2.2 Eastern Atlantic and Mediterranean

2.2.1 Biological sampling

The main objective of biological sampling within the BYP is to support research on stock structure by means of genetic analyses (tissue) and microconstituents analyses (otoliths); research on reproduction (gonads) and research on growth (spines, vertebrae and otoliths). Sampling in the eastern Atlantic as well as western, central and eastern Mediterranean was accomplished. For 2004-2005 samples were collected in Iceland, Spain, Portugal, Italy, Croatia, and Turkey.

2.2.2 Research on maturity

In 2004-2005, 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 to the control of its reproduction in captivity to establish a sustainable tuna aquaculture. Progress has been made 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 sequencing and assays to measure gene expression have been completed. A study on size and age at sexual maturity of female bluefin tunas from the Mediterranean Sea was completed by Turkish and EU scientists in 2001-2004.

2.2.3 Research on tuna farming

Research on BFT farming, has been carried out within framework of the ICCAT BYP since 2002 as initially proposed. Research progress and results have been reported in SCRS papers (Ticina *et al.* 2003, Ticina *et al.* 2004, Ticina *et al.* 2005, and SCRS/2005/114). Additionally, as was suggested by the BYP Working Group, sampling of muscle tissue for genetic studies and sampling of otoliths for stable isotopes analysis have been done. Samples were shipped to Dr. Pla (Girona University) and Dr. Rooker (Texas A&M University). As this research indicated high shedding rate of single barb "spaghetti" tags, research aimed to evaluate suitability of non-invasive caudal peduncle tags for tuna tagging purposes is currently under way.

At present, additional research on tuna farming is being accomplished by an *ad hoc* GFCM-ICCAT Working Group. The Third Meeting on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean was held in March 2005.

2.2.4 Research on spawning areas

For 2004-2005 larval surveys were carried out in the Balearic Islands and in the Northern Levantine Basin. Further evidence of spawning of bluefin tuna and the other tuna species in the eastern Mediterranean Sea was given. Furthermore, the preliminary results of the survey conducted in the western Mediterranean were reported in the *International Larval Fish Conference* (Barcelona, July, 2005).

On the other hand, in October 2005 a larval research meeting, in the framework of project CLIOTOP, will be held at Málaga (Spain). This program may promote resolution of issues of early life history that have been of concern to BYP.

A tuna larval survey (TUNALEV) in the Northern Levantine Basin (Cilician Basin) was conducted from 5-18 June 2004. Further evidence of spawning of bluefin tuna and the other tuna species in the eastern Mediterranean Sea was given. Samples of bluefin tuna larvae were shipped for genetic studies to USA. Results of this study are underway.

A meeting of the Mediterranean Larval Group was hosted in September 2004 in Girne (Cyprus), where the need of joint larval studies in the Mediterranean Sea was stressed.

2.2.5 Research on genetics

As a result of the tuna larval survey in the Northern Levantine Basin, samples of bluefin tuna larvae were shipped for genetic studies to USA. Results of this study are underway.

2.2.6 Research on otolith microchemistry

Otolith microchemistry study (SCRS/2005/083) has resulted in advance in our understanding of stock structure and mixing component of the biology of bluefin tuna. The discriminatory power of stable isotopes (δ13C, δ18O) in otoliths of yearlings (age-1) was high, with 91% of individuals classified correctly to eastern and western nurseries. A large fraction (~43-64%) of the Atlantic bluefin tuna collected in the western Atlantic fishery (comprised primarily of large school and medium category fish) originated from nurseries in the east. Alternatively, medium and giant category bluefin tuna from the Mediterranean were largely (~82-86%) of eastern origin. Thus, initial evidence suggests that western fishery received high subsidy from the Mediterranean population. While these results are promising, more complete sampling is required to ensure that valid population-wide inferences can be made.

2.2.7 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, tagging of 43 bluefin tunas in the Northern Levantine Sea, donated by the Turkish Bluefin Tuna Farmers and Exporters Union, brought valuable results. This study was carried out by Turkish, Italian, English, Spanish, and USA scientists. Also, 22 fish were tagged on bluefin farms in Spain (Ricardo Fuentes) and Malta within the tagging program with participation of University of Bari (Italy), IEO (Spain), MCRF (Malta) and COPEMED.

Furthermore, adult bluefin tuna tagging activities in the Mediterranean, coordinated by the University of Bari (Italy), will be continued during 2005.

2.2.8 Conventional tagging

Two conventional tagging surveys have been carried out, one in the proximity of the Strait of Gibraltar in fourth quarter of 2004, and another one in the Bay of Biscay in the third quarter of 2005, with 912 and 1694 juvenile bluefin tagged, respectively. Also conventional tagging of juvenile bluefin tuna is being accomplished in collaboration with both professional and recreational fishermen in the western Mediterranean.

2.2.9 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/2005/109 provides an ageing comparison analysis between vertebrae and spines of bluefin tuna of the same individual fish. Additional work on this topic will be required. To make progress with direct ageing research, the group proposes a meeting to reach agreement in reading criterion of different structures (type of bands that are considered annual, type of banding with reflected or transmitted light, border interpretation, etc.). Recognizing that there are many planned assessments in late 2006, it is proposed to hold the meeting in early 2006 (April). Canada noted that it plans a pilot validation study of ages determined from archived otoliths using the bomb radiocarbon signal as a time-marker. Canada hopes to present the results of its study as a national contribution under the auspices of the BYP at the planned workshop in 2006.

3. Research Plan for 2006[*]

There has been considerable progress to date on the sampling plan developed by the BYP in 1999 and continued through 2005, but at a lower cost than originally anticipated. While there is a need to maintain sampling to achieve the plan outlined in the BYP sampling plan (Anon 2000), the BYP research funds in 2005 and 2006 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 2005-2006, 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.

[*] A number of research proposals for 2006 were discussed. These are available from the Secretariat.

Table 1. Recommended 2005-2006 BYP contributions to bluefin research (€).

Project description 2005-2006	*Request*	*BYP Fund Balance*	*Research priority*
		35,000	
Planned expenditures in 2005 (to support commitments made in the 2004 BYP)			
Shipping samples	1,000	34,000	1
Larval and biological sampling (Turkey)	500	33,500	1
Ageing coordination	22,000	11,500	1
Anticipated 2006 Commission contribution	37,500	49,000	
Planned expenditures in 2006			
I. Biological sampling			
W. Atlantic sampling (Canada)	4,000	45,000	1
Mediterranean & E. Atlantic sampling (established by BYPE Coordinator)	10,850	34,150	1
Biological sampling coordination	2,000	32,150	1
Complete analysis of central North Atlantic cruises	10,000	22,150	2
II. Larval sampling (established by BYPE Coordinator)	13,200	8,950	1
Larval sampling coordination	2,000	6,950	1
III. Tagging (established by BYPE Coordinator)	4,950	2,000	1
Tagging coordination	2,000	0	1

Appendix 9

EXECUTIVE SUMMARY
ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH (ERPB)
(Expenditures/Contributions 2005 & Program Plan for 2006)

1. Program objectives

The original plan for the ICCAT Enhanced Research Program for Billfish (ERPB) (ICCAT 1987) 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 2005 and are highlighted below. During the 2005 Billfish Working Group meeting, the Working Group requested that the ERPB 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 2005. 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 was 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.

It is with extreme sadness that we report that the Eastern Atlantic Coordinator, Dr. N'Goran Ya, passed away during the summer of 2005. Dr. N'Goran brought a lot of enthusiasm to his job and had just finished coordination travel in several African countries on behalf of the ERPB prior to his death. In addition, Dr. N'Goran had participated in the Billfish Data Preparatory intersessional meeting in Natal, Brazil, this past April. We will miss him.

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 ERPB and highlight the need to increase the resources devoted to support the work pursued by the ERPB. The development of the ERPB 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.

2. Budget and Expenditures - 2005

This report presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2005. In 2005, funding for the ICCAT Enhanced Research Program for Billfish operated under the financial arrangement established by the 1997 SCRS (ICCAT 1998). 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 2005 (ICCAT 1998). As a result of this development, the Program in 2005 was fully coordinated by the Secretariat in consultation with area coordinators and Contracting Parties.

Contributions in 2005 included an allocation of €11,273.01 from the regular Commission budget **(Table 1)**. Other funds that are normally contributed to the Billfish Program were not made available in 2005. Therefore, it was again necessary (as in 2004) to reduce major expenditures for 2005 Billfish research activities by about 50% (**Table 2)**.

The total funds available (as of the start of Fiscal Year 2005) for the 2005 Billfish Program amounted to €14,963.53, plus any contributions that were made during 2005. Several additional expenditures are expected to be incurred before the end of 2005 and into the first quarter of 2006, such as Program coordination travel. Therefore, there is a need to carry over the 2005 balance in Billfish Program funds to the 2006 Budget, as has been the practice for this and other special programs in previous years.

[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.

Although no new cash contributions were obtained in 2005, other than the Commission funds, in-kind contributions to the Program continued to be made during 2005. 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 traveling to Venezuela to oversee ERPB funded work and Martinique to encourage the reporting to the SCRS of France' research on FADs. Travel cost for these trips were absorbed by the U.S. National Marine Fisheries Service and the University of Miami, and as such represented an in-kind contribution to the Billfish Program for 2005. 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.

3. Research contributions

The result of the reduction of cash contributions has been that part of the Program Plan for 2005 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 13 observer trips on Venezuelan longline vessels were accomplished in 2005; about the same carried out in 2004, but about half of what had been planned for 2005.

As summary of research carried out during 2005 was summarized by the western area Coordinator in SCRS/2005/082, and by the Eastern Atlantic Coordinator in SCRS/2005/040. Additional working documents on billfish were submitted to the 2005 SCRS as well as the billfish intercessional meeting held in Natal, Brazil in April 2005. These documents included: SCRS/2005/025-047, 064, 077, 080, and 105.

4. Coordination, Protocols, and Program Plan - 2005

It was confirmed that Drs. Powers and Prince (U.S.A.) will continue to function as the General Coordinator and West Atlantic Coordinator, respectively. Mr. Paul Bannerman (Ghana) has agreed to act as Co-Coordinator for the East Atlantic Ocean, along with Dr. Taib Diouf (Senegal) or his designee.

The summary of the 2006 proposed budget, totaling €49,950 is attached as **Table 3**. The Working Group requests that the Commission increase its contribution for 2006 to €22,546.54 to cover the most critical parts of the 2006 ERPB. Funding at this level is required to continue the program given the extremely low 2005 carry-over balance in the current budget of only €8,461.62 (soon to be reduced to €5,461.62 when 2005 funding requests from Ghana and Cote d'Ivoire are completed). This carry over balance is much lower than in previous years and now threatens the continuation of the program at even a meager level. 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 2006. The consequences of the Commission failing to make the requested contribution (€22,546) includes elimination or reduction of the following research activities of the ERPB in 2006: (1) eliminating important at sea observer initiatives in Uruguay and Brazil planned for 2006; (2) eliminating coordination travel for the eastern Atlantic Coordinator to attend the ICCAT billfish stock assessment meeting in 2006; (3) Further reduction (about 50%) of the Venezuelan observer program from 2005 levels (2005 already had operated at about 50% of planned activities); (4) 50% reduction of support for acquiring hard parts for age and growth analysis; (5) 50% reduction of conventional tagging activities, including distribution of tag recovery incentive rewards; and (6) 50% reduction of all planned shore-based sampling activities from 2005 levels. In addition, new shore-based or at-sea research activities will not be attempted.

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. Detailed or planned activities are provided in the section below.

5. Detail of research activities planned for 2006

5.1 Shore-based sampling

5.1.1 West Atlantic

Barbados. Dr. Hazel Oxenford, University of West Indies, has expressed interest in to expanding 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 2006 will be €500. Some coordination travel in this location by the West Atlantic Coordinator, or his designee, may be required in 2006.

Bermuda. Shore-based sampling of the annual billfish tournaments will be conducted in Bermuda in 2006. 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 2006 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 2006.

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 2006. Some coordination travel for this effort may be required in 2006.

Cumaná, Playa Verde, Morro de Puerto Santo, 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 €200 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 €800. Sampling artisanal longline boats and artisanal fisheries in Morro de Puerto Santo and Margarita Island will be conducted in 2005 and the requested funding for these segments is as follows: Morro de Puerto Santo €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. Collection of biological materials for research on age and growth, as well as reproductive biology, will be continued during 2006 in Venezuela. Costs to the program for this activity in 2006 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 2006. 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 2006 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 2006 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 was re-established in 2004 at the request of the Ministry of Agriculture, Lands, Forestry, and Fisheries (coordinated by Mr. Crofton Isaac and Mr. Paul Phillip). Funds for this activity were dispersed to Grenada in 2004/2005 but as of this date only one progress report has been submitted. Problem involving obtaining transportation to the landings sites has been given as the reason for lack of

progress. It is uncertain whether Grenada intends to return unused research funds or will resolve the transportation problem and conduct the research. It will be necessary to resolve this problem prior to disbursement of additional funds. No new expenditures are anticipated for 2006.

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 2006 through the Nichirei Carib Corporation. If this activity does occur, the requested funding in 2006 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 2006 SCRS concerning this activity but will not require funding in 2006.

5.1.2 East Atlantic

The Coordinator for the East Atlantic will need travel funds in order to attend the ICCAT billfish stock assessment planned for 2006. In addition, prior to the billfish stock assessment, the billfish rapporteur is planning the work with scientists from Ghana, Côte d'Ivoire and Senegal in order to develop standardized CPUE time series for these two east Atlantic locations for the upcoming stock assessment. This will involve coordination travel.

Côte d'Ivoire. Abidjan shore-based sampling of size frequency, sex determination, and catch and effort of the artisanal and recreational fisheries for billfish will be continued in 2006. Funding for 2006 will be €1,500.

Dakar, Senegal. Shore-based sampling of the Senegalese artisanal, recreational and industrial fisheries for billfish size frequency, sex determination, catch and effort data and tagging efforts 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 2006 by the East Atlantic Co-coordinator, Mr. Paul Bannerman. Funding for 2006 will be €1,500. Some travel by the East Atlantic Coordinator may be required to accomplish this task in 2006.

Portugal. Some coordination travel to Portugal and Madeira may be necessary in 2006 to investigate sampling opportunities for collection of hard parts for age and growth work. Costs of coordination travel are indicated in sections below.

5.2 At-sea sampling

5.2.1 West Atlantic

Bermuda. At-sea sampling of home based longline vessels targeting pelagic species maybe initiated in 2006 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 2006. 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 2006. This proposed work will be conducted at no cost and 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 2006 are shown in the next section.

Brazil. At-sea sampling on Brazilian longliners will be initiated in 2006 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 2006, although no expenses are anticipated for this activity during the upcoming year, except for coordination travel for Dr. Hazin.

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 2006.

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 and determining sex. Costs for establishing the Uruguay billfish observer data base format to correspond to those established by the ERPB will be €1,500 for 2006.

Venezuela. At-sea sampling out of the ports of Cumaná, Puerto La Cruz, and Margarita Island will be continued in 2006. A total of about 10 tuna trips and 7 swordfish trips on mid-sized industrial longline vessels will be made in 2006, and the cost will be €8,000. In addition, two long-range trips on large Taiwanese-type vessels (€1,500), and two trips on smaller longline vessels (€400) will be made in 2006. Therefore, the total West Atlantic at-sea sampling for 2006 will be €9,900. In addition, insurance for at-sea sampling for 2006 will be €1,200.

5.3 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 2006. These projects are independently funded but may require coordination travel in 2006.

5.4 Tagging

The following conventional tagging activities and expenditures are proposed. The purchase of tags, tagging equipment, and ICCAT tagging T shirts (incentive rewards) will not be required in 2006. The total for tag rewards (including the €900 needed in Venezuela) will amount to €1,500 for 2006. A lottery reward of €500 will also be necessary for 2006.

5.5 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 2006. In addition, purchase of hard parts in 2006 will be €1,000 (Barbados and Azores). Implementation of any newly submitted work will be contingent on the availability of funds.

5.6 Coordination

5.6.1 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 Coordinators will be to establish sampling programs and oversee sampling activities. Funding for West and East Atlantic Coordinators in 2006 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

5.6.2 Miscellaneous/Mailing

The requested funding for 2006 for East Atlantic miscellaneous and mailing is €100. Similar needs for the West Atlantic Coordinator are covered by the U.S. domestic budget.

5.6.3 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 Oriente (Venezuela) for these data entry functions. However, there are no anticipated costs for quality control and data entry for 2006 at this time.

5.6.4 Bank charges

Charges by the bank for the transfer of funds and bank checks in 2006 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 2006 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 2006.

Table 1. Summary budget for the Billfish Program.

Source	€
Balance at start of Fiscal Year 2005	14,963.53
Income (allocation from ICCAT Regular Budget)	11,273.01
Expenditures (see **Table 2)**	- 17,774.92
Balance (as of September 28, 2005)	**8,461.62**

Table 2. 2005 Budget & Expenditures of the Enhanced Research Program for Billfish (as of September 28, 2005).

Chapter	*Budget (€)*	*Expenditures (€)*
West Atlantic sampling		
Venezuela	16,100	16,000.00
Grenada	1,094	
Other	6,044	
East Atlantic sampling		
Ghana	1,500	
Cote d'Ivoire	1,500	
Other	3,000	
Tagging		
Rewards	2,000	
Outreach (including T shirts)	2,000	
Travel by Program coordinators		
West	10,000	
East	10,000	1,709.78
Mailing & miscellaneous--East Atlantic	100	
Bank charges on Billfish account	250	65.14
TOTAL	**50,950**	**17,774.92**

Table 3. 2006 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
Barbados	1,000 *
St. Maarten, Netherlands Antilles	1,500 *
West Atlantic at-sea sampling:	
Venezuela (Cumaná, Puerta la Cruz, and Margarita Island)	11,100
Uruguay	1,500 *
East Atlantic shore-based sampling:	
Dakar, Senegal	1,500
Ghana	1,500
Côte d'Ivoire	1,500
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 (including Drs. Hazin and Luckhurst)	20,000 *
Mailing & miscellaneous-East Atlantic	100
Bank charges	250
GRAND TOTAL	**49,950**

*Authorization of these expenditures depends, in part, on sufficient funds being available from new contributions in 2006.

Appendix 10

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON STATISTICS

1. Opening of the meeting and arrangements

The Sub-Committee on Statistics met on September 26 and 27, 2005 at the offices of the ICCAT Secretariat. The meeting was chaired by Dr. Pilar Pallarés (EC-Spain) and Dr. Guillermo A. Diaz (United States) served as Rapporteur.

2. Issues regarding data submission

2.1 Task I and Task II data reporting

2.2.1 Tagging database

Table 1 in the Secretariat Report on Statistics and Coordination of Research shows the Task I and Task II data received by the Secretariat from each country by species and fleet (gear). At the present time, 19 of the 41 Contracting Parties have not submitted any 2004 data to the Secretariat, compared to 26 last year. Approximately 50% of the Task I data received lacked Task II catch and effort or size data. **Table 1** (see Secretariat Report on Statistics and Coordination of Research) provides a summary of the 2004 data reports received by the Secretariat. The Secretariat informed the Sub-Committee that compared to the previous year more countries submitted their data using the electronic forms provided by ICCAT. The Sub-Committee encouraged those countries that are not submitting their data in this way to adopt the electronic forms for data submission in the near future.

The Secretariat also informed of some countries that reported aggregated data (by species, gear, and/or areas). These data cannot be assimilated into the ICCAT database and a serious effort should be made to avoid the submission of aggregated data.

The Sub-Committee discussed and agreed on maintaining the current deadline for data submission as July 31, 2006. Data reported during the Species Work groups discussions will be incorporated and acknowledged as a footnote in the catch tables prepared by the Secretariat.

Intersessional meetings, such as stock assessments, require data to be submitted no later than two weeks prior to the meeting. The Sub-Committee noted that late data submission usually results in stock assessments being conducted on incomplete data series. The Sub-Committee reminded the Contracting Parties of the several stock assessments to be conducted during 2006 which will require earlier submission of data.

Recognizing that the estimation of total catches in round weight, by flag, species and fishing gears is essential information for any scientific studies, and to avoid confusion in changing reporting criteria held for the past 35 years, the Sub-Committee recommended that reporting the total catches from the entire Atlantic not be changed. Also, the Sub-Committee remembers the obligation to report Task II data. However, considering that a high percentage of Task I data do not have the corresponding detailed Task II data and recognizing the importance and usefulness of the CATDIS data (i.e. total catch in weight by 5x5 area and quarter), the Committee recommended that the countries also submit the Task I catches by 5x5 areas, gears and calendar quarters as a Task I supplement. If the countries could not disintegrate the total catch in these strata, the finest strata as possible can be adopted for this purpose (e.g. 5x10 or 5x5 biannual).

2.2 Tagging data

The Secretariat is attempting to update all of the information it has for conventional and archival tagging of tunas and billfishes in the Atlantic. The Sub-Committee recommended that the Secretariat develop a protocol to present tagging data similar to the one used for Task I and Task II data (**Table 1** in the Secretariat Report on Statistics and Coordination of Research).

The conventional tagging database has been updated with information received during last year from EC-España (AZTI: 632; IEO-Coruña: 6; IEO-Santander: 190), EC-Greece (126), EC-Ireland (6), and also sporadic

recoveries reported by various other entities (16). Two additional data sets are waiting clarification prior to incorporation into the database (these include data on more than 500,000 tags submitted by United States). The Secretariat has contacted U.S. scientists to resolve remaining questions about these data.

As recommended by the Sub-Committee on Statistics at the last SCRS meeting, the Secretariat has continued with the tagging revision and a quality control process started in 2004. This task was done in collaboration with ICCAT scientists involved in tagging experiments. Given the complexity of this revision it is crucial to improve this collaboration in the future, considering that a large fraction of tagging/recapture records are still flagged for revision and clarification.

Many of the problems faced by the Secretariat in respect to tagging information, relies on the lack of compliance with the data exchange protocol (rules, formats, codes, procedures, etc.) regulating the submission and revision of tagging data. The Secretariat is planning to prepare a draft document with standard formats, rules and procedures in order to contribute to the future ICCAT tag data exchange protocol.

The Sub-Committee recommends that the SCRS establish an *ad hoc* group to improve coordination and communication of all tagging programs carried out for ICCAT species. Although more work is necessary, the Sub-Committee recognized that the Secretariat has greatly improved the ICCAT tagging database.

2.3 Revisions to historical data

The longline catch data reported by South Africa for 1998-2002, included in the Secretariat's database were expressed in gilled and gutted weight. The procedure of estimating these new values is explained in document SCRS/2005/068 and was reviewed by the Sub-Committee, which recommends incorporating these data into the ICCAT database.

Japan, Venezuela and Ukraine have made revisions to their data on billfish and small tunas (see **Table 2** in the Secretariat Report on Statistics and Coordination of Research). For Ukraine, the changes are resulting from recommendations made at the Billfish Data Preparatory Meeting held in Brazil in May 2005. Morocco's 1998 bluefin reported landings have been revised and the Sub-Committee recommends all these proposed revisions be reviewed by the appropriate species groups and incorporated into the ICCAT database subsequent to positive review and acceptance by the species groups.

In April 2005 all the Task II information, as well as the data catalogue (catch, effort, and sampling), was placed on the ICCAT web site with the possibility to carry out consultations or to download the databases. The Sub-Committee urged the scientists of the countries to collaborate in improving this database that at times are somewhat incomplete, questionable and/or uncertain.

A joint FAO and ICCAT document (SCRS/2005/089) was presented and the meeting. The document highlighted catch discrepancies between the catch databases of the two organizations for major tuna species in the Atlantic. The Sub-Committee requests that the species working groups review this information and make a recommendation regarding the incorporation of missing data into the ICCAT database.

It is also recommended that the species working groups specify and establish a protocol for adopting the FAO statistics, not only for prior years but also for future substitutions.

The Committee notes that the bluefin tuna data collection from farming activity [Rec. 04-06] was implemented in some countries in recent times. Preliminary data have been examined by the SCRS. This fact is an important improvement of the situation reported in the last years for the Task II size data of Mediterranean purse seine catches. Bluefin tuna length data taken at harvesting can be used even for statistical or assessment purposes, under the condition to have information about the time period of remaining in the cage and avoiding the use of age 0 and 1 data. The use of weight data taken at harvesting in farms and age 0 and 1 data should be evaluated on a case by case basis by the species group concerned.

2.4 Shark statistics

The Secretariat indicated that little new information on sharks Task I and II data has been reported. At the present time, only a few countries report shark statistics by species (catch and size). These data deficiencies have been apparent for many years and made the last shark assessment highly uncertain. Countries should make an effort to improve data reporting on shark statistics (Task I and II). Morocco reported shark total catch data for

the period 1995-2004 in its Annual Report, and will improve and report this data by main species in the near future.

Concern was raised during the meeting that countries might be using different conversion factors for the same shark species. The Sub-Committee encouraged the countries to submit the list of shark conversion factors that are being used to the Secretariat.

2.5 Statistical Documents and other trade information

Information from Statistical Documents Programs are regularly summarized in reports by the different parties and submitted to the Secretariat for their exploitation. On the basis of studies of these documents, catches that have not been reported in Task I can be identified and estimated. A total of eight Contracting or Cooperating Parties have submitted information regarding statistical documents. Details on the information, by Party, are presented in the Secretariat Report on Statistics and Coordination of Research, **Table 4**. The Sub-Committee expressed concern on the lack of reporting from some countries, particularly EC and Croatia that are needed in order to make accurate estimates of catches by country of origin.

In the Secretariat Report on Statistics and Coordination of Research, **Tables 5 to 7**, the Secretariat presented comparative figures between the catches reported in Task I and the figures obtained from the statistical documents received by the Secretariat for bluefin tuna, bigeye and swordfish. These data have been previously used by the species groups to estimate unreported catch and the Sub-Committee recommends that species groups continue to evaluate these data for those purposes.

2.6 Other by-catch species

The Sub-Committee in Statistics agreed that the Sub-Committee on by-catch should develop a list of additional species to be reported as by-catch and protocols for data reporting besides the ones already developed by this group.

3. Updated report on relational database system

The ICCAT relational data base system is a composite structure of various databases (Task I, Task II catch-and-effort, Task II size sampling, catch-at-size, CATDIS, tagging, trade statistics, etc.) with nearly 120 inter-related tables and more than 3 gigabytes in size. Its design is considered finalized in terms of model and structure. In terms of data management tools, only a part of the “user-friendly” data manipulation tools, were, or are, under development. The Secretariat intends to continue this complex and time consuming task during the following years. At the same time, the Secretariat will continue the data revision and validation of Task II.

The Sub-Committee recommended the Secretariat to continue with the improvement of the database system by creating a document for the database (formats, etc.) and different tools to allow the users an easy access to the database.

The Sub-Committee agreed that the species code for southern bluefin tuna should be the same code used by CWP which is “SBF”.

4. Updated report on Survey of Fishery Statistics Collection Systems

A detailed summary of the various data collection systems was presented by the Secretariat in the Secretariat Report on Statistics and Coordination of Research, **Table 8**. The detailed responses to the questionnaires are available at the Secretariat. For next year the Secretariat proposes that these questionnaires be studied in detail and to present a working document that establishes a fishing profile of the Parties that have responded to these surveys.

The Sub-Committee recommended that the information presented in **Table 8** of the Secretariat Report mentioned above be somehow summarized in the near future in order to give a general idea of the quality of the data in the ICCAT database.

5. National and international statistical activities

5.1 International and inter-agency coordination and planning (FAO, CWP, FIRMS)

The Secretariat informed the Sub-Committee that incorporation of ICCAT publications into the ASFA database was behind schedule. To solve this problem, the Secretariat contracted an institute in India.

During the 2004 SCRS there was discussion on ICCAT's possibly hosting the GAO website to allow access to its environmental related database. The Secretariat was unable to host the GAO website but links to different environmental related databases (including GAO's) are now in the ICCAT website.

The Sub-Committee recognized the importance of these interagency collaborations and encouraged the Secretariat to continue with them.

5.2 National data collection systems and improvements

Chinese Taipei informed on the improvements in its fishery independent data collection system implemented in 2005, that included: (1) a pilot port sampling program started in Cape Town at the end of September 2005, (2) an increase in the number of observers (from four to five) in its Atlantic observer program, and (3) a requirement that all vessels carry two VMS Units (100% coverage) to improve data collection and cross check logbook information. Canada reported that implementation of a new database system for catch and effort information complicated reporting of Task I and II data this year, but the problems have been resolved.

6. Report on data improvement activities

6.1 Japan Data Improvement Project

The 2003 *Resolution by ICCAT on Improvements in Data Collection and Quality Assurance* [Res. 03-21] established a Data Fund to be used "for training in data collection and for supporting of scientific participation in SCRS data preparatory and stock assessment sessions by scientists from Parties with insufficient capacity to meet data collection, quality assurance, and reporting obligations." At the end of 2004, Japan initiated a 5-year project to aid several countries meet their data collection and reporting obligations. The report of the Project activities is presented separately in the Secretariat Report on Statistics and Coordination of Research.

Under this program, Brazil reported that a two-week course on the standardization of catch rate took place in Recife-PE (Brazil), in July 2005. Researchers from Brazil, Uruguay and Venezuela attended it. Drs. Mauricio Ortiz (NOAA/USA) and David Die (University of Miami/USA) acted as instructors. S-Plus was the software used during the course. The first week was devoted to the learning of the S environment, language and functions related to the issue of standardizing catch rates. Several examples of the use of generalized linear models (GLM), generalized additive models (GAM), tree models and other kinds of models were presented and discussed. All participants agreed that the course was very important, with a significant improvement of their computational and analytical abilities being achieved. The identification of problems in the data available, as well as the discussion that followed on approaches to solve those problems, were also highlighted as a positive point of the training course. The acquisition of 4 S-Plus licenses was also considered crucial to the continuation of the data processing and analysis effort.

Ghana is to benefit under the above mentioned project by the improvement of its fisheries statistics. One Ghanaian scientist was sponsored by the project to attend the meeting of the Workshop on Tropical Tunas in July 2005. Three scientists, from Ghana, Côte d'Ivoire and the Republic of Guinea, were sponsored to attend the 2005 SCRS meeting in Madrid. The first training session on the use of the AVDTH software, provided by an EU expert, is scheduled for the end of October 2005. In September 2005, Ghana sent 2004 logbook data to ICCAT.

6.2 Data Fund from [Res. 03-21]

In 2003 the SCRS and the joint meeting of fishery scientists and managers outlined some attempts to identify fleets that have gaps in their data collection systems and transmission of data. Later, the Contracting Parties considered it opportune to provide the Secretariat with funds to help certain countries improve their capacity to collect and submit information on their tuna fisheries.

Table 4.2.1 (in the Secretariat Report on Statistics and Coordination of Research) presents the current balance of the Fund and projected expenditures to the end of 2005. The protocol for approving the use of the Fund for particular activities was developed by the SCRS at its 2004 meeting.

In 2005, the Data Fund has been used to finance the participation of scientists at scientific meetings: One participant (from Côte d'Ivoire) to the Billfish Data Preparatory Meeting, and two participants (from Ghana and Senegal) to the SCRS meeting. The Data Fund was also used to purchase 5,000 streamer tags in order to accommodate the increasing number of requests for tags and to avoid depletion of the inventory kept by the Secretariat.

For 2006, it is expected that the Data Fund will continue to be used for capacity-building and data collection activities in conformity with the priorities identified by SCRS. In addition, the subcommittee recommended that the Data fund be used to help to complete of the Field manual and to start data recovery efforts.

7. Review of publications

7.1 CATDIS

Given the difficulty of receiving Task I data (total annual nominal catch by country) in five degree squares and by month or quarter, the Secretariat has attempted to breakdown the data by quarter and by 5 degree squares. This work file was updated to cover the period from 1950 to 2003. This work has enabled the preparation of fishing maps published in the last Statistical Bulletin and the reports of the species groups. This file has also been used by the CWP for the publications of data of integrated fisheries databases of the Atlantic.

Recognizing the benefits of having graphic representations of the data available in CATDIS, the Sub-Committee appreciates the offer from Japan of graphic software, free of charge, which would be available at the Secretariat for the SCRS scientists' use.

The Sub-Committee recommends that the Secretariat verify and disaggregate the gear codes used in CATDIS, according to scientific needs.

7.2 FISHSTAT

This program created by FAO provides a standard access to various FAO databases and some catch databases of several regional fishery bodies. Preliminary work is needed to format the Task I data in accordance with a format that is compatible with this software. This work has been carried out and the file is available on the ICCAT web site.

7.3 Statistical Bulletin

This year the Secretariat has made a considerable effort to improve the presentation of data in *Statistical Bulletin, Vol. 34*, which can be summarized in the following three points:

- presentation of graphics in color;
- inclusion of all the years from 1950 to 2003; and
- presentation of fishing maps.

Part of this work constitutes the initial phase for the development of the ICCAT Atlas proposed by the SCRS in 2002.

7.4 Task II

The publication in paper copy of these data (Data Record) was discontinued in 2000. Starting this year (April 2005) all information will be available on the ICCAT web site.

7.5 Other publications

7.5.1 Collective Volume of Scientific Papers

Volume 57 was published, consisting of two issues (487 pages) corresponding to reports and documents for the 2004 BETYP Symposium and the Second World Meeting on Bigeye Tuna. The latter issue was peer-reviewed. Both issues were produced in hard-bound and CD versions. Volume 58 was published with the remaining documents and reports pertaining to other inter-sessional meetings and the SCRS meeting held in 2004. The Volume consists of five issues (1,782 pages) produced on CD.

During 2004 and 2005, the Secretariat scanned every scientific paper published since 1973 in the *Collective Volume* series, as well as the 1986 special publication for the Skipjack Year Program. The entire collection, about 3,200 files, is available in PDF (those documents published after 2000 can be edited; older documents are available only as images). The collection is available from the ICCAT web site and will also be made available as a 3-CD set in early 2006.

For 2006, the Secretariat plans to enhance the accessibility of individual documents in the collection through the construction of a database. Currently, the collection is maintained in a series of HTML files with links to individual papers. Better accessibility of the documents would be achieved by modifying the database to include direct links to the individual files.

7.5.2 Biennial Report

During 2005, the Report for Biennial Period 2004-2005 (Part I, 2004) was published in three issues: Commission (1), SCRS (2) and Annual Reports (3). Produced in three languages, the Biennial Reports represent one of the main publication tasks by the Secretariat.

7.5.3 Newsletter

In 2005, the Secretariat reinstated the practice of issuing a *Newsletter* aimed at the general public to inform them of recent and planned activities, and major achievements. Two issues were prepared (February and September, 2005).

7.5.4 Image archive

Considering the improvements made in the existing ICCAT database, the Sub-Committee discussed the possibility to plan a “visual” database. The new database would include photos, video and other material of interest. To avoid copyright problems, the Sub-Committee recommended that the scientists send any material they wish to have included in the base. The Sub-Committee noted the existence of a password protected web page (www.halios.net) which contains visual material.

8. Review of progress made for a revised ICCAT Manual

A report on the Secretariat's efforts to aid in the completion of a revised ICCAT Manual was presented separately and is available from the Secretariat. The main Chapter drafted in 2005 was on various types of sampling for statistics and biological data, which was completed by a contract to CEFAS (UK). The Japan project provided funding for the chapter on the collection of biological information. Future work includes a chapter with descriptions of fisheries and fleets. The Secretariat indicated the need to find sufficient funding to contract out this chapter.

The Sub-Committee encourages scientists to provide comments and suggestions on the ICCAT Manual to the Secretariat before the end of the SCRS Plenary. Those comments will be transmitted to the authors for inclusion in the final version that should be returned to ICCAT within a month. The Sub-Committee also recommended the implementation of a formal protocol for the revision of the ICCAT Manual.

Considering the importance of completing the ICCAT Manual in the near future, the Sub-Committee recommended that the Commission consider alternative options for making funds available.

The Sub-Committee recognized that the revised ICCAT Manual should incorporate references to other species considered as by-catch by the SCRS. The Sub-Committee also recognized that incorporating those species at the

same level of the tuna and tuna-like species would increase the cost of the Manual considerably. Taking into account that a lot of information on these species (turtles, birds, etc.) has already been developed and can be available to the SCRS, the Sub-Committee recommended that such information be provided to the Secretariat which will analyze how to include it in the revised ICCAT Manual.

9. Consideration of recommendations from inter-sessional meetings

9.1 Classification of artisanal vs. industrial marlin catches

After a discussion of the classification of artisanal vs. industrial marlin catches, the Sub-Committee decided that such a decision should not be made by the Sub-Committee. Thus, no recommendation was made on this issue.

9.2 Protocol to distinguish 0 catches from unreported catches

The Sub-Committee extensively discussed the issue of unreported catches and zero catches. The Sub-Committee decided that it is a decision of each species working group to decide if unreported catches should be replaced by zero catches in the catch tables.

9.3 Data imputations methods for filling in gaps in reported catches

The Sub-Committee agreed that each species group should make a recommendation to the Secretariat on how to proceed on this matter. Each species group needs to identify potential problems and then try to solve them. Different statistical approaches can be used to fill in the gaps. However, it is not to the scope of this Sub-Committee to evaluate such techniques. The Sub-Committee emphasizes that progress is being made in this field.

It was recently noted by scientists that there were historical data, previously used by SCRS working groups to carry out their yearly stock assessments and not available in the present ICCAT database, or existing in other sources.

Regarding the data used in the past by the SCRS, the present lack of availability may be due to different reasons, such as simply that these historical data have not been submitted “officially” to the ICCAT Secretariat.

There was a consensus that many of these historical data should be of key importance in the SCRS present and future stock assessment, as it is of key importance to analyse the longest possible series in all stock assessment work.

The Sub-Committee on Statistics recommended that the ICCAT Secretariat initiate a “data recovery plan”. This plan should target: (1) the identification and (2) the recovery of historical tuna data that are not presently available in the ICCAT database.

The identification of these missing data should be based on a careful examination of:

- data published in historical statistical archives and documents published either by ICCAT (data records), by national laboratories or by international bodies (ICES); and

- data previously used during its previous SCRS assessment (for instance the albacore assessment done during the seventies).

All the data identified as missing data should be (1) either recovered from ICCAT scientists or from national sources, or (2) re-entered manually in the ICCAT database using their identified “paper sources”.
The sources, type and quality of these data should, of course, be well documented in a metabase associated with the database and available to the working groups using them.

The data targeted by this “data recovery plan” would be, by order of priority:

1) Size data;
2) Historical Task I data (for some countries);
3) Catch and effort data by time and area strata;
4) Biological and tagging data;

5) Sport fishery data; and
6) Other data or information on Atlantic tuna and their fisheries.

The period targeted by this "data recovery plan" should be for:

- YFT, SKJ, BET, SMT and Billfishes: period since 1950;
- ALB and BFT: since 1900, e.g. the entire century, but with a priority for post 1950 data as they are more important for stock assessment analysis.

Active communication should be developed by the ICCAT Secretariat and the person in charge of this recovery plan, with the rapporteurs of the species groups, as the recovery work will be done primarily by species. Active contacts should also be developed with scientists who have been working on these historical data or collecting them, as well as with fishery bodies such as ICES and various national laboratories having worked on tuna data.

It was strongly recommended by Sub-Committee on Statistics that special funds should be allocated to this "data recovery plan". These funds should allow to recruit a person in charge of this plan during a period of, at least one year, and preferably two years and also to cover the running costs of this activity.

9.4 Spatial and temporal resolution discrepancies in Task II statistics between longline and surface fisheries

During its workshop held in July 2005, the tropical tunas working group outlined the difficulties raised by the discrepancies existing in the Task II statistics between longline (5x5 resolution) and surface (1x1 resolution) fisheries in the analysis conducted. Consequently the group recommended that all industrial fleets should report Task II statistics by month and 1x1 degree squares. This would facilitate the evaluation of the potential impact of management measures such as spatio-temporal closures, and will also be more convenient for fishery-environment studies. It was also noted that the questions raised by the Commission needs often more detailed data than officially requested.

This was discussed, and several objections were made, based on data confidentiality, technical reasons (linked to the size and drifting of longline) and the implications with other tuna organizations, even if some longline data are already available at this higher resolution. It was suggested that another way to tackle the problem was the temporary use, when necessary, of the national detailed database during these workshops. No advice was made by the group on this recommendation.

10. Future plans and recommendations

The Sub-Committee recommends that the Sub-Committee on Statistics meeting continued to be scheduled before the meetings of the species groups.

11. Other matters

No other matters were discussed.

12. Adoption of Report and closure

The Report was adopted and the 2005 meeting of the Sub-Committee on Statistics was adjourned.

Addendum 1 to Appendix 10

Agenda of the Sub-Committee on Statistics

1. Opening, adoption of Agenda and meeting arrangements
2. Issues regarding data submission
   2.1 Task I and Task II data reporting
   2.2 Tagging data
   2.3 Revisions to historical data
   2.4 Shark statistics
   2.5 Statistical Documents and other trade information
   2.6 Other by-catch species
3. Updated report on relational database system
4. Updated report on Survey of Fishery Statistics Collection Systems
5. National and international statistical activities
   5.1 International and inter-agency coordination and planning (FAO, CWP, FIRMS)
   5.2 National data collection systems and improvements
6. Report on data improvement activities
   6.1 Japan Data Improvement Project
   6.2 Data Fund from [Res. 03-21]
7. Review of publications
8. Review of progress made for a revised ICCAT Manual
9. Consideration of recommendations from inter-sessional meetings
   9.1 Classification of artisanal vs. industrial marlin catches
   9.2 Protocol to distinguish 0 catches from unreported catches
   9.3 Data imputations methods for filling in gaps in reported catches
   9.4 Spatial and temporal resolution discrepancies in Task II statistics between longline and surface fisheries
10. Future plans and recommendations
11. Other matters
12. Adoption of Report and closure

Appendix 11

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 2005 Meeting of the Sub-Committee on By-Catch was opened by Dr. Gerry Scott (United States). The Agenda, which was circulated before the meeting, was reviewed, modified and adopted and is attached to this report as **Addendum 1 to Appendix 11**. It was noted that the agenda would be addressed during two meeting sessions of the Sub-Committee. Dr. E. Cortes (United States) kindly agreed to serve as Rapporteur for the first session. Dr. Guillermo Diaz (United States) served as Rapporteur for the second session.

The main objectives for the first session, which took place on September 27 at the ICCAT Secretariat, were identified as dealing with issues related to Recommendation 04-10. A document summarizing the recommendations and the Executive Summary was distributed. The discussion dealt with five documents (SCRS/2005/059, 065, 074, 086, and 090). Turtles and bird by-catch discussions were taken up during the second session of the Sub-Committee which was reconvened on October 5, during Plenary.

2. Review of new information concerning by-catches

Documents discussed during the first session of the Sub-Committee are summarized below:

SCRS/2005/059 re-estimated shortfin mako shark catches by Japanese tuna longline vessels in the Atlantic Ocean using logbook data from 1971 to 2004 and smaller time and area strata than the two (north and south areas) previously used. Results were very similar.

SCRS/2005/065 examined spatio-temporal variation in sharks and oilfish by-catches of the Greek swordfish longline fishery in the eastern Mediterranean by applying a GLM approach to presence-absence landings data and assuming a Bernouilli distribution with a logit link function. All shark species were analyzed together because the fillets are all landed together; about 50% are blue sharks, also some *Alopias*, Sphyrnidae, *Carcharhinus* and *Galeorhinus* are caught. The next step will be to use observer information for this type of analysis.

SCRS/2005/074 provided an update of by-catch landed by the Spanish surface longline fleet targeting swordfish in the Atlantic Ocean. Total by-catch was around 75% by weight of the total landings; large pelagic sharks made up 70% and blue shark was the most prevalent species. The three most prevalent species in the catch, *Xiphias gladius*, *Prionace glauca* and *Isurus oxyrhinchus* represented on average about 93% of the total landings in weight. *Prionace glauca* and *Isurus oxyrhinchus* are the most prevalent species within the group of large pelagic sharks, representing 86.3% and 10.5%, respectively, which is very similar to levels observed in other oceans.

SCRS/2005/086 was a preliminary re-assessment of the validity of the 5% fin-to-dressed carcass weight ratio for sharks. The main point of this document, which conducted a review based on various fishery-dependent and fishery-independent sources, was to emphasize that the fin to weight ratios area highly variable, depending on the species, fin set used, and fin cutting technique. The main conclusion was that—when using the primary fin set (composed of the first dorsal, two pectoral, and lower lobe of the caudal fin, as is traditional in the USA—the 5% fin-to-dressed weight ratio is generally an upper limit that is not inappropriate.

SCRS/2005/090 reported on trace element concentrations for swordfish and blue shark and their potential use as a biomarker. The elements measured were iron and zinc. Concentrations in specimens from the central North Atlantic were significantly higher than those from animals in the central equatorial Atlantic. These results suggested that trace element composition is a potential biomarker for populations of these species in the study area.

SCRS/2005/069 provided information on the Uruguayan observer program which started in 1994 and has continued since that time, SCRS/2005/071, and SCRS/2005/072 were reviewed during the second session of the Sub-Committee meeting, which occurred on October 5 (see below).

3. Review of other national or international activities concerning by-catches

South Africa reported its NPOA for sharks is in its draft form and will be finalized and gazetted by the end of this year. Additionally, its NPOA for sea birds was adopted and gazetted in 2004. WWF and Birdlife South Africa has been involved this year in providing seabird identification guides to fishers, explaining the impact of fishing mortality on populations and training fishers on release procedures for seabirds and turtles. A project has been implemented this year in collaboration with WWF and Birdlife South Africa to evaluated by-catch levels of seabirds, turtles and sharks, using observer data which have been collected since 1998. A project initiated by Birdlife South Africa and WWF was implemented this year to investigate various mitigation measures for seabird by-catch.

The EC has implemented an observer program since 2001 to record basic data on by-catch and catches in their pelagic longline and purse seine fleets in the Atlantic Ocean. As an example, coverage of the Spanish fleet ranged from 7-14% of the catches. Gear experiments that included the effect of different hook type and baits on by-catch reduction are also being conducted.

Japan reported that between August 2004 and January 2005 the Japanese longline observer program monitored nine cruises or 365 days of fishing, most of which took place in the fishing ground of Atlantic bluefin tuna in the North Atlantic. Data collected through this observer program are: (1) information on fishing boat, fishing gear and fishing processes, (2) oceanographic and weather information, and (3) biological information such as species identification, size and maturity on tuna and tuna-like species as well as other by-catch species. In the South Atlantic, Japan is also running an observer program which collects by-catch information in the fishing ground of southern bluefin tuna under the framework of CCSBT. The information of the particular activity will be presented in the meeting of Ecologically Related Species Group meeting of CCSBT which will be held in Kaohsiung, Chinese-Taipei, in February 2006. Japan is also conducting experimental longline cruises to test mitigation measures for both sea turtles and seabirds, such as dyed bait, circle hook. As for the mitigation measure for the incidental take of sea bird, the deployment of tori streamer line has become mandatory for longliners fishing for southern bluefin tuna since 1997. Finally, Japan has its Plan of Action for both sea bird and turtle by-catches.

The Uruguayan observer program started in 1998 and continued into 2004. Fleet coverage reached 35% in 2004. Observers record detailed information on gear configuration, environmental observations, biological data of the catch and by-catch and biological samples are also taken.

Mexico reported that an observer program was implemented in 1994 and it has been operating since then with 100% coverage. Observer record data on the catch and by-catch as well. The recorded data was used to create a data base for the spatial analysis of by-catch. In addition, Mexico has already implemented its NPOA of sharks.

Côte d'Ivoire reported on the high volume of by-catch recorded as 'false tunas' in the foreign tuna fleet, which in 2004 comprised an important volume of harvest.

Brazil informed that through cooperative efforts, involving fishermen, fishery research institutions and organizations devoted to the conservation of sea birds, particularly "Projeto Albatroz" and IBAMA, the NPOA for the Reduction of the Incidental Catches of Sea Birds was finalized and should be officially approved and implemented very soon. The completion of the National Plan of Action for Sharks was similarly achieved, particularly through the efforts of the Brazilian Society for the Study of the Elasmobranchs and IBAMA, and should also be implemented soon. In regard of the Brazilian Observer Program, the Committee was informed that the mandatory presence of observers on board of all chartered vessels had significantly strengthened the program, which now had about 40 observers permanently at sea. This measure, together with the introduction of new logsheets with fields to record live and dead discards, as well as all by-catches, including birds, turtles, and mammals, should significantly improve the collection of data on the species by-caught by Brazilian longliners.

The United States reported on its domestic longline observer program which has been underway since 1992 and continued into 2004. Observer coverage for 2004 is estimated to be around 8%. In 2004 an experimental gear design was initiated in the Gulf of Mexico compare catch rates of tunas and sea turtles using two different sizes of circle hooks. Summaries of activities in the United States related to its NPOAs for sharks and seabirds are provided in this year's Annual Report to ICCAT, including available observations and estimates of by-catch of seabirds in the U.S. Atlantic pelagic longline fleet.

4. Consideration of Resolution [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 again encouraged Contracting Parties, Entities and Fishing Entities to implement the Resolution.

Various country reports on this issue are summarized above under agenda item 3.

BirdLife International gave a presentation of results from the Global *Procellariiform* Tracking Database, which has been assembled through collaboration between seabird scientists from around the world. Seven species of albatross and four threatened petrel species breed in the South Atlantic. Distribution is concentrated below 30° South, but extends further north near the coasts of Brazil, South Africa and Uruguay. This overlaps with approximately 30-40 million hooks of ICCAT longline fishing effort per year. Approximately 40% of breeding albatross distribution is on the high seas, emphasizing the importance of collaboration between ICCAT members and cooperating non-members for solutions to the problem of seabird by-catch, particularly including distant water fishing nations who have the largest fishing effort in this region. The representative from BirdLife reported that 19 of the 21 species of albatross are now threatened with extinction. Given these threats, and the availability of new data on albatross and petrel distribution, population declines and by-catch rates, the BirdLife representative emphasized that it is now a very opportune time for ICCAT member seabird experts to meet within the ICCAT Sub-Committee on By-catch, to share information and collaborate to produce and assessment of the impact of seabird by-catch resulting from ICCAT fisheries in the convention area, as requested by the Commission in Resolution 02-14. The presentation included an outline of some of the mitigation measures exist which can significantly reduce seabird by-catch within pelagic longline fisheries, emphasizing that this is a solvable problem.

It was reiterated that ICCAT has not collected quantitative data on seabird by-catch and that this situation will persist unless coverage is increased, especially in areas where a high level of sea bird interaction is expected. The analysis presented in SCRS/2005/072 indicates the utility of such data for conducting analyses necessary to address the issues raised by the Commission in [Res. 02-14]. Collaborative work between ICCAT scientists familiar with the tuna fisheries and seabird experts will likely be the most efficient means to address these priority issues.

The Committee (as it had in previous discussions) again noted that the implications of element 3 of Resolution [Res. 02-14] are quite broad. The Committee continues to be concerned that to achieve the full range of issues held in [Res. 02-14] will require expertise not yet held by SCRS. In all, this request will 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.

5. Consideration of Resolution [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 all available information from Contracting Parties and non-Contracting Parties, Entities or Fishing Entities (CPC's) 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 fisheries for tuna and tuna-like species.

Uruguay presented information on sea turtle by-catch from its observer program for the Brazilian and Uruguayan fleets. SCRS/2005/069 presents quantitative and qualitative information on Uruguay's Observer Program and provides details on the development it has undergone. SCRS/2005/071 gives regional information, obtained from

Brazil and Uruguay's observer programs, concerning the incidental catch of sea turtles in an extensive area of the southwestern Atlantic Ocean. Details are provided on the catch values and CPUE for two of the species caught, *Caretta caretta* and *Dermochelys coriacea*, and analyzes the time-area distribution of *C. caretta*, giving possible areas of concentration.

The United States reported on further 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. Research results demonstrated some combinations used achieved up to a 90 percent reduction in fishing gear-sea turtle interactions for leatherbacks and loggerheads. The United States and partners are have launched 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.

6. Consideration of Recommendation [Rec. 04-10] on sharks

Recommendation 04-10 indicates that the SCRS shall review and report back to the Commission in 2005 the revision of the ratio between fins and onboard weight of sharks, if necessary. The SCRS reviewed three SCRS documents presented in recent years (Mejuto and García Cortés 2004, Santos and García 2005, and SCRS/2005/086) and other available information on this issue. The two first SCRS papers included information taken by observers at sea in the EU fleet, while the last SCRS paper was a review of information available throughout the world.

The Sub-Committee drafted a response to the Commission which summarizes the available information relative to this issue. This text may be found in Section 16.5 of the SCRS report.

7. Review of 2004 shortfin mako assessment [Rec. 04-10]

The Sub-Committee recalled that Brooks (2005) reanalyzed blue and shortfin mako assessments after having identified and corrected a minor code error. Results of the new analyses were essentially the same as those previously obtained.

The Commission directed in [Rec. 04-10] that in "2005, the SCRS shall review the assessment of shortfin mako sharks (*Isurus oxyrinchus*) and recommend management alternatives for consideration by the Commission." The Sub-Committee reviewed the shortfin mako assessment during its meeting and in response to [04-10] drafted a response which may be found in Section 16.6 of the SCRS report.

8. Recommendations

The following is a list of recommendations with financial or policy implications reported by the Sub-Committee on By-catches in 2005.

i) The Sub-Committee recommends that the Commission hire 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

ii) 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 Sub-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.

iii) The Sub-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. It is important to provide a basis for quantifying by-catch levels.

iv) The Commission has started to take measures to reduce fishing capacity, which may indirectly help reduce the magnitude of by-catch species such as sharks, turtles and birds. The Sub-Committee recommends that mitigation measures which have been demonstrated to reduce or eliminate interactions of by-catch species with tuna fisheries should be instituted by CPCs. The Sub-Committee also encourages further research into fishing gear modifications that can lead to reductions in by-catch.

The following is a list of additional recommendations pertinent to the conduct of the Sub-Committee's business.

v) The Sub-Committee recommends that data reporting include total catches (landings and discards)

vi) Due to the uncertainties in the basic catch information, more research into stock assessment methodologies that fully utilize the available data, including the tagging data, such as proposed in Aires-da-Silva *et al.* (2005) is recommended. These efforts should make use of the all of the available tagging study results. The Sub-Committee noted that the available shark tagging data from several Parties is already held at the Secretariat, but that results of one large-scale tagging study Fitzmaurice *at al.* (2005) have yet to be incorporated into the ICCAT shark tagging database. The Sub-Committee recommends that the Secretariat request these data from the appropriate source.

vii) In addition to making use of the tagging data, better use of historic effort patterns from the tuna fisheries might be useful in improving advice on the status of these and other by-catch species. The Sub-Committee recommends that the Sub-Committee on Statistics review the available data and develop a method to raise the nominal reported effort statistics to the reported Task I catch data for the range of tuna fleets in the ICCAT area of responsibility.

viii) The Sub-Committee also recommends that Parties be encouraged to conduct data mining research to estimate historical catch (including discarded catch) and size/sex frequency of the catches from the full range of fleets impacting these species.

ix) The Sub-Committee further recommends that standardized CPUE patterns from major fishing fleets, such as those of the EC-Spain, EC-Portugal, etc., be provided.

x) The Sub-Committee also recommends making broader use of trade statistics (fins, etc.) to extend the historical time series of estimates of removals. If using trade statistics, the Sub-Committee recommends use of species- and fleet-specific fin to weight conversion ratios as stated in the response to the Commission on Recommendation 04-10

xi) The Sub-Committee further recommends continued research into the use of historic measures of relative abundance, such as those potentially available from exploratory fishing surveys conducted in the 1950s, for example.

xii) Information available on movement patterns for blue and other sharks in the South Atlantic is relatively sparse. Increased tagging efforts (including the application of electronic tags) throughout the Atlantic, but especially in the southern hemisphere, are recommended. Cooperative research between ICCAT Parties and other Regional Fisheries Management Organizations with interest in shark and other by-catch species is especially needed because of the wide-ranging and highly migratory nature of these stocks. Such cooperative research might best be coordinated through ICCAT, and the Sub-Committee recommends the Commission again consider funding a by-catch coordinator position at the Secretariat to deal with shark and other by-catch issues.

xiii) A number of uncertainties remain regarding basic life-history characteristics of blue shark and shortfin mako. There remain questions on the reproductive cycle for blue sharks which, if addressed through research, may result in more certain stock evaluations into the future. For shortfin mako, our understanding of life history traits is much less refined than for blue sharks and considerable improvement in understanding of mako shark biology should result from intensified research on this species. The Sub-Committee thus recommends increased research into the life history of these species.

9. Other matters

The Sub-Committee on By-catch discussed a proposal to integrate the activities of the Sub-committee on By-catch with the Subcommittee on Environment. There is a clear need for the SCRS to develop its capacity to

integrate ecosystemic approaches into the assessments, into the science and into the scientific advice provided to the Commission. At the same time, there is a need to maintain the recent advances in developing the SCRS research on by-catch species, especially sharks.

The Committee recommends that the SCRS develop a proposal for reorganizing the Sub-Committees on By-Catch and on Environment over the next year. The proposal should include: (1) an ecosystem /environment/by-catch Sub-committee whose mandate is the implementation of ecosystemic approaches into the SCRS's research, science and scientific advice; and (2) a shark working group which maintains by-catch data collection and by-catch monitoring activities. Terms of reference should be developed for the new organizational structure.

10. Adoption of the report and closure

Upon review, the report of the Sub-Committee was adopted and the meeting was closed.

Addendum 1 to Appendix 11

Agenda of the Sub-Committee on By-Catches

1. Opening of the meeting, adoption of Agenda and arrangements for the meeting
2. Review of new information concerning by-catches
3. Review of other national or international activities concerning by-catches
4. Consideration of Resolution [02-14] on seabirds
5. Consideration of Resolution [03-11] on sea turtles
6. Consideration of Recommendation [04-10] on sharks
7. Review of 2004 shortfin mako assessment [Rec. 04-10]
8. Recommendations
9. Other matters
10. Adoption of the report and closure

Appendix 12

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON ENVIRONMENT

1. Opening, adoption of Agenda and meeting arrangements

The Meeting of the Sub-Committee on Environment was held in Madrid on October 5, 2005 at the Hotel Gran Velazquez. Dr. J.M. Fromentin (EC-France) chaired the meeting. After the SCRS decision in 2004, the Sub-Committee had two major objectives in 2005 besides the usual review of new information on the environment, the updating and access of the GAO environmental database presented by Dr. F. Marsac last year, and a synthesis of the ecosystem approach and the relevance of its application to ICCAT.

2. Review of environmental databases and GAO program

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

Since then, no further modifications were made to the software, but the install procedure has to be completed for download on the Internet. A number of updates have been conducted in 2005 on several databases:

2.1 Oceanographic stations

In 2004, the database contained 78,724 stations that have been archived in the area 80°W-20°E / 30°N-30°S over the period 1906-1991. In September 2005, the following extensions were carried out:

- extension to the North Atlantic (to 50°N) when it was previously limited to 30°N,
- extension to the whole Gulf of Mexico (previously excluded),
- extension to the whole Mediterranean Sea,
- inclusion of older data (from 1862) when the previous database was starting in 1906,
- update to 2001, and
- inclusion of two other parameters: silicates and chlorophyll (when available).

The present database contains a total of 535,094 stations, with 418,833 multi-parameters stations and 116,251 CTD profiles.

2.2 Vertical temperature profiles

The updating process is underway and should be completed by the end of the year. It will update the data series up to 2004 in the same enlarged region as previously described for the oceanographic stations.

2.3 Pseudo wind stress and sea surface temperature

The data coverage is still the same (60°W-16°E / 30°N-20°S), by 2° grid. The database has been updated to 2004.

2.4 OPA circulation model

No change or update has been carried out on this dataset. The coverage is 80°W-16°E / 20°N-20°S for the period 1980-2000. An update to 2003 was planned for the beginning of 2005, but the original datasets (which are processed by an ad hoc procedure) are no longer available at Meteo-France (which was the data provider). It would be necessary to start from NetCDf files but we do not have presently the resources to undertake this work, as a new processing tool has to be designed.

2.5 ***Topex-Poseidon sea level anomalies***

No update work has been conducted on this dataset. This dataset covers the entire ocean, for the period September 1992-October 2001, by 1° boxes and 10 days. An update will be undertaken if human resources are added to the present team.

The software and the database (at the current stage of update) will be posted by the end of 2005 on the following web site: http://www.brest.ird.fr/ur109/produits/gao.htm. A link to this web-page will be further added on the web-page of the ICCAT Sub-Committee on Environment. Any further update or development will be automatically loaded on this web page, with an e-mail advice for people being registered to GAO (free registration).

3. Review of new information concerning environment

Contrary to last year in which many SCRS documents were presented concerning topics on tunas-environment, no SCRS documents were presented this year on these subjects.

However, Dr. Eric Prince presented a recent study on the impacts of hypoxic waters on marlin and sailfish. Hypoxia indeed occurs in distinct strata of the eastern Pacific and Atlantic Oceans as a result of organic matter degradation due to high productivity in surface layers. This cold stream restricts the depth distribution of tropical pelagic marlins, sailfish and tunas by compressing the acceptable physical habitat into a narrow surface layer. The depth distributions of marlin and sailfish monitored with electronic tags and average dissolved oxygen (DO) and temperature profiles indeed show that this cold hypoxic environment constitutes a lower habitat boundary in the eastern tropical Pacific, but not in the western North Atlantic, where DO is not limiting. Eastern Pacific and eastern Atlantic sailfish are larger than those in the western North Atlantic, where the hypoxic zone is much deeper or absent. Larger sizes may reflect increased growth from enhanced foraging opportunities afforded by the closer proximity of predator and prey in compressed habitat, as well as the higher productivity. The shallow band of acceptable habitat restricts these fishes to a very narrow surface layer and makes them more vulnerable to over-exploitation by surface gears. Predictably, the long-term landings of tropical pelagic tunas from areas of habitat compression have been far greater than in surrounding areas.

4. Development of a work plan to incorporate ecosystem considerations into SCRS advice

The opportunity to go from a single species approach to a multi-species approach and ecosystem has been, for several years, at the heart of the discussions of the fishing community, that is, some international commissions for assessment of the resources. This matter was again discussed at the 2004 plenary session and it was proposed that a small group prepare a summary of the status of this matter and propose the first elements of reflection for an integration of the ecosystem approach within the framework of ICCAT.

This document recalls, first of all, the general, scientific and institutional contexts in which the ecosystem approach of the fisheries (EAF) has developed. At the general level, the report recalls all the recent FAO reports on world catches, their stagnation since about 15 years which is linked to a problem of general over-capacity and an increase in the number of stocks fully exploited or over-exploited. To these pessimistic facts, should be added the growing demand for the products of the sea, the ever increasing demographic pressure along the coasts and greater interest in other uses of the marine ecosystems. At the scientific level, the document recalls the increasing importance that issues concerning the impact of fishing has had on: non-targeted species, the biodiversity of the marine ecosystems, the degradation of the habitats, feeding interactions (and the famous cascading effects) and, of course, other uses. The key issue of the uncertainties in the advice and consequently, that of the precautionary approach is also discussed. At the institutional level, the document discusses the key role of three organs of the United Nations, the U.N. Convention on the Law of the Sea (UNCLOS), the United Nations Conference for the Environment and Development (UNCED), and the Food and Agriculture Organization of the United Nations (FAO), which have organized diverse international meetings, the most recent being that held in Johannesburg in 2002. It should be noted that at these meetings important declarations were ratified. Important aspects concerning fisheries were: the application of the ecosystem approach for 2010, the conservation or the rebuilding of the stocks to MSY levels for 2015 or the establishment of the 1995 Code of Conduct of Responsible Fisheries.

The document then summarizes the principles of the ecosystem approach. Contrary to the traditional approach, the ecosystem approach operates on two levels: (1) going from a single-species aspect or single stock to the

overall ecosystem and (2) going from a resource-fisher system to a resource-society system as a whole (extending the players to all the component of civil society). On the scientific level, this double dimension generates a considerable increase in the number of variables to take into account during the process of assessing the stocks and ecosystems exploited. The overall variables can be grouped under four large areas: governance, exploitation, resources and the impacts on the ecosystems. The challenge of the ecosystem approach is, therefore, strong and its success depends on the capacity of the scientists to render the general objectives into operational tools, which is not an easy task. In effect, the main objective of regional commissions such as ICCAT is to maintain the stocks exploited at the level of MSY, which is expressed in operational terms by the use of models that permit estimating the reference points. The translation of such an objective to the ecosystem level could be the maintenance of the ecosystems exploited at a sustainable while at the same time permitting exploitation and other uses. However, although such an objective seems simple, it has many problems that are not so simple, such as: how can an ecosystem be evaluated? Or what are the desirable states of an ecosystem?

The document deals then with the manner in which the ecosystem approach is considered by the various fisheries commissions, with particular emphasis on the tuna commissions, i.e. IATTC, IOTC, CCSBT and WCPFC. Moreover, the latter has created an ad hoc working group on "Ecosystem and by-catches", whose objectives are quite ambitious, since they include the estimation of by-catches of all the tuna fleets, a realistic modeling of the ecosystem and the development of ecosystem reference points that should serve, in the last instance for the management of the fisheries.

Lastly, the document reviews the manner when the SCRS could deal with these issues and it is proposed that the Sub-Committees on Environment and on By-catches be merged into one "Ecosystem" Sub-Committee. It is noted that such a merging would require certain adjustments, such as for example, the creation of a species group on sharks, whose assessments are made under the auspices of the Sub-Committee on By-catches. The first mandate of this new sub-committee could be to study how to incorporate the ecosystem approach into the SCRS stock assessment process and, in a more pragmatic manner, to organize the meetings to study the specific issues associated with the ecosystem approach that thee species groups or the Commission could consider (for example, the issue of time and/or area closure). This new committee could also promote active cooperation with the other tuna commissions concerning this matter. Finally, it appears necessary to create, in the last instance, an interface between the SCRS and the Commission to consider the crucial issue of governance, which could be the key to everything.

Following this presentation, the discussion was open. In an atmosphere of consensus, the SCRS considers it opportune, after 10 years of activities and in a general favorable context, that the Sub-Committee on Environment should move towards an "ecosystem" sub-committee and in order to expand its mandate. The manner of carrying out this change, particularly through the possibility of merging the Sub-Committees on Environment and By-catches into a single sub-committee, generated some varied discussion and opinions. These discussions are summarized in the Report of the Sub-Committee on By-catch. The Sub-Committee on Environment indicated its agreement in favor of the merger.

5. Recommendations

The Sub-Committee on Environment once again considers that the GAO software responds to most of needs identified by the SCRS regarding the environmental databases. Some updates have been made by the owner of this software (Dr. F. Marsac) in 2005, but the SCRS has expressed its interest in further spatial and temporal extension, particularly for the South Atlantic, currently limited at 30°S. Knowing that this additional work cannot be done either by Dr. Marsac or the Secretariat, the Sub-Committee recommends that an expert be contracted for a period of two months in order to fulfil this task. The cost is estimated at around €5,000 for 2006.

It is highly recommended that the Sub-Committee on Environment evolve towards an « ecosystem » sub-committee. Nevertheless the opportunity of a merger with the Sub-Committee on By-catches was proposed, discussed and accepted. However, the details and the terms of reference of this new sub-committee are still to be defined.

6. Other matters

After six years in office, and expecting a notable change in the Sub-Committee on Environment, the Convener expressed his wish for the office be renewed starting in 2006.

7. Adoption of Report and closure

The Report was adopted and the 2005 meeting of the Sub-Committee on Environment was adjourned.

Addendum 1 to Appendix 12

Agenda of the Sub-Committee on Environment

1. Opening, adoption of Agenda and meeting arrangements
2. Review of environmental databases and GAO program
3. Review of new information concerning environment
4. Development of a work plan to incorporate ecosystem considerations into SCRS advice
5. Recommendations
6. Other matters
7. Adoption of Report and closure

Appendix 13

WORK PLANS FOR 2006

Tropical Tunas Work Plan

The Group does not envisage carrying out an assessment on yellowfin, bigeye or skipjack in 2006. It considers that it would be more productive to continue a more general review of consequences of the multi-species aspect of the fishery.

The Group continues to think that the review of alternative measures does not only concern bigeye but should also include the other tropical tunas (yellowfin and skipjack), taking into account the multi-species nature of the fishery, particularly the surface fisheries in the Gulf of Guinea. Therefore, since a partial response has been given to the Commission's questions on the consequences of the new measures that were decided in 2005, the Group considers that it is necessary to continue these studies, especially on the alternative measures aimed at protecting juveniles. Thus, the Group proposes, to this effect, holding a working group meeting in 2006.

Several research items are proposed to prepare for this meeting:

1. Finish the in-depth revision of the Task II statistics (catch and effort, size) for the three species, up to 2004, to have a homogeneous data set available;

2. Continue studies on natural mortality, and particularly juvenile mortality, which are of crucial importance for the assessments. The work will involve, in particular, that started in 2005 on the review and analysis of tagging information relative to tropical tunas in order to estimate natural mortality and the rate of exploitation (natural mortality/fishing mortality ratio) for the three species;

3. Try to understand why the recent estimates of MSY of bigeye tuna have considerably increased as compared to assessments carried out in the 1990s;

4. Consider the relevance of the fishery indicators currently used and their possible updating for the three species;

5. Resume (or continue) the study on the effective use of the new models and management tools such as MULTIFAN or simulation methods that permit exploring the feasibility and the impact of possible new management measures;

6. Continue the study of the feasibility and the impact of other alternative management measures that were identified last year, such as: (i) minimum size better adapted to the exploitation conditions and taking into account the resulting rates of discard mortality, and possible assorted measures of a commercial nature; (ii) reductions in fishing effort; (iii) restrictions on some fisheries and/or types of fishing operations, independently of the time-area closures; (iv) quotas; (v) time-area closures; (vi) potential methodological and/ or technological improvements to modify the current selectivity of the surface gears, and especially purse seine. For each type of measure proposed, a feasibility study will also be made and the pertinent indicators defined, for the monitoring of application and, if possible, effectiveness.

Atlantic Albacore Work Plan

Overview

The next North and South albacore stocks assessments are planned for 2007 in conformity with Recommendations [Rec. 04-03 and Rec. 04-04]. The Committee emphasizes the need to hold a data revision Working Group meeting in 2006 for the analyses of both stocks, with emphasis on the North Atlantic stock that has not been analysed since 2000. Ideally, this inter-sessional meeting should take place during 4 days in the second quarter of 2006.

Task I and Task II data

Data from ICCAT database will be available and compiled up to 2004 year for North and South stocks.

Biological parameters

Review of the growth pattern for albacore in the Atlantic for both North and South stocks.

Methods for estimating catch-at-age for North Atlantic albacore and South Atlantic albacore.

Conduct analyses on the CAS separately from the assessment in order to verify changes in the input data as well as consistency of the methods applied, and thoroughly check errors; testing the different methods applied in both stocks.

Review and update tagging database for North Atlantic

For some population analysis models, tagging data are used as an input (e.g. MULTIFAN-CL). All the available release–recapture observations should be checked for errors before being incorporated in the model. This work needs to be done by the scientists involved on these tagging programs and the Secretariat in advance of the analyses.

Assessment models

The base case for North Atlantic albacore is defined by the VPA-ADAPT (Porch *et al.* 2001) model which analyses the international catch-at-age and uses the standardized catch rates from main fleets to calibrate the VPA analysis.

MULTIFAN-CL, a length based, age-structured statistical model that includes spatial structure, fish movement and tagging data, was applied as a preliminary analyses to the north and south albacore stocks. Results were encouraging and it is planned to follow this work for next assessment. Definition of priors will be done at this meeting.

Bluefin Tuna Work Plan

Overview

The next bluefin tuna stock assessment (East and West) is scheduled for May-June 2006 in Madrid. Nine days are deemed to be sufficient for the quantitative assessment work and report writing only if much of the data-preparatory work is carried out in advance of the meeting. In particular, it is essential that the BFT-East data through 2004 be as final as possible by the end of January and that the BFT-West 2005 data be submitted to the Secretariat before the end of March. The Commission instructed the SCRS to evaluate numerous management options including those identified in the 2001 ICCAT Working on Bluefin Mixing (Anon 2002) for dealing with the central Atlantic Region: (a) *Status quo*, where the 2-stock boundary is maintained, (b) *central North Atlantic management unit*, where this unit is defined based on fishery and biological data, and (c) *expanded western Atlantic management unit*, where the boundary line is moved to the east, and (d) other appropriate management boundaries.

Data submission

The official Commission deadline for submission Task I and II data for 2004 is long past. National Scientists should submit any missing eastern Atlantic and Mediterranean statistics forthwith. Data for the western stock through 2005 should be submitted to the Secretariat by the end of March, so that the Secretariat can incorporate the statistics into the database. It may not be possible to include data received after this date in the assessment. *Action: National Scientists.*

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

All National Scientists should provide catch, size and CPUE data up to and including 2004 where available. The Group recognizes that this may not be possible for all fleets. Assessment software should be adapted to accommodate the possibility of incomplete data for 2004 and earlier. Software used for western assessments will be restricted to validated and documented software retained in the ICCAT catalog. These catalog entries need be completed by January. *Action: National Scientists and Secretariat.*

For the western assessment scenarios, catch at size should be created for (*Action: National Scientists and Secretariat*):

1. West Atlantic as usually defined (West of 45^{o} North of 10^{o}N), (ICCAT 1982).

2. Central Atlantic (10^{o}N and North, 30-45^{o}W) as described as a starting point by the ICCAT Workshop on Bluefin Mixing (Anon 2002).

3. Northern northeast Atlantic as defined the ICCAT Workshop on Bluefin Mixing (Anon 2002) Figure 3.

4. Other management areas, as proposed by the Commission.

All National Scientists should provide catch, size and CPUE data up to and including 2004 (East) and 2005 (West) where available. The Group recognizes that this may not be possible for all fleets. *Action: National Scientists.*

If catch at age is to be utilized for smaller areas than just West versus East, then national scientists should submit estimates of catch at age for their fisheries for those areas. Also, the areas chosen should coincide with the options in the ICCAT database.

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

CPUE series

National scientists are requested to update relative abundance series as used in the 2002 (east) and 2002 (west) assessments. In addition, Japanese scientists should develop alternative CPUE series for examining the three options identified in the 2001 ICCAT Workshop on Bluefin Mixing (Anon 2002). *Action: National Scientists*.

Thus, for the western assessments, CPUE should be developed for the following combinations (*Action National Scientists*):

1. West Atlantic.

2. West + central Atlantic (10^{o}N and North, 30-45^{o}W as described as a starting point by the ICCAT Workshop on Bluefin Mixing, Figure 3) (Anon 2002).

3. West + central + northern northeast Atlantic as defined by the ICCAT Workshop on Bluefin Mixing, Figure 3 (Anon 2002).

4. Central Atlantic (Areas 3 and 4 of the ICCAT Workshop on Bluefin Mixing (Anon 2002), if feasible)).

5. Other management Areas, as proposed by the Commission.

Catch summaries

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

Assessment

The stock assessment work should update the 2002 (East) and 2002 (West) stock assessments, taking into account the variants mentioned above for dealing with the central Atlantic area.

In the case of the eastern unit, the data exploratory meeting that was held in 2004 (SCRS/2005/013) reported large uncertainties and numerous sources of errors in the catch-at-size and catch-at-age data. Therefore, it is recommended that the Bluefin Tuna Species Group should deeply investigate the use of assessment methods that do not use size/age data and that may also be robust to large uncertainties in the total catch data (e.g., yield per recruit, simulation modeling), so that final recommendations may be based on a variety of methods. Also, methods to evaluate management strategies, as per the Report of the Bluefin Tuna Research Planning Meeting (June 2005) should be explored. *Action: National Scientists*.

Atlantic Swordfish Work Plan

Assessment

In conformity with Recommendation [03-03], it is recommended that the next Atlantic swordfish stock assessments be conducted in September 2006. The Atlantic assessment will be completed in five days. The deadline for submission Task I and II data is July 31, 2006. However, if National Scientists cannot meet the 31 July deadline for the 2005 data, and if National Scientists prepare the catch-at-size raised to the catch, then late submissions (for 2005 data only) can be accepted up to August 23, 2006. Data received after this date may not be included in the assessment. *Action: National Scientists.*

The assessments should take into account the conclusions reached by the SWO Stock Structure Symposium (currently scheduled to meet in January, 2006).

All National Scientists should provide catch, size and CPUE data up to and including 2005 where available. The Group recognizes that this may not be possible for all fleets. Assessment software should be adapted to accommodate the possibility of incomplete data for 2005. *Action: National Scientists.*

North

The priority for the north stock is to monitor the status of the stock relative to B_{MSY}.

- The lumped biomass production model analyses will be updated using data to the end of 2004, or 2005 where available, and include 5-year projections.
- Catch at size is required to evaluate the effects of regulations. Catch at size should be available at the beginning of the meeting. *Action: Secretariat.*
- Age-specific analyses will be conducted, data and schedule permitting.
- The meeting will provide a response to [Res. 02-04] regarding the effects on the mortality of immature swordfish, the stock, and fishing activities of the new management measures for North Atlantic swordfish for 2003 and 2004.

South

The priority for the south stock is to update the 2002 assessment.

- The lumped biomass production model analyses will be updated using data to the end of 2004, or 2005 where available, and include 5-year projections.
- Catch at size is required to evaluate the effects of regulations. Catch at size should be available at the beginning of the meeting. *Action: Secretariat.*

Appendix 14

LIST OF ACRONYMS

ASFA	Aquatic Sciences and Fisheries Abstracts (FAO)
ASPIC	A fishery surplus-production model
ASPM	An age-structured surplus-production model
AVDTH	*Acquisition et validation des données de pêche au thons tropicales* (Acquisition and validation of data on tropical tunas)
AZTI	*Instituto Tecnológico Pesquero y Alimenario* (Technological Institute on Fishing and Food, Spain)
BETSD	Bigeye Tuna Statistical Document
BETYP	Bigeye Year Program
BFTSD	Bluefin Tuna Statistical Document
B_{MSY}	Biomass corresponding to Maximum Sustainable Yield
BYP	Bluefin Year Program
CAQ	Committee on Aquaculture (of GFCM)
CARICOM	Caribbean Community
CAS	Catch at size
CATDIS	Task II catch data raised to total landings (5ºx5º, FAO Area, quarter, gear)
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CD	Compact Disc
CEFAS	Centre for Environment Fisheries and Aquaculture Science (UK)
CI	Confidence interval
CLIOTOP	Climatic Impacts on Oceanic Top Predators (from GLOBEC)
COFI	FAO Committee on Fisheries
COPEMED	*Cooperación Pesquera en el Mediterráneo* (Fishery Cooperation in the Mediterranean, FAO, Rome)
CPCs	Contracting Parties and Cooperating Contracting Parties, Entities or Fishing Entities
CPUE	Catch-per-unit effort
CRFM	Caribbean Regional Fisheries Mechanism (CARICOM)
CTC	Cooperative Tagging Center (USA)
CTD	Conductivity-temperature-depth
CWP	Coordinating Working Party on Fisheries Statistics
DO	Dissolved oxygen
EAF	Ecosystem approach of the fisheries
EC	European Community
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ERPB	Enhanced Research Program for Billfish ~~Research~~
ETRO	East Tropical (Atlantic)
EU	European Union
F	Fishing mortality rate
FADs	Fish Aggregating Devices
FAO	Food & Agriculture Organization of the United Nations
FIRMS	Fishery Resources Monitoring System
FIS	France/Côte d'Ivoire/Senegal
FISHSTAT	Fishery Statistics software (FAO)
FL	Fork length
FONAIAP	Fondo Nacional de Investigaciones Agropecuarias (Venezuela)
FTP	File Transfer Protocol
GAM	Generalized additive models
GAO	*Gestionnaire d'Applications Océanographiques* (Software for processing oceanographic data)
GB	Gigabyte
GFCM	General Fisheries Commission for the Mediterranean
GG	Gilled and gutted
GLM	Generalized Linear Model
GLOBEC	Global Ocean Ecosystem Dynamics
HBS	Habitat based standardization

HTML	Hyper Text Markup Language
IATTC	Inter-American Tropical Tuna Commission
IBAMA	*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováreis* (Brazilian Institute of the Environment and Renewable Natural Resources, Brazil)
IEO	*Instituto Español de Oceanografía* (Spanish Institute of Oceanography, Spain)
IFREMER	*Institut Français de Recherche pour l'ixploitation de la Mer* (French Research Institute for Exploitation of the Sea, France)
INAPE	*Instituto Nacional de Pesca* (Nacional Institute of Fishing, Uruguay)
INIA	*Instituto Nacional de Investigaciones Agrícolas* (National Institute of Agricultural Research, Venezuela)
INRH	*Institut National de Recherche Halieutique* (National Institute of Fishery Research, Morocco)
IOF	Institute of Oceanography and Fisheries (Split, Croatia)
IOTC	Indian Ocean Tuna Commission
IRD	*Institut de Recherche pour le Développement* (Research Institute for Development, France)
ISMAR	Institute of Marine Sciences (Italy)
IUU	Illegal, unreported and unregulated
IWC	International Whaling Commission
JDIP	Japan Data Improvement Project
LJFL	Lower jaw fork length
MCRF	Center for Research on Fisheries (Malta) ??
MOU	Memorandum of Understanding
MSY	Maximum sustainable yield
MULTIFAN-CL	A length-based statistical stock assessment model
NEI	Not elsewhere included (on species tables)
NMFS	National Marine Fisheries Service (USA)
NOAA	National Oceanographic and Atmospheric Administration (USA)
NPOA	National Plan of Action
OPA	*Océan PArallélisé* (a circulation model known by French acronym OPA)
PCBs	Polychlorinated Biphenyls
PDF	Portable Document Format
PSAT (tags)	Pop-up satellite tags
REPRO-DOTT	An EU-funded research project on bluefin tuna reproduction in captivity
RFB	Regional Fisheries Bodies
RFMOs	Regional Fisheries Management Organizations
RRCI	Relative rate of catch increase
RWT	Round weight
SD	Statistical Document
SDP	Statistical Document Program
SHFU	Shanghai Fisheries University (China)
SPR	Spawning biomass per recruit or spawning potential ratio
S/R	Spawning/Recruit
SSB	Spawning stock biomass
STACFAD	Standing Committee on Finance and Administration
SWOSD	Swordfish Statistical Document
TAC	Total allowable catch
TIS	Trade Information Scheme (CCSBT)
TDR	Temperature-depth recorder
TUNALEV	Tuna larval survey in the northern Levantine Basin
UFRPE	*Universidade Federal de Pernambuco* (Federal University of Pernambuco, Brazil)
UK	United Kingdom
UNCED	United Nations Conference for the Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel Monitoring Systems
VPA	Virtual Population Analysis
WCPFC	Western Central Pacific Fisheries Commission
WiFi	Wireless Fidelity
WWF	World Wildlife Fund
XML	eXtensible Markup Language
Y/R or YPR	Yield per recruit

Appendix 15

REFERENCES

AIRES-DA-SILVA, A., I. Taylor, A.E. Punt, V.F. Gallucci, N.E. Kohler, P.A. Turner, R. Briggs, J.J. Hoey. 2005. A framework for estimating movement and fishing mortality rates of the blue shark, *Prionace glauca*, in the North Atlantic from tag-recapture data. Col. Vol. Sci. Pap. ICCAT, 58(3): 1073-1086.

ANON. 2000. Bluefin Year Program (BYP): Progress Achieved Through 1999 and Future Perspectives. Col. Vol. Sci. Pap. ICCAT, 51(3): 767-812.

ANON. 2001. Report of the ICCAT SCRS Albacore Stock Assessment Session (Madrid, Spain, October 9-15, 2000). Col.Vol. Sci. Pap. ICCAT, 52(4): 1283-1390.

ANON. 2002. ICCAT Workshop on Bluefin Mixing (Madrid, Spain, September 3-7, 2001). Col. Vol. Sci. Pap. ICCAT, 54(2): 261-352.

ANON. 2003. Report of the 2002 ICCAT White Marlin Stock Assessment Meeting (Madrid, Spain, May 14-17, 2002) Col. Vol. 55(2): 350-452.

ANON. 2003a. Report of the 2002 Atlantic Bluefin Tuna Stock Assessment Session (Madrid, Spain, July 22-30, 2002). Col. Vol. 55(3): 710-937.

ANON. 2004. ICCAT Yellowfin Tuna Stock Assessment Session (Madrid, Spain, July 21-26, 2003). Col. Vol. Sci. Pap. ICCAT, 56(2): 443-527.

ANON. 2004a. Bluefin Tuna Research Program Planning Meeting (Madrid, Spain, May 15-16, 2003). Col. Vol. Sci. Pap. ICCAT, 56(3): 987-1003.

ANON. 2004b. 2003 ICCAT Albacore Stock Assessment Session (Madrid, Spain, September 15-20, 2003). Col. Vol. Sci. Pap. ICCAT, 56(4): 1223-1311.

ANON. 2005. 2004 ICCAT Bigeye Tuna Year Symposium (Madrid, Spain, March 8-9, 2004). Col. Vol. Sci. Pap. ICCAT, 57(1).

ANON. 2005a. Report of the Second World Meeting on Bigeye Tuna (Madrid, Spain, March 10-13, 2004). Col. Vol. Sci. Pap. ICCAT, 57(2).

ANON. 2005b. Report of the 2004 ICCAT Data Exploratory Meeting for East Atlantic and Mediterranean Bluefin Tuna. Col. Vol. Sci. Pap. ICCAT, 58(2): 662-699.

ANON. 2005c. Report of the 2004 Inter-sessional Meeting of the ICCAT Sub-Committee on By-Catches: Shark Stock Assessment (Tokyo, Japan, June 14-18, 2004). Col. Vol. Sci. Pap. ICCAT, 58(3): 799-890.

BLOCK, B.A., S.L.H. Teo, A. Walli, A. Boustany, M.J.W. Stokesbury, C.J. Farwell, K.C. Weng, H. Dewar, and T.D. Williams. 2005. Electronic tagging and population structure of Atlantic bluefin tuna. *Nature* 434: 1121-1127.

BROOKS, E.N. 2005. Re-visiting benchmark estimates from the catch-free model applications to blue shark and shortfin mako shark. Col. Vol. Sci. Pap. ICCAT, 58(3): 1200-1203.

FAO. 2005. Report of the Third Meeting of the Ad Hoc GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean. Rome, 16-18 March 2005. *FAO Fisheries Report.* No. 779. Rome, FAO. 2005. 108p.

FITZMAURICE, P., P. Green, G. Kierse, M. Kenny, M. Clarke. 2005. Stock discrimination of the blue shark, based on Irish tagging data. Col. Vol. Sci. Pap. ICCAT, 58(3): 1171-1178.

ICCAT. 1982. Report for Biennial Period, 1980-81, Part II: 88.

ICCAT. 1987. Report for Biennial Period, 1986-87, Part I in "Program of Enhanced Research for Billfish": 233-235.

ICCAT. 1998. Report for Biennial Period, 1996-97, Part II(1) in Report of the Meeting of the Standing Committee on Finance and Administration (STACFAD): 218-229.

ICCAT. 2005. Report for Biennial Period, 2004-05, Part I(2): 132-136.

MEJUTO, J., B. García-Cortés. 2004. Preliminary relationships between the west fin weight and the body weight of some large pelagic sharks caught by the Spanish surface longline fleet. Col. Vol. Sci. Pap. ICCAT, 56(1): 243-253.

MYERS, R. and B. Worm. 2003. Rapid worldwide depletion of predatory fish communities. *Nature*, Vol. 423, pp.280-283.

PALSBOLL, P.J., J. Allen, M. Berube, P.J. Clapham, T.P. Feddersen, P.S. Hammond, R.R. Hudson, H. Jorgensen, S. Katona, A.H. Larsen, F. Larsen, J. Lien, D.K. Mattila, J. Sigurjonsson, R. Sears, T. Smith, R. Sponer, P. Stevick, and N. Oien. 1997. Genetic tagging of humpback whales. Nature 388: 767-769.

PORCH, C., S.C. Turner, J.E. Powers. 2001. Virtual population analyses of Atlantic bluefin tuna with alternative models of transatlantic migration: 1970-1997. Col. Vol. Sci. Pap. ICCAT, 54(2): 1022-1045.

SANTOS, M.N., A. Garcia. 2005. Factors for conversion of fin weight into round weight for the blue shark (*Prionace glauca*). Col.Vol. Sci. Pap. ICCAT, 58(3): 935-941.

TICINA, V., L. Grubišic, I. Katavic, I. Jeftimijades, V. Franicevic. 2003. Tagging of small bluefin tuna in the growth-out floating cage - Report of the research activities on tuna farming in the Adriatic Sea during 2002. Col. Vol. Sci. Pap. ICCAT, 55(3): 1278-1281.

TICINA, V., L. Grubišić, I. Katavić, I. Miletić, I. Jeftimijades, V. E. Tičina, V. Fran. 2004. Some difficulties in sampling and tagging live bluefin tuna in the growth-out floating cages. Col. Vol. Sci. Pap. ICCAT, 56(3): 1218-1221.

TICINA, V., L. Grubišic, I. Katavic, V. Franicevic, V. E. Ticina, M. Ožic. 2005. Conversion of farmed bluefin tuna product weight to live weight of the fish. Col. Vol. Sci. Pap. ICCAT, 58(4): 1271-1274.