INTERNATIONAL COMMISSION
for the
CONSERVATION of ATLANTIC TUNAS

R E P O R T
for biennial period, 2002-03
PART II (2003) - Vol. 2
English version

MADRID, SPAIN 2004

INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

CONTRACTING PARTIES

(as of 31December 2003)

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

COMMISSION OFFICERS

Commission Chairman	*First Vice-Chairman*	*Second Vice-Chairman*
M. MIYAHARA, Japan (since 27 October 2002)	A. SROUR, Morocco (since 27 October 2002)	C. DOMINGUEZ-DIAZ, EC-Spain (since 27 October 2002)

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

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	Chairman
STANDING COMMITTEE ON FINANCE & ADMINISTRATION (STACFAD)	J. JONES, Canada (since 21 November 1997)
STANDING COMMITTEE ON RESEARCH & STATISTICS (SCRS) Sub-Committee on Statistics: P. PALLARÉS (EC-Spain), Convener Sub-Committee on Environment: J.M. FROMENTIN (EC-France), Convener Sub-Committee on By-catches: H. NAKANO (Japan), Convener	J. Gil PEREIRA, EC-Portugal (since 12 October 2001)
CONSERVATION & MANAGEMENT MEASURES COMPLIANCE COMMITTEE	F. WIELAND, EC (since 19 November 2001)
PERMANENT WORKING GROUP FOR THE IMPROVEMENT OF ICCAT STATISTICS AND CONSERVATION MEASURES (PWG)	K. BLANKENBEKER, United States (since 19 November 2001)

ICCAT SECRETARIAT

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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, 2002-2003, Part II (2003)"***, 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 18th Regular Meeting of the Commission (Dublin, Ireland, 17-24 November 2003) and the reports of all the meetings of the Panels, Standing Committees and Sub-Committees, as well as some of the Working Groups. It also includes a summary of the activities of the Secretariat and a series of National Reports of the Contracting Parties of the Commission, relative to their activities in tuna and tuna-like fisheries in the Convention Area.

The Report for 2003 has been published in three volumes. ***Volume 1*** includes the Secretariat's Administrative and Financial Reports, the Proceedings of the Commission Meetings and the reports of all the associated meetings (with the exception of the Report of the Standing Committee on Research and Statistics -SCRS). ***Volume 2*** contains the Secretariat's Report on Statistics and Coordination of Research and the Report of the Standing Committee on Research and Statistics (SCRS) and its appendices. ***Volume 3*** contains the National Reports of the Contracting Parties of the Commission and Reports of Observers.

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

MASANORI MIYAHARA
Commission Chairman

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SECRETARIAT'S REPORT ON STATISTICS AND COORDINATION OF RESEARCH IN 2002-2003

1. Introduction

This report summarizes the work carried out by the Secretariat between October 2002 and September 2003 as concerns statistics and research.

2. Submission and processing of Task I and Task II data

In spite of the change in the deadline date for the submission of data to the Secretariat, many parties continued to present required data late. **Table 1** shows the details of statistical data submission. Data submissions made during the SCRS meeting too late to be included in the species tables are not included in Table 1.

This year three stock assessment sessions were held: Mediterranean swordfish in May, yellowfin tuna in July, and albacore in September. The Secretariat prepared the catch-at-size data for all these meetings and the catch-at-age file for yellowfin tuna.

The submission of required data that does not follow the procedure or the standard format was the subject of an in-depth review by the Sub-Committee on Statistics during its meeting in May and a protocol for the submission of data was defined and could result in improving this situation (see SCRS/2003/012, Appendix 3).

3. Working files (CATDIS)

During the year, the CATDIS file that shows the nominal Task I catches in 5 degree rectangles was updated to include the years from 1950 to 2000. The year 2001 has not been processed due to the delay in the transmission of Task II data for some important fleets. The Coordinating Working Party on Fishery Statistics (CWP), which has developed a database on Atlantic catches, has included this file in their database. For the moment, this file only comprises the nine major species (bluefin tuna, yellowfin tuna, bigeye tuna, skipjack tuna, albacore, swordfish, blue marlin, white marlin, and sailfish). In the next version the other species will be included.

4. Tagging data

4.1 Conventional tags

Tagging and recovery data were received from Côte d'Ivoire, EC-Spain, EC-Portugal, EC-France, Croatia and the United States. The majority of the data received from Europe and Africa relate to BETYP tagging cruises. Tagging data on 210 shark tags have been entered in the provisional database, as well as recovery information on 80 tags.

4.2 Archival tags

In accordance with the SCRS recommendation on the archival tag inventory, the Secretariat has received release information for 34 archival tags from EC-Italy released in 2003, and 60 tags from Japan released in 1999 and 16 released in 2001. The procedure for payment of the rewards for these archival tags is quite imprecise and lengthy and requires improvement to encourage better collaboration from the recoverers.

4.3 Updating of the database

The implementation of the tag database is not yet finalized and consequently no revision of historical data could be made.

4.4 Posters

Due to the lack of resources, the Secretariat did not make much progress on the choice of a generic poster and its circulation on Internet, as recommended by the SCRS.

5. Shark database

All the Task II information on sharks (2001 and 2002) submitted in the traditional format are entered in the central Task II database. Old data should be processed to try to separate Task I and Task II data and their incorporation in the different databases. Task I data for 2001 and 2002 are entered in a provisional database that will be integrated with the historical data in the near future. This task, together with entering previously submitted Task II data, may take some time, given the variety of formats in which data have been submitted in the past. Furthermore, the Secretariat lacks information on conversion factors, and many data have been submitted in dressed weight, or in number of fish. It should be noted that, in addition to the data for the major species being very incomplete, some Contracting Parties and/or non-Contracting Parties, Entities or Fishing Entities continue to report combined species of shark with no species breakdown. These considerations may cause difficulties for the assessments scheduled for 2004.

6. Revision of historical data

The revised Task I data series of bluefin tuna 1991-1997 submitted by Algeria in 2002 was not accepted by the SCRS, pending justification by Algeria for these changes. These revisions were not included in the ICCAT database and are still pending, as no explanation for the modifications has been received.

A revised Task I series for Mediterranean swordfish was received from Malta. These changes are explained in document SCRS/2003/048 and were accepted by the Species Group for the assessment. EC-Italy and Morocco also submitted new and revised size data for Mediterranean swordfish.

New data series from 1991-2002 for the NEI tropical catches (bigeye, yellowfin and skipjack), both for catch and effort and for catch-at-size were received. Task I was calculated from the catch and effort data, which for most years were lower than the catch-at-size, but these were not re-raised. These data, however, included catches that had already been reported by the flag countries. In order to avoid double reporting, the Task I data for Netherlands Antilles (purse seine) Panama (purse seine and baitboat) and Senegal (baitboat) were removed from the NEI series.

Netherlands Antilles submitted a new Task I data series, 1996-2002. In many cases these data coincide with the data obtained through European scientists, and the differences were attributed to the catch data covering all vessels under the Netherlands Antilles flag, some of which had not previously been included in the estimates. The new series for albacore, however, was not included by the Species Group in the stock assessment, as there were considerable doubts as to the reliability of these data, given the very high catch levels. It was later clarified by Netherlands Antilles that these catches had been included in the report in error.

Despite submitting revised size data for albacore 1997-2001, Chinese Taipei did not submit the corresponding catch-at-size for these years. Attempts by the Secretariat to re-create the catch-at-size for Chinese Taipei during the meeting caused some difficulties in the work of this Species Group. Further details on revisions made to albacore data (Task I, catch and effort, size and catch at size) can be found in document SCRS/2003/074.

New Task I series for king mackerel and Spanish mackerel were submitted by the United States, replacing data for these species that had previously been submitted as provisional, and these new figures were accepted and entered in the ICCAT database. Similarly, new series for white marlin and sailfish were entered, as these had been accepted by the Billfish Species Group previously, but had not been officially submitted.

7. Trade data

Japan submitted summary reports of information collected under the Bluefin and Bigeye Statistical Document Programs for the period July-December 2002. For the same period, information was received from the United States in relation to bluefin tuna and from Thailand in relation to bigeye tuna. Bi-annual reports for bluefin tuna, bigeye tuna and swordfish were received from Japan and from Korea for the period January 2003-June 2003. Copies of the individual documents (preferably in an electronic format), as had been requested by the SCRS, were not received.

8. Progress on the development of the database

All the Task I and Task II (catch & effort and sampling) are currently incorporated in the database. The catch-at-size files are also included in the databases and the weighting and substitution procedures are now being developed. Details can be found in document SCRS/2003/026.

9. Vessel database

Following the Commission's recommendation, the Secretariat has made available on Internet a database accessible to the public (http://www.iccat.org). As of 21 October 2003, this database contains 3,029 vessels from 18 Contracting Parties and two Cooperating non-Contracting Parties, Entities or Fishing Entities. Information received from other non-Contracting Parties was integrated into the central base but not included in the web page structure, as the inclusion of such information was not envisaged in the *Recommendation by ICCAT Concerning the Establishment of an ICCAT Record of Vessels Over 24 Meters Authorized to Operate in the Convention Area* [Ref. 02-22]. This is the first version of this database and it will probably be improved or changed according to the future wishes of the Commission.

10. Compliance tables

The Secretariat continues to prepare the compliance tables for the Commission, avoiding the use of scientific data from Task I or Task II except when Reporting Tables have not been presented by the Contracting Parties or Cooperating Parties.

11. Publications

11.1 Data Record (D.R.)

This volume has not been published for the last two years due to the re-structuring of the database. The Secretariat proposes this not be published in book form and would like to have an application available on Internet or on CD-ROM with all the Task II data available at the Secretariat, respecting the confidentiality of the information as the Sub-Committee on Statistics decides.

11.2 Statistical Bulletin

This publication was published in February 2003, and more updated versions are available on the Internet. A new, more interactive application will soon be available on the Internet.

11.3 Collective Volume (Red Book)

In early July 2003, Volume 55 was published on CD-ROM, which contained 127 documents and a total of 2,145 pages. In addition, another 15 documents submitted to the 2002 SCRS were either withdrawn by the senior author or simply not submitted for publication. As in 2002, due to the request from numerous scientists and libraries that wished to continue receiving the printed version of the publication, 75 copies of Volume 55 were printed, and were sent to those addresses indicted by the Chief Scientists in response to a survey. In 2003, considerable efforts have been made to standardize Publication Guidelines for both the Detailed Reports and the contributed papers, such that the publication time will be reduced and the end product will be more consistent.

Following a suggestion from the ad hoc Working Group on SCRS Organization, in late September the Secretariat set up an FTP site containing electronic copies of all draft SCRS papers available at the Secretariat (those that had been presented at inter-sessional meetings, as well as those sent to the Secretariat in advance of the October meeting).

11.4 Biennial Report

The ICCAT Report for the 2002-2003 Biennial Period, Part I, was published in three volumes (Commission, SCRS and National Reports), in Spanish, French and English. For the first time, the National Reports were included in a separate volume (Volume 3). The Commission volume contains about 360 pages, the SCRS volume about 220 pages and the National Report volume about 120 pages.

11.5 A.S.F.A

The Secretariat has initiated discussions to contract the National Information Centre for Marine Sciences (India) to input 405 bibliographic entries for the ASFA in 2000-2002. By out-sourcing, this will get and keep the ICCAT contribution to ASFA up-to-date, and make this a useful database for ICCAT scientists. Progress has also been made on the preparation of a bibliographic database geared more to the needs of ICCAT. Information from ASFA (approximately 2,500 references) corresponding to ICCAT entries have been integrated into the ICCAT bibliographic database.

12. Internet

Two parallel web pages continue to be maintained: www.iccat.es and www.iccat.int. These web pages are in the same format as last year and they have been updated with the meeting announcements, new publications, and the documents of Volume 55 of the Collective Volume. These pages contain more than 566 files occupying about 170 MB of space.

Due to the need to exchange large files or reports between the Secretariat and the other Parties we have setup a new FTP server has been set up, accessible on request at info@iccat.es.

A new web hosting service was contracted with ACENS to host the web site www.iccat.org. This site now houses the ICCAT record of vessels authorized to operate in the Convention area. This base can be accessed directly from this address, or through a link on www.iccat.es.

13. Electronic equipment

In 2003, the Secretariat bought the following equipment:

1 Compact Proliant M380 server with two central processing units (CPUs)
2 flat screens to replace broken monitors
16 RAM memory cards for PCs and 8 graphic cards for PCs
1 hard disc (120 Gb) for storing digitalized documents
1 PC for new staff member in accounts department
2 portable computers for new staff members in the Statistics department
1 portable computer for the Executive Secretary
9 HP laserjet printers
1 Digital camera
1 Scanner/photocopier KYOCERA for connection to the local network

14. Standardization of codes

The inter-sessional meeting of the Sub-Committee on Statistics, held in May 2003, discussed at length the need to harmonize and standardize the codes used by ICCAT. In this regard, some proposals have been made and are included in the annex to document SCRS/2003/012. It will be strongly recommended that the National Scientists try to conform to the new proposal aimed at improving the management of ICCAT data.

15. Scientific meetings

Appendix 1 provides the list of meetings as well as the pertinent results of the various meetings.

16. Special programs

The BETYP Coordinator's report presented to the SCRS provides detailed information on the Bigeye Year Program (BETYP). As concerns the Enhanced Billfish Research Program and the Bluefin Year Program (BYP), the Species Groups have submitted a report on the status of the progress of these programs. All can be found in the Appendices to the 2003 SCRS Report.

Table 1. Data reported to ICCAT in 2003

As of 6 October 2003

FLAG	*DATA*	*DATE*	*BFT*	*YFT*	*ALB*	*BET*	*SKJ*	*BON*	*SWO*	*OTHERS*	*SHK*	*AREA*	*REMARKS*
CONTRACTING PARTIES													
ALGERIA	TASK1	4.viii.2003	TRAP,HAND,BLL					TRAP,PS,GILL	BLL,GILL,UNCL	LTA,FRI,BOP		MEDI	
			PS,GILL,UNCL					UNCL					
	C&E												
	SIZE												
ANGOLA	TASK I												
	C&E												
	SIZE												
BARBADOS	TASK I	12-ix-2003		LL	LL	LL		LL	LL	BIL			
	C&E												
	SIZE												
BRAZIL	TASK I	4.viii.2003	LL	LL,BB,PS	LL,BB	LL,BB	LL,BB,PS		LL,BB	BIL,BLF,FRI,SMA	YES		
	C&E	4.viii.2003		LL,BB	LL.BB	LL,BB	LL,BB		LL,BB	FRI,BIL	YES		
	SIZE	4.viii.2003		LL		LL			LL	WHM			
CANADA	TASK I	29.vii.2003	LL,HARP,TL,RR	LL,TL,RR	LL,TL,RR	LL,TL,RR			LL,TRAW,HARP	MIX,WHM	YES	NW	discards reported
			TRAP										
	C&E	29.vii.2003	RR,HARP,TL,LL	RR,TL,LL	RR,TL,LL	RR,TL,LL			HARP,LL		YES		
	SIZE	26.iii.2003		LL,TROL	HARP, LL,TROL	LL,TROL				WHM		NW	
CAPE VERDE	TASK I	7.viii.2003		PS,HAND			PS,HAND			FRI,LTA,WAH			
	C&E												
	SIZE	7.viii.2003		HAND			HAND			FRI,LTA,WAH			
CHINA, P. REP	TASK I	03.vi.2003	LL	LL	LL	LL			LL	BUM,WHM,SAI			
	C&E	03.vi.2003	LL	LL	LL	LL			LL	BUM,WHM,SAI			
	SIZE												
COTE DIVOIRE	TASK I												
	C&E												
	SIZE												
CROATIA	TASK I	14.vii.2003	PS,LL,SPOR									MEDI	
	C&E	14.vii.2003	PS,LL,SPOR										
	SIZE												
CYPRUS	TASK I	15.vii.2003	LL		SPOR			GILL/TROL	LL	MIX	YES	MEDI	
	C&E	15.vii.2003	LL					GILL/TROL	LL	MIX	YES		
	SIZE												
EUR. COMM.													
EC-ESPAÑA													
ALL AREAS	TASK I	16.ix.2003	LL,TRAP,HAND,	PS,LL,BB	SURF,BB,TROL	PS,LL,BB	PS,LL,BB,TRAP	SURF,TRAP	LL,BB,TRAP,PS				
			BB,OTH		LL,PS		SURF		OTH,SURF	LTA,BIL.FRI	YES		
MEDI +MALAGA	TASK I	7.iv.2003	BB,HAND,TRAP		LL, SURF			SURF,TRAP	LL,TRAP,SURF	FRI,LTA		MEDI,NE	2001 DATA
			LL,SRF,SPR,PS										
ALL AREAS	TASK I	19.ix.2003	*Total revision of 2001 data, including data not previously submitted.*										
SWO LL Fishery	C&E	12.ix.2003							LLHB				
CANARIAS	C&E	10.vii.2003	BB	BB	BB	BB	BB		BB				
TROPICAL	C&E	27.vi.2003		BB,PS	PS	BB,PS	BB,PS			FRI,LTA			
NORTH EAST	C&E	2.ix.2003			BB,TROL								
NORTH EAST	C&E	16.ix.2003	BB										
MEDI +MALAGA	C&E	7.iv.2003	BB,HAND,TRAP		LL, SURF			SURF,TRAP	LL,TRAP,SURF	FRI,LTA		MEDI,NE	
			LL,SURF,SPOR										
MEDI +MALAGA	C&E	16.ix.2003	BB										

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FLAG	*DATA*	*DATE*	*BFT*	*YFT*	*ALB*	*BET*	*SKJ*	*BON*	*SWO*	*OTHERS*	*SHK*	*AREA*	*REMARKS*
SWO LL Fishery	SIZE	12.ix.2003							LLHB				
CANARIAS	SIZE	10.vii.2003		BB	BB	BB	BB						
NORTH EAST	SIZE	7.iv.2003							LL				
NORTH EAST	SIZE	2.ix.2003			BB,TROL								
MEDI	SIZE	7.iv.2003	BB,HND,TRP,LL						LL				
TROPICAL	SIZE	27.vi.2003		BB,PS	PS	BB,PS	BB,PS			FRI,LTA			
TROPICAL	CAS	27.vi.2003		BB,PS	PS	BB,PS	BB,PS			FRI,LTA			+rev from 1991
EC-FRANCE	TASK I	22.ix.3003	PS										
	TASK I	12.ix.2003			PS,MWT,SRF,BB								
	TASK I	29.ix.2003	BB,GLL,MWT,PS	BB,PS,MWT	BB,PS,MWT,GLL	BB,PS,MWT	BB,PS,UNC	GILL, UNCL	MWT,UNCL	FRI,LTA,MIX			
	C&E	25.vi.2003			MWT								
	C&E	22.ix.3003	PS										
	SIZE	26.vi.2003			MWT								
	SIZE	27.vi.2003		BB,PS	PS	BB,PS	BB,PS			FRI,LTA			
	C-A-S	27.vi.2003		BB,PS	PS	BB,PS	BB,PS			FRI,LTA			+ rev from 1991
EC-GERMANY	TASKI	1.ix.2003						MWT			YES	EAST	
EC-GREECE	TASKI	01.vii.2003	LL,PS,HAND		LL,PS,HAND			PS	LL	LTA,FRI		MEDI	
	C&E												
	SIZE												
EC-IRELAND	TASK I	1.viii.2003	GILL,MWT,TROL		GILL,MWT,TROL				GILL,MWT,TROL		YES		2000-2002
	C&E	1.viii.2003	GILL,MWT,TROL		GILL,MWT,TROL				GILL,MWT,TROL				
	SIZE	1.viii.2003			MWT,GILL,TROL								gears mixed 2001
EC-ITALY	TASK I	29.ix.2003	HAND,LL,TRAP									MEDI	
	TASK 1		SPOR,PS,OTH										
	TASK I	2.x.2003			LL,UNCL		UNCL			LTA,BON,FRI,MSP			
	C&E												
	SIZE	26.v.2003	HND,GLL,LL,PS						LL,GILL	SPF			1995-2001
	SIZE	3.x.2003			LL,PS				UNCL				
EC-PORTUGAL													
MAINLAND	TASK I	08.vii.2003	TRAP,SURF,LL	SURF,LL	SURF, LL	LL	TRAP,SURF,LL	TRP,SRF,PS,LL	TRP,SRF,PS,LL	BIL,LTA,TUS	YES		
MADEIRA	TASK 1	17.vii.2003	BB,LL	BB,LL	BB,TROL	BB,LL	BB,LL	BB	LL	BUM,FRI			
AZORES	TASKI	08.vii.2003	LL	BB	BB,LL	BB,LL	BB	GILL	LL		YES	AZ,MAD	
AZORES	C&E		LL	BB	BB,LL	BB,LL	BB	GILL	LL				
MADEIRA	C&E												
MAINLAND	C&E	08.vii.2003	TRAP,SURF,LL	SURF,LL	SURF, LL	LL	TRAP,SURF,LL	TRP,SRF,PS,LL	TRP,SRF,PS,LL	BIL,LTA,TUS			
AZORES	SIZE												
MADEIRA	SIZE	20.i.2003		BB	BB	BB	BB		LL	BUM			
MAINLAND	SIZE	08.vii.2003	TRAP,LL	TRAP				TRAP	TRP,LL				
EC-U.K.	TASK I	29.ix.2003	GILL						GILL				
	C&E												
	SIZE												
FRANCE (ST P&M)	TASK I												
	C&E												
	SIZE												
GABON	TASK I	24.iv.2003		TRAW,SURF				TRAW,SURF		LTA, SSM	YES	SE / ETRO	
	C&E	24.iv.2004		TRAW,SURF				TRAW,SURF		LTA, SSM			

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As of 6 October 2003

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	SIZE	*no size data available*											
GHANA	TASK 1	30.vii.2003		PS,BB		PS,BB	PS,BB		GILL	LTA,BIL			
	C&E	30.vii.2003		PS,BB		PS,BB	PS,BB		GILL	LTA,BIL			
	SIZE	30.vii.2003		PS,BB		PS,BB	PS,BB						
GUINEA ECUAT.	TASK I												
	C&E												
	SIZE												
GUINEA REP.	TASK I												
	C&E												
	SIZE												
HONDURAS	TASK I												
	C&E												
	SIZE												
ICELAND	TASK I	27.i.2003	LL										
	C&E	27.i.2003	LL										
	SIZE												
JAPAN	TASK I	4.vii.2003	LL	LL	LL	LL			LL	WHM,BUM,BLM	YES		1999-2001
	TASK I	3.ix.2003			LL								
	TASK I	29.ix.2003	LL	LL	LL	LL	LL		LL	BILSBT			2002 + rev 2001
	C&E	27.iii.2003	LL	LL	LL	LL	LL		LL	BIL,SBT		ALL	1999-2001
	SIZE	4.vii.2003	LL	LL	LL	LL	LL		LL	BIL,SBT			up to 2001
	C-A-S	3.ix.2003			LL								
KOREA	TASK I	10.vii.2003		LL		LL			LL			ETRO	
	C&E	10.vii.2003		LL		LL			LL			ETRO	
	SIZE												
LIBYA	TASK I												
	C&E												
	SIZE												
MALTA	TASK I	26.v.2003							LL				and historical rev
	C&E												
	SIZE												
MAROC	TASK I	29.ix.2003	TRAP,PS,GILL	UNCL	UNCL	UNCL	UNCL	TRAP,PS	TRAP,PS,GILL	BOP,FRI,LTA			
			HAND						LL				
	C&E												
	SIZE	26.v.2003							GILL				and historical rev
MEXICO	TASKI	24.vii.2003	LL	LL		LL	LL	LL	LL	BIL,BLF		NW	
	C&E	24.vii.2003	LL	LL		LL	LL	LL	LL	BIL,BLF			
	SIZE												
NAMIBIA	TASK I	15.ix.2003	LL	BB,LL	BB,LL	BB,LL		LL		BIL	YES		
	C&E	15.ix.2003		BB,LL	BB,LL	BB,LL		LL			YES		and 2001
	SIZE	15.ix.2003			BB,LL	LL		LL					and 2000-01
PANAMA	TASK I												
	C&E												
	SIZE												
RUSSIA	TASK I	23.vii.2003						TRAW		BLT,FRI,LTA		NE/SE	
	C&E												
	SIZE												
SAO TOME & P.	TASK I												
	C&E												

Table 1. Data reported to ICCAT in 2003

As of 6 October 2003

FLAG	*DATA*	*DATE*	*BFT*	*YFT*	*ALB*	*BET*	*SKJ*	*BON*	*SWO*	*OTHERS*	*SHK*	*AREA*	*REMARKS*
	SIZE												
SOUTH AFRICA	TASK I	1.ix.2003		BB,SPOR,LL	BB,SPOR,LL	BB,LL	BB		LL	SBF,MIX,BIL	YES		
	C&E			BB,LL	BB,LL	BB,LL	BB		LL	MIX,BIL	YES		
	SIZE	29.viii.2003			BB, LL	LL			LL		YES		alb-bb 1985-2002
TUNISIE	TASK I												
	C&E												
	SIZE												
TRINID. & TOB.	TASK I	07.viii.2003		LLHB, RR	LLHB	LLHB		UNCL	LLHB	BIL, WAH, MIX	YES		
	C&E												
	SIZE												
TURKEY	TASK I	02.vii.2003	UNCL						UNCL*				*SWO=2001
	C&E												
	SIZE												
UK - OT	TASK I												
BERMUDA	C&E												
	SIZE												
UK - OT	TASKI	8.v.2003		BB, LL	BB	BB	BB		LL		YES	SE	
STA HELENA	C&E	8.v.2003		BB, LL	BB	BB	BB		LL		YES	SE	
	SIZE	*No size data available*											
UK- OT	TASKI	29.vii.2003								SLT	YES	SW	
FALKLANDS	C&E	29.vii.2003								SLT			
	SIZE												
U.S.A.	TASK I*	31.vii.2003	LL,GILL,HND	LL,GILL,HND	LL, GILL, HAND,	LL,HAND,TRAW	LL,HAND,TRAW,	LL,HAND,TRAW,	LL,HAND,TRAW,	KGM,SSM,WAH	YES		
			TRW,TRP,RR	TRW,TRP,RR	HARP,RR	RR	TRAP,RR,GILL	TRAP,RR,GILL	TRAP,RR,GILL	LTA,BLF,BUM,			
	* YFT	02.VII.2003	HARP	HARP*						WHM,SAI			
	C&E	31.vii.2003	LL	LL	LL	LL	LL	LL	LL	KGM,WAH,BIL			
	SIZE	31.vii.2003		HND,HRP,LL,RR	RR,HAND,LL	RR,HAND,LL	RR,LL	RR,HND,LL,GLL	HRP,LL,RR,TRW	BLF,LTA,WAH	YES		
	C-A-S	31.vii.2003	LL,RR,HRP,PS		LL, HAND,RR	RR,LL,HAND			LL,TRL,HRP,HND				
	C-A-S	27.vi.2003		LL,HRP,HND,RR									
URUGUAY	TASK I	1.viii.2003	LL	LL	LL	LL	LL		LL		YES		
	C&E												
	SIZE												
VANUATU	TASK I												
	C&E												
	SIZE												
VENEZUELA	TASK I	10.ix.2003		PS,BB,LL,GILL	LL	PS,BB,LL	PS,BB,GILL	LL	LL,GILL	BIL,FRI,WAH,BLF			
	C&E			BB,PS	LL,PS	BB,LL,PS	BB,PS		LL	FRI,WAH,BIL,			
	SIZE	29.vii.2003			LL								
	SIZE	21.vii.2003		BB,PS	LL,PS	BB,PS	BB,PS			BLF,FRI			
COOP. STATUS													
CHINESE TAIPEI	TASK I	30.vi.2003	LLFB	LLFB	LLFB	LLFB	LLFB		LLFB	WHM, BUM, BLM			2001-2002
	C&E	30.vi.2003	LLFB	LLFB	LLFB	LLFB	LLFB		LLFB	WHM, BUM, BLM			2000-2001
	SIZE	30.vi.2003	LLFB	LLFB	LLFB	LLFB	LLFB		LLFB	WHM, BUM, BLM			2000-2001
PHILIPPINES	TASK I	23.iv.2003		LL	LL	LL			LL			ALL	
	C&E	23.iv.2003		LL	LL	LL			LL			ALL	Format problems
	SIZE												
OTHERS													

Table 1. Data reported to ICCAT in 2003

As of 6 October 2003

FLAG	*DATA*	*DATE*	*BFT*	*YFT*	*ALB*	*BET*	*SKJ*	*BON*	*SWO*	*OTHERS*	*SHK*	*AREA*	*REMARKS*
BELIZE		04.viii.2003	*Replied - no vessels fishing for tuna in the Atlantic, hence 0 catch reported.*										
CARICOM*	TASK I	6.x.2003		UNCL		UNCL	UNCL			BIL,BLF,WAH,OTH			
CHILE		20.ii.2003	*Replied- Chile does not operate tuna fisheries in the Atlantic and has no catches to report*										
CONGO		18.ii.2003	*Replied - A local fleet started a tuna line fishery at the beginning of 2003. Congo will report catches at the end of the year.*										
CUBA	TASKI	2.vi.2003	LL	LL	LL	LL			LL	BIL, OTH			
	C&E	2.vi.2003	LL	LL	LL	LL			LL	BIL, OTH			
	SIZE	2.vi.2003	LL	LL	LL	LL			LL	BIL, OTH			
GRENADA	TASK 1	30.I.2003		LL/TROL	LL/TROL	LL/TROL	LL/TROL			BIL,BLF,WAH,OTH			
GUAYANA	TASK I	28.viii.2003								BRS, KGM	YES		
INDONESIA		06.iii.2003	*Replied -There is no Indonesian fishing vessel operating in the Atlantic Ocean*										
LATVIA	TASKI	15.viii.2003		TRAW				TRAW					
LEBANON		4.ix.2003	*Replied - No fishing boats registered in Lebanon licensed to fish tuna*										
MOZAMBIQUE		30.vii.2003	*Statistics from Japanese vessels operating in the Indian Ocean*										
NEI-1	TASK 1	Calculated from catch & effort data											
	C&E	27.vi.2003		PS,BB	PS	PS,BB	PS.BB			FRI,LTA,BLF		ETRO	
	SIZE	27.vi.2003		PS,BB		PS,BB	PS,BB			FRI,LTA,BLF		ETRO	
NETHERLAND ANT.	TASK1	7.vii.2003		PS		PS	PS			FRI			
NORWAY		4.viii.2003	*No Atlantic tuna catches made in 2002, shark data submitted*								YES		
TP.OB.SH	TASKI	8.v.2003		LL	LL	LL	LL		LL	BIL	YES	SE	
	C&E	8.v.2003		LL	LL	LL	LL		LL	BIL	YES	SE	
SENEGAL	TASKI	30.vi.2003		BB		BB	BB						
SEYCHELLES	TASKI	24.vii.2002	LL	LL	LL	LL			LL	BIL	YES	SE	
SINGAPORE		13.vi.2003	*Replied - No catches to report as Singapore has only a small coastal fishing fleet.*										
St. VINCENT	TASK1	31.vii.2003		TROL,LLFB	LLFB	LLFB	TROL,LLFB	TROL		CER,WAH,MIX,BIL		NW	
St. VINCENT	C&E	31.vii.2003		LLFB	LLFB	LLFB	LLFB			BIL,MIX			
STA. LUCIA	TASK1	29.ix.2003		HAND/BL	HAND/BL	HAND/BL	HAND/BL			SMALL TUNAS			entered as UNCL
** Caricom - Dominica and St Kitts & Nevis. Grenada, Guyana and Sta Lucia also reported individually*													
FISHING FLEET STATISTICS (number of boats) WERE RECEIVED FROM:													
Algeria		**Iceland**		**UK-Sta Helena**		**Chinese Taipei**							
Barbados		**EC-Germany**		**Trinidad & Tobago**		**Seychelles**							
Brazil		**EC-Ireland**		**Uruguay**		**St. Vincent & the Grenadines**							
Canada		**EC-Spain (Canarias)**		**USA**									
Cyprus		**South Africa**											

Appendix 1

Meetings at which ICCAT was represented between November 2002 and October 2003

SUMMARY

This document presents basic information about scientific and administrative meetings where ICCAT was represented either by a member of the Secretariat staff or by someone else on behalf of the Secretariat. Basic information presented for each meeting includes substantive agenda items and the main implications for ICCAT.

27TH SESSION OF THE GENERAL FISHERIES COMMISSION FOR THE MEDITERRANEAN

VENUE: Rome, Italy, November 19 to 22, 2002.

REPRESENTATIVE: V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Inter-sessional activities 2001-2002; Report on the activities of the Scientific Advisory Committee (SAC); Autonomous budget - Status of Ratification of the Amendment to the GFCM Convention; Management of Mediterranean fisheries; Program of work for the inter-sessional period 2003-2004.

COMMENTS: The GFCM acknowledged all of the scientific recommendations on large pelagic species that had been made by the SAC in June 2002. The GFCM also endorsed three recommendations made by ICCAT at its November 2002 meeting regarding eastern Atlantic bluefin tuna (catch limits, reduction of juvenile catches, and collection of statistics from bluefin tuna farming). The GFCM endorsed the creation of an ad hoc working group that would develop criteria for sustainable tuna farming practices from a broad perspective including statistics, biology, management, environment, aquaculture, etc. In addition, the GFCM endorsed the SCRS' plan to assess Mediterranean swordfish in 2003.

ACTIONS:

SCRS: SCRS scientists should participate actively in the working group on tuna farming.

REPORT AVAILABILITY: From FAO.

INTERNACIONAL CONFERENCE AGAINST ILLEGAL, UNREPORTED AND UNREGULATED FISHING (IUU)

VENUE: Santiago, Spain, November 25 & 26, 2002.

REPRESENTATIVE: A. Lima and V. Restrepo (ICCAT Secretariat); M. Miyahara, Commission Chairman.

SUBSTANTIVE AGENDA ITEMS: The format of the conference dealt with a series of presentations followed by discussion sessions and round tables in which the various aspects of IUU fishing were discussed.

COMMENTS: There were presentations on the different plans of action that have been developed based on the FAO Plan of Action. Further, the round tables discussed subjects, such as: (1) The responsibilities of the flag status and the responsibilities with respect to the nationals; (2) Actions for the fight against IUU fishing; (3) How to prevent fish from IUU fishing from reaching the markets and ports. The discussions were very useful and often they were based on examples taken from ICCAT as a leader in taking measures that adapt to the rapid changes that usually take place in IUU fishing. In general, the conclusion was reached that the lists of IUU vessels alone are no longer sufficient to combat this type of activity. These lists should be complemented by other types of measures such as a registry of licensed vessels ("positive" lists), controls on access to the market which include improved follow up of the product from its capture up to its final destination.

ACTIONS: None.

REPORT AVAILIBILITY:

FIFTH SESSION OF THE IOTC SCIENTIFIC COMMITTEE

VENUE: Victoria, Seychelles, November 26 to 29, 2002.

REPRESENTATIVE: P. Pallarés (IEO, Spain).

SUBSTANTIVE AGENDA ITEMS: 2001-2002 inter.-sessional activities. National reports. Reports of the Permanent Groups on the Collection of Data and Statistics, Tropical Tunas, Neritic Species and Tagging. Report of the Working Group on Methods. Executive reports on yellowfin, skipjack and bigeye. Program on longline depredation. Election of chairman.

COMMENTS: The Work of the Scientific Committee is still being structured. This year, for the first time, national reports have been presented, with a structure similar to those presented to the SCRS.

Permanent Group on Statistics: The report noted the serious deficiencies in the basic data as the major current problem. The problem of the IUU fleets, partial reporting and, in many cases, mixed with the artisanal fleets, and the reduced and partial sampling coverage of the longline and artisanal fleets continued to be the major causes of the deficiencies. On the positive side, improvements have been made in the sampling programs in the area and in the estimates of historical data and in the databases through the WINTUNA protocol developed by the IOTC Secretariat.

Permanent Group on Tropical Tunas: In 2002, the group assessed yellowfin and updated the bigeye assessment carried out in 2001. This year, for the first time, executive reports on the species were presented, with a structure similar to that of the SCRS. In the yellowfin assessment, different estimates were utilized (global models, structured by ages, mixed), although the high degree of uncertainty in the estimate of the reference parameters precluded a quantitative assessment of the state of the stock. Notwithstanding, all the methods coincided in that the state of the catches is close to or above that corresponding to MSY. Together with this, the catches of juveniles have been increasing continuously in recent years. The group recommended not increasing catches or effective effort on yellowfin and a reduction in the catches of juveniles.

With regard to bigeye, the updating of the assessment through an age-structured production model (ASPM) showed catches considerably above MSY, although effort was maintained considerably below that corresponding to maximum yield. As in the case of yellowfin, the catches of juveniles had increased significantly in the recent period. The group recommended reducing catches to the level of MSY and decreasing the catches of juveniles.

There was no assessment or management recommendations for skipjack.

Permanent Group on Tagging: The recommendation was maintained on the usefulness of carrying out a large-scale tagging program. Within that project, various actions are envisioned for the short- and medium-term, financed in major part by the Community, with participation of the fishing sector.

Methods Group: The development of an operative model was recommended to evaluate the robustness of the stock indicators, procedures to standardize catch rates, and assessment methods.

The remainder of the permanent groups, Neritic Species, Temperate Species and Billfishes did not have any notable activity in 2002.

A Permanent Group on By-catch was created and the meeting schedule for 2003 was established: Tropical Tunas and Tagging, first fortnight of June, skipjack assessment and management measures aimed at reducing effective effort on yellowfin and skipjack; Billfishes: September, Neritic Species, not yet determined. Statistics and Scientific Committee, prior to the Commission, November-December. In addition, it was recommended that the Secretariat as well as the scientists actively participate in the 2nd World Bigeye Meeting and in joint work initiatives on common subjects (environmental factors, methods, etc.) under study by other Commissions.

The Committee elected Dr. Kirkwood as Chairman, in substitution of Mr. R. Pianet.

ACTIONS:

SCRS: The work of the SCRS, especially that of the Sub-Committees on Environment and By-catch, and the Methods Group should be coordinated with similar groups in IOTC. In the last SCRS Report, specific recommendations are included (joint group on environmental factors, BETYP Symposium and the 2nd World Bigeye Meeting) aimed at closer collaboration among tuna commissions.

REPORT AVAILABILITY: IOTC.

COORDINATING WORKING PARTY ON FISHERY STATISTICS (Twentieth Session)

VENUE: Mahé, Seychelles, January 21 to 24, 2003

REPRESENTATIVE: Papa Kebe (ICCAT Secretariat)

SUBSTANTIVE AGENDA ITEMS:

Review of inter-sessional developments in Agency programs in fishery statistics. Advocacy role of the CWP in improving the quality of fishery statistics. Catch and trade certification schemes. Global inventory of high seas fishing vessels. FIGIS-FIRMS development.

COMMENTS:

CWP noted that a number of its members had developed their data collection for elasmobranchs and in some cases other by-catch species (e.g. seabirds, turtles) and welcomed the preparation of more field guides for the identifications of elasmobranches.

CWP recommended that importing countries should transmit the full trade document information to the RFBs collected by the catch and trade certification schemes.

A meeting of the agencies involved in the FIRMS initiative was held immediately prior to the CWP meeting to review the progress of FIGIS and to discuss standards and mechanisms in the supply of information. The draft version of the proposed FIRMS Partnership Agreement was discussed and the group proposed that the FSC (steering committee) establish the Rules of Procedure and the Information Management Policy.

The Handbook of Fishery Statistical Standards has been extensively revised by FAO and released as a web-based application.

ACTIONS:

SCRS: The meeting recognized that methodological descriptions of national fishery statistics programs provide very useful indications of statistical quality and recommended that such descriptions be collated and made available.

The CWP noted that several general-purpose fishery data systems are under development by different RFBs and recommended that the characteristics of such information systems be compared and evaluated in a workshop organized by FAO before CWP-21.

The CWP recommended the use of the term “gross removals” to cover the nominal catch.

COM: The CWP recommended that a common format and similar graphic user interface for sharing and presenting vessel records be agreed and adopted with close collaboration between FAO and RFBs

At the invitation of ICES the next CWP meeting will be held in Copenhagen probably in January/February 2005.

REPORT AVAILABILITY: //www.fao.org/fi/body/rfb/cwp/cwp_home.htm

25TH MEETING OF THE COMMITTEE ON FISHERIES (COFI)

PLACE: Rome, Italy, February 24 to 28, 2003.

REPRESENTATIVE: A. Lima and V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Achievements of Major Program on Fisheries 2000-2002; Progress report on the implementation of the Code of Conduct for Responsible Fisheries and related international Plans of Action (IPOAs on capacity, IUU fishing, seabirds and sharks); Decisions and recommendations of the Eighth Session of the COFI Sub-Committee on Fish

Trade; Decisions and recommendations of the First Session of the COFI Sub-Committee on Aquaculture; Outcome of the Technical Consultation on improving information on the status and trends of capture fisheries; Conclusions and recommendations of the FAO Expert Consultation on identifying, assessing and reporting on subsidies in the fishing industry; Strategies for increasing the sustainable contribution of small-scale fisheries to food security and poverty alleviation; Implementation of ecosystem approach to fisheries management to achieve responsible fisheries and to restore fisheries resources and marine rnvironments; Planned activities over the 2004-2009 period.

COMMENTS: Many items relevant to ICCAT were discussed. Several of the tools that have been developed by ICCAT for management purposes received prominent attention during the meeting. One of these was the use of Statistical Documents for tracking international trade and as a mechanism to identify IUU activities. Vessel lists, both positive and negative, also received considerable attention and many countries called for a faster compilation of lists of vessels authorized to fish in the different RFMOs. COFI decided to hold two technical consultations in 2004 that will be of relevance to ICCAT: One, on progress made regarding the IPOA on IUU Fishing (to be held at FAO headquarters); The other one on sea turtles, focusing on the results of recent studies to better understand the various causes for the declines in some stocks, and for ways to minimize their by-catch by various gears (to be held at the FAO offices in Bangkok). The meeting also gave support to the planned strategy to improve reporting on status and trends, and for the use of FIGIS as a tool for distributing information at regional and global scales.

ACTIONS:

COMMISSION: Commission Contracting Parties should participate actively in the planned meetings for 2004, as both are relevant to the work of ICCAT.

REPORT AVAILABILITY: From FAO.

AD HOC MEETING OF THE ESTABLISHMENT OF FIRMS

PLACE: Rome, Italy, February 28, 2003.

REPRESENTATIVE: A. Lima and V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Review of the Draft FIRMS Partnership Agreement.

COMMENTS: This was a meeting between potential FIRMS partners and the FIGIS team at FAO, viewed as a precursor to the FIRMS Steering Committee. The meeting made changes to the draft partnership agreement (now called "arrangement"), making it clearer about rights and responsibilities, and about the role of the FIRMS Steering Committee. Two important issues are (a) to define who the partners would be (the meeting agreed that the arrangement would be between each participating institution and the Partnership, with FAO signing the arrangement on behalf of the partnership); (b) to set up an interim arrangement so that the Steering Committee could begin to function with a minimum of five Partners. The discussions were not completed for lack of time, thus another meeting was planned for July 2003.

ACTIONS:

SCRS and COMMISSION: ICCAT needs to examine the potential costs and benefits of the FIRMS Partnership and decide the extent to which the Secretariat should remain involved.

REPORT AVAILABILITY: N/A, but see SCRS/2003/023.

THIRD MEETING OF SECRETARIATS OF TUNA AGENCIES AND PROGRAMS

PLACE: Rome, Italy, February 28, 2003.

REPRESENTATIVE: A. Lima and V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Status of the FIRMS Partnership; Trade documentation schemes; Vessel listings; 2nd World Bigeye Tuna Meeting.

COMMENTS: Staff members from ICCAT, IATTC, IOTC, CCSBT and FFA were present at the information meeting. Participants agreed that there were clear benefits to be obtained by joining the FIRMS partnership; however, some felt that they needed to have a clearer idea of how much work would be involved. Regarding trade documentation, participants agreed that it would be useful to work together to identify specific ways in which the statistical documents could be harmonized in order to make them more effective for all tuna RFBs. It was also agreed that the term "statistical" in Statistical Documents was rather a misnomer because of the very limited usefulness of these instruments for the collection of catch statistics. Therefore, the focus of any improvements to the documents should be on the fight against IUU fishing via trade documentation. Regarding vessel lists, recognizing that many tuna fleets are highly mobile, participants agreed that there is a clear need to identify mechanisms in which to exchange vessel information. For doing so, it would be necessary to identify a common format for exchanging vessel data. ICCAT informed the other Secretariats that it was planning to host the 2nd World Bigeye Meeting in March 2004, immediately after a planned symposium of the BETYP. Other Secretariats welcomed the ICCAT initiative and offered to participate in the Steering Committee for the organization of the meeting.

ACTIONS:

None

REPORT AVAILABILITY: N/A.

THIRD MEETING OF REGIONAL FISHERY BODIES

PLACE: Rome, Italy, March 3-4, 2003.

REPRESENTATIVE: V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Summary information on the role of RFBs; External factors affecting the management of fisheries; Status of the FIRMS Partnership; Implications from the World Summit on Sustainable Development; Approaches for incorporating ecosystem considerations into fisheries management; Relations with UNEP.

COMMENTS: The meeting reviewed FAO Fisheries Circular 985 that summarizes the mandate of RFBs. Concerning external factors affecting RFBs, it was agreed that many of these could not be tackled adequately because the mandate of RFBs was often limited in scope (e.g., primarily to capture fisheries in the case of ICCAT). The meeting reviewed the development of the draft FIRMS Partnership, with special focus on the deliberations held at the February 28 meeting. The meeting took into account the goals specified by the World Summit on Sustainable Development; concern was expressed that some of those goals were unrealistic in some cases due to the life history characteristics of fish stocks (for example, not all stocks may be rebuilt to MSY levels by 2015). Regarding ecosystem considerations, several participants felt that the ecosystems approach is not yet clearly understood and defined; it was also noted that only one RFB (CCAMLR) currently has an explicit mandate to incorporate ecosystem considerations directly into management. Regarding relations with UNEP, there was agreement that there should be a strong emphasis on RFBs inputting their management expertise to Regional Seas Programs (RSPs) and that duplication of work between RFBs and RSPs should be avoided.

ACTIONS:

None.

REPORT AVAILABILITY: From FAO.

WORKING GROUP "FISHERY STATISTICS" OF THE AGRICULTURAL STATISTICS COMMITTEE

VENUE: Luxembourg, May 5, 2003

REPRESENTATIVE: Papa Kebe (ICCAT Secretariat)

SUBSTANTIVE AGENDA ITEMS: Nomenclature in the fisheries; Changes in the areas by the submission of catch data; Economic indicators in the fisheries; EUROSTAT participation in the FIGIS-FIRMS project; Data exchange protocol. Legislation relative to the exchange process and the submission of data.

COMMENTS: Mainly it is noted that the protocol for the exchange and transmission of data is governed by strict and precise regulatory texts that define the duties of the parties involved as well as the obligation to use internet service (mailbox). Any omission should be explained and justified. Another important point of the discussions concerned the development of a fishing profile by country and the effort deployed in training the statistical correspondents

ACTIONS: ICCAT should intensify its collaboration with EUROSTAT to continue publication on CD of Atlantic fisheries data and eventually to obtain data missing from the ICCAT database and to obtain the procedures used by the EU Member States to develop the fisheries statistics.

FIRST MEETING OF THE AD HOC GFCM/ICCAT WORKING GROUP ON SUSTAINABLE TUNA FARMING/FATTENING PRACTICES IN THE MEDITERRANEAN

VENUE: Rome, Italy, May 12 to 14, 2003.

REPRESENTATIVE: V. Restrepo (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: Review of the Working Group mandate; Development of survey on current situation (capture fisheries, farming, and Market-side components); Review of available information to-date, statistical issues, biological issues; management issues; Potential environmental issues; potential social/economical issues; Future work plan for the Working Group.

COMMENTS: The Working Group was created by initiative of the GFCM to review the current situation of bluefin tuna farming in the Mediterranean and to draft technical guidelines to improve the sustainability of this practice. The meeting focused primarily on the development of a questionnaire aimed at surveying the current extent of farming in the Mediterranean region. The surveys were to be filled out by national scientists by September, to be reviewed at the Second Working Group meeting (scheduled to take place 12/2003).

ACTION ITEMS: None

REPORT AVAILABILITY: SCRS/2003/020.

FIRST COPEMED FORUM ON FISHERIES IN THE WESTERN MEDITERRANEAN

VENUE: Madrid, Spain, July 23 to 25, 2003.

REPRESENTATIVE: A. Lima and J. Porter (ICCAT Secretariat).

SUBSTANTIVE AGENDA ITEMS: One of the priority objectives identified during the second stage of FAO's COPEMED project (due to end in 2004) was the establishment of fora to promote dialog between stakeholders of the fishing sector (administration, research, and industry). The GFCM has stressed the importance of having representatives from the fisheries private sector participating to improve the quality of GFCM's work and to facilitate the implementation of its recommendations. This Forum focused on the role of international, institutional, scientific, and inter-professional cooperation.

COMMENTS: The most important outcome of the meeting was a set of recommendations that focus on maintaining regional projects after COPEMED concludes, the continued improvement and standardization of research and statistics, better dissemination of scientific results and inclusion of the professional sector in the decision making process.

ACTION ITEMS: The ICCAT and COPEMED Secretariats should continue to maintain good communications on Mediterranean statistics and research in order to foster further collaboration between scientists affiliated with both organizations.

REPORT AVAILABILITY: from COPEMED.

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

(Madrid, Spain – 6-10 October 2003)

1. Opening of the meeting

The 2003 meeting of the Standing Committee on Research and Statistics (SCRS) was opened on Monday, 6 October, at the Hotel Reina Victoria, in Madrid, by Dr. Joao Gil Pereira, the Chairman of the Committee. Dr. Pereira welcomed the participants to the annual meeting. He also welcomed four new members to ICCAT: Cyprus, Iceland, Malta and Turkey.

2. Adoption of Agenda and arrangements for the meeting

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

The following scientists served as Rapporteurs for the species sections (Agenda item 8) of the 2003 SCRS Report:

Tropical tunas - general	R. Pianet
YFT - Yellowfin tuna	C. Brown
BET - Bigeye tuna	N. Miyabe
SKJ - Skipjack tuna	J. Ariz
ALB - Albacore	M. Keatinge
BFT - Bluefin tuna	J. Powers (W), J.M. Fromentin (E)
BIL - Billfishes	D. Die
SWO - Swordfish	G. Scott
SBF - Southern Bluefin	Z. Suzuki
SMT - Small tunas	L. Gouveia

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

3. Introduction of Contracting Party delegations

Delegates from the following 20 Contracting Parties were present at the 2003 SCRS Meeting: Brazil, Canada, Cape Verde, China, Côte d'Ivoire, Croatia, Cyprus, European Community, Ghana, Iceland, Japan, Korea, Malta, Mexico, Morocco, South Africa, Tunisia, Turkey, United Kingdom (Overseas Territories), and United States of America. The List of Participants is attached as **Appendix 2**.

4. Introduction and admission of observers

The Representative of FAO, the depository of the ICCAT Convention, was introduced and welcomed.

Scientists from Chinese Taipei, the Caribbean Community (CARICOM), the International Whaling Commission (IWC), and SEO/Birdlife were admitted to the meeting as observers (see **Appendix 2**).

5. Admission of scientific documents

The Secretariat informed the Committee that about 100 scientific documents were submitted during the year, many prepared for inter-sessional meetings. Not all of these documents were made available for the SCRS meeting, as authors must provide 80 copies for distribution at the Plenary, but all received electronically by 2

October 2003 were available on the ICCAT FTP site. Ten documents that were not made available or presented to the relevant Species Groups, or to the SCRS, were not accepted in 2003.

In addition there were eight meeting reports, 22 National Reports and Reports of Observers, and several Secretariat documents. The List of Documents is attached as **Appendix 3**.

6. Report of Secretariat activities in data and research

The Secretariat informed the Committee that the Secretariat's Report on Statistics and Coordination of Research in 2002-2003 had been presented to the Meeting of the Sub-Committee on Research and Statistics, and thoroughly discussed at that time. There were no further questions.

7. Review of national fisheries and research programs

Brazil

In 2002, the Brazilian tuna longline fleet consisted of 129 vessels, a 4.0% increase from 2001, when 124 vessels were operating. The number of baitboats operating in 2002 was 39, the same as in 2001. Two purse seine boats also operated in 2002.

The Brazilian catch of tunas and tuna-like fishes, including billfishes, sharks, and other species of minor importance, was 50,575 t (round weight), representing a decrease of about 1.5% from 2001. The majority of the catch again was taken by baitboats (about 50%), with skipjack tuna being the most abundant species. The total catch of the tuna longline fishery, equal to 16,320.3 t, was about 30% lower than in 2001. Yellowfin tuna, accounting for 20.4% of the catches, was the most caught species, with landings of 3,323 t. Swordfish and albacore, with catches of 2,903 and 2,865 t, were the second and third most caught species. Bigeye ranked fourth with 2,581 t, remaining very close to 2001 catches. The total catch of white marlin, blue marlin and sailfish was, respectively, 407 t, 386.9 t, and 547.5 t. About 3,150 t of sharks were caught, most of them (62.4%) being blue sharks.

With the election of a new government in Brazil, which took power on 1 January 2003, the responsibility for all issues relating to highly migratory species in Brazil (including data collection and submission to ICCAT) was transferred from the Fisheries and Aquaculture Department of the Ministry of Agriculture, Livestock and Supply to the Special Secretary of Aquaculture and Fisheries (SEAP), which has the status of Ministry. This is the first time in Brazilian history that the management of fisheries has been raised to a Ministerial level.

Several research activities continued to be conducted on tuna species in Brazil. A total of 4,026 fishes were measured at landing, as follows: 1,331 yellowfin, 1,722 bigeye, 500 swordfish, 89 sailfish, 348 white marlin, and 36 blue marlin. Data have also been collected from several recreational fisheries based off southeast and northeast Brazil, where sport tournaments are conducted by local yacht clubs.

In order to adequately comply with ICCAT recommendations, the Brazilian government has, in the past, implemented several fishery regulations. A new Rule (I.N. 3/ 2003), regulating the Brazilian tuna fishery, was published on 19 September 2003, establishing the catch limits for South and North Atlantic swordfish, North Atlantic albacore, white marlin and blue marlin. Besides, the release of all specimens of marlins that are still alive by the time of boarding continued to be mandatory, while the sale of any white marlin or blue marlin landed was prohibited until 31 December 2003. The prohibition of chartering of foreign vessels included on the ICCAT and CCAMLR lists of IUU fishing vessels was also reiterated. Furthermore, a new Decree (No. 4810), regulating the chartering of vessels was also published, establishing the obligation of observers on board 100% of chartered vessels and prohibiting any at-sea transshipment.

Canada

Bluefin tuna are harvested in Canadian waters from July through December over the Scotian Shelf, in the Gulf of St. Lawrence, in the Bay of Fundy, and off Newfoundland. The Canadian nominal landings of Atlantic bluefin tuna in 2002 were 603.6 t. In addition, 36.9 t were estimated to have been discarded dead from the swordfish longline fleet.

All traditional bluefin tuna fishing areas produced catches of tuna in 2002. However, in most of the previous years, the tended line fishery in the area between Georges and Browns Bank off southwest Nova Scotia known as the Hell Hole has produced the largest fraction of the total Canadian landings. In 2002, the landings of bluefin tuna in the Gulf of St. Lawrence fishery considerably exceeded those from the Hell Hole. Additional catches were also taken from the St. Margaret's Bay traps, from the rod and reel fishery off northeastern Nova Scotia, and from coastal fishing areas off Halifax and Liverpool, Nova Scotia. The latter fishery is relatively new and landings have followed an increasing trend. In the Bay of Fundy, bluefin tuna were taken by electric harpoon. Finally, a tended line fishery exists on the Tail of the Grand Banks of Newfoundland. Overall in 2002, the fishery was considered generally successful, and fishermen enjoyed good catch rates and the quota was caught quickly, a situation which repeated in 2003.

Turning now to the swordfish fishery, swordfish occur in Canadian waters from April to November, primarily on the edge of Georges Bank, the Scotian Shelf and the Grand Banks of Newfoundland. The Canadian nominal landings of swordfish in 2002 were 959 t. Landings of undersized swordfish were as close to zero as possible (~0.5%). In 2002, Canada had a dead discard allowance of 40 t. Based on data from at-sea Observers on the swordfish longline fleet, 32.7 t of swordfish were estimated to have been discarded dead.

In 2002, swordfish fishery changed from a competitive one to one operated under Individual Transferable Quotas (ITQs). Under the ITQ system, fishers are able to direct for swordfish or use the Individual Quota for by-catch to support the other tunas fishery. This resulted in a longer fishing season for swordfish than in previous years, ending in November, rather than August.

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

Canada's research program in 2002 was as follows:

1) Continued a collaborative (Canada/USA/Science/Industry) high-tech satellite tagging project.

2) Member of Central North Atlantic Bluefin Tuna Research Steering Committee, conducted exploratory fishing in the central North Atlantic in 2002 using chartered vessels and a Japanese research vessel. This work was collaborative in nature with several other countries, including United States, Japan and Bermuda.

3) Provided preliminary estimates of dead swordfish and bluefin discards based on Observer coverage of the domestic large pelagic longline fleet. In 2002, the observer coverage target on this fleet was augmented to 20% from the standard 5% level.

Cape Verde

Tunas are migratory species that, according to the season, pass through the Cape Verde Islands. Bait fishing with live bait was introduced in Cape Verde in the mid-1950s, which coincided with the development of tuna fishing in the Atlantic in general. The major species of tuna and tuna-like species caught are yellowfin, skipjack, bigeye, Atlantic black skipjack, and wahoo.

Fishing for these resources in Cape Verde waters is carried out by three different fleets: the national artisanal fleet (hand line), the national industrial fleet (hand line, baitboat and purse seine), and the foreign industrial fleet. Some species are destined for export and as the primary material for the national canneries, which later export their products. The national catch of tunas reached 3,306 t in 2001.

In the artisanal fishery the catches are practically all from hand line fishing and are essentially comprised of yellowfin tuna. The development of these catches has shown some stability in recent years.

The national industrial fishery is carried out mainly by purse seine and hand line and the catches are essentially comprised of skipjack and yellowfin tunas. The development of these catches has shown many fluctuations due

to various reasons, such as, the start of an easier and more interesting market for *Decapterus macarellus*, international market problems for skipjack tuna, and an export embargo, among others.

In virtue of the fishing agreements and contracts, a foreign fleet is authorized to fish in the Cape Verde EEZ. The Government of Cape Verde has established fishing agreements with the countries of the West African Sub-Regional Fisheries Commission (CSRP), within the framework of the principle of reciprocity. Since 1995, there has been a protocol with the Government of Angola.

Some research activities being carried out include the intensive collection of statistical data on the catches of tunas and tuna-like species and their entry to a database, the annual publication of a Statistical Bulletin since 1981, information provided for the updating of the stock assessments, and participation in ICCAT activities.

China

At present, China has 60 tuna longline vessels operating in the Atlantic Ocean, with 8,026.8 t of tuna and tuna-like species (in round weight), including sharks. Bigeye tuna and bluefin tuna are the targeted species of the Chinese longline fleet, whose 2002 catches amounted to 5,839.5 t and 39.1 t, respectively. Yellowfin tuna, swordfish and albacore were taken as by-catch, with catches of 696.7 t, 513.2 t, and 225.7 t, respectively. Measures have been taken to maintain bigeye tuna and bluefin tuna catches under the catch limit set by ICCAT. Shanghai Fisheries University (SHFU) is in charge of data collection and compilation of Atlantic tuna fishery statistics. China started a tuna observer program in ICCAT waters in 2001 and this observer program will be continued. The Government of China issued fishing licenses to all Chinese fishing vessels operating on the high seas of the world oceans on 1 June 2003.

Côte d'Ivoire

Côte d'Ivoire has not had tuna vessels since 1985 nor has it had any industrial tuna fishery since that time. However, scientists of Côte d'Ivoire, in collaboration with their French and Spanish colleagues, monitor the landings of the French and Spanish fleets at the fishing port of Abidjan. Besides these two flag countries, Ghanaian vessels are landing more and more of their catches at Abidjan, which continues being the second tuna port of Africa after Victoria (Seychelles). An average of 100,000 t of tuna are landed annually to supply three canning factories.

In 2002, the scientists based at the CRO registered the entry of 46 vessels (16 Spanish, 15 French, 8 Ghanaian, and 7 other flags, i.e., St. Vincent, Seychelles) at the port of Abidjan. All these vessels were monitored by the CRO and IRD scientists. The reporting of the amounts of tuna landed by these fleets is the responsibility of the scientists of these countries. Furthermore, there were reported landings of 5,000 t of "false tuna." These "false tuna" are increasing in Côte d'Ivoire.

The only Ivorian tuna fishery is the artisanal driftnet fishery that operates essentially off Abidjan and targets tunas and tuna-like species (billfishes and sharks). This fishery has been monitored by the CRO since 1988 and the data are regularly submitted to ICCAT.

In 2002, the canoe fishery carried out 12,401 trips, landing of 65 t of sailfish *(Istiophorus albidus)*, 78 t of blue marlin *(Makaira nigricans)*, 2 t of white marlin *(Tetrapturus albicans)*, and 19 t of swordfish *(Xiphias gladius)*. Besides these billfishes, there were 77 t of mako sharks *(Isurus oxyrynchus)*, hammerheads (*Sphyrna zygaena* and *S. lewin*) and silkies *(C. falciformis)*.

Croatia

Total Croatian catches of tuna and tuna-like fishes in 2002 were 977 t. 100% of the catch is comprised of bluefin tuna. Over 99% of the fish have been caught by purse seine, and the rest by longliners and sport fishing (hooks). Almost the total purse seine catch is transferred to floating cages for growing purposes. Due to the lack of giant bluefin tuna in the Adriatic Sea, 1,683 t of large bluefin tuna were imported in Croatia in 2002 from Italy, Spain and Tunisia.

The number of licensed vessels actively fishing for tuna and tuna-like species was 31, while 14 of these were licensed large-scale vessels (>24 m).

In 2002, a study has been under way, within the framework of the BYP, on bluefin tuna farming, based on tagging of live specimens in the grow-out floating cages. Currently, this research is targeting specimens of approximately 12-15 kg (live round weight). Specimens that were tagged last year are still alive in the cages. Additionally, samples of heart muscles of dead specimens have been taken for genetic studies, and sent to Dr. Carles Pla, as suggested by the BYP Working Group.

Cyprus

The large pelagic species are caught by almost all types of fishing methods in Cyprus, i.e., by the inshore fishery, the multi-purpose fishery, and the trawl fishery.

Bluefin tuna are present in the waters of Cyprus all year round and they are fished from April to November. The Cyprus nominal landings of bluefin tuna in 2002 were 91.4 t. Bluefin tuna catches increased during the last four years, as the importance and the demand of tuna in the market is increasing. In 2002, 40 multi-purpose licensed vessels participated in the bluefin fishery.

Swordfish occur in the waters of Cyprus all year round, but they are fished mainly from April to November, with the peak season in the summer months. Swordfish, as well as the other large pelagics, are caught by surface drift longline. The Cyprus nominal landings of swordfish in 2002 were 103.6 t.

Other tunas (albacore, bigeye, Atlantic bonito, etc.) are collectively reported as "tuna-like species" in the log records.

The Cyprus fishery is not directed at sharks, the majority of which are caught incidentally. The shark catch of Cyprus fishery is insignificant.

The collection of fishery statistics is based on the Fisheries Law. According to the system, all vessels must keep a logbook with detailed information. All catches are inspected by Fisheries Inspectors upon landing, to ensure that they were weighed and recorded accurately. The system ensures 100% of properly completed log records and individual fish weights.

Cyprus fully supports research on large pelagics. In past years, some research was carried out, mainly on swordfish. However, research has been limited in recent years.

Cyprus implements the ICCAT conservation and regulatory recommendations. Most of the ICCAT recommendations are included in the Fisheries Law and Regulations. All ICCAT regulatory recommendations will be gradually implemented, as Cyprus has become a Contracting Party to ICCAT and will become an EC member next year.

European Community

EC-France

Information on national fisheries

In 2002, the total French catches of tunas and tuna-like species in the Atlantic Ocean and Mediterranean amounted to 64,850 t, i.e., slightly less than that of 2001 (67,263 t). This relative stabilization has come about after a decline in French catches observed since the mid 1990s, which is due mainly to the effect of the moratoria in the Gulf of Guinea, to the decrease in the number of tropical purse seiners, and to a decrease in the catches of temperate tunas.

– Temperate tunas

Albacore: Albacore fishing in the Atlantic Ocean in the 2002 fishing season was mostly carried out by pelagic trawl, and secondly by baitboat and purse seine, as a result of the re-conversion of driftnet vessels. The total catches amounted to 4,290 t in 2002.

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

Bluefin tuna: The overall French catches of bluefin tuna amounted to 6,565 t in 2001.

In the Mediterranean, bluefin tuna have been mainly caught by purse seiners since the 1970s. The 2002 catch (5,810 t) continues the declining trend observed since 1994 (11,800 t). The majority of the fishing effort continues to be concentrated in the western part of the Mediterranean basin, although there is a marked extension towards North Africa and the eastern Mediterranean basin. The majority of the fish caught have an average weight of 10-30 kg, except during the fishing season of the Balearic Islands and Malta, when the weight of the majority of the fish is between 140-250 kg.

Bluefin tuna catches in 2002 in the East Atlantic amounted to 755 t. Albacore continues to be the main target species of the French tuna fisheries in the northeastern Atlantic, whereas bluefin tuna catches are minor. The other fleets catch bluefin tuna as by-catch using pelagic trawl or driftnet.

Other species: Swordfish are caught occasionally in the northeastern Atlantic, as by-catch of the fleets that target albacore; catches in 2002 were 74 t.

– Tropical tunas

Given the multi-species nature of the tropical tuna fisheries, information by fleet is more appropriate than information by species. The most notable fact concerning this fishery is the important decline in the catches (-24%) due both to the combined effect of the moratoria in the Gulf of Guinea and the decrease in fishing effort, in terms of the number of boats as well as in the total fishing days. The total catch of tropical tunas amounted to 53,726 t in 2002.

1) Seventeen (17) French purse seiners caught 49,187 t, as follows: 31,291 t of yellowfin tuna, 14,298 t of skipjack tuna, 3,463 t of bigeye tuna, 18 t of southern albacore, 90 t of by-catches, and 27 t of discards. A comparison of the average catches made prior to the entry into force of the moratoria (1991-1996, 65,600 t) with those corresponding to the period after its application (1998-2000, 50,000 t), shows an important overall decline in catches. This is due mainly to the important decline in sets on floating objects and to some increase on free schools, within an overall context of a decrease in fishing effort in terms of number of days at sea.

2) Five baitboats based in Dakar obtained a catch of 4,539 t, as follows: 1,444 t of yellowfin tuna, 2,305 t of skipjack tuna, 786 t of bigeye tuna, and 4 t of frigate tuna and Atlantic black skipjack.

Research and statistics

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

– Temperate tunas

For the North Atlantic, biological sampling is carried out at the time of landings of catches of some fleets to evaluate the size structure of the catches.

Bluefin tuna: In the spring of 2000, the "Stromboli" program on bluefin tuna was initiated, co-financed by the European Community " and coordinated by France. The major objectives of this program which finalized at the end of 2002, were as follows: *(i)* to collect and analyze historical catch data from the Atlantic and Mediterranean traps; *(ii)* to test, by simulation models, the potential of this species to withstand exploitation based on its biological and ecological characteristics; and *(iii)* to study the possibility of establishing abundance indices based on aerial surveys in the area of the Balearic Islands and Sicily.

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In 2002, a new research program, "FEMS," was started, co-financed by the European Community and coordinated by CEFAS (United Kingdom) and in which France is actively participating; this program will continue until 2005. Its objective is to develop simulation models to evaluate the different management strategies of the fish stocks exploited. The tuna stocks included in this program are the East Atlantic bluefin tuna stock, the North Atlantic albacore stock, and the three major Atlantic tropical tuna species.

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

Albacore: Technical trials have been carried out in view of the re-conversion of the fleets affected by the prohibition on driftnets that entered into force on 1 January 2002. The techniques tested up to now include mainly longline, "automatic" troll and purse seine.

– Tropical tunas

As concerns tropical tunas, fishery statistics and research are carried out in close collaboration with the research institutes of Côte d'Ivoire and Senegal within the context of a regulation that establishes a European Community framework for the collection and processing of the data necessary for a common fisheries policy. These statistics cover 100% of the logbooks of this fleet. In 2002, sampling was carried out on 385,000 tropical tunas to determine species composition of the landings, and 195,000 fish were measured to determine their stock structure.

Scientists of the IRD actively participate in the working groups that concern their work (Statistics, Working Group on Yellowfin, Working Group on Tropical Species, SCRS) and each year they present to these working groups detailed fishery statistics on the French and European inter-tropical fleets.

Other research work on tropical tunas concerns: (i) biotic interactions in high seas eco-systems (estimate and comparison of the feeding levels in the food chains of high seas pelagics, (ii) tactics and strategies developed for the purse seine fleets (mixed models, behavior of the vessels, simulation [FEMS], etc., (iii) impact of floating objects on the biology of tunas (dynamics of the association between tuna schools land baitboats, modeling of the associated "spots" system, etc.), and (iv) connection between environmental variability and area dynamics of the tuna populations (modeling, "GAO" oceanographic database).

EC-Greece

The Greek large pelagic fleets fish mainly in the Aegean, Ionian and Cretan seas, but they occasionally extend their activities to the eastern Levantine Basin. The main target species include swordfish, bluefin tuna and, to a lesser extent, albacore.

Swordfish comprise the major component of the large scombrid catches in the areas exploited by the Greek fleets and their production during the last decade fluctuated from 750 to 2,500 t. Swordfish fishing is carried out using drifting longlines. The fishing season lasts from February to the end of September, as a closed season is in effect from October to January, aiming at the protection of age 0 individuals. About 100 vessels are involved on a regular basis in the swordfish fishery, but during the summer months there are additional boats involved in the fishery on an opportunistic basis.

Bluefin tuna are fished by handline and surface longline. Most of the boats exclusively targeting bluefin tuna are scattered in the North Aegean Sea, and use mainly hand lines. Their number is estimated to be up to 200 and their fishing activities on bluefin tuna are seasonal. The main fishing period lasts from September to April, following market demand. In the South Aegean, the large pelagic fleets primarily target swordfish, and bluefin tuna is a secondary target or by-catch species, at least during the swordfish season. During that period, bluefin tuna fishing is carried out mainly by drift surface long lines. Hand lines are less common and are mostly deployed from October to January when the Greek swordfish fishery is closed by law.

The Greek bluefin tuna production increased from about 100 t in 1990 to 1,200 t in 1997. After the establishment of production quotas by the European Community and the ICCAT recommendations for reduction of fishing pressure on the stock, a national regulation was enforced in 2001 aimed at restricting the fishing activity for large pelagic species. According to this regulation, a special license is required for a boat to enter the bluefin tuna or swordfish fishery.

The albacore fishery is limited to certain areas mostly during the autumn months and is carried out mainly by hand line, troll, and longline.

EC-Ireland

Irish fishermen have been fishing albacore since 1990 with more than 30 vessels employing driftnets taking part in the fishery annually at its peak. Between 1999 and 2001 participation in the driftnet fishery was restricted to 18 vessels in line with European Community regulations. In addition, domestic legislation was introduced in 2000 restricting all fishing for tuna to vessels specifically licensed to do so.

The total catch of albacore tuna in the 2002 fishery amounted to 1,100 t with a by-catch of 15 t of bluefin tuna and 5 t of swordfish. 2002 was the first year since the fishery began that no driftnetting occurred. A total of 22 Irish vessels participated in the fishery with all vessels using the mid-water paired trawl method. Fishing operations commenced in the Bay of Biscay in July in an area bounded by latitudes 43^{o}-48^{o} North and longitudes 1^{o}-6^{o} West, continuing in this area until the end of August. During September and October vessels moved northwest towards the Chapelle Bank and the southwest coast of Ireland. This area is represented by latitudes 47^{o}-57^{o} North and 7^{o}-17^{o} West. The CPUE (t/days fishing) increased steadily throughout the season from 0.63 t/day in July, to 3.7 t/day in October when only two or three pairs of Irish vessels remained in the fishery.

A scientific monitoring program has been conducted in the fishery each year since 1998. Biological data were collected from 103 hauls during 2002. From a total estimated catch of 147,305 albacore caught by Irish vessels in 2002, 3372 were measured, 2,867 from the Bay of Biscay and 505 from the southwest coast of Ireland and the Chappelle Bank. Fork length ranged from 41-99 cm with a mean size of 62 cm and clearly apparent modes centered on 52, 66, and 81cm for albacore caught in the Bay of Biscay. Off the southwest coast of Ireland and at the Chappelle Bank fish ranged in size from 51-120 cm FL with a mean size of 93 cm and a less obvious single mode of 97 cm.

Length frequency data have been combined from the southern and northern data sets and raised to represent national monthly landings figures. These data are then combined and raised to represent the total Irish catch of albacore in 2002 for all months.

EC-Italy

According to its international obligations, Italy is continuing to support research on large pelagic species, an important resource for the Italian fishery, also linked to ancient cultural traditions.

Bluefin tuna catches in 2002 were quite below the quota (4,628 t), due to a delay in attributing the national quota by the EC. Most of the catches are provided by purse seiners (3,246 t) but the difficulties to monitor this important fishery are still increasing, due to the tuna farming practices. As a matter of fact, only a very minor quantity of catches from the tuna purse seine fishery was landed in Italy in the last three years, because the tuna were sold at sea in international waters and moved into floating cages, mostly in foreign countries. As a direct consequence, it was very difficult and costly to obtain an acceptable size distribution of these catches and this problem is expected to increase even more in the future.

Swordfish catches decreased to 3,539 t (-45%), due to a combination of negative factors: the driftnet ban adopted by the EC and the adverse weather conditions in the spring and summer of 2002. The size frequencies of the catches show a stable situation. Even for albacore, the unusual environmental and oceanographic conditions in 2002 initially affected the catch, but the fishing season was unusually prolonged even in summer and autumn, with catches reaching a total of 4,032 t (+43% as compared to 2001). The catches of minor tuna-like species (bonito, frigate tuna, Mediterranean spearfish, and others) are only partially monitored. In 2002 they provided a total catch of 7,103 t, with a relevant increase as compared to 2001 catches.

Research showed a strong increase, due to the enforcement of EC Reg. 1543 for a common data collection system. As a consequence, several thousand length and weight frequencies have been collected, as well as data on maturity, age, CPUE, economy and the tuna sport fishery related to ICCAT species, with several scientific institutes carrying out these duties and while still continuing the national programs. Italian institutions are also co-operating with other foreign scientific institutes in research related to tuna tagging and other studies on the biology of several species.

EC-Portugal

Portuguese catches of tuna and tuna-like-species amounted to 10,341 t in 2002, which represents a decrease of 26% from the 1998 catch (13,979 t). This decreasing trend is mainly due to the decline in the baitboat fisheries in recent years. However, an increase of 33% over the catch of 2001 was observed in 2002. Apart from the catches of tuna and tuna-like species, a total of 3,955 t of pelagic sharks were caught as by-catch in the longline fisheries.

The Portuguese tuna fisheries take place mainly in the Azores and Madeira archipelagos, where local baitboat fleets target different species of tuna, depending on the season and the local abundance of each species. In 2002, these baitboat fleets caught 2,464 t in the Azores and 3,825 t in Madeira, which included 2,926 t of skipjack, 2,913 t of albacore, 1,436 t of bigeye tuna and 5 t of yellowfin tuna. Part of the Azores fleet fished in the Madeira area during 2002.

A longline fleet based at mainland Portugal, which mainly targets swordfish and operates both in the North and South Atlantic, caught a total of 899 t of swordfish in 2002, of which 380 t were caught in the South Atlantic. The catch of the longline fleet based in the Azores amounted to 235 t in the northeastern Atlantic. A new longline fishery targeting swordfish is developing in the Mediterranean Sea. Their total catch in 2002 reached 7 t, which is considerably less than in 2001 (115 t).

Longliners based in Madeira has been operating since 1990 in the eastern Atlantic and in the Mediterranean, and catch an average of 300 t of bluefin tuna per year. A total of 106 t of bluefin was caught in 2002.

One trap has been operating in the south of Portugal since 1995, targeting mainly bluefin tuna. In 2002 the total catch amounted to 69 t, of which 17 t corresponded to bluefin tuna.

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

An observer program on the Azores baitboat fishery has been carried out since 1998, covering more than 50% of the fleet. In 2003, under the ICCAT Bigeye Year Program (BETYP), no bigeye tuna were tagged with pop-up tags in the Azores due to the lack of tuna during the tagging trials.

EC-Spain

Spanish catches in 2002 in the Atlantic and Mediterranean were 97,880.5 t (31,469 t of yellowfin tuna; 10,523 t of bigeye tuna; 25,466 t of skipjack tuna; 9,997 t of albacore; 11,196 t of swordfish; 6,304 t of bluefin tuna; 705 t of billfishes; and 781 t of others tunas and tuna-like species). A total of 253,798 fish were sampled (preliminary data: 36,528 yellowfin; 18,611 skipjack; 36,387 bigeye; 46,359 albacore; 19,464 bluefin; 96,214 swordfish; and 235 other species). Thirty-one scientific documents were presented to the 2003 SCRS, in which Spanish scientists from various research institutes participated.

– Tropical tunas

In the tropical tuna and the Canary Islands fisheries 99,492 fish were sampled. In addition, 99,008 fish were identified to estimate the species composition of the catch. The sampling of the purse seine is carried out at the ports of Abidjan and Dakar. Since 1990, there has been a change in purse seine fishing strategy with the introduction of FADs. The BIOTHON project, which started in 2000 and finalized in February 2002, was aimed at improving sampling of this fleet. In 2003, two IEO observer cruises were carried out, and in 2002 and 2003 scientific analysis of the observer data continued. Fishery information is obtained from fishing logbooks, with a 95% coverage rate in recent years. In the tropical baitboat fishery, the coverage rate is close to 100%. There is a reporter-sampler at Dakar. The most important catches are made by the floating objects (“manchas”) fishing method. Studies on tunas from the Canary Islands area are carried out by means of sampling and information network at the 10 major landing points of the Canary Islands, with a coverage rate close to 100%. Within the BETYP, two bigeye tagging cruises were carried out in waters close to the Canary Islands, with 716 fish tagged. There have been 366 recoveries of fish tagged on the six trips made within the program. In 2003, another cruise was carried out in which 263 bigeye were tagged.

– Temperate tunas

ICCAT Task I and II data for albacore are prepared from information from the surface fisheries obtained at the 13 major ports of the Cantabrian Sea and the South Atlantic region and/or from surveys, which represent 85-95% coverage of the landings. Size distribution was obtained from sampling of baitboats (10,729 fish) and troll (27,908 fish) fisheries. Descriptions of the fisheries (SCRS/2003/079) were developed, progress was made in the application of MULTIFAN-CL (SCRS/2003/072), and in stock structure through genetics and tag-recapture. Studies were made on the uncertainty in the assessments associated with stock structure (SCRS/2003/071). Catch at age, age abundance indices (SCRS/2003/078) were calculated, and the state of maturity (SCRS/2003/080) was studied. Document SCRS/2002/044 was presented to the GFCM-ICCAT Group, which updates knowledge on the fishery and the biological characteristics of albacore catches in the Mediterranean.

The bluefin tuna fisheries in the Cantabrian Sea and in the South Atlantic region were studied through monitoring of the fishing operations, in which 4,123 and 14,666 fish were measured, respectively. Sampling for sex-ratio continued, as did the collection of samples for studies on growth and stock structure. In the Mediterranean, observer activity on-board longliners continued, with the sampling of 666 fish. Sampling for sex ratio and the collection of biological simples for studies on growth, reproduction and stock structure also continued. In 2002, a European Community project ended that analyzed the time series of bluefin tuna trap catches and the viability of establishing a new abundance index based on data from aerial surveys. Special attention was given to improving all the information on tuna farming, in accordance with the recommendations of the GFCM/ICCAT Group. A project was initiated in 2002 on Recreational Fishing in the Mediterranean. The project on the tagging of temperate tunas on board sport fishing vessels in the Cantabrian Sea continued. Research continued on abundance indices, growth, reproduction, stock structure and environmental effects.

The fisheries for swordfish and associated species were studied in documents on fishing carried out by the Atlantic fleet (SCRS/2003/084), on the ratio between fin weight and round weight of pelagic shark species (SCRS/2003/085), and in seven documents on Mediterranean swordfish and associated species (SCRS/2003/042, 043, 047, 049, 051, 052 and 053). There were 70,236 fish sampled from the Atlantic and 25,978 from the Mediterranean. Biological sampling was also carried out for size-sex, as was voluntary tagging by the commercial fleet, and opportunistic tagging by observers for swordfish, sharks and billfishes. There have been 412 recoveries of various species, mostly pelagic sharks. The FAIR-CT-3941 project continued on nuclear DNA analysis to study stock structure, with 2,508 samples accumulated. The SHKLL2 project was initiated to carry out studies on by-catches in the surface longline fisheries. In the Mediterranean, the FAO-COPEMED project continued, financed by Spain, and which involves numerous countries from the Mediterranean area.

Ghana

Baitboats and purse seiners exploited tuna resources off the EEZ of Ghana. The total number of vessels currently in operation is 36, comprised of 26 baitboats and 10 purse seiners. Catches in 2002 dropped to 66,000 t, from 88,000 t in 2001. Of the overall tuna landings, 57% were made by baitboats. The percentages of the principal species landed were: skipjack (58%), yellowfin (31%), bigeye (4%) and other tuna-like species (7%). Purse seiners continued to work in association with baitboats often sharing the catch off FADs. This collaboration has led to a mixture of varying sizes of fish often landed by the baitboats, leading to some problems in stratification by gear. A workshop in this regard was held in Ghana from 2-5 February 2003, to help streamline the inconsistencies observed (SCRS/2003/010). Scientists from ICCAT and Ghana participated in this workshop. In 2002, Ghanaian scientists again participated in a tagging cruise organized by the Bigeye Tuna Year Program (BETYP) off Sao Tome during the months of June to August 2002. Over 490 bigeye were tagged, representing 7.24% of the total species tagged. The ICCAT moratorium on the use of FADs was observed during the months of November 2002 to January 2003, with 18 scientific observers deployed on Ghanaian registered tuna vessels. Preliminary results show general compliance with the recommendation with a fair assessment of catches made. Catch records on billfishes continued off the western coast of Ghana as part of the ICCAT Enhanced Research Program on Billfish.

Iceland

Fisheries for bluefin tuna by Icelandic fleet are still developing and the total landings in 2002 were 1.1 t.

The main tuna related activities in Iceland in recent years relate to experimental longline fisheries in the waters south of Iceland that have been conducted annually in the autumn since 1996. The project is organized by the

Marine Research Institute in Iceland and operated in cooperation with a Japanese fishing agent. Last year, five Japanese longline vessels operated in the area south of Iceland in September to early November. The operation was fully covered by Icelandic observers and catch data and tissue samples for various biological studies were obtained from 597 fish, thereof 324 fish from within the Icelandic EEZ (muscle, liver, gill for DNA analysis, vertebrae and spines for ageing). The total bluefin catch from the experimental fisheries within the Icelandic EEZ in 2002 was 40.3 tons.

Research analyses related to the experimental fisheries include studies on the age frequency distribution of the bluefin catch in 1999-2002 (SCRS/2003/082). Diet analysis of bluefin south of Iceland is being conducted and studies of the genetic structure of the bluefin from Icelandic waters are under progress in cooperation with US scientists.

Other research related activities include collection and shipment of tissue samples from more than 1,200 bluefin tuna from the experimental fisheries to the ICCAT sample archive in Charleston, South Carolina, USA.

Japan

Longline is the only gear currently operated by Japan in the Atlantic Ocean. The number of Japanese longline vessels that operated in the Atlantic in 2001 and 2002 was estimated to be 187 and 180, a continuous decline from the 291 vessels that operated in 1996. Similarly, total fishing effort in number of hooks has declined more so, to less than 50% during the same period. The reduction in fishing effort is attributable to the shift of the longline vessels to the Pacific partly due to the low catches of bigeye.

The provisional 2002 catch of tunas and tuna-like fishes in the Atlantic Ocean and Mediterranean Sea by the Japanese fishery is estimated to be 23,400 t (a decrease of 28,000 t from 1999). Bigeye is the most important species, accounting for about 65% of the total catch, followed by bluefin tuna, yellowfin and swordfish. In 2002, catches for bigeye, bluefin, southern bluefin and swordfish increased while those of albacore bigeye, yellowfin and marlins decreased.

It appears that there have been no new changes known to this fishery in recent years except for the above-mentioned decline of fishing effort.

Activities on data collection and research, including updated information on the observer program, are detailed in the National Report of Japan.

Korea

The 2002 catch of tunas and tuna-like fishes by the Korean longline fishery in the Atlantic Ocean amounted to 96.5 t, representing a decrease of 50.1% from the previous year´s figure. Bigeye tuna make up the major component of the total Korean catch, accounting for 90% of the total catch. Until recently, the retreat of Korean longliners from this area and the change in target species to southern bluefin tuna caused a sudden decrease in bigeye and yellowfin catches. However, the target species in 2002 was bigeye tuna and the catch of this species was mainly increased. As compared to bigeye, only a minor catch of yellowfin tuna was reported in 2002. The longliners also caught small quantities of other tunas and billfishes. The swordfish catch in 2002 was 1.5 t.

Routine scientific monitoring work was carried out by the National Fisheries Research and Development Institute (NFRDI). This monitoring covers the collection of catch and fishing effort statistics from the Korean tuna longliners in the Atlantic to meet the ICCAT data requirements. To implement the recommendations adopted by ICCAT, Korea has taken the necessary measures, including the introduction of new domestic regulations. Starting this year, a fisheries observer program has been initiated to monitor the Korean distant water fisheries, including those for tunas.

Mexico

Fishing effort of the Mexican longline fleet is carried out in the exclusive economic zone of the Gulf of Mexico. It is directed at yellowfin tuna (*Thunnus albacares*). In 2002, 33 vessels operated, which carried out a total of 374 fishing trips. There was a reported catch of 32,461 yellowfin tuna, equivalent to 1,315 t. The major catch of this species is made during the last two quarters of the year. Other tuna species caught are: bluefin tuna, *T. thynnus* (1.0% of the total catch); bigeye tuna, *T. obesus* (0.6%) and skipjack tuna, *Katsuwonus pelamis* (0.4%).

There were also incidental catches of marlins and similar species, which represented about 10% of the total catches of tunas and marlins. The most important species in the catch were as follows: blue marlin (*M. nigircans*) with 1,147 fish, white marlin (*Tetrapturus albidus*) with 848 individuals, sailfish (*Isthiophorus albicans*) with 1,896 individuals and swordfish (*Xiphias gladius*) with 1,130 individuals. As concerns the incidental catch of sharks, there was a reported total of 40 white tip sharks (*Carcharhynus longimanus*), 171 blacktip sharks (*C. limbatus*) and 245 mako (*Isurus oxyrhinchus*) or porbeagle *(Lamna nasus)* sharks. The hammerhead shark (*Sphyrna* spp.) and zorro (*Alopias vulpinus*) shark species represented about 8 and 17 % of the shark by-catches, respectively.

Research efforts continued to maintain an Observer Program on board Mexican longline vessels in the Gulf of Mexico, in order to report all the information on fishing activities. This information serves as a base for the research work related to the standardization of catch per unit of effort, the estimate of optimum fishing effort for the fishing area of the Mexican fleet, assessment of the Mexican fishery, and the evaluation of the associated fauna.

Morocco

The major tuna and tuna-like species exploited by Moroccan fishers are bluefin tuna, bigeye tuna, swordfish and small tunas, such as skipjack, Atlantic bonito, bullet tuna and others.

In recent years, improved statistical data collection methods have resulted in better identification of the species landed at the major ports of Morocco.

Also, in 2002, the national catches of tunas and tuna-like species were about 12,286 t, which represents an increase of about 4.5% as compared to 2001 catches. This slight increase is essentially due to the increase in catches of small tunas.

In terms of weight, bluefin tuna represent 24% of the total catch, swordfish 29%, and bigeye tuna 7%. Albacore represent 0.44% and yellowfin tuna 0.64%. As concerns the small tunas, they represent 37% of the total weight.

The fishing techniques and gears used for these species are trap, hand line, purse seine, longline and driftnet. It should be noted that Morocco is currently developing a draft regulation on the use of some fishing gears, which includes driftnet.

With regard to the implementation of the conservation and management measures adopted by ICCAT, some regulatory measures have been in force in Morocco for many years concerning, among other measures, the minimum size limits, the limit on fishing effort and the monitoring of fishing activities on land and at sea.

Research activities are carried out by the *Institut Nacional de Recherche Halieutique*, which this year opened a second research center in the Mediterranean, based in Tangiers.

Further, regular research activities continued during the year, particularly those that are carried out jointly with the COPEMED project, and which are centered on the study of the biology and exploitation of tunas in the Mediterranean.

South Africa

The South African tuna fishery comprises three sub-sectors, namely baitboat, tuna longline and sport. One hundred and fifty intermediate-term fishing rights were allocated in the baitboat sub-sector in 2002. The tuna longline sub-sector continued to operate under experimental conditions since its inception in 1997. Of the initial 30 experimental permits allocated in 1997 only 23 vessels were actively fishing in 2002. There are approximately 50 vessels annually active in the sport sector. Tuna are also taken as by-catch in the pelagic shark longline fishery. The baitboat and sport fisheries predominantly target albacore between October and June when albacore are available in near-shore waters off the southwest coast of South Africa. Tuna longline vessels operate throughout the year and fish in the vicinities of the Agulhas Bank, Cape Basin and Walvis Ridge. In 2002, the fishing grounds were expanded to include the southwest Indian Ocean and to a limited extent the Mid-Atlantic Ridge. Swordfish comprise the bulk of the catches made by tuna longline vessels.

The total albacore catch is estimated at 6,507 t for 2002, which is a decrease of 729 t compared to 2001 but is above the mean annual catch of the last decade. In the longline sub-sectors fishing effort decreased by of over 150,000 hooks in the Atlantic Ocean between 2001 and 2002. However, reported swordfish landings increased from 397 t to 500 t, respectively. In 2002 substantial catches of bigeye tuna (305 t), yellowfin tuna (144 t), blue shark (63 t) and mako shark (19 t) were also reported.

Length measures of albacore are continually provided through regular port sampling trips. In addition, an on-board observer program, which was implemented in 1998, is used to provide length measures of all tuna, sharks and billfishes caught by the tuna longline fleet. This program is also used to validate catch returns and to provide estimates of by-catch, incidental catch and discards. The observer program is intended to cover 20% of all tuna longline fishing trips. The major focus of research, since 1998, has been the life history and stock delineation of swordfish occurring in the waters of Southern Africa. Consequently, the observer program is utilized to collect biological material of swordfish for ageing, sexing, maturation, diet and genetic studies. The program will also be used to tag swordfish and tunas in the near future.

Tunisia

In 2002, 53 tuna vessels, 90 longliners and 3 traps set to the north of the country comprised the fishery for large pelagics off the Tunisian coasts. Landings of tunas, swordfish and small tunas in 2002 amounted to 6,500 t, representing an important decrease of 2,200 t, that is, close to 26%. In terms of proportion, small tunas comprise 46% of the total catches, with 3,000 t, whereas bluefin tuna catches estimated at 2,500 t only represented 38%. The proportion of the swordfish catches is 16%, i.e., about 1,140 t. The contribution of the catches of the three traps to the Tunisian national catches of bluefin tuna still remains low, at about 0.3%. On the other hand, the purse seiners obtained 97% of the national catches of this species. These purse seiners work in a group, and their bluefin products in Tunisia are mostly for fattening purposes. Further, 2,000 t of bluefin tuna were exported live to Spain in 2002. Research activities carried out by the INSTM are aimed at improving knowledge on the biology and on bluefin tuna and swordfish fishing. These research programs are jointly financed with FAO-COPEMED and the INSTM.

Turkey

In 2002, about 2,300 t of bluefin tunas were caught in Turkish waters by purse seiners in the Sea of Marmara, Aegean and in the eastern Mediterranean Sea. As albacore are not in statistics, they are included under the bluefin tuna catch.

In 2001, 14,416 t of small tunas, mainly 13,460 t of bonitos (*Sarda sarda*), 750 t of Atlantic black skipjack (*Euthynnus alletteratus*), 316 t of *Auxis* spp., and 516 t of swordfish were also caught in Turkish waters.

In 2002, Turkish bluefin tuna farms began to operate in the Aegean and eastern Mediterranean Seas.

The bluefin tuna fishing season for Turkish purse seiners was voluntarily closed on 9 June 2003, 36 days before the actual catch restriction in the Mediterranean Sea (16 July-15 August 2003). The bluefin tuna catch in the eastern Mediterranean Sea was carried out in national and international waters between northern Cyprus and Turkey (SCRS/2003/116). In a Turkish-Italian joint research project, first information on the reproductive biology of bluefin tuna in the eastern Mediterranean is given. The presence of spawning bluefin tuna in the Mediterranean Sea during late May-early June 2003 is reported. This is the first evidence that bluefin tuna spawn in the Eastern Mediterranean Sea between Cyprus and Turkey. These first findings indicate that bluefin tuna can spawn one month earlier than reported for other Mediterranean spawning areas (SCRS/2003/124).

In a Turkish-Italian joint research project in the eastern Mediterranean Sea that is on-going, 34 bluefin tuna were tagged with pop-up satellite tags between Cyprus and Turkey. Three (3) tags popped-up at the excepted pop-up time while the others prematurely detached themselves from the fish. Almost all the tags were located close to the places of deployment and three of them in the Aegean Sea (SCRS/2003/125). In 2003, sampling is being carried out with ICCAT on bluefin tunas for stock structure, reproduction and growth in Turkish waters.

United Kingdom (Overseas Territories)

The Bermuda commercial fishing fleet for tuna and tuna-like species consisted of 212 vessels during the year 2002 with approximately one-third of the vessels actively fishing for tuna and tuna-like species. Most of the

fishing effort is carried out in the inner 50 km of the Bermuda Exclusive Economic Zone while longline operations work further offshore. Bermuda-based longliners are equipped with an Andronics satellite-based vessel monitoring system (VMS).

For the year 2002, the total catch of tuna and tuna-like species was estimated at 108 metric tonnes. The two principal species in the landings are wahoo and yellowfin tuna, which together comprise approximately 86% of total landings.

Bermuda continues to be involved in the ICCAT Enhanced Program for Billfish Research. A study on the post-release survival of blue marlin and the description of billfish habitat, utilizing pop-up satellite tags, continued in 2002. The Bermuda Marine Resources Division continues to be engaged in a number of regional research programs directed at various pelagic species including wahoo, yellowfin tuna and blue marlin. These programs include tag-recapture studies, species age and growth and population genetics.

Bermuda worked with colleagues from the United States, Canada and Japan in 2002 in the central North Atlantic Bluefin Tuna Research Steering Committee to plan exploratory research cruises to sample bluefin tuna. Bermuda hosted a planning meeting of this group early in the year.

The collection of scientific data on billfish and other species is ongoing. Data collection provides material for research programs and helps ensure compliance with ICCAT management measures. In addition, increased monitoring of recreational fishing for tuna and tuna-like species is planned in the coming year.

United States

The total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 2002 was 17,793 t, a decrease of about 28% from 26,384 t in 2001. However, reported U.S. catches of king mackerel and Spanish mackerel include only estimates for the period January-April and January-May, 2002, respectively. Estimated swordfish catch (including estimated dead discards) increased 39 t to 2,715 t, and provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico increased in 2002 to 2,333 t, from 2,045 t in 2001. The estimated 2002 Gulf of Mexico landings of yellowfin tuna accounted for about 40% of the estimated total U.S. yellowfin landings in 2002. U.S. vessels fishing in the northwest Atlantic landed an estimated 1,913 t of bluefin, an increase of 299 t compared to 2001. Provisional skipjack landings increased by 21 t to 90 t from 2001 to 2002, estimated bigeye landings decreased by 529 t compared to 2001 to an estimated 575 t in 2002, and estimated albacore landings increased from 2001 to 2002 by 175 t to 499 t. The number of longline vessels in the U.S. fishery targeting Atlantic swordfish and tunas has declined steadily since the mid-1990s. Since implementation of time-area closures affecting the U.S. fleet, the estimated volume of dead discarded swordfish <125cm LJFL represents a reduction of nearly 50% in 2001 and 2002 compared to the average level from 1997-1999.

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 2002 and 2003 focused on several items. Research on development of methodologies to identify genetically discrete populations 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 8,489 billfishes (swordfish, marlins, sailfish, and spearfish) and 664 tunas in 2002. This represents an increase of 9% for billfish and a 34% increase for tunas from 2001 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.

The United States continues to conduct research on measures to mitigate the interactions between pelagic longline and by-catch of marine turtles under a cooperative research program involving the U.S. Atlantic pelagic longline fishery. Thus far, testing of five potential by-catch reduction techniques during 687 research sets on the Grand Banks has indicated that longline fishermen can avoid unintentional catches of loggerhead sea turtles by

reducing the time their hooks are in the water during daylight hours. The results also indicate important sea turtle by-catch reduction can be achieved by using circle hooks instead of the J hook historically used in the fishery, and by using mackerel for bait rather than squid, the primary bait used in the fishery. The vessels participating in the experimental fishing effort reduced loggerhead sea turtle interaction by 92% using circle hooks with mackerel bait while actually increasing swordfish catch rates over J hooks with squid bait used as control effort. The 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.

In accordance with a recent ICCAT Resolution, the United States has also reported on incidental catches of sea birds in the U.S. Atlantic pelagic longline fleet as well as providing an update on the implementation of its NPOA-Seabirds.

Observers from Cooperating Parties, Entities or Fishing Entities

Chinese Taipei

In 2002, the Chinese Taipei fishing fleet consisted of about 170 vessels and used only longline gear to target tunas and tuna-like species in the Atlantic Ocean. The total landings were estimated at about 47,097 t for all species, indicating a 2.7% increase from 45,868 t in 2001. Of those landing, albacore (21,527 t) is the predominate species, estimated at about 45.7%. There was a decrease from 299 t in 2001 to 286 t in 2002 for the North stock and from 1,149 t in 2001 to 1,073 t in 2002 for the South stock. Bigeye tuna (16,503 t) comprised about 35.7% of the catch, which was in slight excess of the catch limit set at 16,500 t. Yellowfin tuna (4,542 t) accounted for about 9.6% and showed a decrease from 4,805 t in 2001. Other species, including bluefin tuna, swordfish, billfishes, southern bluefin tuna, etc. comprised only 9%. Bluefin were only caught in the eastern Atlantic and Mediterranean and produced 383 t in 2003. The other species were all regulated by catch quotas. Catch and effort statistics were compiled from logbooks and other information, such as trade reports, etc., and submitted to the ICCAT Secretariat regularly as they became available. The Chinese Taipei Fisheries Agency supports the Enhanced Billfish Research Program, the Bluefin Year Program, and the Bigeye Year Program, and supports grants to national scientists for data analyses and participation in appropriate species groups for all species. For scientific purposes, observer programs have been initiated in all oceans, including the Atlantic, since 2001. For purposes of better understanding the fishing activities and the by-catch issue of the longline fishery and to be in line with the international requirement for conserving marine resources, Chinese Taipei has launched an experimental observer program since 2001. In 2002 and 2003, there were two observers dispatched in each of these years to the Atlantic Ocean. Data obtained will be reviewed and used for scientific purposes in the near future. In order to be in accordance with international trends on management of shark species, Chinese Taipei has initiated not only the observer program but also the national data collection systems to achieve the goal. Specifically, the column of shark statistics in the original logbook sheets is subdivided into four columns for different shark species in the revised format of logbook sheets. As for the certificate system, the Bluefin Tuna, Bigeye Tuna and Swordfish Statistical Document Programs developed by ICCAT are fully implemented.

Observers from intergovernmental organizations

Caribbean Community (CARICOM)

Available data from five CARICOM countries (Grenada, Republic of Guyana, Commonwealth of Dominica, St. Kitts and Nevis, and St. Lucia) indicate that large pelagic fisheries are multi-species and multi-gear fisheries. A range of vessel types is now employed in these fisheries, although the traditional small open boat is still the most commonly used vessel in the island territories. In Guyana, tuna and tuna-like species are harvested mainly as by-catch, while shark species are targeted using several types of gear. In Grenada, St. Kitts and Nevis, and St. Lucia, billfish tag and release activities by the sport fishing sector has continued. Additionally, in 2003, Grenada resumed collection of biological data on billfishes. Given current ICCAT regulations, Guyana limited efforts to develop directed fisheries for tuna and tuna-like species. Also, in view of ICCAT's swordfish recovery program, Grenada has continued efforts to limit swordfish harvest levels. In 2003, CARICOM and FAO continued to work together to develop recommendations for improving participation of CARICOM countries in agreed regional and international fisheries management arrangements.

Observers from non-Contracting Parties, Entities or Fishing Entities

St. Vincent and the Grenadines

St. Vincent and the Grenadines has a locally based fishing fleet, which is largely artisanal in nature. There is also a high seas fishing fleet, composed of foreign -owned vessels. In 2002, the total catch from the locally based fleet was about 103 t, almost 50% lower than the 2001 catch. Similarly, the high seas fleet's catch in 2002 was 3,738 t, significantly lower (by >50%) than the 2001 catch.

As a small island developing State, St. Vincent and the Grenadines must continue to explore all available sources of revenue in order to ensure food security for its people. Such efforts must be in compliance with acceptable international practices and standards. St. Vincent and the Grenadines continues to develop and implement the relevant legislative, management, monitoring and enforcement mechanisms with regard to its high seas fleet. These measures are intended to ensure that these vessels are fully compliant with management initiatives taken by ICCAT and other relevant organizations.

8. Executive Summaries on species

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

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

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

8.1 YFT - YELLOWFIN TUNA

YFT-1. Biology

Yellowfin tuna is a cosmopolitan species distributed mainly in the tropical and subtropical oceanic waters of the three oceans, where they form large schools. The sizes exploited range from 30 cm to 170 cm FL. Smaller fish (juveniles) form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish are found in surface and sub-surface waters. The majority of the long-term recoveries have been tagged in the West Atlantic and recovered in the East Atlantic, where several recaptures are recorded each year. Maturity occurs at about 100 cm FL. Reproductive output among females has been shown to be highly variable, although the extent of this is unknown. The main spawning ground is the equatorial zone of the Gulf of Guinea, with spawning occurring from January to April. Juveniles are generally found in coastal waters off Africa. In addition, spawning occurs in the Gulf of Mexico, in the southeastern Caribbean Sea, and off Cape Verde, although the relative importance of these spawning grounds is unknown. Although such separate spawning areas might imply separate stocks or substantial heterogeneity in the distribution of yellowfin tuna, a single stock for the entire Atlantic is assumed as a working hypothesis (Atlantic Yellowfin Working Group, Tenerife 1993), taking into account the transatlantic migration indicated by tagging, a 40-year time series of longline catch data that indicates yellowfin are distributed continuously throughout the entire tropical Atlantic Ocean, and other information (e.g., time-area size frequency distributions and locations of fishing grounds). Growth patterns are variable with size, being relatively slow initially, and increasing at the time the fish leave the nursery grounds. Males are predominant in the catches of larger sized fish. Natural mortality is assumed to be higher for juveniles than for adults. This assumption is supported by tagging studies for Pacific yellowfin.

YFT-2. Description of the fisheries

Yellowfin tuna are caught in the entire tropical Atlantic, between 45ºN and 40ºS, by surface gears (purse seine, baitboat and handline) and by longline. Total Atlantic catches in 2001 amounted to 159,156 t **(YFT-Table 1, YFT-Figure 1** and **YFT-Figure 2**).

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

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

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

YFT-3. State of the stock

A full assessment was conducted for yellowfin tuna in 2003 applying various age-structured and production models to the available catch data through 2001. Unfortunately, at the time of the assessment meeting, only 19% of the 2002 catch had been reported (calculated relative to the catch reports available at the time of the SCRS Plenary). The results from all models were considered in the formulation of the Committee's advice.

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

Both equilibrium and non-equilibrium production models were examined in 2003. The effective effort used for the production models was calculated by first creating a combined index from the available abundance indices

by fleet and gear, and weighting each index by the catch of that fishery. One of the non-equilibrium models applied estimated the annual effective fishing effort internally, allowing the fishing power trends by fleet to vary.

The estimate of MSY based upon the equilibrium models ranged from 151,300 to 161,300 t; the estimates of F_{2001}/F_{MSY} ranged from 0.87 to 1.29. The point estimate of MSY based upon the non-equilibrium models ranged from 147,200-148,300 t. The point estimates for F_{2001}/F_{MSY} ranged from 1.02 to 1.46 (**YFT-Figures 4a-b**); the main differences in the results were related to the assumptions of each model. The Committee was unable to estimate the level of uncertainty associated with these point estimates.

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

In summary, the age-structured and production model analyses implied that although current (2001) catches are slightly higher than MSY levels, effective effort may be either slightly below or above (up to 46%) the MSY level, depending on the assumptions. Consistent with these model results, yield-per-recruit analyses also indicated that 2001 fishing mortality rates could either be above or about the level which could produce MSY. Yield-per-recruit analyses further indicated that an increase in effort is likely to decrease the yield-per-recruit, while reductions in fishing mortality on fish less than 3.2 kg could result in substantial gains in yield-per-recruit and modest gains in spawning biomass-per-recruit **(YFT-Figures 6a-b)**.

YFT-4. Outlook

Since reported yellowfin landings in 2001 appear to be somewhat above the MSY level estimated during the 2003 assessment and fishing effort and fishing mortality may be in excess of the levels associated with MSY, it is important to ensure that effective effort does not increase beyond the current level. Projections indicate that stock biomass is likely to decrease if fishing mortality increases to the level estimated for 1992, which is currently being approached or exceeded. Thus the possibility that the fishing power of the purse seiners and other fleets may further increase, even if the total capacity of the fleet were to remain constant, is also cause for concern. It should be noted that the current estimate of total yellowfin landings in 2002, which was not available at the time of the assessment, is 137,500 t.

YFT-5. Effects of current regulations

In 1973, the Commission adopted a regulation that imposed a minimum size of 3.2 kg for yellowfin tuna, with a 15% tolerance in the number of fish per landing. This regulation has not been adhered to, as the proportion of landings of yellowfin tuna less than 32 kg has been far in excess of 15% per year for the purse seine and baitboat fisheries. Based on the catch species composition and catch-at-size data available during the 2003 assessment, yearly catches in number ranged between 54% and 72% undersized yellowfin tuna by purse seiners, from 63% to 82% undersized fish for baitboats over the period 1997-2001. Landings of undersized fish occur primarily in the equatorial fisheries. Unfortunately, it is difficult to realize substantial reductions in catches of undersized fish in these fisheries because small yellowfin are mostly associated with skipjack, especially when fishing occurs on floating objects; thus it is difficult to avoid catching small yellowfin when catching skipjack, the latter being an important component of eastern Atlantic (equatorial) purse seine fleet catches. The Committee suggests that the Commission consider the practicality of maintaining the 3.2 kg minimum size regulation.

In 1993, the Commission recommended "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." As measured by fishing mortality, effective effort appears to be approaching or exceeding the 1992 levels (**YFT-Figure 5b**).

The effects of the moratorium on FAD fishing are detailed in the 2003 Report of the Working Group for the Evaluation of a Closed Area-Season for the Use of FADs by Surface Fisheries.

YFT-6. Management recommendations

Estimated catches of yellowfin tuna have averaged 144,000 t over the past three years. This average falls near the lower estimate of the range of MSY from the age-structured and production model analyses conducted during this assessment. The Committee considers that the yield of 159,000 t in 2001 is likely somewhat above the replacement yield, and that recent levels of fishing effort and fishing mortality may be near MSY. Therefore the Committee reaffirms its support for the Commission's 1993 recommendation "that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna, over the level observed in 1992." The Committee's estimates of effective fishing effort for recent years fall near the estimate for 1992.

The Committee also continues to recommend that effective measures be found to reduce fishing mortality of small yellowfin, based on previous results of yield-per-recruit analysis. In 1993, the Committee evaluated the effects of the moratorium on fishing on floating objects (and other measures to reduce catches of small fish) begun in late 1997, but there were insufficient data to fully evaluate the impact on yellowfin tuna. In general, the approach was intended to benefit bigeye tuna and is not expected to reduce the mortality of juvenile yellowfin tuna. In fact, the fishing mortality on juvenile yellowfin tuna appears to have increased substantially during the moratorium years, although it is unclear that this is related to the moratorium.

ATLANTIC YELLOWFIN TUNA SUMMARY	
Maximum Sustainable Yield (MSY)[1]	~148,000 t
Current Yield [2]	
(2001)	159,000 t
(2002)	137,500 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 [Ref. 72-1]
- Effective fishing effort not to exceed 1992 level [Ref. 93-4]
- Closed area/season for fishing on FADs [Ref. 99-1]

[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 2002 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 (landings and discards, t) of Atlantic yellowfin tuna by major area, gear and flag, 1978-2002.

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002**	*2002****
TOTAL			**134044**	**127517**	**130961**	**155818**	**165001**	**165373**	**113940**	**156547**	**146535**	**144428**	**135219**	**161322**	**192456**	**163848**	**160492**	**158338**	**168170**	**149112**	**150624**	**136481**	**147471**	**141651**	**132366**	**159156**	**25854**	*137350*
	AT.E		**119246**	**114158**	**117798**	**138114**	**138711**	**124953**	**76053**	**113656**	**106606**	**110304**	**99180**	**123239**	**157112**	**123371**	**120167**	**115163**	**113854**	**108075**	**111903**	**99616**	**110730**	**104877**	**94957**	**116361**	**17311**	*106564*
	AT.W		**14798**	**13359**	**13163**	**17704**	**26290**	**39666**	**37481**	**42365**	**31751**	**27680**	**30284**	**32807**	**27095**	**32640**	**32895**	**37230**	**46335**	**34047**	**30682**	**29609**	**28044**	**28980**	**30184**	**38580**	**8543**	*29971*
	UNCL		**0**	**0**	**0**	**0**	**0**	**754**	**406**	**526**	**8178**	**6444**	**5755**	**5276**	**8249**	**7837**	**7430**	**5944**	**7982**	**6990**	**8040**	**7256**	**8697**	**7794**	**7225**	**4215**		*816*
Landings	AT.E	Bait boat	8980	13715	7690	9788	13211	11507	14694	16120	15301	16750	16020	12168	19560	17772	15095	18470	15652	13496	13804	13974	17480	19056	13009	19886	1319	*14163*
		Longline	11290	6777	12508	7986	10456	6040	8092	9444	3684	4481	7511	6385	7640	5502	3903	4107	8503	7955	8567	5964	8036	7495	8436	5159	2920	*4325*
		Other Surf.	878	1375	574	5347	3224	3904	2407	1516	2296	2932	2532	2485	2239	3783	2509	2081	1905	1854	1946	2031	1554	1469	1632	1735	579	*607*
		Purse seine	98098	92291	97026	114993	111820	103502	50860	86576	85325	86141	73117	102200	127673	96314	98660	90505	87794	84770	87586	77646	83659	76856	71879	89581	12493	*87469*
	AT.W	Bait boat	1012	605	392	1917	2970	3603	3698	5478	2421	5468	5822	4834	4718	5359	6276	6383	7094	5297	4560	4275	5511	5349	5649	5315		*6009*
		Longline	9572	9277	6735	11323	9926	6969	8503	9743	12407	9990	14736	13033	13215	9410	11777	9925	9463	8833	8737	8823	8795	11596	11465	12535	5216	*12141*
		Other Surf.	552	2442	901	1642	1282	3345	2077	6150	7101	5557	3692	3293	2362	3457	3483	4842	10166	13580	6601	4801	4580	5345	5200	6985	3327	*3855*
		Purse seine	3662	1035	5135	2822	12112	25749	23203	20994	9822	6665	6034	11647	6800	14414	11359	16081	19612	6338	10784	11710	9157	6523	7870	13745		*7966*
	UNCL	Longline	0	0	0	0	0	754	406	526	8178	6444	5755	5276	8249	7837	7430	5944	7982	6990	8040	7256	8697	7794	7225	4215		*737*
																												79
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0		*0*
Landings	AT.E	ANGOLA	2296	904	558	959	1467	788	237	350	59	51	246	67	292	510	441	211	137	216	78	70	115	170	35	34		*34*
		BENIN	0	48	95	100	113	49	65	60	19	3	2	7	1	1	1	1	1	1	1	3	1	1	1	1		
		CAMBODIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0		
		CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
		CAP-VERT	470	581	864	5281	3500	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1727	1781	1448	1721	1418	1663	1851	1684		*287*
		CAYMAN ILS	0	0	602	1460	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	71	1535	1652	586	262	*262*
		CHINESE TAIPEI	203	190	71	432	203	452	87	146	254	193	207	96	2244	2163	1554	1301	3851	2681	3985	2993	3643	3389	4014	2787	2589	*2589*
		CONGO	0	0	140	50	0	0	0	11	20	15	15	21	22	17	18	17	14	13	12	12	12	12	12	12		
		COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0		
		CUBA	2339	3168	5128	2945	2251	1916	1467	1585	1332	1295	1694	703	798	658	653	541	238	212	257	269	0	0	0	0		*0*
		EC-ESPANA*	33636	40083	38759	51428	54164	51946	40049	66874	61878	66093	50167	61649	68603	53464	49902	40403	40612	38278	34879	24550	31337	19947	24681	30937	88	*31260*
		EC-FRANCE*	55192	47776	54372	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	34840	33964	36064	35468	29567	33819	29966	30739	31246	29789	32211		*32753*
		EC-PORTUGAL	125	185	77	208	981	1333	1527	36	295	278	188	182	179	328	195	128	126	231	288	176	267	178	194	3	3	*6*
		ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	234	0	0	0	0	0	0	0	0	0	0		
		FAROE-ISLANDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
		G.EQUATORIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	88	218	225	225	295	225	162	270	245	*245*
		GAMBIA	0	0	0	0	0	0	0	0	0	0	0	0	2	16	15	0	0	0	0	0	0	0	0	0		
		GEORGIA	0	0	0	0	0	0	0	0	0	0	0	0	0	25	22	10	0	0	0	0	0	0	0	0		
		GHANA	546	1426	1974	5510	9797	7689	9039	12550	11821	10830	8555	7035	11988	9254	9331	13283	9984	9268	11720	16504	17807	28328	17010	30642		*23499*
		JAPAN	1722	1241	2217	2863	4815	3062	4344	5765	3634	4521	5808	5882	5887	4467	2961	2627	4194	4770	4246	2733	4092	2101	2268	1423		*1346*

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002**	*2002****
	KOREA	8625	6449	5349	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453	297	101	23	94	142	3	8	*8*
	LATVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	255	54	16	0	55	151	223	97	25	36	72	334	*334*
	LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	208		
	LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	332	0	0	0	0	0	0	0	0	0	0		
	MAROC	3440	2986	3243	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	72	69	3	147	59	165		*13*
	NEI-1*	0	0	0	0	3121	5388	1104	0	0	2077	3140	5436	12513	3988	10049	8251	6186	6143	8437	5981	7224	5190	5448	9273	8209	*8209*
	NETHERLAND.ANT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3183	6082	6110	3884	5441	4793	4035	*4035*
	NORWAY	0	0	0	0	0	0	0	0	813	418	493	1787	1790	0	0	0	0	0	0	0	0	0	0	0		*0*
	PANAMA	1477	739	1661	341	1933	1568	1653	3100	0	0	0	0	0	6706	7041	7838	8644	10854	5759	3137	1753	930	1103	574	1022	*1022*
	PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	173	86	0	50	*50*
	POLAND	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	RUSSIA FED.*	0	0	0	0	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936	2696	4275	4931	4359	221	0		*0*
	SAO TOME & PRINCIPE	39	28	31	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0	1	4	4	4	4	0		
	SENEGAL	0	0	0	0	0	0	0	0	0	0	0	2	90	132	40	19	6	20	41	208	251	834	252	295	447	*447*
	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	11	*11*
	SEYCHELLES.SH.OB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0		*0*
	SOUTH AFRICA	281	4595	540	178	49	456	759	382	55	68	137	671	624	52	69	266	486	183	157	116	229	318	353	316		*144*
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*1*
	U.S.A	8131	2884	1614	1472	636	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	U.S.S.R	687	806	448	541	1004	1282	2168	3768	1851	1275	3207	4246	3615	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	215	0	0	0	0	0	0	0	0	0	0		
	UK-S.HELENA	37	69	55	59	97	59	80	72	82	93	98	100	92	100	166	171	150	181	151	109	181	116	136	72	9	*9*
	VENEZUELA	0	0	0	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
AT.W	ARGENTINA	4	0	0	8	7	0	0	44	23	18	66	33	23	34	1	0	0	0	0	0	0	0	0	0		
	BARBADOS	67	81	40	30	36	51	90	57	39	57	236	62	89	108	179	161	156	255	160	149	150	155	155	142		*115*
	BRASIL	852	1353	1008	2084	1979	2844	2149	2947	1837	2266	2512	2533	1758	1838	4228	5131	4169	4021	2767	2705	2514	4127	6145	6239		*6172*
	CANADA	318	0	0	0	0	0	0	0	0	0	30	7	7	29	25	71	52	174	155	100	57	22	105	125		*70*
	CANADA-JPN	0	0	0	0	0	0	0	0	2	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	628	655	22	470	435	*435*
	CHINESE TAIPEI	181	848	616	435	407	87	559	780	1156	709	1641	762	5221	2009	2974	2895	2809	2017	2668	1473	1685	1022	1647	2018	1953	*1953*
	COLOMBIA	0	0	0	0	3	29	0	180	211	258	206	136	237	92	95	2404	3418	7172	238	46	46	46	46	46		*46*
	CUBA	661	232	689	1997	1503	793	2538	1906	2081	1062	98	91	53	18	11	1	14	54	40	40	15	15	0	0	65	*65*
	DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	18	12	23	30	31	9	0	0	0	80	78	78		*78*
	DOMINICAN REP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	89	220	226	226		*226*
	EC-ESPANA	2029	1052	0	0	0	1957	3976	1000	0	0	1	3	2	1462	1314	989	7	4	36	34	46	30	171	672		*0*
	EC-FRANCE	0	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		*0*
	GHANA	0	0	265	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
	GRENADA	166	148	487	64	59	169	146	170	506	186	215	235	530	620	595	858	385	410	523	302	484	430	403	759		*593*

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002**	*2002****
		JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	21	0	0	0	0		
		JAPAN	1647	1707	1117	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	457	1004	806	1081	1304	1602	1026		*464*
		KOREA	4259	4414	1933	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0	84	156	0	0	0	0		
		MEXICO	0	0	16	42	128	612	1059	562	658	33	283	345	112	433	742	855	1093	1126	771	826	788	1283	1390	1084		*1133*
		NETHERLAND.ANT	173	173	173	173	173	173	173	150	150	160	170	170	170	150	160	170	155	140	130	130	130	130	130	0		
		PANAMA	1440	102	807	262	675	62	246	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0		
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	106	78	12	79	*79*
		SEYCHELLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0		*0*
		ST.LUCIA	67	28	27	25	26	23	56	79	125	76	97	70	58	49	58	92	130	144	110	110	276	123	134	145		*94*
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	1	40	48	22	65	16	43	37	35	48	38	33	24		*884*
		TRINIDAD & TOBAGO	0	0	0	0	0	232	31	0	0	0	1	11	304	543	4	4	120	79	183	223	213	163	112	122	125	*125*
		U.S.A	1616	298	553	1688	1095	2553	2180	9735	9938	9661	11064	8462	5666	6914	6938	6283	8298	8131	7745	7674	5621	7567	7051	6703	5887	*5890*
		UK-BERMUDA	12	26	35	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44	67	55	53	59	31	37		*37*
		URUGUAY	0	0	0	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53	171	53	88	45	45	0		*91*
		VENEZUELA	1306	2811	5397	4500	14426	16750	16427	18100	9554	11137	10756	15567	10556	16503	13773	16663	24789	9714	13772	14671	13995	11187	10549	17561		*11421*
		VENEZUELA-FOR	0	0	0	0	0	9826	5452	2435	2201	0	193	0	0	0	0	0	0	0	0	0	0	0	0	1091		*0*
	UNCL	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	156	200	124	0	0	0	0	0		*0*
		CHINESE TAIPEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*0*
		EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*209*
		LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*73*
		MAROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		*79*
		NEI-105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	284	400	59	62	0	0	0		*0*
		NEI-111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	649	0	0		*0*
		NEI-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98	604	862	1315	1399	2894	1911	1584	1471		*22*
		NEI-144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26		*35*
		NEI-166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110		*0*
		NEI-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63		*118*
		NEI-40	0	0	0	0	0	0	0	0	0	0	0	137	162	78	68	18	174	143	223	48	41	0	11	29		*0*
		NEI-42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4		*0*
		NEI-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23		*0*
		NEI-71	0	0	0	0	0	754	406	526	956	1297	2324	2643	3938	4240	3768	2555	3626	2913	3970	4155	4057	3453	2646	332		*0*
		NEI-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	54		*0*
		NEI-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	393	1263	1396	951	762		*0*
		NEI-94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	46	22	0	0	0		*0*
		PANAMA	0	0	0	0	0	0	0	0	7222	5147	3431	2496	4149	3519	3594	3134	3422	2588	1954	1156	358	385	0	0		*0*
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1956	1341		*280*
Discards	AT.W	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167	0	0		*0*

July 2003 for the yellowfin stock assessment

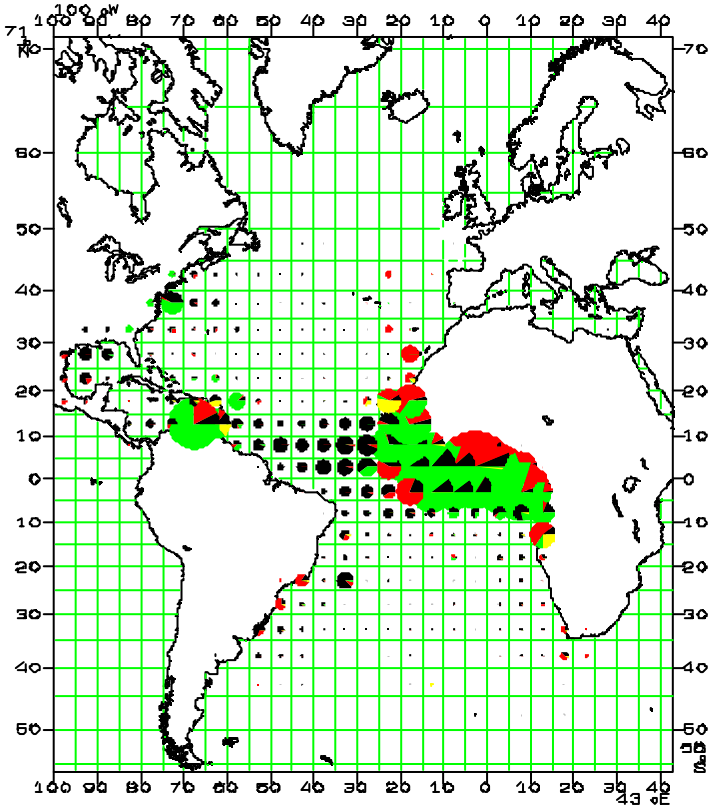
* Catch at size 1991-2001 (1993-1999 for Russian Federation) was based on figures estimated by Species Group, not on Task I

** 2002 data available during the assessment were provisional and incomplete and were not used.

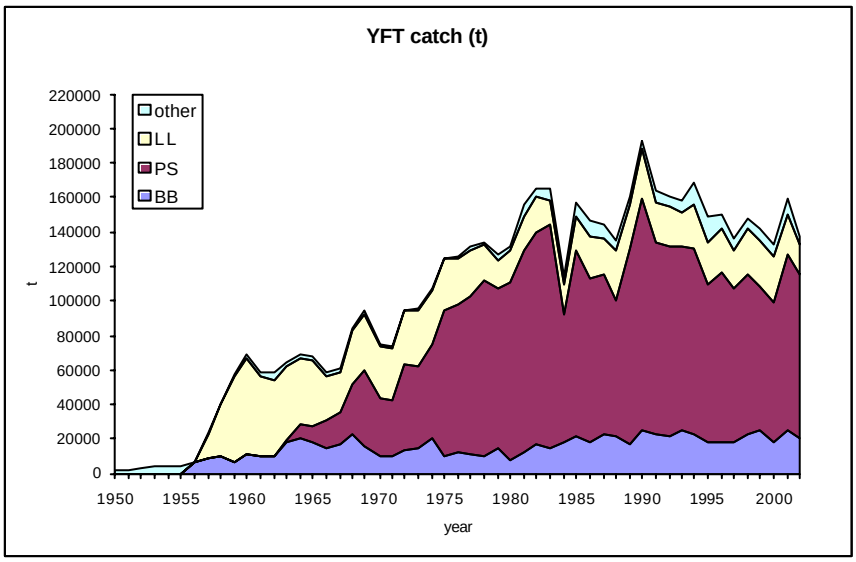
*** 2002 data as of 2 October 2003.

Since the assessment, the following changes were received: Russian Federation East 2000 = 737 t; EC-Ireland East 2001 = 3t; Japan East 2001= 1485;
EC-España west 2001 = 0; Japan west = 1085; EC-España Uncl = 117; NEI-166 Uncl = 72

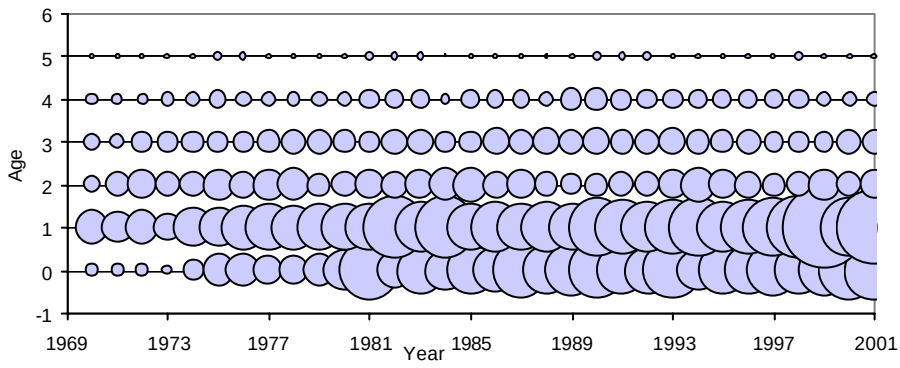
Blank cells for 2002 indicate that catches were not reported to ICCAT.



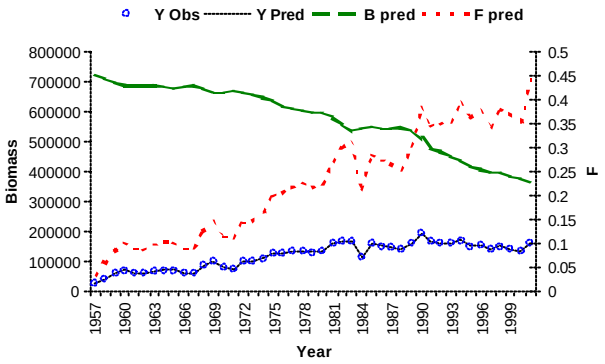
YFT-Fig.1. Geographical distribution of Atlantic yellowfin tuna catches, by fishing gear, 1950-2000 combined. Black, medium-shaded, dark-shaded and light-shaded areas in circles correspond to catches by longline, purse seine, baitboat and other fisheries, respectively.



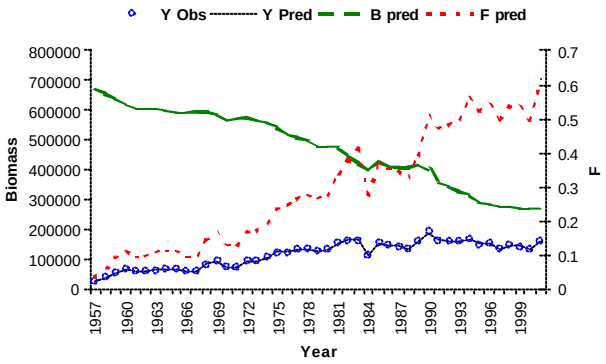
YFT-Fig. 2. Estimated annual catch (t) of Atlantic yellowfin tuna by fishing gear, 1950-2002.



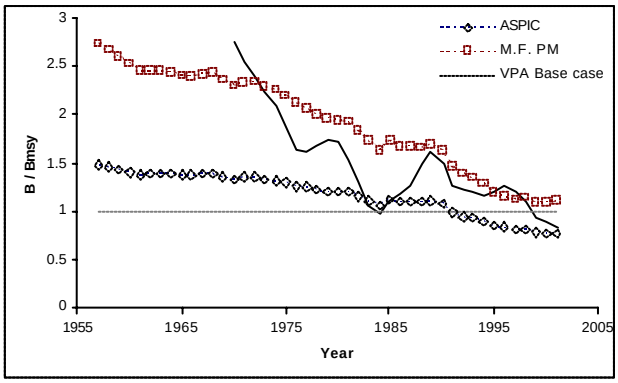
YFT-Fig.3. Relative distribution of Atlantic yellowfin tuna catches by age and year (bubble size is proportional to total catches).



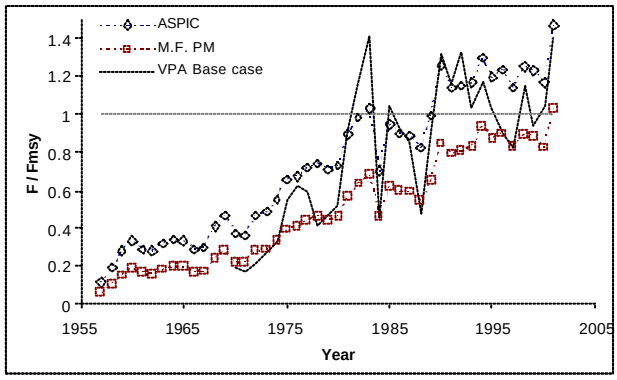
YFT-Fig.4a. Trends in yield (observed and predicted), predicted biomass and predicted fishing mortality from the ASPIC non-equilibrium production model.



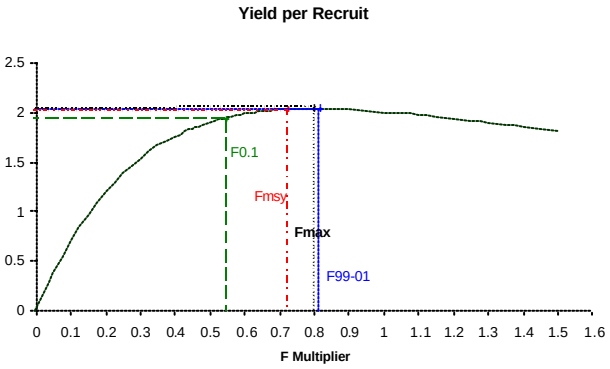
YFT-Fig. 4b. Trends in yield (observed and predicted), predicted biomass and predicted fishing mortality from the Multifleet non-equilibrium production model.



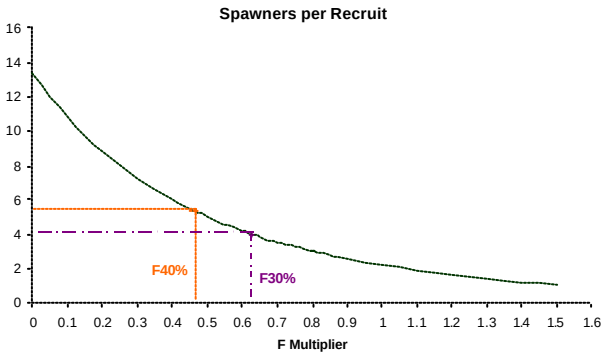
YFT-Fig. 5a. Comparison of relative biomass trends calculated using VPA and non-equilibrium production models.



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



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



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

8.2 BET - BIGEYE TUNA

No assessment was conducted this year for bigeye tuna. Therefore, the results of stock assessment given in this report are taken from the last assessment conducted in 2002. Other information regarding fisheries statistics and new studies are updated and incorporated where necessary.

Compared to other tuna species, bigeye tuna has received less attention in the past with respect to research on basic biological characteristics, in spite of the importance of this species for the Atlantic fisheries that are currently exploiting it. The lack of reasonable estimates of some biological parameters considerably hindered the stock assessment process, and sometimes led to unrealistic results. The ambitious Bigeye Tuna Year Program (BETYP) was proposed and was adopted by the Commission in 1996. The activities were started in 1999 after external funds were made available. The substantial part of the Program, such as tagging and sampling, has ended already, and the completing symposium of this Program is scheduled for March 2004 in Madrid. The results are being provided to the SCRS as given in the Report of BETYP Activities **(Appendix 5)** and other SCRS documents. The outcome of this Program is expected to assist and improve the task of the Committee substantially.

BET-1. Biology

The geographical distribution of bigeye tuna is very wide and covers almost the entire Atlantic Ocean between 50°N and 45°S. This species dwells in deeper water than other tuna species and exhibits extensive vertical movements. Archival tagging and sonic tracking studies conducted on adult fish in other oceans has revealed that they exhibit clear diurnal patterns being much deeper in the daytime than at night. Spawning takes place in tropical waters when the environment is favorable. From the nursery areas in tropical waters, juvenile fish tend to migrate into temperate waters as they grow larger. Catch information from the surface gears indicate that the Gulf of Guinea is a major nursery ground for this species. Various prey organisms such as fish, mollusks, and crustaceans are found in stomach contents. Bigeye exhibit relatively fast growth; fish about 100 cm in fork length correspond to nearly three years old, and this is when they become mature. A new growth study based on otolith and tagging data is underway and will provide improved information in the near future. Young fish form schools mostly mixed with other tunas such as yellowfin and skipjack. These schools are often associated with drifting objects, whale shark and sea mounts. This association appears to be less and less as they grow larger.

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

Circumstantial evidence, such as the time-area distribution of fish and movements of tagged fish, suggests an Atlantic-wide single stock for this species, which is currently accepted by the Committee. However, the possibility of other scenarios, such as north and south stocks, should not be disregarded.

BET-2. Description of the fisheries

The stock has been exploited by three major gears (longline, baitboat and purse seine fisheries) and by many countries throughout its range of distribution **(BET-Figure 1)**.

The size of fish caught varies among fisheries: medium to large for the longline fishery, small to large for the directed baitboat fishery, and small for other baitboat and purse seine fisheries. Corresponding average weights are 45-50 kg, 20-30 kg and 3-4 kg for these three types of fisheries, respectively. The economic value of fish is also different depending on the fishing gear and market. Generally speaking, the price per kg of longline-caught fish at the unloading site is at least several times higher than that for fish caught by other fisheries such as purse seine.

The longline and baitboat fisheries have a long history that dates back before 1960. The major baitboat fisheries are located in Ghana, Senegal, the Canary Islands, Madeira and Azores. Unlike in other oceans, baitboats catch significant amounts of medium and large size bigeye tuna, except in Ghana where mainly small fish are caught. The tropical purse seine fleets operate in the Gulf of Guinea and off Senegal in the East Atlantic and off Venezuela in the West Atlantic. The fleets are comprised of EC-France EC-Spain, Ghana and other flag vessels

managed by EC companies in the east, and the Venezuelan fleet operates in the west. The bigeye catch by the Venezuelan fleet was very minor. While bigeye tuna is a primary target species for most of the longline and baitboat fisheries, except Ghana, this species has been of secondary importance for the purse seine fisheries and the Ghanaian baitboat fishery.

There are two major longline fisheries, operated by Japan (15,000 t in 2002) and Chinese Taipei (16,500 t in 2002), whose catch accounted for 43% of the total catch in weight in 2002. Korea has reduced its activity in the Atlantic considerably since 1990. In more recent years, China and the Philippines started fishing in 1993 and 1998, respectively. China increased its catch thereafter and was beyond 5,000 t after 1998. The Philippines' catch was the highest in 1999 (2,100 t) but declined thereafter to less than 1,000 t.

Since about 1991, the purse seine and Ghanaian baitboat fisheries introduced a fishing technique that utilizes artificial fish aggregating devices (FADs). Similarly, baitboat fleets in Senegal and the Canary Islands have developed a method that uses the baitboats as FADs. These new techniques have apparently improved fishing efficiency and contributed to the increase of the bigeye catch.

The activities of the illegal, unreported and unregulated (IUU) longliners that fly flags of convenience appear to have started in the early 1980s, and became significant thereafter. In 1999, catches suspected to have been made by the IUU longline fleet were tabled and studied by the Committee for the first time. Those estimates were based on Japanese import statistics which are available since 1983. The estimates of unreported catch are considered to be minimum estimates and they are uncertain. Since 2000, St. Vincent reported its bigeye catch for the large longline vessels to ICCAT, and according to these statistics the activities by such fleet appeared to have reduced to a negligible level in 2002. Because of the apparent decrease in catches by IUU activities, the estimated total unreported catch in 2002 was less than 3,000 t, i.e. a 90% decline from the high of 25,000 t estimated for 1998 **(BET-Figure 2)**. However, since there has been no information on whether or not these IUU activities had actually reduced, those activities may have continued and their catch exported to countries other than Japan.

The total annual catch **(BET-Figure 3)** exhibited an increase up to the mid-1970s reaching 60,000 t and fluctuating between 45,000 and 84,000 t over the next 15 years. In 1991, it passed 95,000 t and continued to increase, reaching a historic high of about 130,000 t in 1994. It has declined since then with some fluctuation. The provisional total catch in 2002 was about 73,000 t, which was the lowest since 1989 and a drop of 22,000 t from 2001. This decline has continued since 1999. All three types of fisheries (purse seine, baitboat and longline) indicated a decline by 23%, 48% and 43%, respectively, between 1999 and 2002. The purse seine and baitboat catches have shown relatively large year-to-year variation. According to the Committee's estimate based on the calculations from correction of species composition, the Ghanaian baitboat and purse seine fisheries have shown a large increase from about 5,000 t in the early 1990s to more than 11,000 t in three of the most recent five years.

BET-3. State of the stocks

The 2002 assessment was hampered by the lack of detailed information from some of the major fisheries operating in the Atlantic. Important sources of uncertainty in the assessment include (a) catches made by IUU longliners, (b) the species composition of Ghanaian fisheries that target tropical tunas, and (c) the lack of reliable indices of abundance for small bigeye.

Two indices of relative abundance were used to assess the status of the stock: one based on Japanese longline catch and effort data **(BET-Figure 4)** that targets this species and represents roughly 20-40% of the total catch, and another one from the U.S. longline fishery that accounts for a smaller fraction of the catch. Both of these indices relate to medium and large-size fish.

Various types of production models were applied to the available data. In some cases, the models were unable to produce parameter estimates within a biologically meaningful range, and therefore strong assumptions had to be made in these cases about stock productivity. The range of MSY estimates obtained from production models was 79,000-105,000 t. The upper limit of this range is larger than the one estimated in the 1999 assessment, probably as a result of the addition of high catches since then. Such increases in MSY estimates are common when maximum observed catches are revised upwards. MSY estimates can also vary depending on the type of models used. Estimates obtained from other type of model ranged from 91,000 to 112,000 t.

The production model analyses estimate that the total catch was larger than the upper limit of MSY estimates for the years between 1993 and 1999, causing the stock to decline considerably, followed by a leveling off of the biomass in recent years as total catches decreased. These results also indicate that the current biomass is about 10-20% below the biomass corresponding to MSY and that current fishing mortality is about 15% higher than the rate that would achieve MSY (see Summary Table and **BET-Figure 5**).

Several types of age-structured analyses were conducted using the Japanese and U.S. longline indices and catch-at-age data converted from the available catch-at-size data. Although all results indicate a sharp increase in fishing mortality and an opposite decline in biomass in recent years, the results were unstable and thus the analyses were considered to be inconclusive. The uncertainties in the catch of some fleets and the lack of reliable size and CPUE data for some fisheries may be the reasons for this.

Yield-per-recruit analyses and other models **(BET-Figure 6)** provided estimates of $F_{0.1}$ and F_{max}, which are often used as benchmarks in the stock assessment (potentially as surrogates of F_{MSY}). Current F appears to exceed $F_{0.1}$ and is also likely to be higher than F_{max}, adding support to the production model's conclusion that the bigeye stock is being over-exploited. Spawning stock biomass-per-recruit **(BET-Figure 6**) is lower than its $F_{SPR30\%}$ by about 20%, which corresponds to a threshold at which recruitment over-fishing may occur for other fish species. Multi-gear yield-per-recruit analysis suggests that there cannot be an increase in yield by intensifying fishing effort of any sector; however, yield-per-recruit can be increased with a reduction of fishing effort for small-fish fisheries **(BET-Figure 7)**.

In many of the analyses conducted by the Committee, the role of natural mortality (M), particularly for small fish, is very important; i.e., the impact of the small-fish catch on the large-fish fishery is large if M is relatively low, but it will be smaller if M is high. Without precise estimates of M, results could be misleading. It is very encouraging that an estimate of M for juvenile fish was provided. This will enhance the Committee's ability in reducing uncertainty in the stock assessment.

BET-4. Outlook

Stock projections were conducted based on the production model results and assuming a catch of 100,000 t in 2002 and varying levels of constant catch thereafter. The 100,000 t level assumed for 2002 presupposes that all fisheries will maintain similar catch levels as in 2001 as shown in **BET-Table 1**. The projection results suggest that the biomass of the stock will not decline further with constant catches of 100,000 t, which is very close to the reported catch for 2001. Increases in biomass are expected with catches of 95,000 t or less, and further declines in biomass are expected with catches of 105,000 t or more **(BET-Figure 8)**.

BET-5. Effects of current regulations

The bigeye minimum size regulation of 3.2 kg was adopted in 1980 to reinforce the same regulation for yellowfin. It is clear that a large quantity of juvenile bigeye tuna smaller than 3.2 kg continues to be captured mostly from the equatorial surface fleets (baitboat and purse seine). The percentage of fish smaller than the minimum size **(BET-Figure 9)** has increased since 1990 and was more than 50% of the total fish caught thereafter, except in 2000, although the absolute number of undersized fish might have been reduced in some fisheries. According to the yield-per-recruit analysis **(BET-Figure 6)**, a full implementation of this regulation could result in an increase in yield-per-recruit by almost 20 % at F_{max}.

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

Limiting the catch in 2002 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 [Ref. 00-1]. The 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 60,346 t and 26,000 t lower than the total catch

limit (86,500 t). As a whole the total catch in 2002 for all countries is about 23,000 t lower than the average total catch of 1991 and 1992.

BET-6. Management recommendations

The yield-per-recruit and spawning-per-recruit analyses highlighted a potential importance in reducing F on small fish. However, the percentage of fish less than this minimum size (3.2 kg) is very high (45-59% of the total fish caught) since 1990. The Committee, therefore, recommends the full implementation of the moratorium on FAD fishing by all surface fisheries in the Gulf of Guinea.

The most recent assessment indicated that the stock has declined due to the large catches made since around the mid-1990s below the level that produces the MSY and current F is higher than F_{MSY}. Projections indicate that catches of more than 100,000 t will result in continued stock decline. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendation [Ref. 01-01 and 02-01] and other countries were to maintain 2001 catch levels, then the total catch would be about 110,000 t. Thus, if the Commission wants to ensure that the decline in the stock will be halted, it should consider limiting the total catches made by all countries fishing in the Atlantic to be 100,000 t or less. The total catch for 2002 was 73,000 t and much lower than the above value due to the decline of the catches for some countries. However, it should be noted that the actual figure for 2002 could be higher if IUU activity has continued undetected and/or because of the provisional nature of the 2002 reported catch.

The Committee expresses its appreciation for the effort made by the Commission in establishing the Statistical Document Program for this species. This Program is very helpful in identifying the unreported catches in the Atlantic and will make the catch limit regulation more effective, and thus will contribute to reduce uncertainties in the bigeye stock assessment. Considering the uncertainties in IUU catches, in particular those of 2002, the Committee stresses the importance of full participation in the Statistical Document Program for all countries that fish tuna and engage in tuna trading.

ATLANTIC BIGEYE TUNA SUMMARY	
Maximum Sustainable Yield (likely range)	79,000 t - 105,000 t [1]
Current (2002) Yield [2]	73,085 t
Replacement Yield	
2002 [3]	102,200 t
2003 [4]	104,000 t
Relative Biomass (B_{2002}/B_{MSY}) [5]	0.81 - 0.91
Relative Fishing Mortality	
(F_{2001}/F_{MSY}) [3]	1.15
($F_{2001}/F_{0.1}$) [4]	1.12
(F_{2001}/F_{max}) [6]	0.99
Conservation & management measures in effect:	- 3.2 kg minimum size [Ref. 79-1] - 25% of FADs fishing vessels and 5% of others to be covered with observers [Ref. 96-1] - Limits on numbers of vessels [Refs. 98-3, 02-1] - Catch limits for those who reported 1999 catch in 2000 was larger than 2,100 t [Ref. 02-1] - Moratorium on FAD fishing for all surface fleets, Nov 1 to Jan 31, in eastern tropical area [Ref. 99-1]

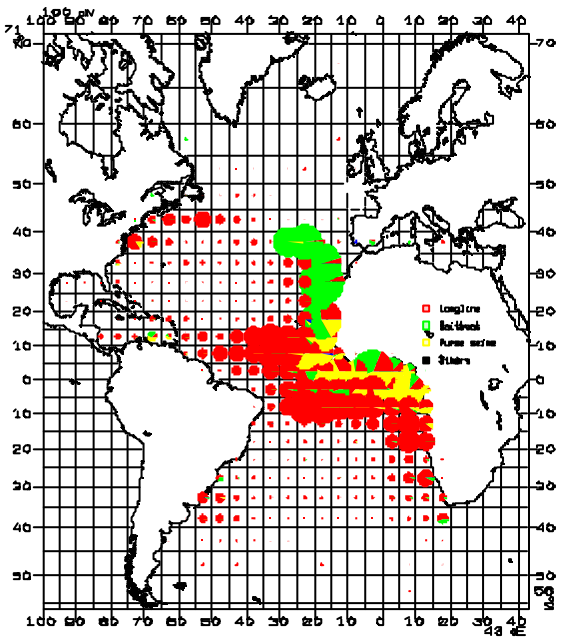
1 Range based on point estimates from various production models. MSY estimates obtained by delay-difference model range from 91,000 t to 112,000 t.
2 Provisional figure, subject to change in the future.
3 Point estimate from non-equilibrium generalized production model.
4 Point estimate from delay-difference model.
5 Range based on point estimates from a non-equilibrium production model and a delay-difference model (estimated from $B_{2002}/B_{0.1}$).
6 Yield-per-recruit estimate based on the 2001 selectivity pattern of 1998-2001 in the moratorium analysis.

BET-Table 1. Estimated catches of Atlantic bigeye tuna, t, by major gear and flag, 1978-2002.

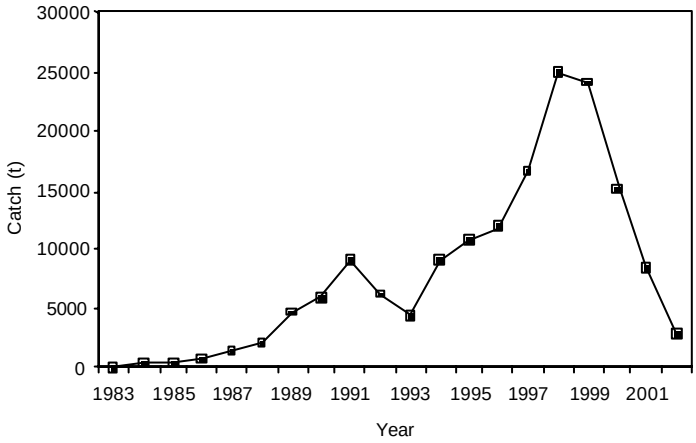
0	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
TOTAL	*52693*	*45975*	*63596*	*67753*	*73493*	*59384*	*71052*	*78215*	*65396*	*55976*	*65796*	*78068*	*84337*	*94795*	*97758*	*110060*	*129507*	*123155*	*119114*	*105647*	*109887*	*121177*	*102349*	*95398*	*73085*
Gear Group	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Bait boat	*14629*	*9591*	*12349*	*10124*	*6922*	*9796*	*11439*	*17651*	*15618*	*12631*	*9710*	*12672*	*18106*	*17750*	*16248*	*16467*	*20285*	*25552*	*18959*	*18639*	*21263*	*22360*	*12311*	*16870*	*11639*
Longline	*28796*	*27560*	*41677*	*41608*	*51805*	*33757*	*43303*	*52595*	*39942*	*35570*	*47758*	*58389*	*56537*	*61556*	*62359*	*62871*	*78296*	*74816*	*74900*	*68251*	*71825*	*76513*	*70902*	*54842*	*43773*
Other Surf.	*174*	*481*	*366*	*365*	*290*	*177*	*247*	*415*	*550*	*626*	*469*	*636*	*287*	*434*	*604*	*648*	*974*	*561*	*353*	*536*	*429*	*1373*	*1219*	*1626*	*1482*
Purse seine	*9094*	*8343*	*9204*	*15656*	*14476*	*15654*	*16063*	*7554*	*9286*	*7148*	*7859*	*6371*	*9407*	*15055*	*18547*	*30074*	*29952*	*22226*	*24902*	*18221*	*16370*	*20931*	*17917*	*22060*	*16192*
ARGENTINA	23	0	0	0	0	0	0	100	41	72	50	17	78	22	0	0	0	0	0	0	0	0	0	0	
BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	17	18	18	6	11
BENIN	0	0	0	40	45	0	0	0	15	6	7	8	10	10	7	8	9	9	9	30	13	11	0	0	
BRAZIL	812	782	698	505	776	535	656	419	873	756	946	512	591	350	790	1256	596	1935	1707	1237	644	2024	2768	2659	2582
CAMBODIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	
CANADA	0	0	0	0	0	0	0	0	0	0	95	31	10	26	67	124	111	148	144	166	120	263	327	241	279
CANADA-JPN	0	0	0	0	0	0	0	0	11	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAP-VERT	464	45	27	72	200	293	167	112	86	60	117	100	52	151	105	85	209	66	16	10	1	1	2	0	0
CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	428	476	520	427	1503	7347	6564	7210	5840
CHINESE TAIPEI	2970	2486	2561	1887	2147	1623	925	1220	1125	1488	1469	940	5755	13850	11546	13426	19680	18023	21850	19242	16314	16837	16795	16429	16503
CONGO	0	0	5	0	0	0	0	8	19	10	10	14	15	12	12	14	9	9	8	8	8	8	8	8	8
CUBA	2300	2300	1385	711	521	421	447	239	171	190	151	87	62	34	56	36	7	7	5	0	0	0	0	0	16
EC-ESPANA	6849	5419	8430	10010	9332	8794	13617	10340	10884	8875	8475	8263	10355	14705	14656	16782	22096	17849	15393	12513	7115	13739	11250	10134	10524
EC-FRANCE	8985	7308	6283	8020	7074	8124	4254	4615	4266	3905	4161	3261	5023	5581	6888	12719	12263	8363	9171	5980	5624	5529	5949	4948	4293
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	10	0
EC-PORTUGAL	5350	3483	3706	3086	1861	4075	4354	6457	7428	5036	2818	5295	6233	5718	5796	5616	3099	9662	5810	5437	6334	3313	1498	1605	2590
FAROE-ISLANDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	8	0	
G.EQUATORIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	
GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	87	10	0	0	0	184	150	121	0
GHANA	124	238	332	780	791	491	2162	1887	1720	1178	1214	2158	5031	4090	2866	3577	4738	5517	5805	7431	13252	11460	5586	14095	5893
GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	65	25	20	10	10	0	1	0	0	0	0	0
ICELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
JAPAN	9863	12150	20922	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34722	35053	38503	35477	33171	26490	24330	21833	24337	17762	14703
KOREA	9716	8022	10235	12274	10809	9383	8989	10704	6084	4438	4919	7896	2690	802	866	377	386	423	1250	796	163	124	43	1	87
LIBERIA	0	0	0	0	0	0	0	0	0	0	0	206	16	13	42	65	53	57	57	57	57	57	57	57	57
LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	508	1085	500	400	400	400	400	400	400	31	593
MAROC	394	414	387	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0	0	0	0	700	770	857	913
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	6	8	6	2	2	7
NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29	7	46	16	423	589	640	274
NEI-1	0	0	0	0	338	1141	157	0	0	85	20	93	785	751	1462	2787	2321	2008	3822	1910	1685	3697	2285	3024	2248
NEI-104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
NEI-105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	403	468	42	196	194	27	0	0
NEI-111	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1412	1870	0	0	0
NEI-112	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	38	13	6	1	2	0	0	0	0	0
NEI-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	607	1458	3077	4721	7322	7964	4450	3658	0
NEI-144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	383
NEI-147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0
NEI-157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	0	0
NEI-166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	515	0
NEI-172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	0
NEI-28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	473	148

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
NEI-40	0	0	0	0	0	0	0	0	0	0	0	319	182	194	234	42	100	222	210	97	44	0	0	39	0
NEI-66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
NEI-71	0	0	0	0	0	46	369	354	757	1406	2155	4331	5674	8787	5911	4143	8244	8601	7827	9970	11474	9471	6134	1880	0
NEI-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0
NEI-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	210	1690	4412	4561	4481	1652	0
NEI-94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	43	36	0	0	0	0
NEI-UK-OT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0
NETH. ANTILLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	2890	2919	3428	2359	2803	1879
NORWAY	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PANAMA	2127	513	4518	2500	2844	2732	3165	4461	5173	5616	3847	3157	5258	7447	9991	10438	13234	9927	4777	2098	1252	579	952	89	63
PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1154	2113	975	377	837
POLAND	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	38	4	8	91	0	0
SAO TOME & PRIN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	
SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5	9	126	237	138	258	730	1473	1131	1308	565
SEYCHELLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	162
SEYCH.SH.OB	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
SIERRA LEONE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0
SOUTH AFRICA	0	19	422	381	137	187	60	102	168	200	553	367	296	72	43	88	76	27	7	10	41	41	225	167	304
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	2	2	1	1216	506	15
TOGO	0	0	0	0	0	14	52	18	24	22	7	12	12	6	2	86	23	6	33	33	33	0	0	0	
TRINIDAD & TOB.	0	0	0	0	0	191	41	22	0	0	1	19	57	263	0	3	29	27	37	36	24	19	5	11	30
U.S.A	248	212	202	158	422	315	539	639	1085	1074	1127	847	623	975	813	1090	1402	1209	882	1138	929	1263	574	1085	575
U.S.S.R	2202	2229	2813	2832	635	352	1233	870	1071	1887	1077	424	95	0	0	0	0	0	0	0	0	0	0	0	0
UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UK-S.HELENA	22	8	9	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10	10	12	17	6	8	5	5
URUGUAY	0	0	0	86	397	605	714	597	177	204	120	55	38	20	56	48	37	80	124	69	59	28	25	25	67
VENEZUELA	244	347	661	1684	999	4284	3315	2861	1122	349	226	115	161	476	270	809	457	457	189	274	222	140	226	661	629
VENEZUELA-FOR	0	0	0	0	0	0	827	57	14	0	106	0	0	0	0	0	0	0	0	0	0	0	0	47	0

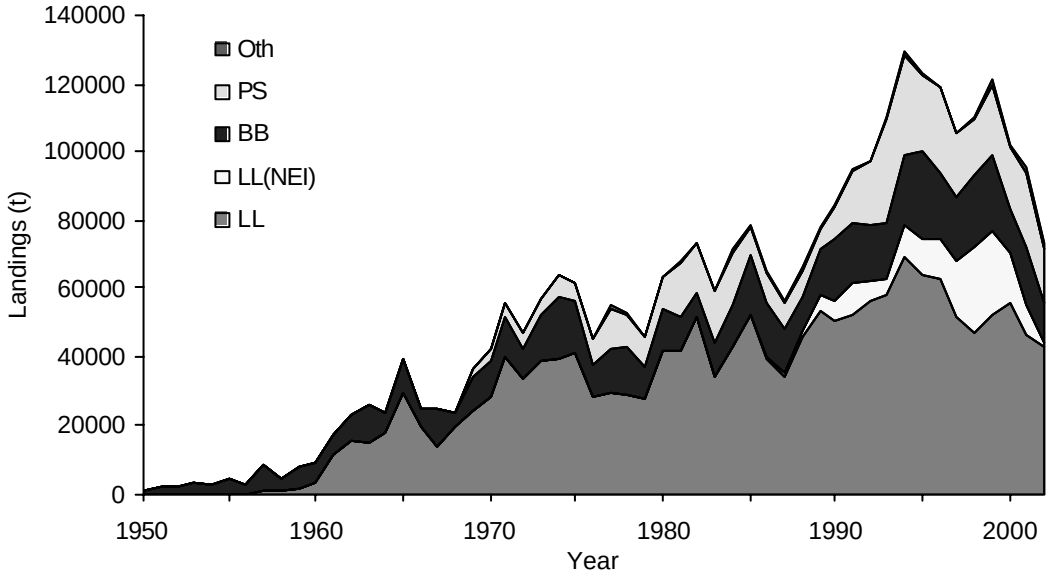
Blank cells for 2002 indicate that catches were not reported to ICCAT.



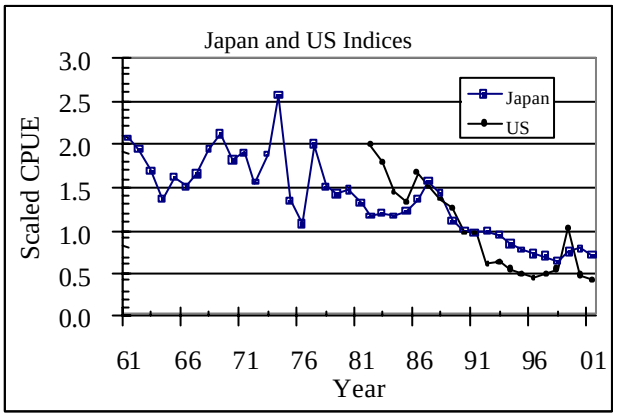
BET-Fig. 1. Geographical distribution of bigeye catches (1950-2000) by major tuna fishery. Dark shaded, light shaded, medium shaded and black areas in circles correspond to catches by longline, purse seine, baitboat and other fisheries, respectively.



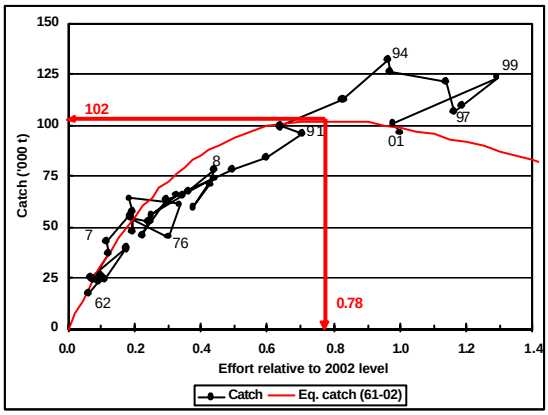
BET-Fig. 2. Estimates of unreported catches of bigeye by longliners, based on Japanese import statistics.



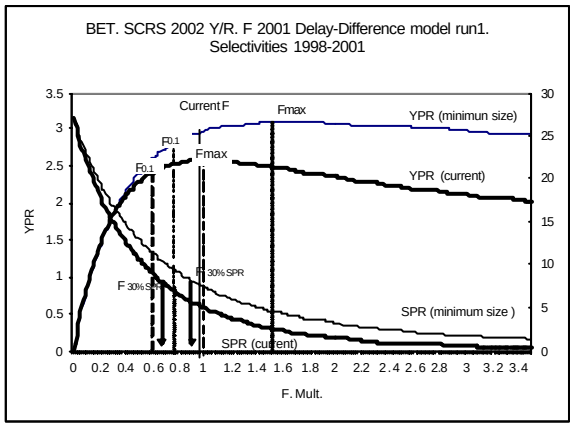
BET-Fig. 3. Cumulative 1950-2002 landings (t) of bigeye tuna in the Atlantic by gear categories; longline (LL), longline un-reported (LL-unrep), baitboat (BB), purse seine (PS) and other surface fisheries.



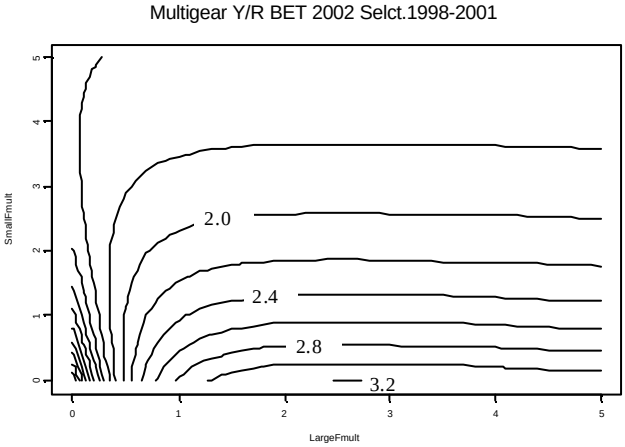
BET-Fig. 4 Abundance indices used in the stock assessment of bigeye tuna obtained from the longline fishery.



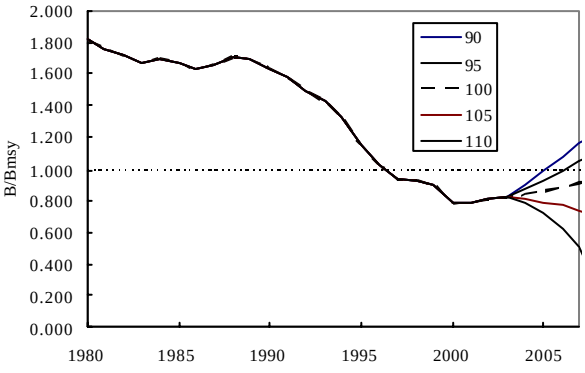
BET-Fig. 5. Production curve estimated by an equilibrium production model (Fox shape) plotted with observed catch-effort trajectory.



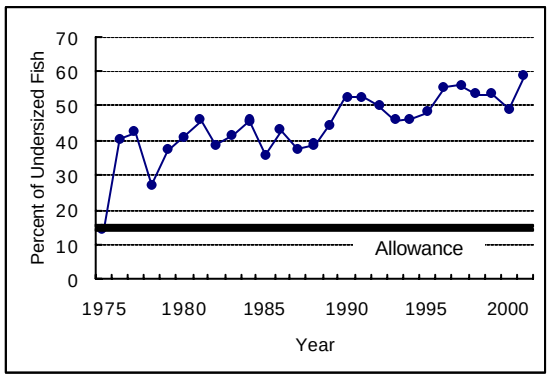
BET-Fig. 6 Yield-per-recruit (YPR) and spawning biomass-per-recruit (SPR) for bigeye assuming current selectivity (heavy lower curves) and selectivity of full compliance of the 3.2 kg minimum size (fine upper curves). Vertical lines indicate $F_{30\%SPR}$, F_{max} and $F_{0.1}$.



BET-Fig. 7. Results of multi-gear yield-per-recruit analysis reflecting the 2001 situation. The large fish fishery (X-axis) and the small fish fishery (Y-axis) correspond to the longline fishery plus baitboat fishery in the North Atlantic and all other fisheries, respectively.



BET-Fig. 8. Future projections based on the production model analysis. Future catch was assumed to be 100,000 t in 2002 and constant catches of various amounts (in thousand t) thereafter.



BET-Fig. 9. Annual trend of undersized fish (below the 3.2 kg minimum size) for the overall fishery.

8.3 SKJ – SKIPJACK TUNA

No stock assessment was carried out it 2003. However, this report includes the latest data available on the catches and the fisheries.

SKJ-1. Biology

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

Skipjack is a species that is often associated with floating objects, both natural objects or diverse FADs that have been used extensively since the early 1990s by purse seiners and baitboats (during the 1991 to 2002 period, about 55% of skipjack were caught with FADs). The concept of viscosity (low interchange between areas) could be appropriate for the skipjack stocks. A viscose stock can have the following characteristics:

- A local decline of a segment of the stock;
- Over-fishing of that component may have little, if any, repercussion on the abundance of the stock in other areas;
- There is a minor proportion of fish that make large-scale migrations.

The introduction of fish aggregating devices could have changed the behavior of the schools and the migrations of this species. Prior to the use of these devices, free schools of mixed species were much more common than now. Due to the large number of FADs, and the tendency of skipjack to associate with floating objects, substantial behavioral changes, including movement patterns, may occur. These behavioral changes may imply changes in the biological parameters of this species as a result of the changes in the availability of food, predation and fishing mortality. Skipjack caught with FADs are usually found associated with other species. The typical catch with floating objects is comprised of about 63% skipjack, 20% small yellowfin, 17% juvenile bigeye and other small tunas.

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

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

However, taking into account the large distances, various environmental restrictions, the existence of a spawning area in the East Atlantic as well as in the northern zone of the Brazilian fishery, and the lack of additional evidence (e.g. transatlantic migrations in the tagging data), the hypothesis of separate East and West Atlantic stock has been maintained as the most plausible alternative.

In addition, taking into account the biological characteristics of this species and the different areas where fishing takes place, smaller management units could be considered.

SKJ-2. Description of the fisheries

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

considered to be somewhat under-estimated, due to the discards of small-sized tunas, which include skipjack, by the purse seine fleets fishing under objects and by some baitboat fleets in the equatorial area of the East Atlantic.

Total Atlantic catches in 2002 amounted to 114,432 t (**SKJ-Table 1, SKJ-Figure 2**).

As concerns the East Atlantic, the skipjack fishery underwent important changes in 1991, with the introduction of artificial floating objects (FADs), with the subsequent expansion of the purse seine fishery towards the west (30°W), in latitudes close to the Equator, following the drift of the objects, the introduction of FADs in the Ghanaian purse seine and baitboat fisheries (1992), and the development of a fishing technique (whose main target species is bigeye) in which the baitboat is used as the aggregating device, fixing the school (comprised of bigeye, yellowfin and skipjack) during the entire fishing season in waters off Senegal, Mauritania and the Canary Islands (1992). These changes have resulted in an increase in the exploitable biomass of the skipjack stock (due to the expansion of the fishing area) and in its catchability. At present, the most important fisheries are the purse seine fisheries, mainly those of EC-Spain, EC-France, the NEI fleet (Vanuatu, Malta, Morocco, Belize, Guinea, and St. Vincent), Ghana and Netherlands Antilles, followed by the baitboat fisheries (Ghana, EC-Spain and EC-France). In 2002, catches in the East Atlantic reached 92,941 t, which represents a 21% decrease as compared to 2001 (117,591 t) **(SKJ-Figure 3).**

The most important fishery in the West Atlantic is the Brazilian baitboat fishery. As concerns the purse seine fisheries, whose catches are considerably less than those taken by baitboat, catches were only made by the Venezuelan and Brazilian fleets. Catches in the West Atlantic in 2002 amounted to 21,374 t, a 32% decrease with respect to 2001 (31,362 t) **(SKJ-Figure 4).**

There is no information available on the effective fishing effort exerted on skipjack tuna in the east, particularly after the introduction of fishing with artificial floating objects. Considering vessel carrying capacity as a measure of nominal effort, in the East Atlantic Ocean, the total carrying capacity of the baitboat fleets remained relatively stable between 1972 and 2001. On the other hand, purse seine carrying capacity showed an increasing trend until 1983, and a spectacular decline in 1984, due to the shift of a part of the fleet to the Indian Ocean. Since 1991, this carrying capacity of the purse seine fleet has declined gradually until 1997, and since then remained stable at about 32,000 t capacity, increasing in 2001 to 36,000 t, and it 2002 it has decreased 17%, to 30,000 t **(SKJ-Figure 5).**

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

Fishing effort of Brazilian baitboats decreased by half between 1985 and 1996, whereas an increase in effort was observed between 1997 and 1998. In 1999, 2000 and 2001 it remained at the level of 1998. The Committee was unable to evaluate the catch and effort pattern for some skipjack fisheries in 2002, although this is planned for the next assessment.

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

SKJ-3. State of the stocks

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

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

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

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

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

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

Eastern stock

Standardized catch rates are not available. However, an analysis was made of the different indices of the purse seine fishery that could provide valuable information on the state of the stock. The indices analyzed were: catches, catch per day fishing, number of sets per fishing day, positive sets, catch by 1^{o}x1^{o} squares exploited **(SKJ-Figure 7)**, average weight, Grainger and Garcia index (annual growth rate of catches with respect to the average catch of the previous three years). For the majority of the indices, the trends were divergent, depending on the area, which may indicate the viscosity of the skipjack stock, with limited mixing rates between areas. In general, the development of the catches (with stable nominal effort), the average weights, and the catch per positive set showed a possible scenario of local over-fishing in the Equatorial area of maximum fishing concentration on FADs, even though the last index could be biased due to an increase in purse seine catchability. Other indices, such as the number of sets per fishing day or the catch by area fished, could also show similar biases. In other areas, particularly in the Senegalese area where there is a predominance of fishing on free schools, the trends of the indices showed a completely distinct stock situation (they remain stable).

On an overall level, the Grainger and García index **(SKJ-Figure 8a)**, a gross indicator of stock status for situations such as that of the skipjack fisheries in the East Atlantic with increasing effort, showed negative values since the early 1990s. This could be interpreted as a warning sign that catches are too high. However, the Group expressed doubts about the validity of applying this conclusion to the entire eastern stock. The Committee was informed that since the Madeira Working Group carried out the stock assessment of skipjack, a scientific paper has been published on this topic. Because this method presupposes that fishing effort increased during this period, the changes over time in the relative rate of catch increase (RRCI) was broken down into two historical periods (data before 1984 in one hand and data from 1990 to 1999 on the other hand; **SKJ-Figure 8b**). In contrast with the previous analysis, the years from 1985 to 1989 were not used in the analysis because fishing effort decreased due to the partial shift of European Community purse seiners to the Indian Ocean in the second half of the 1980s. Notice that the last period began in the early 1990s with the massive use of FADs fishing operations.

A new, non-equilibrium production model was presented based on a generalized model. A run of the fit of this model showed a possible decline in the yield of the stock following the introduction of FADs. However, the MSY estimates are considered too preliminary to be utilized as a measure of the state of the stock. In the same way, the model estimated a possible generalized increase in the efficiency of the fishing gears of about 5% annually for this species.

Because of the difficulties to assign ages to the skipjack catches, the estimates of the values of natural mortality by age and obtaining indices of abundance (especially for the eastern stock), no catch-by-age matrices were developed and, consequently, no analytical assessment methods (VPA type) were applied.

Western stock

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

SKJ-4. Outlook

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

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

SKJ-5. Effects of current regulations

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

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

SKJ-6. Management recommendations

No management recommendations were proposed.

ATLANTIC SKIPJACK TUNA SUMMARY

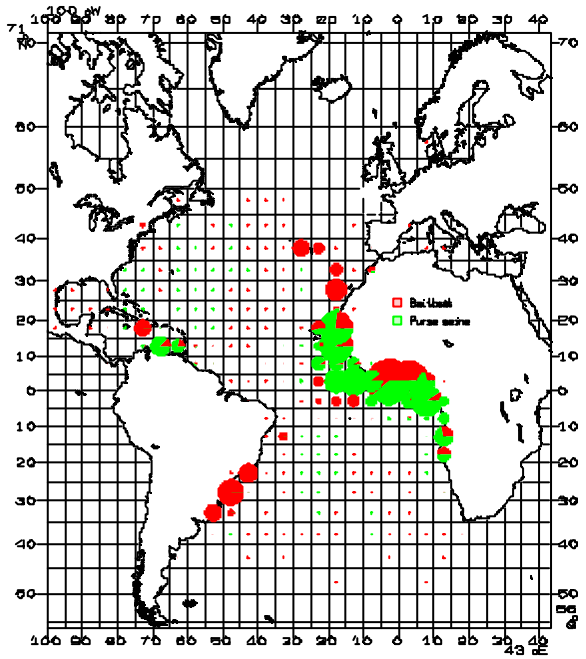
	East Atlantic	**West Atlantic**
Maximum Sustainable Yield	Not estimated	Not estimated
Current (2002) Yield	92,941 t	21,374 t
Current Replacement Yield	Not estimated	Not estimated
Relative Biomass (B_{2002}/B_{MSY})	Not estimated	Not estimated
Relative Fishing Mortality: F_{2002}/F_{MSY}	Not estimated	Not estimated
Management measures in effect	None	None

SKJ-Table 1. Estimated catches of Atlantic skipjack tuna, t, by major area, gear and flag, 1978-2002.

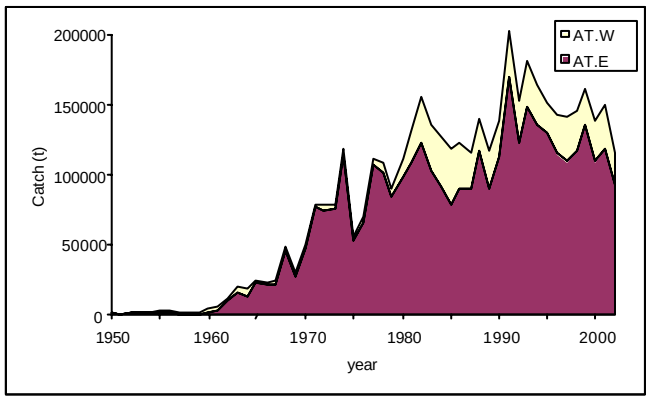
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	TOTAL	*108115*	*89696*	*111358*	*131061*	*154909*	*135038*	*126826*	*118713*	*122172*	*114566*	*139962*	*116120*	*138659*	*203175*	*152815*	*180929*	*164435*	*151249*	*142118*	*141091*	*145875*	*161471*	*138758*	*148953*	*114432*
	AT.E	*100885*	*83119*	*98774*	*107941*	*122368*	*102669*	*91230*	*78441*	*90021*	*90402*	*116226*	*89738*	*112549*	*169771*	*122660*	*147708*	*134486*	*129390*	*114557*	*109373*	*116796*	*134165*	*109463*	*117591*	*92941*
	AT.W	*7176*	*6565*	*12573*	*23073*	*32520*	*31839*	*35596*	*40272*	*32151*	*24164*	*23736*	*26382*	*26110*	*33404*	*30155*	*33221*	*29949*	*21859*	*27561*	*31718*	*29079*	*27306*	*29295*	*31362*	*21374*
	UNCL	*54*	*12*	*11*	*47*	*21*	*530*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*118*
AT.E	Bait boat	41365	44645	38134	38918	44488	34873	28085	29868	30009	38803	48015	41000	36569	41612	35660	31656	37817	33691	32047	38624	42012	41403	30548	44437	24074
	Longline	0	0	0	22	2	62	22	6	19	6	4	9	0	5	3	2	10	3	7	47	85	42	48	53	26
	Other Surf.	840	1508	3906	2528	3054	2242	1328	219	1640	1040	1332	1469	1178	1890	1449	1028	311	308	323	138	930	288	1162	403	201
	Purse seine	58680	36966	56734	66473	74824	65492	61795	48348	58353	50553	66875	47260	74802	126264	85548	115022	96348	95388	82180	70564	73768	92431	77705	72698	68634
	Trawl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
AT.W	Bait boat	2812	4365	9351	17999	22402	20057	16771	28490	25278	18675	21057	23292	22246	23972	20852	19697	22645	17744	23741	26797	24724	23881	25754	25142	18737
	Longline	2	1	1	9	23	8	25	24	8	6	9	25	23	33	29	20	16	33	19	18	14	9	12	17	62
	Other Surf.	901	710	149	410	390	653	842	567	1657	518	355	600	600	871	764	710	1577	2023	452	556	514	480	465	906	459
	Purse seine	3461	1489	3072	4654	9705	11121	17958	11191	5208	4964	2315	2466	3241	8527	8509	12794	5712	2059	3349	4347	3826	2936	3063	5297	2116
	Trawl	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
UNCL	Longline	54	12	11	47	21	530	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
	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	93
AT.E	ALGERIE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	43	89	77	0
	ANGOLA	3501	3628	3482	2532	2257	318	46	131	56	80	30	85	69	66	41	13	7	3	15	52	2	32	14	14	14
	BENIN	0	8	30	60	68	38	10	20	11	5	3	7	2	2	2	2	2	2	2	7	3	2	2	0	
	BULGARIA	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAP-VERT	1284	998	2094	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	1314	470	591	684	962	789	794	284
	CAYMAN ILS	0	0	289	1800	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
	CHINESE TAIPEI	0	0	0	0	2	2	7	4	0	0	1	3	0	5	3	2	10	3	5	47	73	39	41	24	16
	CONGO	0	0	1250	200	0	5	10	8	8	8	8	11	12	9	9	10	7	7	6	6	6	6	6	0	
	CUBA	200	100	196	198	189	135	310	246	569	81	206	331	86	0	0	7	0	0	0	0	0	0	0	0	0
	EC-ESPANA	25066	18748	26384	35458	38016	28934	46659	35100	41992	33076	47643	35300	47834	79908	53319	63660	50538	51594	38538	38513	36008	44520	37226	30954	25441
	EC-FRANCE	25903	18602	25767	26926	31132	29727	12994	13645	13045	17114	16504	15211	17099	33271	21890	33735	32779	25188	23107	17023	18382	20344	18183	16593	16637
	EC-GERMANY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
	EC-PORTUGAL	4584	3074	1954	2825	5530	1113	3974	2409	5446	8420	14257	7725	3987	8059	7477	5651	7528	4996	8297	4399	4544	1810	1302	2167	2958
	ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	102	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	1	11	51	26	0	59	76	21	101	0
	GHANA	2866	4299	5812	7858	18272	24376	20697	19082	22268	24347	26597	22751	24251	25052	18967	20225	21258	18607	19602	27667	34150	43460	29950	43340	31887
	JAPAN	14614	14686	12304	12935	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0	0	0	0	0	0	1	0
	KOREA	8132	12017	6718	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	LATVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	92	0	0	0	0	0	0	0	0	0	0	0
	LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	221	0	0	0	0	0	0	0	0	0	0	
	MAROC	1891	1863	5001	3017	3956	2532	885	1015	1222	1041	428	295	1197	254	559	312	248	5024	684	4513	2486	858	1199	268	281
	NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	0	1	0	0	0	8	0
	NEI-1	0	0	0	0	1560	3383	927	590	540	791	2994	2263	10516	6054	6941	9482	6521	6146	10220	4901	6749	7701	7128	8121	8544
	NETH. ANTILLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7096	8444	8553	9932	10008	13370	5427
	NORWAY	0	0	0	0	0	0	0	0	0	581	738	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PANAMA	2980	1750	1735	144	2541	1611	0	0	0	0	0	0	0	8312	8719	13027	12978	14853	5855	1300	572	1308	1560	281	342
	RUMANIA	0	0	8	0	0	0	0	0	3	0	0	59	142	349	73	0	0	0	0	0	0	0	0	0	

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	1175	1110	540	1471	1450	381	1146	2086	1426	374	0	0
	SAO TOME & PRIN.	100	34	33	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0	0	7	0	0	0	0	0
	SENEGAL	0	0	0	0	0	0	0	0	0	0	0	47	134	652	260	95	59	18	163	455	1963	1631	1506	1271	1046
	SOUTH AFRICA	90	2	48	110	37	104	14	66	101	88	157	96	17	15	7	6	4	4	1	6	2	1	0	1	0
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	U.S.A	6797	2073	2608	2800	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.S.R	2856	1161	2991	1750	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK-S.HELENA	21	76	70	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115	86	294	298	13	64	205	63
	VENEZUELA	0	0	0	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AT.W	ARGENTINA	4	0	17	1	137	243	505	101	138	90	7	111	106	272	123	50	1	0	0	0	0	0	0	0	
	BARBADOS	0	0	0	78	72	39	48	36	33	21	3	9	11	14	5	6	6	6	5	5	10	3	3	0	0
	BRAZIL	635	2065	6071	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560	22528	26564	23789	23188	25164	24146	18338
	CANADA	86	0	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINESE TAIPEI	0	0	0	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2	10	7	2	1	0	1	3
	COLOMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2074	789	1583	0	0	0	0	0	0	
	CUBA	1800	2000	2255	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1017	1268	886	1000	1000	651	651	651	0	0
	DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	60	38	41	24	43	33	33	33	33	85	86	0	
	DOMINICAN REP.	64	87	59	71	80	106	68	204	600	62	63	117	110	156	135	143	257	146	146	0	0	0	0	0	
	EC-ESPANA	2031	1052	0	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0	0	0	0	1	1	0	0
	EC-FRANCE	0	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0
	GHANA	0	0	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GRENADA	1	4	8	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12	11	15	23	23	23	15	14
	JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	0	0	
	JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KOREA	0	0	0	0	0	0	17	20	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEXICO	0	0	1	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0	2	3	0	2	3	11	4
	NETHERLAND.ANT	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	45	40	35	30	30	30	30	30	0	0
	PANAMA	720	161	1026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ST.LUCIA	100	41	40	37	38	35	64	53	76	60	53	38	37	51	39	53	86	72	38	100	263	153	216	151	106
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	17	28	29	27	20	66	56	53	37	42	57	37	68	97	264
	TRINIDAD & TOB.	0	0	0	0	0	1	2	1	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	0	0
	U.S.A	1695	1029	981	2753	33	697	853	1814	1115	734	57	73	304	858	560	367	99	81	85	84	106	152	44	70	90
	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	0	0	1890	4900	12645	11711	11807	9082	4969	5750	4509	3723	3813	8146	7834	11172	6697	2387	3574	3834	4114	2981	3003	6293	2554
	VENEZUELA-FOR	0	0	0	0	0	1067	4719	1630	721	0	0	0	0	0	0	0	0	0	0	0	0	0	0	577	0
UNCL	CHINESE TAIPEI	12	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
	JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KOREA	42	2	4	47	21	530	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93

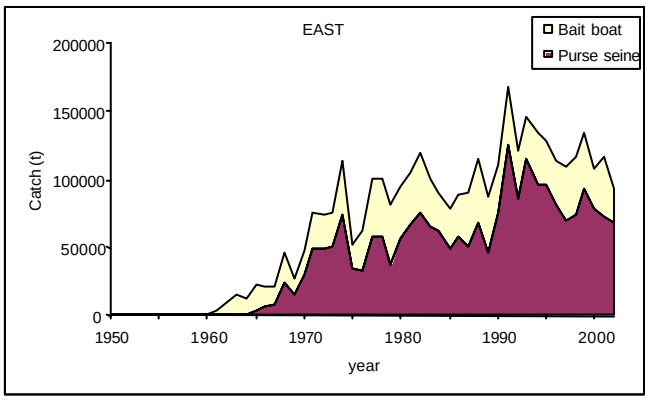
Blank cells for 2002 indicate that catches were not reported to ICCAT.



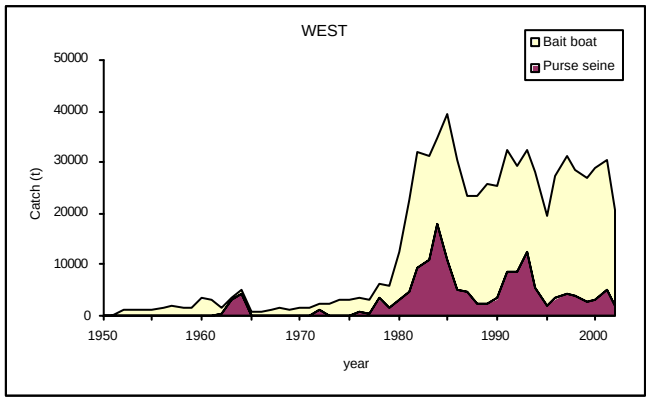
SKJ-Fig. 1. Distribution of reported skipjack surface catches (1950-2000) by 5x5 area and by gear (dark = baitboat; light = purse seine).



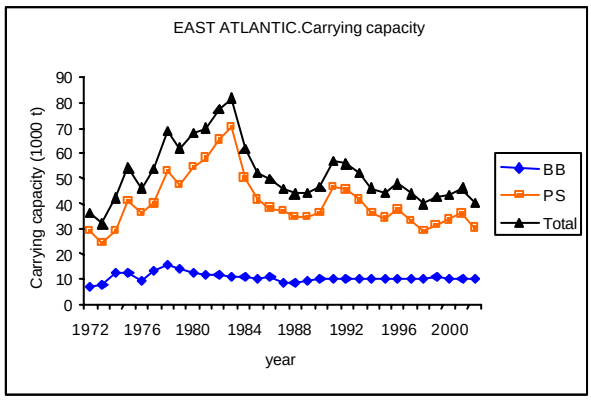
SKJ-Fig. 2. Total eastern and western Atlantic skipjack catch (t) (1950-2002).



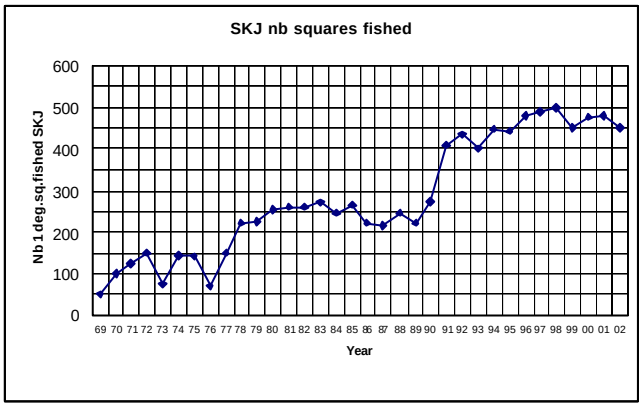
SKJ-Fig. 3. Reported catch (t) of skipjack in the eastern Atlantic, by major gear.



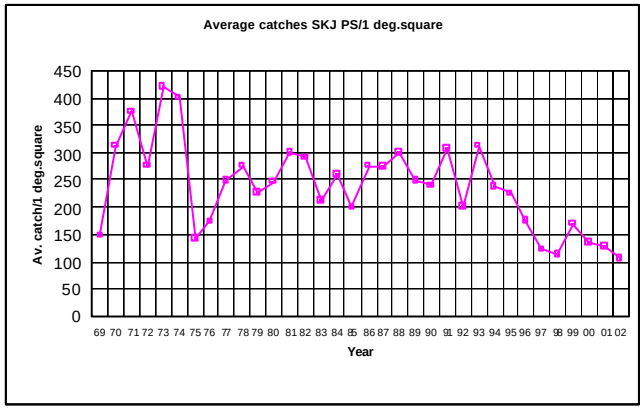
SKJ-Fig. 4. Reported catch (t) of skipjack in the western Atlantic, by major gear.



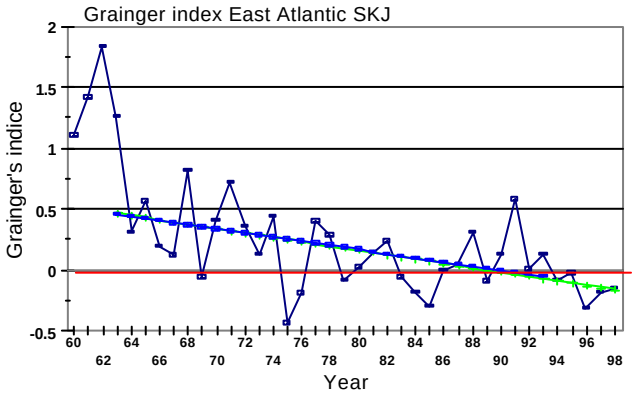
SKJ-Fig. 5. Carrying capacity (in t) of purse seiners and baitboats in the eastern Atlantic.



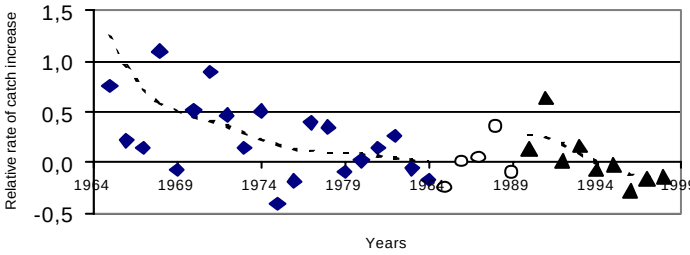
SKJ-Fig. 6 Number of 1x1 degree areas where skipjack catches were reported in the eastern Atlantic purse seine fisheries.



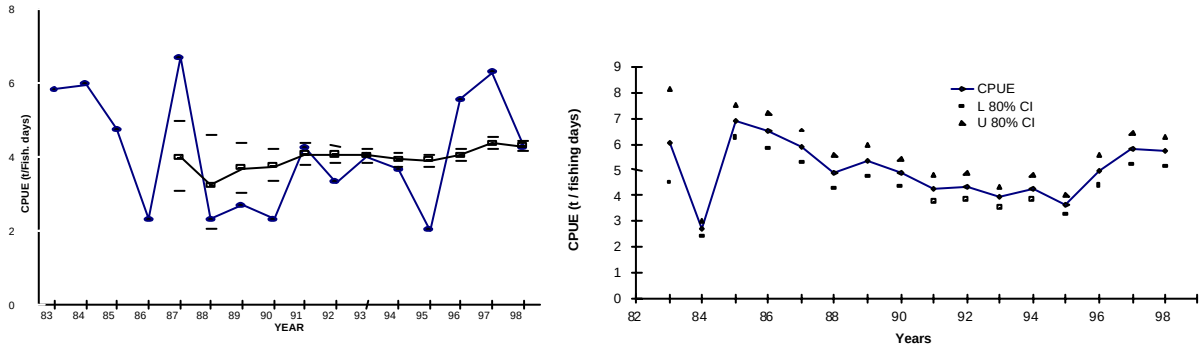
SKJ-Fig. 7. Average skipjack catch per 1x1 degree area (where catches were reported) by the eastern Atlantic purse seine fishery (1969-2002).



SKJ-Fig. 8a. Grainger and García index and trend line calculated for Atlantic skipjack.



SKJ-Fig. 8b. Changes over time in the relative rate of catch increase for eastern Atlantic skipjack for the main two historical periods of the fishery. Years that correspond to major changes in the fishery were not used to estimate the proxy of the maximum yield and are represented by empty circles.



SKJ-Fig. 9. Venezuelan purse seine (left) and Brazilian (right) CPUE estimated GLM delta-lognormal standardization. The dotted line on the left figure denotes observed values.

8.4 ALB – ALBACORE

ALB-1. Biology

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

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

ALB-2. Description of fisheries

North Atlantic

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

The total catch in the North Atlantic has shown a downward trend since the mid 1960s, largely due to a reduction of fishing effort by traditional surface and longline fisheries (**ALB-Table 1**; **ALB-Figure 2**). After stabilization in the 1990s, mainly due to the increased effort and catch by new surface fisheries since 1987 and a peak in 1999 at 34,840 t, catches have again decreased in the past two years. This last downward trend is attributable to both lower catches of the baitboat and troll fisheries (possibly related in some part to bad weather conditions and negative environmental impact on catchability) and to the disappearance of the driftnet fishery only partly replaced by an increase in the mid-water trawl fleet. Catches in 2002 were the lowest recorded in the time series (22,465 t).

South Atlantic

In the last five years, more than 90% of the total annual South Atlantic albacore landings were attributed to four fisheries, namely the surface baitboat fleets from South Africa and Namibia, and the longline fleets from Brazil and Chinese Taipei (**ALB-Table 1**; **ALB-Figure 2**). The surface fleets are entirely albacore directed and mainly catch juvenile fish (70-90 cm FL). These fisheries operate seasonally, from October to May, when albacore are available in coastal waters. The longline fleets contain vessels that target albacore and vessels that take albacore as a by-catch in swordfish- or bigeye-directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets. The Chinese Taipei fleet expends substantial effort in the South Atlantic and the albacore catch (both directed and by-catch) by this fleet is about 56% of the global catch of South Atlantic albacore. In 2000, South African baitboats recorded their lowest annual catch since 1983, due to the unavailability of albacore in near-shore waters. Brazilian longline albacore catches have declined by about 50% in 2002 compared with 2001 due to a reduction of longline freezer vessels. Other albacore by-catches of note are made by Spanish, South African and Nambian longliners, with catches increasing steadily in recent years.

Surface and longline catches remained relatively constant at around 7,500 t and 20,500 t respectively since 1995-1999 (**ALB-Table 1**; **ALB-Figure 2**). This is due, in part, to the implementation of management regulations by some countries in response to the 1994 ICCAT Resolution. However, annual albacore catches exceeded the South Atlantic catch limit in 2000, 2001 and 2002.

Mediterranean

The Mediterranean catches are highly uncertain. Estimated albacore catches in the Mediterranean, mainly by EC-Italy and EC-Greece, are still minor (less than 4,000 t) and do not show any significant trend over time (**ALB-Table 1** and **ALB-Figure 2**). Reported catches have fluctuated between 2,000 t and 4,000 t since 1984, reaching a maximum of 4,866 t in 2001. Although EC-Italy and EC-Greece are the countries with the largest catches in recent years, in 2002 EC-Italy did not report any catches. After the assessment, EC-Italy reported a catch of 4,032 t in the Mediterranean. The Fifth Meeting of the GFCM/ICCAT Ad Hoc Working Group on Stocks of Large Pelagic Fishes in the Mediterranean recommended that in order to better identify which countries are catching albacore and what fishing methods are being used, a questionnaire should be devised and completed by nations operating in the Mediterranean.

ALB-3. State of stocks

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

North Atlantic

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

The Committee noted that CPUE trends have varied since the last (2000) assessment, and in particular differed between those representative of the surface fleets (Spain Troll age 2 and Spain Troll age 3) and those of the longline fleets of Japan, Chinese Taipei and the United States (**ALB-Figure 3**). The Spanish age 2 troll series, while displaying an upward trend since the last assessment, none the less declines over the last 10 years. For the Spanish age 3 troll series the trend in the years since the last assessment is down, however, the trend for the remainder of the last decade is generally unchanged. For the longline fleets, the trend in CPUE indices is either upwards (Chinese Taipei and US) or unchanged (Japan) in the period since the last assessment. However, variability associated with all of these catch rate estimates prevented definitive conclusions about recent trends of albacore catch rates.

With respect to reported landings, the Committee noted that catches in the North Atlantic in the years since the last assessment, have declined by more than 12,300 t or almost one-third of their 1999 levels (**ALB-Table 1**). This is particularly true of catches taken by 'other' surface gears (including driftnets that have been banned), which fell by 7,259 t (95%) along with catches taken by baitboats and trolling boats that declined by 2,838 t (41%) and 2,142 t (24%), respectively.

Equilibrium yield analyses, carried out in 2000 and made on the basis of an estimated relationship between stock size and recruitment, indicate that current spawning stock biomass is about 30% below that associated with MSY (**ALB-Figure 4**). However, the Committee noted considerable uncertainties in these estimates of current biomass relative to the biomass associated with MSY (B_{MSY}), owing to the difficulty of estimating how recruitment might decline below historical levels of stock biomass. Thus, the Committee concluded that the northern stock is probably below B_{MSY}, but the possibility that it is above it should not be dismissed. However, equilibrium yield-per-recruit analyses made by the Committee in 2000 indicate that the northern stock is not being growth-over fished ($F < F_{max}$; **ALB-Figure 5**).

South Atlantic

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

Mediterranean

Due to the lack of proper data, an assessment of the Mediterranean stock has never been carried out by the ICCAT. According to the information available, the Mediterranean stock does not show any particular trend and the mixing rate with the Atlantic stock appears to be insignificant.

ALB-4. Outlook

North Atlantic

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

South Atlantic

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

ALB-5. Effects of current regulations

North Atlantic

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

South Atlantic

Since 1999, the Commission established TACs for this stock (in 2001-2003 the TAC has been set to 29,200 t). The Committee noted that reported catches have exceeded the TAC. However, the Committee is unable to assess whether or not this catch limit has had a direct effect on the stock.

Mediterranean

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

ALB-6. Management recommendations

North Atlantic

No VPA assessment of the North Atlantic albacore stock was possible in 2003 because of uncertainties associated with the catch-at-age. In 2000, the Committee recommended that in order to maintain a stable Spawning Stock Biomass in the near future the catch should not exceed 34,500 t (the 1999 catch level) in the period 2001-2002. The 2000 Committee further noted that should the Commission wish the Spawning Stock Biomass to begin increasing towards the level estimated to support MSY, then catches in 2001 and 2002 should not exceed 31,000 t. The 2003 Committee reiterates its previous advice and extends it until the next assessment.

South

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

Mediterranean

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

ATLANTIC AND MEDITERRANEAN ALBACORE SUMMARY

	North Atlantic[1]	**South Atlantic**[2]	**Mediterranean**
Current (2002) Yield	22,465 t[5]	31,582 t	1,573 t[6]
Maximum Sustainable Yield	32,600 t (32,400-33,100)	30,915 t (26,333-30,915)	Unknown
Replacement Yield (2000)	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	[Ref. 98-8]: Limit number of vessels to 1993-1995 average. [Ref. 00-06]: TAC.	[Ref. 98-9]: Limit catches to 29,200 t. [Ref. 00-07].	None

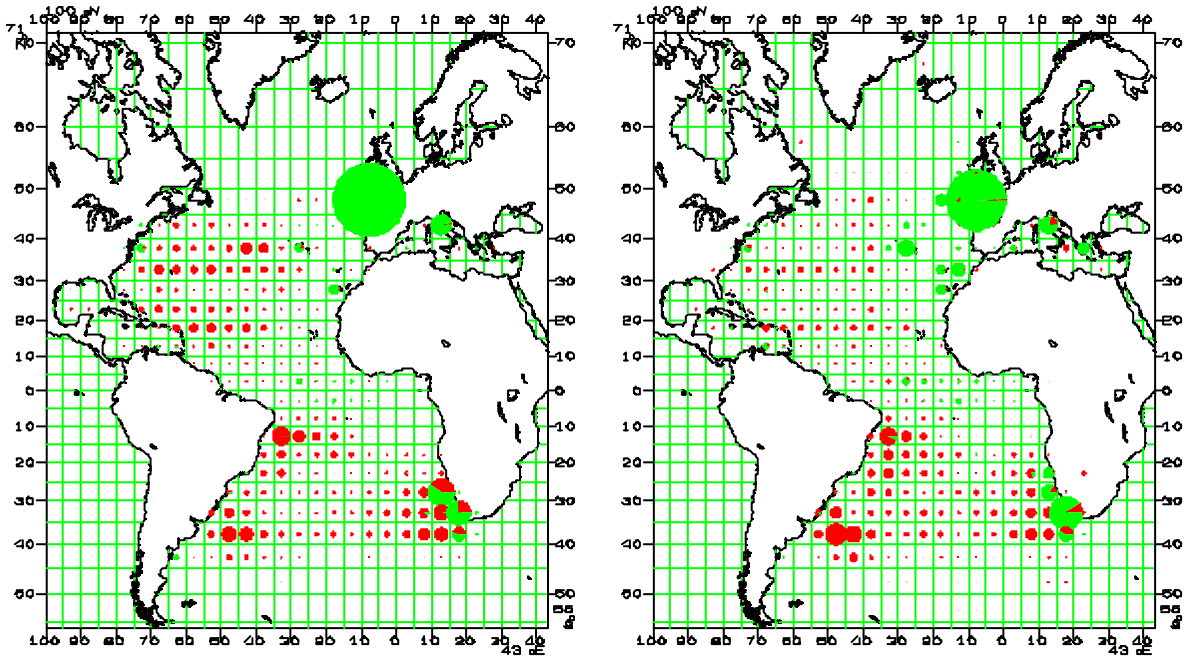
1 VPA results based on catch data (1975-1999). 80% confidence intervals from bootstrap.
2 ASPM results based on catch data (1956-2002). 80% confidence intervals from bootstrap.
3 F_{1999} = North Atlantic, Geometric Mean 1996-1998.
4 North "current" is from 2000 assessment (F_{1999}); South "current"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

ALB-Table 1. Estimated catches of Atlantic albacore by major area, gear and flag, 1978-2002.

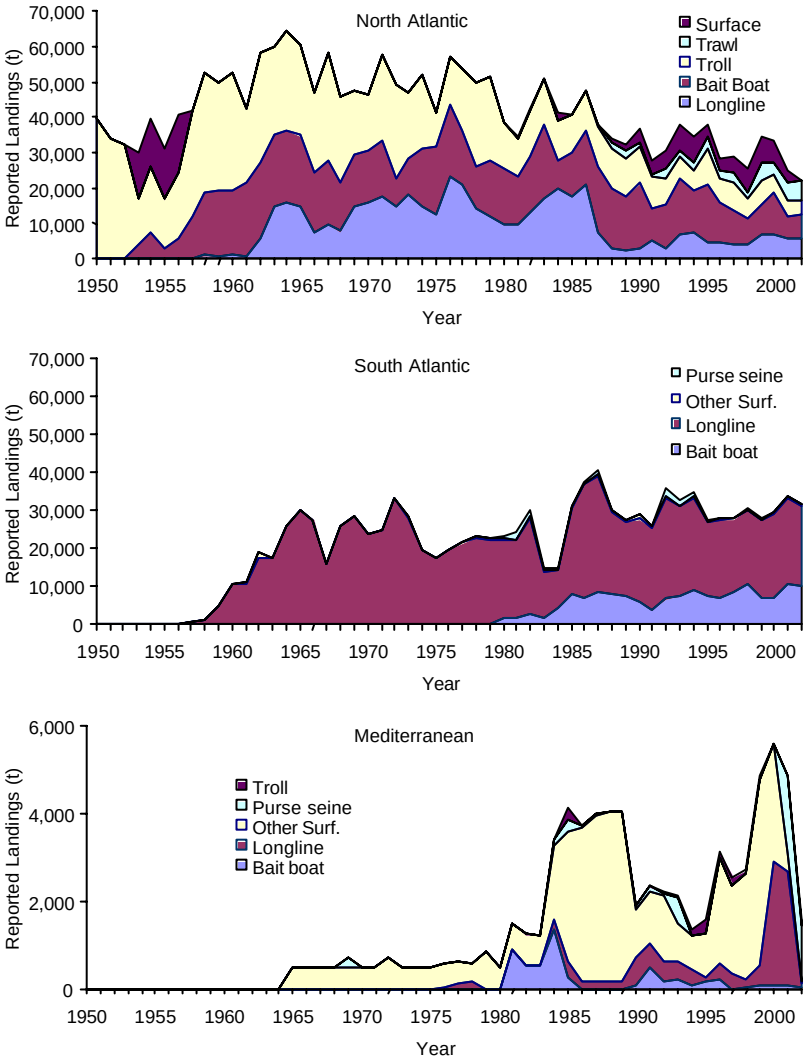
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
TOTAL		**73806**	**74826**	**62137**	**60071**	**73617**	**67643**	**59842**	**76052**	**88554**	**82738**	**68048**	**63342**	**67167**	**56342**	**69598**	**73078**	**71614**	**67512**	**67806**	**67775**	**67554**	**76165**	**78350**	**76622**	**64109**
	AT.N	50047	51365	38707	34531	42673	51490	41829	40826	47554	38115	33878	32070	36557	27938	30815	38063	35036	38295	28780	28988	25587	34840	33754	25186	22465
	AT.S	23169	22628	22930	24040	29672	14918	14599	31097	37288	40630	30107	27212	28714	25866	35918	32516	34733	27231	27898	27802	30487	27553	29259	33782	31582
	MEDI	590	833	500	1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	2130	1349	1587	3125	2541	2698	4851	5577	4866	1573
	UNCL	0	0	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	8003	8444	8782	8920	9760	12788	8489
AT.N	Bait boat	11958	15764	16170	13410	15857	21108	8305	12589	15202	18756	16752	15374	18625	8985	12449	15646	11967	16411	11337	9820	7562	8781	12113	6099	6639
	Longline	14157	12207	9451	9819	13206	16863	19709	17413	21232	7296	3013	2228	2683	5304	3103	7020	7196	4776	4620	4044	3875	6621	6606	5939	5983
	Other Surf.	1	62	10	523	694	367	2231	108	213	343	994	1662	3865	3999	5173	7279	7506	3555	3337	4378	6846	7646	6119	3089	387
	Purse seine	0	0	16	0	84	364	555	59	60	1	97	12	1	222	139	229	278	278	263	0	91	55	191	263	119
	Trawl	0	0	0	1	0	0	0	2	0	262	1693	2240	1033	469	2603	1779	2131	3049	2571	2877	1318	4892	3703	5485	5331
	Troll	23931	23332	13059	10778	12831	12788	11029	10654	10847	11457	11329	10554	10350	8959	7348	6109	5959	10226	6652	7870	5894	6845	5023	4312	4007
AT.S	Bait boat	43	53	1346	1721	2575	1794	4166	7909	6829	8181	7696	7393	5981	3454	6490	7379	8947	7091	6960	8110	10353	6709	6873	10360	9712
	Longline	22806	21843	20671	20426	25255	11941	9834	22672	29815	30964	21828	19407	21590	21859	26519	23650	24224	19718	20472	19447	19699	20588	22275	23020	21508
	Other Surf.	201	544	449	89	493	484	234	334	400	537	398	411	1139	137	393	39	483	10	209	127	0	73	58	377	323
	Purse seine	119	188	464	1804	1349	699	365	182	244	948	185	0	4	416	2516	1448	1079	412	257	118	435	183	53	25	39
MEDI	Bait boat	0	0	0	900	539	535	1331	243	0	0	0	0	83	499	171	231	81	163	205	0	33	96	88	77	29
	Longline	150	0	0	0	0	0	226	375	150	161	168	165	624	523	442	402	350	87	366	348	194	417	2800	2597	73
	Other Surf.	440	833	500	600	700	700	1716	2973	3552	3782	3879	3879	1098	1198	1533	879	766	1031	2435	1991	2426	4265	2689	407	50
	Purse seine	0	0	0	0	0	0	141	274	10	50	16	16	91	110	6	559	23	0	0	0	0	0	0	1786	1304
	Troll	0	0	0	0	33	0	0	264	0	0	0	0	0	48	50	59	129	306	119	202	45	73	0	0	117
UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	160	663	369	496	399	549	108	108	50	2819	5662	18
	Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7454	8336	8674	8870	6941	7126	8471
AT.N	BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	2	5
	BRAZL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
	CANADA	0	0	0	0	0	0	0	0	0	0	47	22	6	5	1	9	32	12	24	31	23	38	122	51	113
	CANADA-JPN	0	0	0	0	0	0	0	0	1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAP-VERT	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	8	20	0	0	21	16	57	196
	CHINESE TAIPEI	9324	6973	7090	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	6409	3977	3905	3330	3098	5785	5299	4399	4305
	CUBA	89	0	31	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0	0	0	0	0	0	0	1
	DOMINICAN REP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	323	121	73	95	0	
	EC-ESPANA	25404	29630	25202	20819	25478	29557	15685	20672	24387	28206	27557	25424	25792	17233	18176	18380	16998	20197	16323	17294	13285	15364	15965	9177	8952
	EC-FRANCE	10400	9320	3955	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304	4694	4618	3711	7189	6019	6344	4290
	EC-IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	40	60	451	1946	2534	918	874	1913	3750	4858	3464	2093	1100
	EC-PORTUGAL	85	149	79	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6470	1634	395	91	324	278	1175	1953
	EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	499	613	196	49	33	117	343	15	0	
	GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6	7	6	12	21	
	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	0
	JAPAN	531	1219	1036	1740	781	1156	576	844	470	494	723	764	737	691	466	485	505	386	466	414	446	425	680	1090	582
	KOREA	3048	2997	797	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0	2	1	0	0	0	0	0
	MEXICO	0	0	2	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PANAMA	768	425	193	177	494	357	2551	601	525	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
	SIERRA LEONE	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	91	
	ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	1	3	
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	300

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	TRINIDAD & TOBAGO	0	0	0	0	0	268	194	318	0	0	0	0	4	0	247	0	0	0	0	2	1	1	2	11	9
	U.S.A	1	0	22	472	699	347	2206	98	251	301	288	243	357	479	438	509	741	545	472	577	829	315	406	322	498
	U.S.S.R	0	59	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	2	
	VENEZUELA	397	593	300	331	137	823	580	408	168	26	119	41	95	319	205	246	282	279	315	49	107	91	1374	329	162
	VENEZUELA-FOR	0	0	0	0	0	0	496	59	4	0	18	0	0	0	0	0	0	0	0	0	0	0	0	20	0
AT.S	ARGENTINA	8	0	4	2	7	55	209	153	356	469	344	354	151	60	306	0	2	0	0	0	0	0	0	0	
	BELIZE.SH.OB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8	2	0	0
	BRAZIL	494	515	476	276	800	731	732	382	520	395	421	435	514	1113	2710	3613	1227	923	819	652	3418	1872	4411	6862	3228
	CAMBODIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	
	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	89	26	30
	CHINESE TAIPEI	20467	20340	18710	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	22573	18351	18956	18165	16106	17377	17221	15833	17222
	CUBA	11	0	27	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0	0	0	0	0	0	0	0
	EC-ESPANA	0	0	0	889	106	295	307	155	200	807	185	0	0	280	1943	783	831	457	184	256	193	1027	282	0	836
	EC-FRANCE	40	172	457	912	947	372	7	18	35	100	0	0	0	50	449	564	129	82	190	38	40	13	23	16	18
	EC-PORTUGAL	0	0	0	0	0	0	741	1357	1029	899	1153	557	732	81	184	483	1185	655	494	256	124	232	486	41	433
	HONDURAS-OB.SH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	7	1	6	0	0	0
	JAPAN	135	105	333	558	569	188	224	623	739	357	405	450	587	654	583	467	651	389	435	424	418	601	547	322	191
	KOREA	1413	878	803	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0	18	4	7	0	18	1	0
	MAROC	2	0	0	0	113	0	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	950	982	1199	1429	1162	2418	3419	2962
	NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	4	8	122	68	55	63	41	5	27	0	2	10	14
	NETHERLAND.ANT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	192	0	2	0	0
	PANAMA	354	125	167	129	210	0	0	0	280	924	0	0	0	240	129	168	213	12	22	0	3	14	0	0	
	PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	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	0
	SOUTH AFRICA	150	480	1850	2320	3180	2760	3540	6697	5930	7275	6570	6890	5280	3410	6360	6881	6931	5214	5634	6708	8412	5101	3610	7236	6507
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
	U.S.A	9	11	0	2	102	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	1	1	2	1
	U.S.S.R	74	0	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UK-S.HELENA	12	2	4	7	11	7	9	0	0	2	1	1	1	5	28	38	5	82	47	18	1	1	58	12	2
	URUGUAY	0	0	0	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49	75	56	110	90	90	0	111
MEDI	CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	12
	EC-ESPANA	0	0	0	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	475	404	380	126	284	152	200	208
	EC-FRANCE	0	0	0	0	0	0	141	250	20	60	31	31	121	140	11	64	23	3	0	5	5	0	0	0	0
	EC-GREECE	0	0	0	0	0	0	0	0	484	500	500	500	500	500	500	1	1	0	952	741	1152	2005	1786	1840	1352
	EC-ITALY	590	833	500	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1275	1107	1109	1769	1414	1414	2561	3630	2826	
	JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MALTA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	4	0	
	NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0	0	0	0	0	0	0	0
	YUGOSLAVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNCL	NEI-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	20	7	7	7	0	0	0
	NEI-71	0	0	0	0	0	0	0	0	0	0	0	0	0	160	281	145	130	110	160	43	43	43	0	0	0
	NETH.ANTILLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7454	8336	8674	8870	6941	7126	8471
	PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	382	210	363	289	369	58	58	0	0	0	
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2819	5662	18

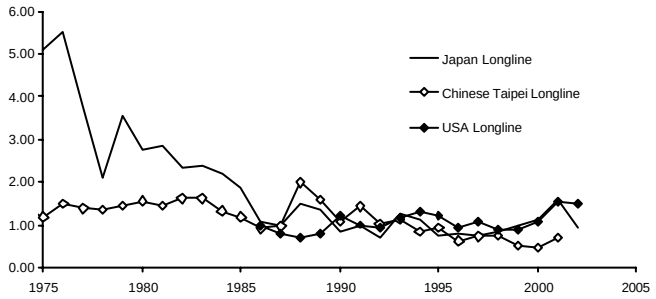
Shaded cells indicate figures not used in the assessment. Netherlands Antilles later confirmed that they had 0 catch in these years.
Blank cells for 2002 indicate that catches were not reported to ICCAT.
After the assessment, EC-Italy reported a catch of 4032 t in the Mediterranean.

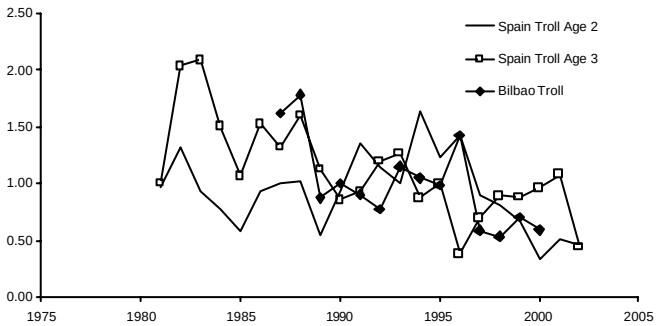


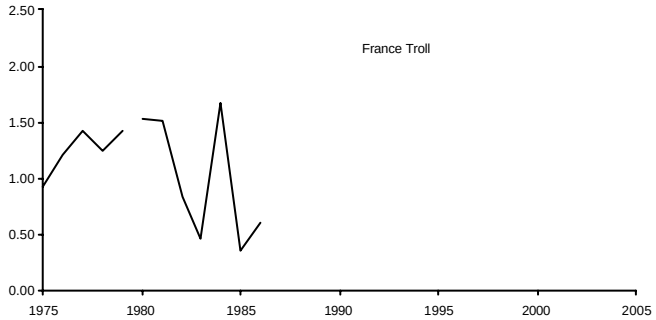
ALB-Fig. 1. Geographical distribution of annual albacore catches in 1980-1989 (left) and 1990-2000 (right). Dark symbols represent longline and lighter symbols represent surface gears.

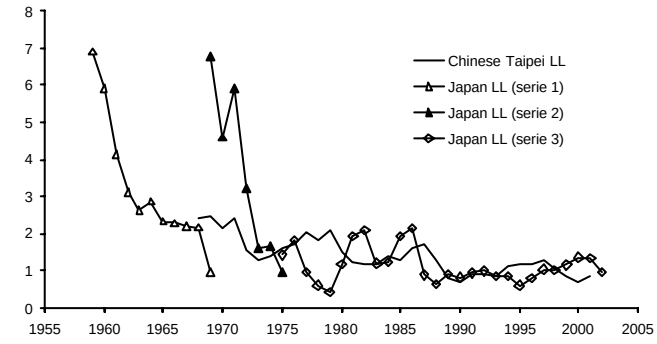


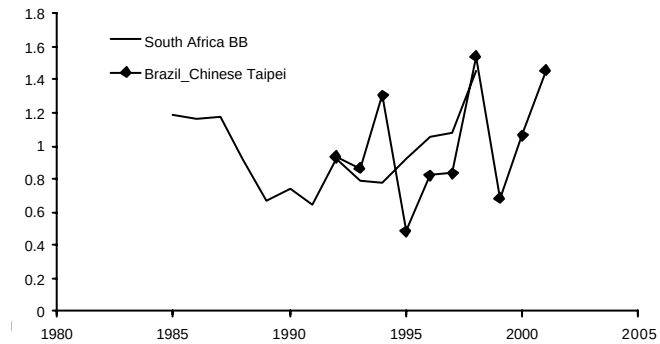
ALB-Fig. 2. Albacore landings (t) by stock and major gear types, 1950-2002. Data from the Mediterranean Sea are highly uncertain and provisional in recent years.



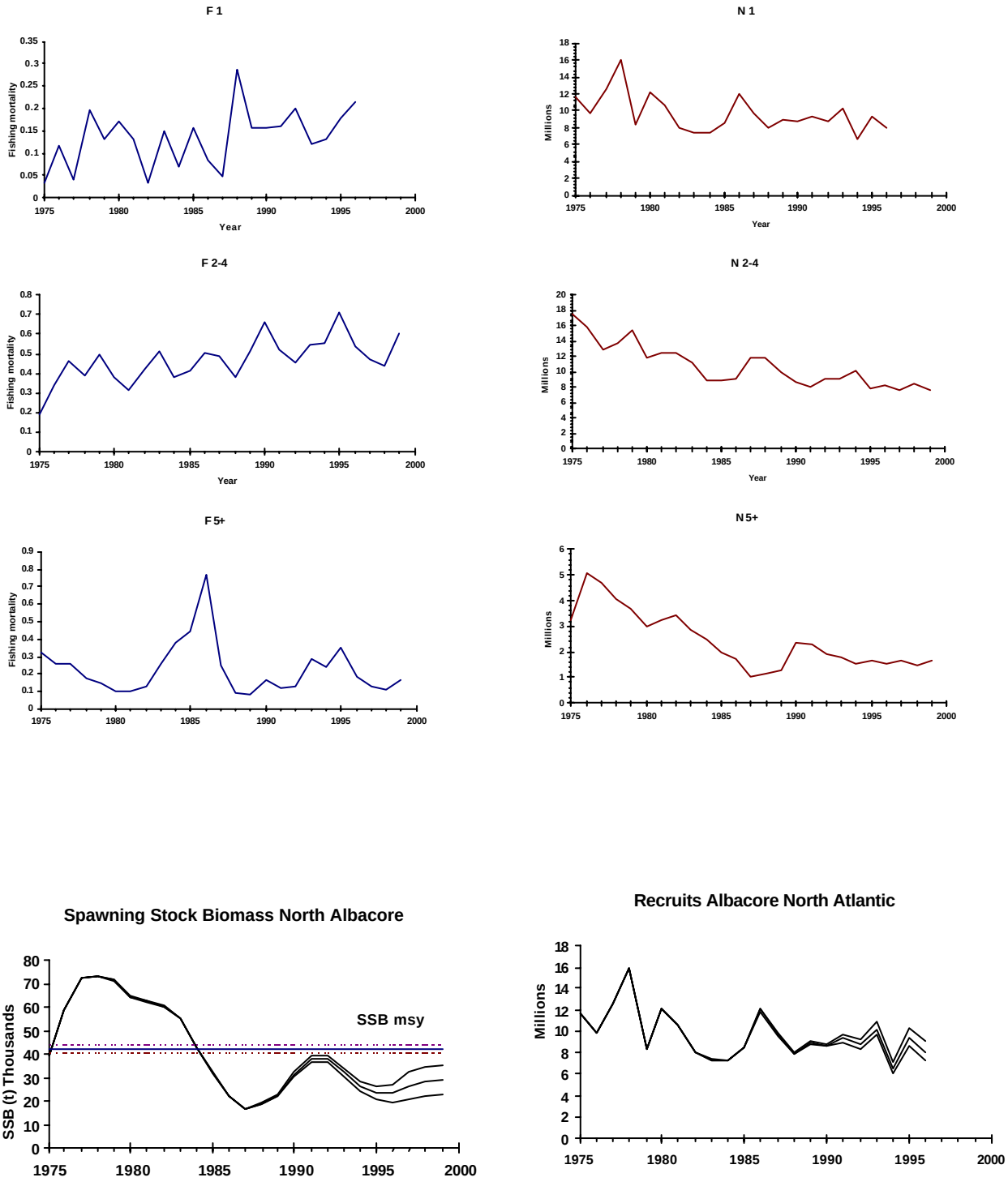




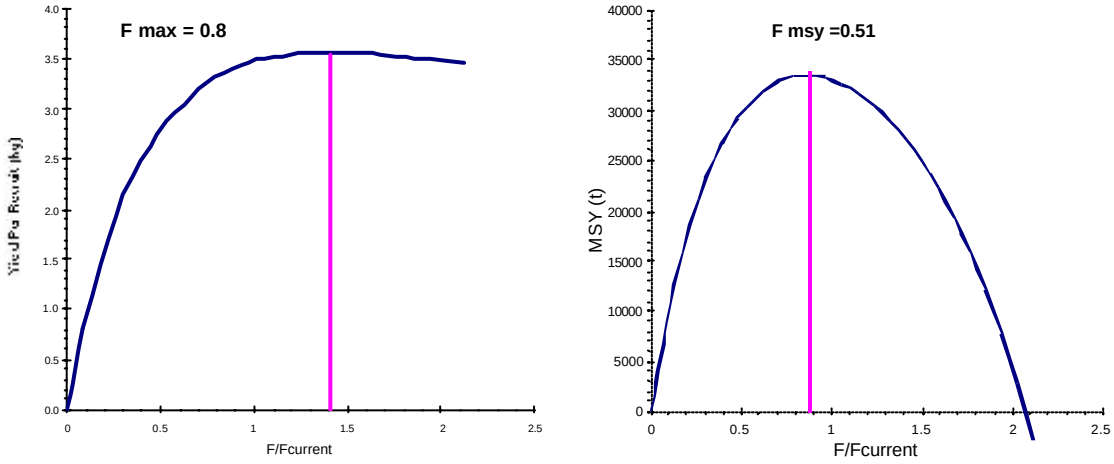




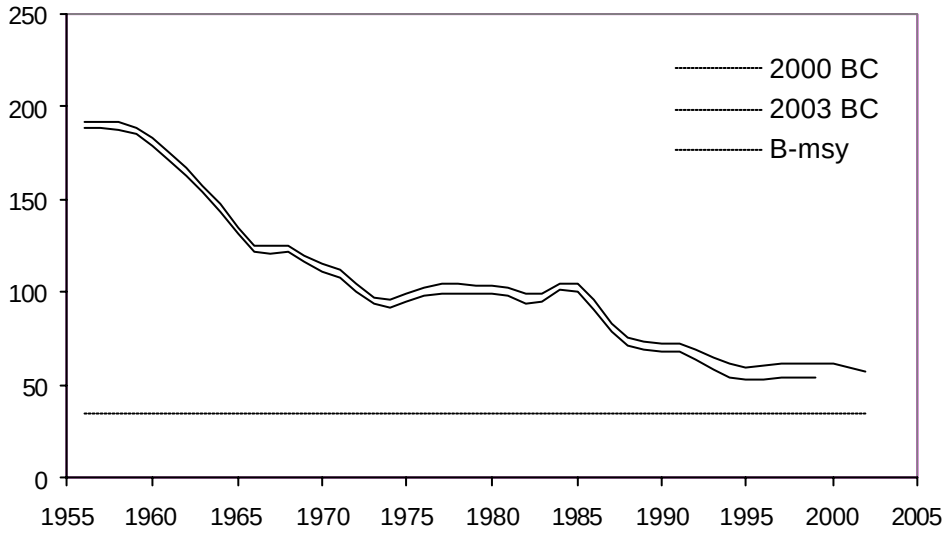
ALB-Fig. 3. CPUE series for North (top 3 panels) and South Atlantic (bottom 2 panels) albacore (scaled to the means).



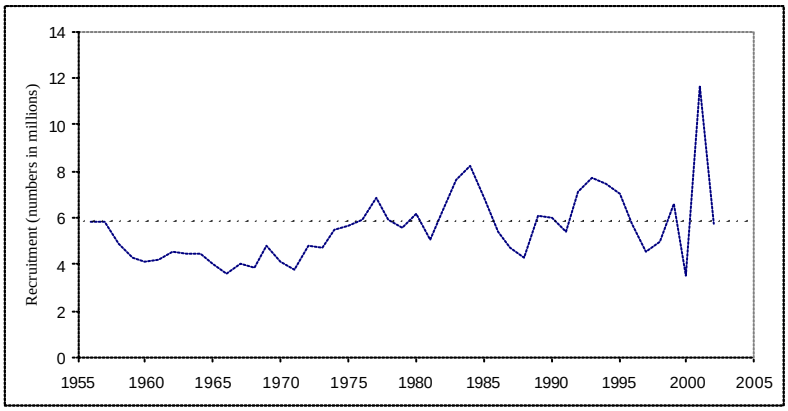
ALB-Fig. 4. North Atlantic albacore Base Case VPA estimates (2000 assessment) of fishing mortality rates (F) and numbers of fish by age-groups (top 6 panels), and spawning stock biomass and recruits with 80% confidence limits (bottom panels).



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



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



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

8.5 BFT – ATLANTIC BLUEFIN TUNA

In 1998, the Commission adopted a 20-year Rebuilding Program for the western Atlantic bluefin management area [Ref. 98-7] aimed at rebuilding to the stock size that will produce MSY (B_{MSY}) by 2018 with a 50% or greater probability. The Program states that the TAC for the west would only be adjusted from the 2,500 t level adopted for 2003-2004 if SCRS advises that (a) a catch of 2,700 t or more has a 50% or greater probability of rebuilding or (b) a catch of 2,300 t or less is necessary to have a 50% or greater probability of rebuilding. According to the Program, the MSY rebuilding target can be adjusted according to advice from SCRS. In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 t, effective beginning in 2003 [Ref. 02-07].

The Commission also recommended in 1998 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea should be reduced to 32,000 t in 1999 and 29,500 t in the year 2000. This recommendation entered into force in August 1999 with exceptions noted for Morocco and Libya. Subsequently, the Commission recommended in 2000 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea in 2001 for China, Croatia, EC, Japan, Korea, Tunisia, Morocco, Libya, non-Contracting Parties, Entities or Fishing Entities be limited to specific levels totaling 32,143 t [Ref. 00-9]. This recommendation entered into force in June 2001. In 2002, the Commission fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Ref. 02-08]. The Committee conducted assessments on East Atlantic and Mediterranean bluefin tuna in 2002 for the first time since 1998. An assessment was not completed in 2000 because of uncertainties in the basic catch data primarily in the Mediterranean. Uncertainties remain in 2002 and 2003 and are a central issue in the east plus Mediterranean assessment. In 2002, the Commission also recommended several actions to improve data collection of bluefin tuna put into cages for farming [Ref. 02-10]. Although this recommendation concerns all Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities whose flag vessels transfer bluefin tuna into cages and/or under whose jurisdiction are located the farms, only one country fulfilled this recommendation at the date of the SCRS meeting.

There has been an accumulation of evidence on bluefin tuna mixing in the last few years through the collection of tagging data and its examination through the modeling of mixing scenarios for evaluating their effect on management. These results were reviewed in 2001 by the Workshop on Bluefin Tuna Mixing. This research led to a long-term plan for modeling finer scale spatial mixing and to short-term strategies for assessment to assist the advice for management. The data and research were reviewed again in 2002. Progress was made on both fronts and is discussed later in this Executive Summary. The Commission, at its 2002 Meeting in Bilbao, called for a *Working Group to Develop Integrated and Coordinated Atlantic Bluefin Tuna Management Strategies* [Ref. 02-11] to meet in 2003. In anticipation of this meeting, the Committee developed a proposal for initiating a coordinated Bluefin Tuna Research Program, to address priority research and data needs for providing scientific advice to the Commission related to revised management procedures for bluefin, in line with procedures followed by other science-based regional fisheries management organizations.

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

No full stock assessments were conducted in 2003, and as such the sections “Status of the stock” and “Outlook” and “Management recommendations” were not changed.

BFT-1. Biology

Present fisheries for Atlantic bluefin tuna are distributed from the Gulf of Mexico to Newfoundland in the West Atlantic, from roughly the Canary Islands to outh of Iceland in the East Atlantic, and throughout the Mediterranean Sea. In 1982, the Commission established a line for separating the eastern and western Atlantic management units based on discontinuities in the distribution of catches at that time in the Atlantic and supported by limited biological knowledge. However, the overall distribution of the catch in the 1990s is much more continuous across the North Atlantic than was seen in previous decades. Tagging evidence indicates that movement of bluefin across the current east/west management boundary in the Atlantic does occur, that movements can be extensive (including transatlantic) and complex, that there are areas of concentration of electronically tagged fish (released in the west) in the central North Atlantic just east of the management boundary, and that fisheries for bluefin tuna have developed in this area in the last decade. At least some of these

fish have moved from west of the current boundary. Complementary studies, which might show east to west movement, are less advanced. The composition, and natal origin of these fish in the central North Atlantic area are not known. Nevertheless, it is clear that the current boundary does not depict our present understanding of the biological distribution and biological stock structure of Atlantic bluefin tuna. Note, however, that the current boundary is a *management* boundary and its effectiveness for management is a different issue.

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

BLUEFIN TUNA - WEST

BFTW-2. Description of the fisheries

One of the most noteworthy changes in the fisheries since 1998 was that a substantial amount of additional catch that was not in accordance with Commission's recommended allocation of catch, was recorded through the Bluefin Tuna Statistical Document system. The reported total catches (landings and discards exclusive of estimated unreported catch) of western Atlantic bluefin tuna in 2000, 2001, and 2002 are estimated as 2,665 t, 2,718 t and 3,215 t, respectively **(BFT-Table 1; BFT-Figure 2)**. The 2002 catches were the highest since 1981. The Japanese longline fishery catches in the West Atlantic increased somewhat in 2002 (575 t), but were below the 1998 value (691 t, which was the highest in the 1990s). The Canadian reported landings (exclusive of discards) for 2002 (604 t), increased from the 2001 level (524 t), and increased slightly above the 1998 level (595 t). The provisional estimates of Canadian dead discards in 2002 were higher than in 2001, but lower than in 2000. Reported catches of U.S. fisheries in 2001 and 2002 were 1,589 t and 1,875, respectively. The estimates of U.S. dead discards for 2002 were higher than the dead discards presented for 2001. In addition, there were 13 t reported by Brazil (Equatorial Guinea flagged vessels chartered by Brazil) for 1999, but no catch has been reported since then. Mexico reported 14 t in 1999, 29 t in 2000, 10 t in 2001, and 12 t in 2002, all higher than all other reported catches since the early 1980s. Notably, Cuba has reported 74 t in 2002, whereas they had no reported catches since 1978.

BFTW-3. State of the stock

The assessment results (**BFT-Figure 3**) are similar to those from previous assessments. They indicate that the spawning stock biomass (SSB) declined steadily from 1970 (the first year in the assessment time series) through the late 1980s, before leveling off at about 20% of the level in 1975 (which has been a reference year used in previous assessments). A steady decline in SSB since 1997 is estimated and leaves SSB in 2001 at 13% of the 1975 level. The assessment also indicates that the fishing mortality rate during 2001 on the spawning stock biomass (SSB) is the highest level in the series. Estimates of recruitment of age 1 fish have been generally lower since 1976. However, recruitment of age 1 fish in two recent years (1995 and 1998) is estimated to be comparable in size to some of the year-classes produced in the first half of the 1970s.

While the large decline in SSB since the early 1970s is clear from the assessment, the potential for rebuilding is less clear. Key issues are the reasons for relatively poor recruitment since 1976, and the outlook for recruitment in the future. One school of thought is that recruitment has been poor because the SSB has been low. If so, recruitment should improve to historical levels if SSB is rebuilt. Another school of thought is that the ecosystem changed such that it is less favorable for recruitment. If so, recruitment may not improve even if SSB increases.

Therefore, the Committee considered two recruitment scenarios as described below (BFTW-4. Outlook). For both scenarios, the assessment indicates that the fishing mortality on the western Atlantic bluefin resource exceeds F_{MSY} and the SSB is below B_{MSY} (thus over-fished according to the Convention's objective of maintaining stocks at the MSY-biomass level) (See Summary Table).

BFTW-4. Outlook

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

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

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

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

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

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

Probability of achieving target biomass in 2018

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

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

The Committee cautioned that these conclusions do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin (this factor is considered further in Section Responses to Commission in 2002 SCRS Report). Furthermore, the projected increases in stock size are strongly dependent on estimates of recent recruitment, which are a particularly uncertain part of the assessment. A sensitivity test in which the estimates of the below average1996 and the strong 1997 year-classes were excluded from the analysis gave somewhat less optimistic results in terms of the estimated probabilities of recovery by 2018. However, these projections still predicted increases in spawning biomass for both recruitment scenarios, except for extreme increases in catch.

BFTW-5. Effects of current regulations

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

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

In 2002, the Commission set the annual Total Allowable Catch, inclusive of dead discards, for the western Atlantic management area to 2,700 t, effective beginning in 2003 [Ref. 02-07]. No data are yet available to evaluate this management measure.

BFTW-6. Management recommendations

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

Projections based on the low recruitment scenario indicate that the TAC could be increased without violating the Rebuilding Program, assuming that relatively large recruitment estimates for some recent year-classes are realistic. The high levels of recruitment estimated for some recent year-classes are consistent with a higher biomass level as a rebuilding target. In previous assessment sessions, the spawning biomass level in 1975 was considered a useful rebuilding target. The 1975 biomass is more than twice the MSY spawning biomass level

associated with the low recruitment scenario. The projections indicate a 35-60% probability of rebuilding to the 1975 spawning biomass level for a catch of 2,500 t per year, depending on the recruitment scenario assumed. It seems likely that a recruitment scenario corresponding to a SSB_{MSY} equal to the level in 1975 would indicate a probability of rebuilding by 2018 for a catch of 2,500 t per year within the range of 35-60%.

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

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

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

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

Current (2002) Catch (discards and estimates of unreported catches included)	3,215t	
Short-term Sustainable Yield	Probably >3,000 t	
Maximum Sustainable Yield (MSY)	3,500 (3,300-3,700)[1]	7,200 (5,900-9,500)[2]
Relative Spawning Stock Biomass		
B_{2001}/B_{1975}	0.13 (0.07-0.20)[1]	0.13 (0.07-0.20)[2]
B_{2001}/B_{MSY}	0.31 (0.20-0.47)[1]	0.06 (0.03-0.10)[2]
Relative Fishing Mortality		
F_{2001}/F_{MSY}	2.35 (1.72-3.24)[1]	4.64 (3.63-6.00)[2]
$F_{2001}/F_{0.1}$	4.87	
F_{2001}/F_{max}	2.35	
Management Measures:	- No landing of fish <6.4 kg, with a 15% tolerance, in number [Ref. 74-1, 98-7] - Limit catches <115 cm (30 kg) to no more than 8% by weight [Ref. 91-1, 98-7] - TAC of 2,500 t from 1999 to 2018 including dead discards subject to revisions consistent with the Rebuilding Program [Ref. 98-7].	

[1] Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "low recruitment" scenario at high spawning levels.

[2] Median and approximate 80% confidence interval from bootstrapping from the 2002 assessment; assumes a "high recruitment" scenario at high spawning levels.

BLUEFIN TUNA - EAST

BFTE-2. Description of the fisheries

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

In 2002, the stock assessment did not include 2001 data as they were incomplete. In 2001, landings for the East Atlantic and the Mediterranean amounted to 34,562 t, which is less than 1998 (39,097 t) and slightly more than or similar to 1999 and 2000 (32,454 t and 33,752 t, respectively). In 2002, the reported catch at the time of the meeting reached 30,343 t, but several important fishing countries had not reported Task I. If these missing catches were approximately at their levels of 2001, then the total catch in 2002 would be around 35,000 t, or slightly more than 2001 and 2000 catches. The reported catch since 1999 is about 60% of the peak catch of 50,762 t in 1996, but it is probably under-estimated because of increasing uncertainty about catch statistics. The Committee already raised this point in 2002.

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

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

BFTE-3. State of the stock

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

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

assessment was 47%. This difference is due primarily to the new and updated CPUE indices used in the 2002 assessment, as well as recent increased recruitment (1995-1996; **BFT-Figure 6**).

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

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

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

BFTE-4 Outlook

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

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

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

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

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

BFTE-5. Effect of current regulations

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

The Commission recommended in 1998 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea should be reduced to 32,000 t in 1999 and 29,500 t in the year 2000. This recommendation entered into force in August 1999 with exceptions noted for Morocco and Libya. Catches were 32,454 t in 1999 and 33,754 t in 2000 (including SCRS estimates of unreported catches from the Bluefin Statistical Document Program (**BFT-Table 1**).

The Commission recommended in 2000 that bluefin tuna catches in the East Atlantic Ocean and Mediterranean Sea should be reduced to 32,143 t in 2001 [Recommendation 00-9]. This recommendation entered into force in June 2001. Reported landings for 2001 were not complete, as of the meeting of the Bluefin Tuna Working Group.

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

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

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

In 1999 the prohibition of purse seine fishing in the Mediterranean (except for the Adriatic) was amended to include the period from 16 July through 15 August. Additionally, purse seining in the Adriatic was prohibited for the month of May. Both prohibitions were designed to protect juveniles. The Committee has not yet been able to evaluate the effect of these new measures. However, reservations on the effects of this system were expressed. It seems, however, that the previous closure (for the month of mid-July through mid-August in the Mediterranean) was being adhered to. In 1997 the Commission prohibited the use of airplanes or helicopters supporting fishing operations in the Mediterranean in the month of June. It is unclear whether this measure is or could be enforced.

High catch of small individuals still occurs and the Committee recommends that every effort be made so that the current measures on the size limit of 6.4 kg are adhered to. Reduction of fishing on juveniles could contribute substantially to increases in both biomass and yield (Section BFTE-4 Outlook). The Committee reiterated that effective measures be taken to implement Recommendation [Ref. 98-4], avoiding catches of age 0 and 1 fish (<3.2 kg).

In 2002, the Commission recommended new measures. One new measure fixed the Total Allowable Catch for the East Atlantic and Mediterranean bluefin tuna at 32,000 t for the years 2003, 2004, 2005 and 2006 [Ref. 02-08]. Also, the Commission modified the minimum size tolerance from 3.2 kg to 4.8 kg for the Mediterranean [Ref. 02-08]. No data are yet available to evaluate these management measures.

BFTE-6. Management recommendations

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

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

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

The Committee noted these same concerns in 2000 and determined that, given these issues, an assessment was not warranted at that time. While an assessment was conducted in 2002 and reviewed in 2003, the Committee does not believe that these data issues have been substantially resolved.
The Committee is concerned about the status of East Atlantic (including Mediterranean) bluefin tuna resources in the light of assessment results; the historically high reported catches made in 1994-1997 (in excess of 46,000 t 1994-97; and in excess of 50,000 t in 1996), and possible under-reporting since 1998. Analyses suggest that at current levels of recruitment and the present level of large- and small-fish fisheries, catch levels of 26,000 t or more are not sustainable over the long-term (see Section BFTE-4 Outlook). Because of the lack of confidence in the input data and in the assessment results, the Committee is not in a position to give or suggest any strong management recommendations for the short or medium term. The Committee can only offer advice about long-term consequences of maintaining current catches. The Committee thinks that long-term sustainable yield is probably lower than current catches because of high fishing mortality rates.

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

EAST ATLANTIC AND MEDITERRANEAN BLUEFIN TUNA SUMMARY[1]	
Current (2001) Yield [2,3]	34,562 t
2001 Replacement Yield	Not estimated
Maximum Sustainable Yield	Not estimated
Relative biomass SSB_{2000}/SSB_{1970}	0.80
Relative numbers $N_{8+,2000}/N_{8+,1970}$	0.70
Relative fishing mortality F_{2000}/F_{max}	2.4
Management Measures:	– No landing of fish <6.4 kg, with a 15% tolerance in # of individuals [Ref. 74 1] – Fishing mortality not to exceed circa 1975 level [Ref. 74-1] – No longlining in Med. in June- July by vessels >24m [Ref. 93 7] – No purse seining in the Adriatic in May [Ref. 98-6] – No purse seining 16 July-15 August in the Mediterranean Sea, except in the Adriatic [Ref. 96-2] – No use of spotter helicopter or plane in Med., in June [Ref. 96-2] – No landing, retaining aboard or selling of fish <3.2 kg [Ref. 98-4]

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

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

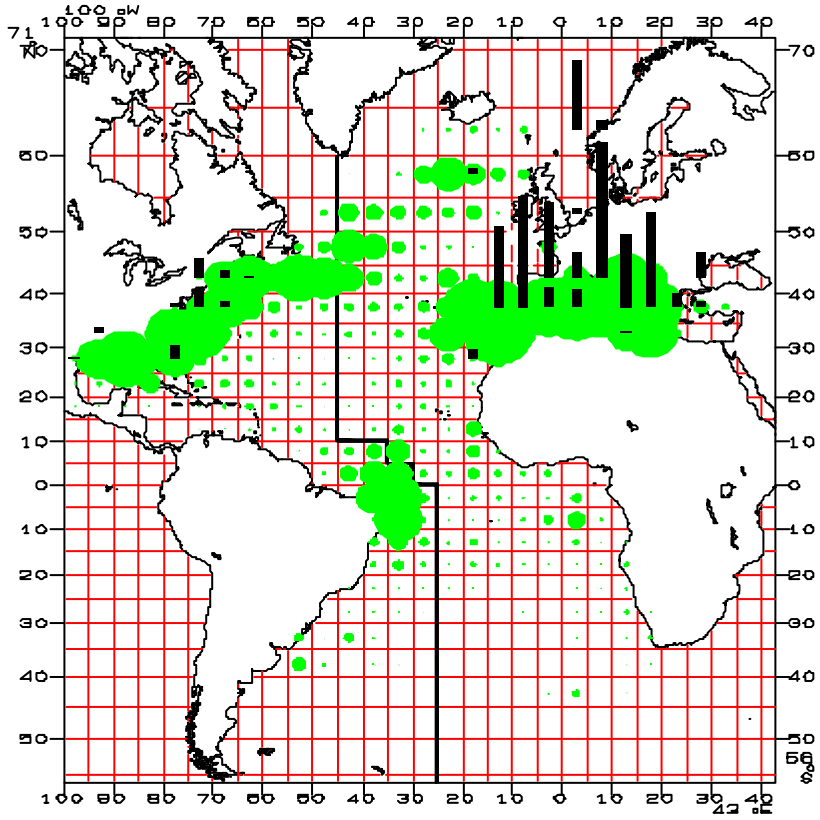
[3] 2002 catches are not reported in this table because reports are incomplete.

BFT-Table 1. Estimated catches (landings and discards, t) of Atlantic bluefin tuna, by major area, gear and flag, 1978-2002.

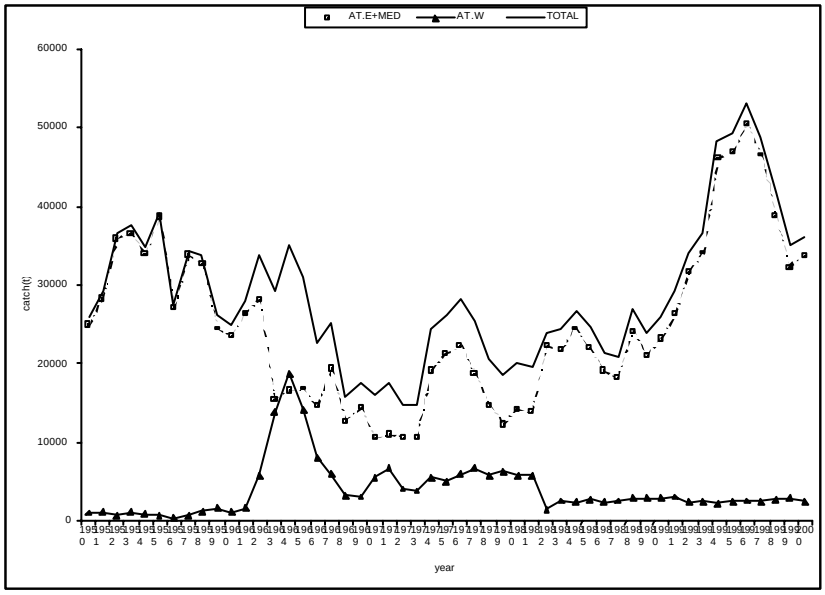
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
TOTAL			*20408*	*18478*	*19904*	*19616*	*23820*	*24202*	*26717*	*24647*	*21373*	*20789*	*27128*	*23818*	*26045*	*29420*	*34012*	*36579*	*48577*	*49716*	*53163*	*48988*	*41688*	*35116*	*36417*	*37279*	*33558*
	AT.E+MED		*14645*	*12223*	*14103*	*13845*	*22375*	*21660*	*24425*	*21962*	*19051*	*18196*	*24117*	*20951*	*23247*	*26428*	*31897*	*34268*	*46471*	*47290*	*50762*	*46758*	*39097*	*32454*	*33752*	*34562*	*30343*
	AT.W		*5763*	*6255*	*5801*	*5771*	*1445*	*2542*	*2292*	*2685*	*2322*	*2592*	*3011*	*2867*	*2798*	*2992*	*2115*	*2311*	*2106*	*2426*	*2401*	*2230*	*2591*	*2662*	*2665*	*2718*	*3215*
Landings	AT.E+MED	Bait boat	3904	2128	1874	1653	1010	3032	4647	2644	2253	2128	2682	2683	2018	1796	1624	4048	2285	3299	5362	3542	2787	1590	2014	2426	2568
		Longline	912	970	1255	917	4255	3606	2734	1763	1448	1703	2396	1974	2522	6066	6416	5059	9224	12867	12959	10206	7049	6484	7052	7057	4920
		Other Surf.	205	230	640	941	551	808	1960	3352	3666	3119	3344	3596	1474	1544	2451	2602	3845	1598	1470	1168	2272	3380	1577	1657	1691
		Purse seine	7556	6369	8978	8795	12786	10746	10302	11305	9621	8857	11198	9450	11304	13291	18269	19321	26026	24046	26344	25006	21608	15636	17341	17324	15830
		Sport	610	1176	105	93	100	194	275	508	323	436	839	459	1553	738	951	1237	2257	3556	2105	2468	1252	1652	2032	1334	1673
		Traps	1458	1350	1251	1446	3673	3274	4507	2390	1740	1953	3658	2789	4376	2993	2186	2001	2834	1924	2522	4367	4129	3711	3735	4763	3641
	AT.W	Longline	3217	3691	3972	3879	363	829	835	1245	764	1134	1373	678	739	895	674	696	539	466	528	382	764	914	859	610	727
		Other Surf.	191	196	131	133	323	514	377	293	166	156	425	755	536	578	509	406	307	384	433	295	344	281	283	202	107
		Purse seine	1230	1381	758	910	232	384	401	377	360	367	383	385	384	237	300	295	301	249	245	250	249	248	275	196	208
		Sport	904	956	893	808	459	808	676	750	518	726	601	786	1004	1083	586	854	804	1114	1028	1179	1106	1124	1120	1656	2070
		Traps	221	31	47	41	68	7	3	20	0	17	14	1	2	0	1	29	79	72	90	59	68	44	16	16	28
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	73	51	57	50	113	38	75
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	4	0	0	0	0	0	0
		Sport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	3	0	0	0	0
Landings	AT.E+MED	ALGERIE	20	150	190	220	250	252	254	260	566	420	677	820	782	800	1104	1097	1560	156	156	157	1947	2142	2330	2012	1710
		CAP-VERT	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	137	93	49	85	103	80	68	39
		CHINESE TAIPEI	0	3	5	6	16	2	0	0	0	0	0	0	0	0	0	334	729	502	472	504	456	249	313	633	666
		CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	1418	1076	1058	1410	1220	1360	1105	906	970	930	903	977
		CYPRUS	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	14	10	10	10	10	21	31	61	90	91
		EC-DENMARK	2	1	0	3	0	0	1	2	1	0	0	0	0	0	0	37	0	0	0	0	1	0	0	0	0
		EC-ESPANA	4190	3656	2468	2601	3813	5257	7547	5090	3577	3654	5995	5210	5379	3664	4532	7096	5878	8426	8762	8047	5800	5363	6246	5867	6304
		EC-FRANCE	2320	1853	1961	2503	5028	4060	4202	5920	3838	4863	6504	4894	5223	5185	8270	8094	12179	10329	9690	8470	7713	6741	7321	6748	6565
		EC-GER.F.R.	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC-GREECE	0	0	0	0	5	0	0	11	131	156	159	182	201	175	447	439	886	1004	874	1217	286	248	622	361	438
		EC-IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	21	52	22	8	15
		EC-ITALY	4983	4020	6272	6017	6658	5865	7140	7199	7576	4607	4201	4317	4110	3783	5005	5328	6882	7062	10006	9548	4059	3279	3845	4377	4628
		EC-PORTUGAL	56	35	24	17	41	174	34	29	193	163	48	3	27	395	358	208	668	481	473	749	377	487	502	468	186
		EC-SWEDEN	2	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	12	0	0	0
		FAROE-ISLANDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	104	118	0	
		G.CONAKRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	0	0	0	0	0	
		ICELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	27	0	0	1
		ISRAEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	
		JAPAN	638	729	999	615	3534	3286	2550	1426	1080	1180	1427	965	1636	3066	3473	3277	2611	4784	4106	3090	3556	3071	3031	2577	2926
		KOREA	0	1	0	0	0	3	0	77	0	0	0	0	0	0	0	0	688	663	683	613	66	0	6	1	0
		LIBYA	677	424	398	271	310	270	274	300	300	300	300	84	328	370	737	635	1422	1540	1388	1029	1331	1195	1549	1940	
		MALTA	26	23	24	32	40	31	21	21	41	36	24	29	81	105	80	251	572	587	399	393	407	447	376	219	
		MAROC	36	208	161	179	993	366	175	98	344	472	577	746	1557	1456	767	494	1812	1713	1621	2603	2430	2227	2923	3008	2986
		NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		NEI-1	0	0	0	0	1	0	25	3	172	183	638	763	415	1754	1349	0	0	0	0	0	0	0	0	0	
		NEI-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	42	0	0	
		NEI-105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	282	240	171	399	428	0	0	0	

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		NEI-118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	20	0	0	
		NEI-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	399	0	0	0	0	0	0	
		NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0	0	0	0	0	0	0	
		NEI-71	0	0	0	0	0	0	0	0	0	0	0	0	0	85	144	223	68	0	0	0	0	0	0	0	
		NEI-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	71	867	333	78	17	0	
		NEI-94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	
		NEI-OTHERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	773	211	0	101	1030	1995	109	571	508
		NORWAY	221	60	282	161	50	1	243	0	31	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
		PANAMA	156	14	117	48	12	0	17	22	11	76	67	0	74	287	484	467	1500	1517	3400	491	0	13	0	0	
		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	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	2
		SIERRA LEONE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	93	118	
		SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TUNISIE	141	262	228	218	298	293	307	369	315	456	624	661	406	1366	1195	2132	2503	1897	2393	2200	1745	2352	2184	2493	
		TURKEY	127	27	391	565	825	557	869	41	69	972	1343	1707	2059	2459	2817	3084	3466	4220	4616	5093	5899	1200	1070	2100	2300
		U.S.A	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		YUGOSLAVIA	1049	756	573	376	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0	0	0	0	0	0	0	0
		YUGOSLAVIA REP. FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	4	0	0
	AT.W	ARGENTINA	0	0	0	0	0	0	0	6	0	2	0	1	2	0	0	0	0	0	0	0	0	0	0	0	
		BRAZIL	14	10	2	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0	0	0	0	13	0	0	0
		CANADA	670	245	324	425	291	433	264	142	41	50	393	619	438	485	443	459	392	576	597	503	595	576	549	524	604
		CANADA-JPN	0	0	0	0	0	0	0	0	32	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CHINESE TAIPEI	1	49	15	7	11	2	3	3	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
		CUBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
		FRANCE.OT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
		JAPAN	3144	3621	3936	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387	436	322	691	365	492	506	575
		KOREA	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
		MEXICO	28	22	10	20	14	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	8	14	29	10	12
		NEI-1	0	0	0	0	14	1	0	0	0	0	0	30	24	23	17	0	0	0	0	0	0	0	0	0	
		NEI-31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
		NEI-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	127	49	
		NEI-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	429	143	0	
		NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		PANAMA	58	10	9	14	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		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	0
		ST.LUCIA	0	0	0	0	0	0	0	0	0	1	3	2	14	14	14	2	43	9	3	0	0	0	0	0	
		TRINIDAD & TOBAGO	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.A	1848	2297	1505	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1085	1237	1163	1311	1285	1334	1235	1213	1212	1589	1875
		UK-BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	
		URUGUAY	0	0	0	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2	0	0	0	0	0	0	1
Discards	AT.W	CANADA	0	0	0	0	0	0	0	0	0	0	0	14		0	0	0	0	0	0	6	16	11	46	13	37
		JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	
		U.S.A	0	0	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141	77	51	44	39	67	25	38

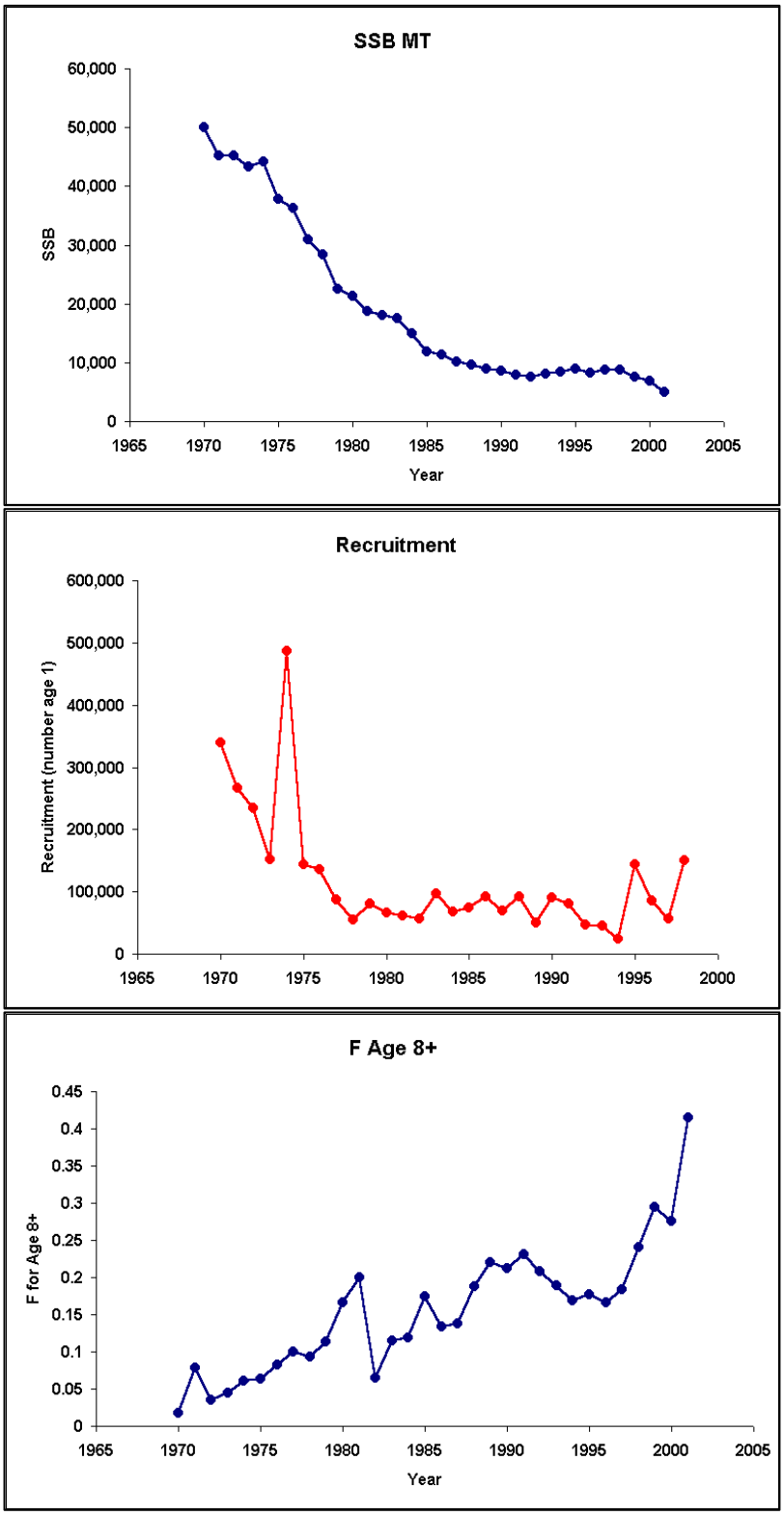
Blank cells for 2002 indicate that catches were not reported to ICCAT.



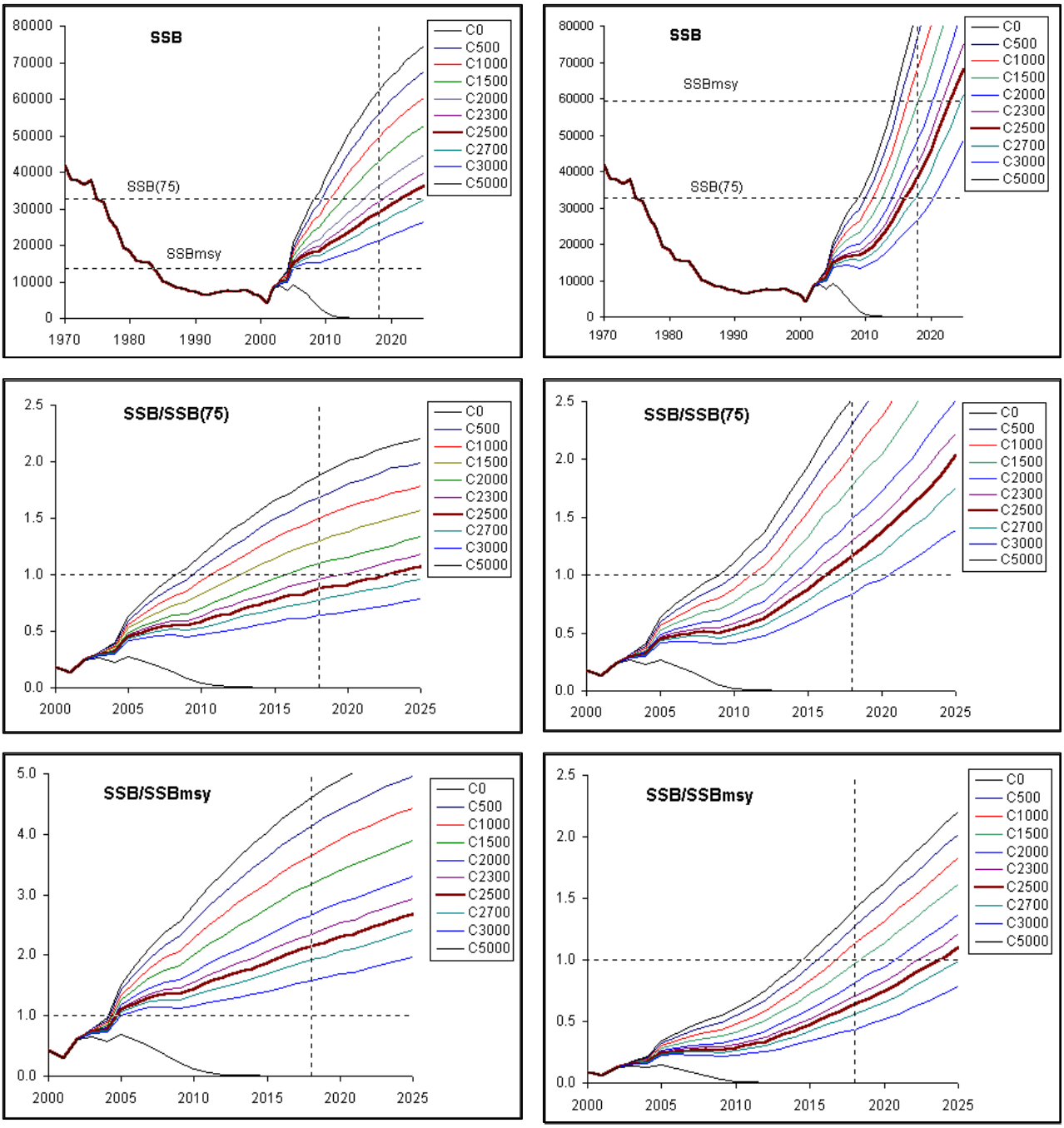
BFT-Fig. 1. Distribution of Atlantic bluefin catches by longline (circles) and surface gears (bars) for the period 1950-1999.



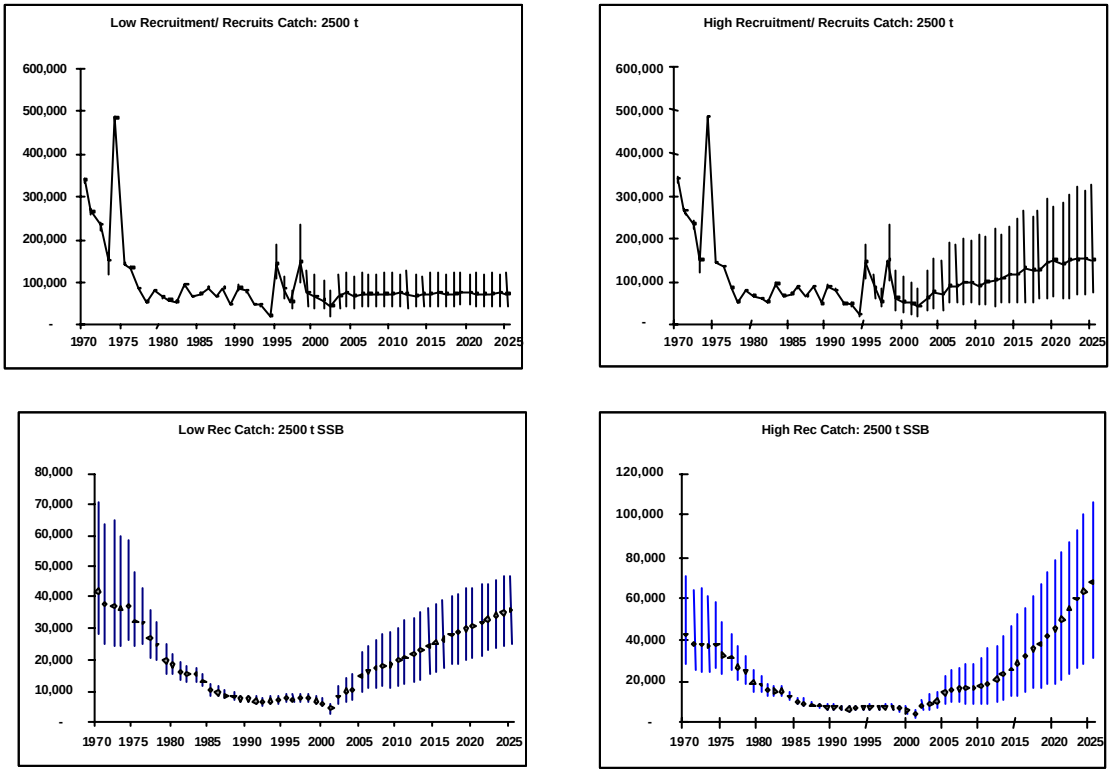
BFT-Fig. 2. Atlantic bluefin catches (in t, including discards) by region. Reported catches for 2001 are largely incomplete.



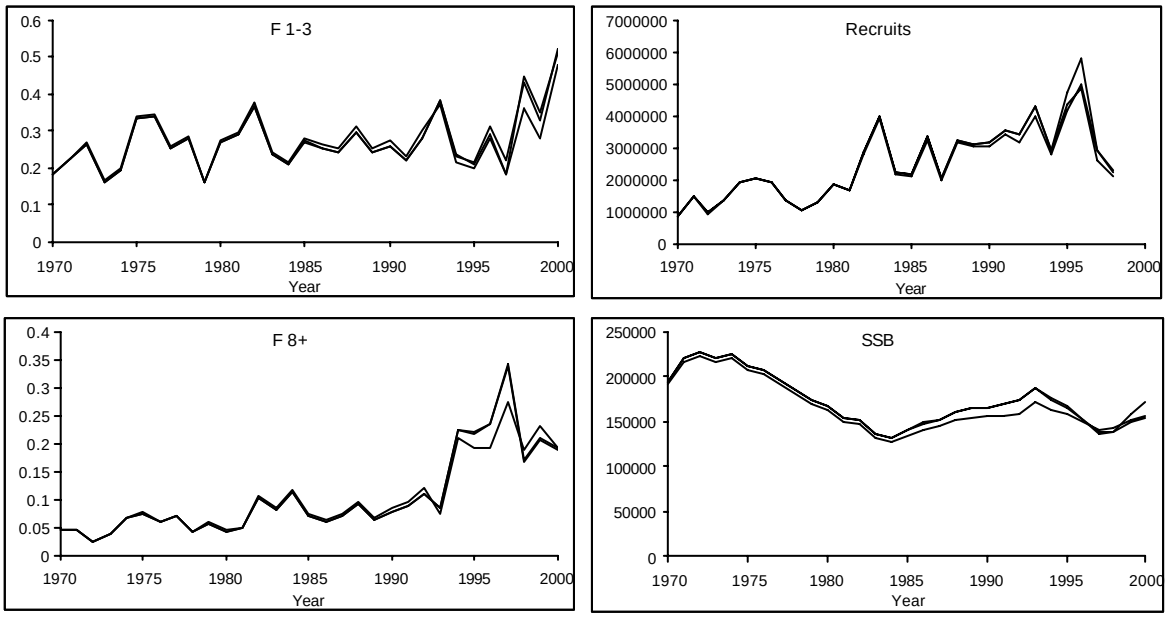
BFT-Fig 3. West Atlantic bluefin tuna spawning biomass (t), recruitment (numbers) and fishing mortality rates for fish of age 8+, estimated by the Base Case VPA run.



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



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



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

8.6 BUM - BLUE MARLIN

No new blue marlin assessments have been conducted since 2000.

BUM-1. Biology

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

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

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

BUM-2. Description of the fisheries

The fisheries for Atlantic blue marlin are characterized by many different participants. The major landings of blue marlin are incidental to the large offshore longline fisheries that have targeted tuna and swordfish, including Brazil, Cuba, Japan, Korea, Chinese Taipei, and others. Other major fisheries are the directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, and many other countries and entities in the Caribbean Sea and off the West coast of Africa. Other directed fisheries include artisanal fisheries in the Caribbean Sea and off West Africa. Development and geographical expansion of other longline fisheries that take blue marlin in the West Atlantic, Caribbean Sea, and East and South Atlantic by various countries have been reported Tropical purse seine fisheries also have an incidental catch of blue marlin.

Landings for the total Atlantic first developed in the early 1960s, reached a peak of over 9,000 t in 1963, declined to the range of about 2,000-3,000 t during the period 1967-1977, and have fluctuated with an increasing trend over the period 1978-1996, and a decreasing trend thereafter **(BUM-Table 1 and BUM-Figure 2)**. For 2001 and thereafter, the United States implemented time area closures that were intended to reduce interactions between longline fishing and unintended catch including blue marlin. 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 2001-2002 reported catch of unclassified billfish was 13% of the reported catch of all billfish, but a much larger proportion of the reported catch of some fisheries. The Committee recommends that every effort be made to report catches by species for all fisheries. The 2002 reported catches (2,324 t) are incomplete. 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.

BUM-3. State of the stock

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

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

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

BUM-4. Outlook

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

BUM-5. Effect of current regulations

This section is concerned with the overall effect of current regulations on the status of the blue marlin stock. It is not concerned with compliance with regulations by individual countries.

Recommendation [Ref. 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 [Ref. 00-13], [Ref. 01-10] and finally [Ref. 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 following are the Atlantic-wide blue marlin reported (Task I) landings for the recent period, for longline and purse seine vessels:

	1996	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
LL	3257	3477	2468	2276	2127	1614	1202
PS	96	82	80	83	79	0*	0*
Total	3353	3559	2548	2359	2206	1614	1202

* Reported catches are likely to be under-estimates.

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

In 2000, the Commission recommended that a blue marlin minimum size be established by recreational fisheries, (e.g., 251 cm LJFL). The Committee does not expect to have enough new information to provide an assessment of the effect of these recent regulations until at least 2005.

BUM-6. Management recommendations

Management recommendations here are the same as those made in 2002. No additional assessment information became available in 2003 to modify these recommendations. The current assessment indicates that the stock is unlikely to recover if the landings contemplated by the 1996 Commission recommendation continue into the future. While there is additional uncertainty in stock status and replacement yield estimates not reflected in bootstrap results, these uncertainties can only be addressed through substantial investment in research into habitat requirements of blue marlin and further verification of historical data. The Committee recommends that the Commission take steps to reduce the catch of blue marlin as much as possible. Steps such as release of live fish from fishing gear, reductions in fleet-wide effort, a better estimation of dead discards, and establishment of time area closures, along with scientific observer sampling for verification could be considered.

The Commission should consider that future evaluation of management measures relative to the recovery of the blue marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of blue marlin, and additional years of data are available. The Committee therefore recommends the next blue marlin assessment not be held before 2005.

ATLANTIC BLUE MARLIN SUMMARY[1]

	Total Atlantic
Maximum Sustainable Yield (MSY)	~ 2,000 t (~ 2,000 - 3,000 t)[2]
2001 Yield	3,326 t
2002 Yield[4]	2,324 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 [Refs. 00-13[3], 01-10[3] and 02-13]

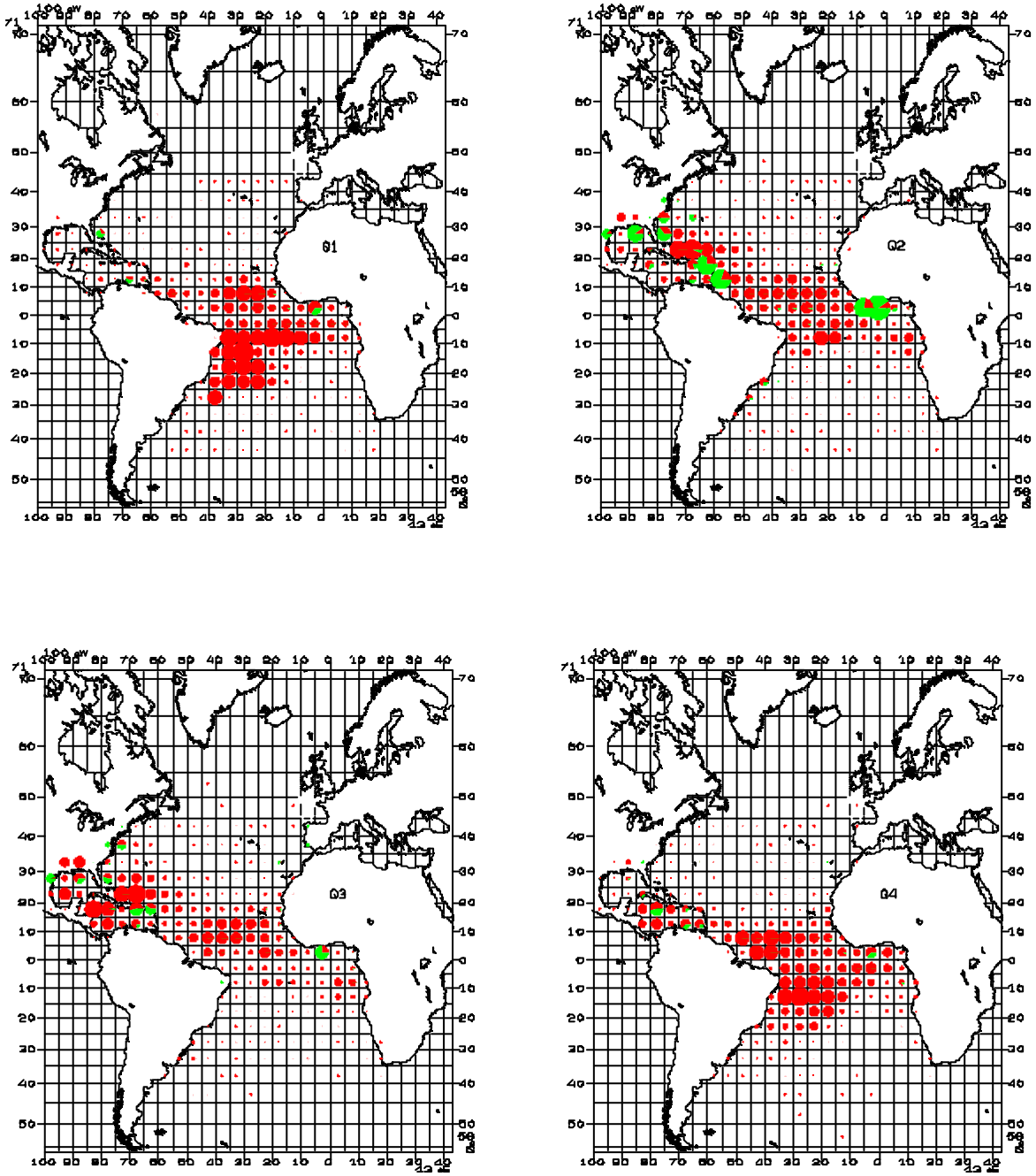
[1] Assessment results are uncertain. Uncertainty in these estimates is not fully quantified by bootstrapping.
[2] Approximate 80% CI from bootstrap for ASPIC model.
[3] These measures did not take effect until mid-2001.
[4] Reported Task I value, which is likely to be an underestimate of the total catch.

BUM-Table 1. Estimated catches (landings and discards, t) of Atlantic blue marlin by major area, gear and flag, 1978-2002.

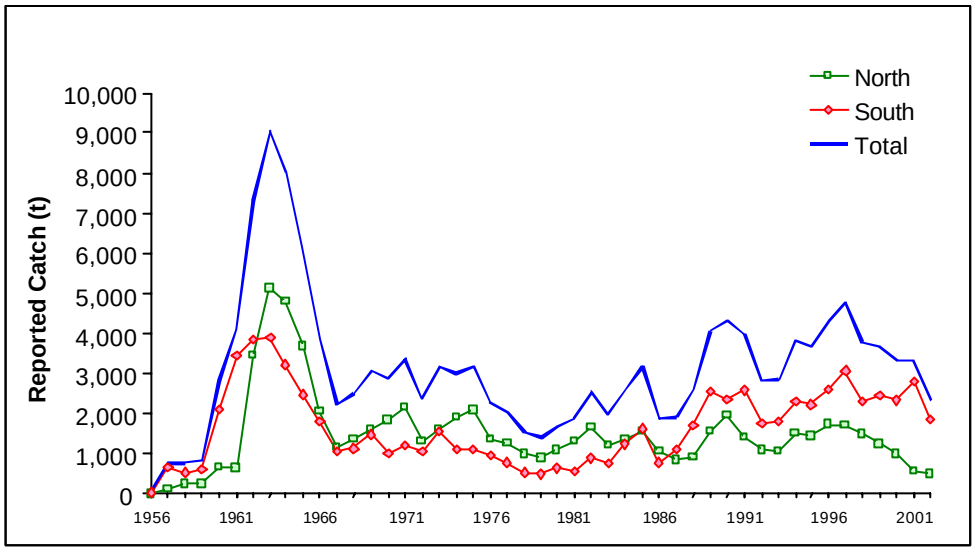
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
TOTAL			*1642*	*1527*	*1848*	*2032*	*2708*	*2130*	*2748*	*3311*	*1993*	*2053*	*2736*	*4214*	*4520*	*4128*	*2952*	*3001*	*3946*	*3802*	*4445*	*4866*	*3868*	*3761*	*3413*	*3326*	*2324*
		AT.N	976	897	1085	1296	1650	1214	1378	1566	1069	836	909	1540	1943	1411	1086	1057	1510	1446	1742	1711	1489	1248	999	549	480
		AT.S	530	504	619	567	884	749	1252	1623	789	1085	1690	2530	2378	2580	1750	1798	2303	2230	2607	3073	2299	2430	2335	2776	1840
		UNCL	136	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	1	4
Landings	AT.N	Longline	553	480	643	792	1162	809	920	1223	695	327	415	1009	1597	981	629	600	1065	925	1266	1227	950	752	642	329	356
		Other Surf.	0	0	0	0	1	2	1	0	0	0	22	100	13	29	26	24	59	84	72	189	332	237	77	70	57
		Sport	301	299	301	300	299	199	206	169	214	181	186	143	50	63	83	113	122	77	66	56	56	38	36	21	17
		Unclass.	122	118	140	204	188	204	251	174	160	190	162	97	123	196	202	193	153	208	142	142	100	140	184	106	
	AT.S	Longline	526	490	498	430	822	533	975	1362	661	964	1530	2017	1958	2280	1473	1415	1643	1565	1991	2250	1517	1524	1485	1285	842
		Other Surf.	2	13	119	135	60	216	276	260	127	121	159	512	418	237	208	382	658	663	605	718	634	904	850	1491	999
		Sport	2	1	2	2	2	0	1	1	1	0	1	1	2	1	0	1	2	2	10	28	0	0	0	0	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	62	69	0	0	0	0	35	146	0	0	0	
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
		Other Surf.	136	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	0	
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	49	81	60	22	37
		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	2	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Landings	AT.N	BARBADOS	72	51	73	117	99	126	126	10	14	13	46	3	18	12	18	21	19	31	25	30	25	19	19	0	
		BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	
		CANADA-JPN	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	48	41	51	79	133	9	31	15
		CHINESE TAIPEI	81	51	160	98	100	125	102	148	117	52	26	11	937	716	336	281	272	187	170	355	80	44	64	65	82
		CUBA	97	156	162	178	318	273	214	246	103	68	94	74	112	127	135	69	39	85	43	0	12	0	0	0	34
		DOMINICAN REP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	71	29	19	0	
		EC-ESPAÑA	0	0	0	0	0	0	3	4	1	0	8	7	2	1	7	7	6	1	22	5	6	3	25	8	1
		EC-PORTUGAL	0	0	0	0	1	2	1	8	12	8	2	1	1	4	2	15	11	10	7	3	47	8	15	17	1
		GRENADA	0	0	1	1	12	6	8	11	36	33	34	40	52	64	52	58	52	50	26	47	60	100	87	104	
		JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	
		JAPAN	54	68	193	332	637	192	351	409	174	78	206	593	250	145	193	207	532	496	798	625	656	427	420	153	125
		KOREA	185	67	48	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16	41	16	0	0	0	0	
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	13	13	13	27	35	68	37	50
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57	100	100	100	100	0	0	0	0	
		NETH.ANTILLES	50	50	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40	40	40	40	40	40	0	
		PANAMA	42	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	38	0	
		SENEGAL	0	0	0	0	0	0	0	0	0	0	0	1	1	5	0	0	5	5	5	0	0	0	0	0	
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	10	5	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	2	2	0	1	0	0	0	0	15
		TRINIDAD & TOB.	0	0	0	0	0	3	8	3	17	2	0	28	4	6	4	3	27	46	21	81	70	33	55	17	16
		U.S.A	295	312	313	342	329	215	280	295	273	291	221	124	29	33	51	80	88	43	43	46	50	37	24	16	17
		U.S.S.R	1	0	0	0	0	0	0	0	7	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		UK-BERMUDA	5	2	4	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15	15	3	5	1	2	2	
		UKRAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	15	5	0	0	0	0	0	0	0	0	0	
		VENEZUELA	94	134	81	106	83	172	117	219	218	60	76	149	70	49	66	74	122	106	137	130	205	220	28	72	76

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	AT.S	BENIN	0	0	0	6	8	0	9	10	7	4	12	0	6	6	6	6	5	5	5	5	5	5	5	0	
		BRAZIL	49	34	23	28	30	27	32	33	46	51	74	60	52	61	125	147	81	180	331	193	486	509	452	780	387
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	25	21	27	41	68	15	61	73
		CHINESE TAIPEI	177	139	129	104	150	47	70	165	98	265	266	462	767	956	488	404	391	280	490	1123	498	442	421	175	190
		COTE D'IVOIRE	0	0	0	0	0	0	100	100	100	100	130	82	88	105	79	139	212	177	157	222	182	275	206	196	
		CUBA	113	180	187	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0	0	0	0	0	0	0	
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	0	15	0	6	23	18	21	38	88	71	82	109	116	86	27
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	6
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8	0	0	0	0	0	
		GHANA	0	0	119	129	52	216	166	150	16	5	7	430	324	126	123	236	441	472	422	491	447	624	639	1295	999
		JAPAN	15	66	115	136	495	248	482	691	335	362	617	962	967	755	824	719	991	913	881	724	529	363	441	181	154
		KOREA	140	78	46	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40	103	40	2	0	1	1	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	100	100	100	100	0	0	0	0	
		PANAMA	32	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	33	0	0	
		SAO TOME & PRIN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	0	0	0	
		SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		U.S.S.R	4	0	0	1	0	0	0	7	16	22	32	5	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK-S.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	0	0	23	0	0	0	
	UNCL	EC-FRA.ESP	136	126	144	169	174	167	118	122	135	132	137	144	199	137	116	146	133	126	96	82	80	83	79	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	
		ST.VINCENT	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	U.S.A	0	0	0	0	0	0	0	0	0	138	124	191	159	142	146	127	111	153	196	97	50	81	60	24	49
	AT.S	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	42	2	2	0	0	
	UNCL	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	

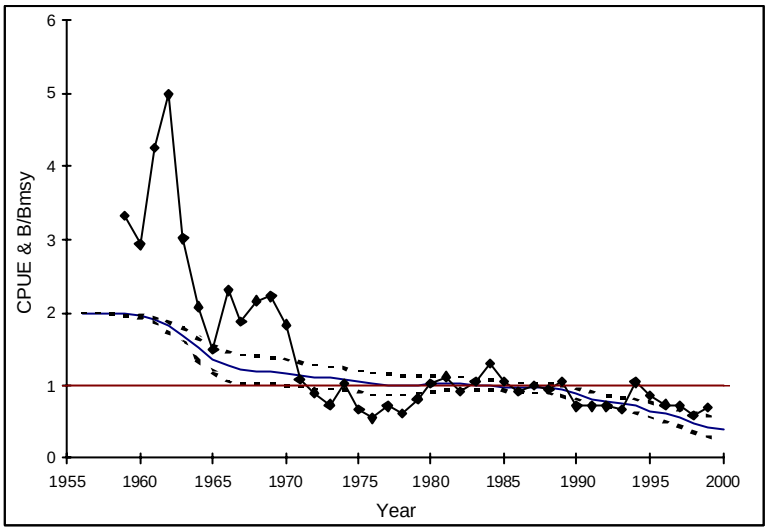
Blank cells for 2002 indicate that catches were not reported to ICCAT



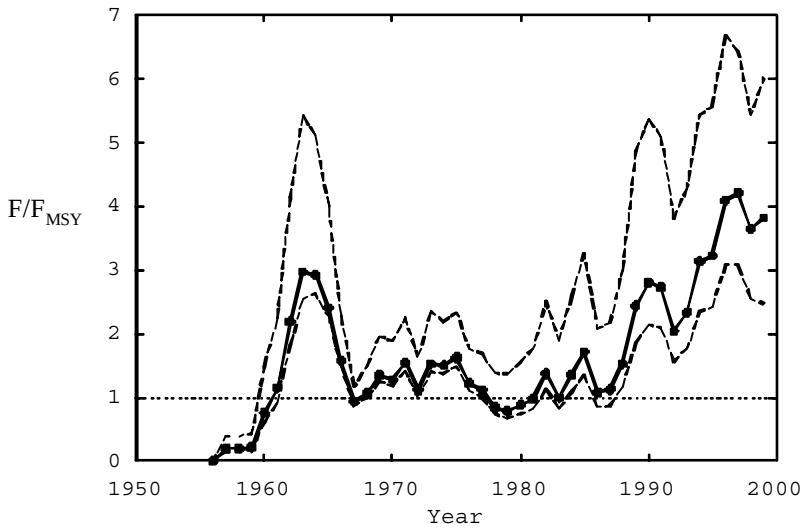
BUM-Fig. 1. Geographical distributions of reported catches (landings+discards) of blue marlin by quarter, combined all years (1956-2000). Heavy- and light-shaded areas correspond to longline and other gears, respectively.



BUM-Fig. 2. Estimated catches (including landings and dead discards in t) of blue marlin in the Atlantic by region. Catch estimates for 2002 are incomplete.



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



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

8.7 WHM - WHITE MARLIN

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

WHM-1. Biology

White marlin are found throughout tropical and temperate waters of the Atlantic Ocean and adjacent seas **(WHM-Figure 1)**. Unlike blue marlin and sailfish, white marlin occur only in the Atlantic Ocean. Their average size in the catch is about 20-30 kg. And although they are generally considered to be a rare and solitary species relative to the schooling scombrids, they are known to occur in small groups consisting of several individuals. Little is known about the age, growth and reproductive biology of white marlin and, with few exceptions, there are no quantitative estimates of population parameters for this species that can be used in stock assessments. They spawn in tropical and subtropical waters in mid- to late spring, and are found in the colder temperate waters during the summer. They are considered to be very fast growing, and have a lifespan of at least 17 to 18 years. Female white marlin grow faster and reach a larger maximum size than males. White marlin are generally considered piscivorus, but also have been known to consume squid. They are found predominately in the open ocean near the upper reaches of the ocean mixed layer.

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

WHM-2. Description of the fisheries

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

Landings for the total Atlantic first developed in the early 1960s, reached a peak of almost 5,000 t in 1965, declined to about 1,000 t per year during the period 1977-1982, and have fluctuated between about 1,000 to 2,000 t through 2002 **(WHM-Table 1)**. The 2002 reported catches, which are likely to be incomplete, were 794 t, more than half of these catches come from a single fishery. Landings for the North Atlantic generally show a trend similar to that of the total Atlantic and have mainly followed those of the offshore longline fisheries **(WHM Figure 2)**. For 2001 and thereafter, the United States implemented time area closures that were intended to reduce interactions between longline fishing and unintended catch including white marlin. 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 2001-2002 reported catch of unclassified billfish was 13% of the reported catch of all billfish, but a much larger proportion of the reported catch of some fisheries. The Committee recommends that every effort be made to report catches by species for all fisheries. In the 2002 assessment, significant improvements were made in the historical estimates of catch for the EC purse seine, the U.S. recreational and Japanese longline catches. These studies,

however, have identified that recent catch estimates may be more uncertain than previously thought, because discards are not generally reported in logbooks. Additionally, changes in the economic importance of this species or changes in the fishing gear may have led to change in the reporting of catches by some fleets.

WHM-3. State of the stock

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

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

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

WHM-4. Outlook

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

WHM-5. Effect of current regulations

This section is concerned with the overall effect of current regulations on the status of the white marlin stock. It is not concerned with compliance with regulations by individual countries.

Recommendation [Ref. 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 [Ref. 00-13], [Ref. 01-10] and finally [Ref. 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 following are the Atlantic-wide white marlin reported (Task I) landings for the recent period, for longline and purse seine vessel vessels:

	1996	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
LL	1174	908	885	924	852	575	671
PS	7	7	9	8	7	0*	0*
Total	1181	915	894	932	858	575	671

* Reported catches are likely to be under-estimates.

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

The Committee does not expect to have enough new information to provide an assessment of the effect of these recent regulations until at least 2005.

WHM-6. Management recommendations

While there is substantial uncertainty in stock status and replacement yield, these uncertainties can only be addressed through research into habitat requirements of white marlins, studies on post-release survival rates of released fish, further verification of historical fishery data and validation, and development of models for abundance estimation and stock assessment. The Committee suggests that the Commission makes substantial investment on these research areas because the stock, although producing relatively stable catches and declining CPUE over the last 20 years, would benefit from a more accurate stock assessment.

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

The Commission should consider that future evaluation of management measures relative to the recovery of the white marlin stock are unlikely to be productive unless new quantitative information on the biology and catch statistics of white marlin, and additional years of data are available. The Committee therefore suggests that the next white marlin assessment not be held before 2005.

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
2001 Yield	642 t	--		--
2002 Yield[5]	794 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. [Ref. 00-13], [Ref. 01-10] and [Ref. 02-13]			

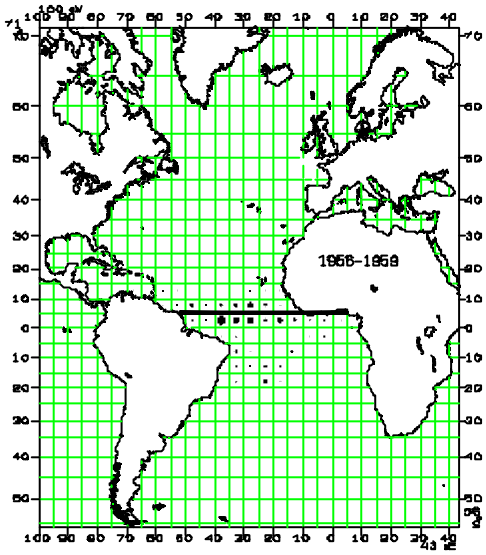
[1] Assessment results are highly uncertain.
[2] The data used are not sufficiently informative to choose a "best case". For consistency, the continuity case presented here is based on data and assumptions that closely resemble the analyses made in 2000. Confidence limits from bootstrapping are conditional 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 2002, which is likely an underestimate of total catch.

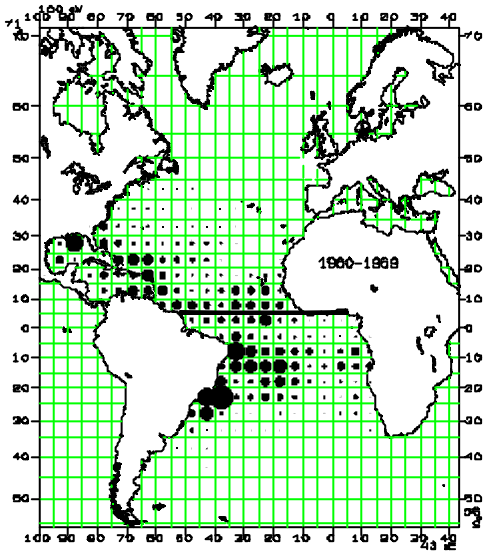
WHM-Table 1 Estimated catches (landings and discards, t) of Atlantic white marlin by major area, gear and flag, 1978-2002.

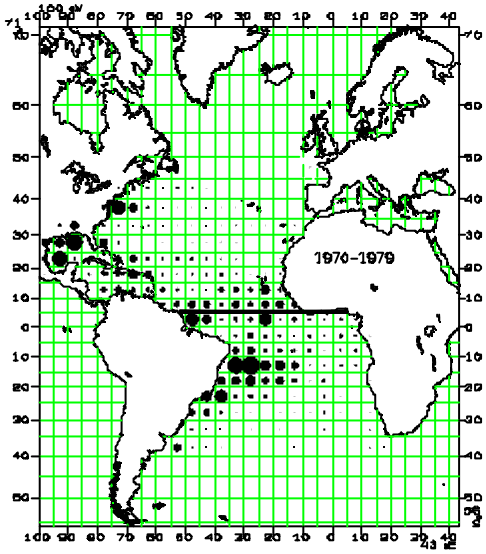
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
TOTAL			975	1039	976	1241	1100	1772	1200	1727	1611	1491	1352	1805	1626	1589	1437	1523	1965	1577	1708	1094	1069	1025	935	642	794
	AT.N		428	482	521	750	605	1280	653	860	905	587	406	368	393	235	610	565	657	617	628	407	385	382	350	290	243
	AT.S		522	534	428	460	463	461	525	844	680	879	921	1409	1196	1343	817	946	1297	951	1073	676	676	634	579	351	551
	UNCL		25	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	10	9	8	7	1	
Landings	AT.N	Longline	317	370	403	671	548	1196	570	788	812	433	167	234	251	105	466	436	528	451	514	316	333	301	282	247	188
		Other Surf.	0	0	0	0	0	0	0	0	0	0	24	0	0	4	3	4	12	5	2	3	13	18	0	7	17
		Sport	111	111	112	72	45	79	66	43	32	38	29	16	21	19	21	30	30	18	20	9	6	6	1	3	6
		Unclass.	0	1	6	7	12	5	17	29	61	54	126	11	40	17	32	30	45	43	28	46	0	0	26	15	
	AT.S	Longline	520	530	419	340	442	308	471	825	654	870	832	1333	1152	1320	803	923	1295	945	660	589	552	623	570	328	484
		Other Surf.	2	4	9	120	21	153	54	15	22	9	89	68	31	17	14	22	1	2	3	5	8	11	9	23	67
		Sport	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	410	0	0	0	0	0	
		Unclass.	0	0	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	45	115	0	0	0	
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	
		Other Surf.	25	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	31	57	41	16	29
		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	1	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4
	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Landings	AT.N	BARBADOS	0	0	0	0	0	0	0	0	0	0	117	11	39	17	24	29	26	43	15	41	33	25	25	0	
		BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
		CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	8	8	8	5	5	3	2
		CANADA-JPN	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	6	7	10	20	1	7	4
		CHINESE TAIPEI	79	62	105	174	134	203	96	128	319	153	0	4	85	13	92	123	270	181	146	62	105	80	59	68	50
		CUBA	43	68	70	189	205	728	241	296	225	30	13	21	14	0	0	0	0	0	0	0	0	0	0	0	7
		EC-ESPAÑA	0	0	0	0	0	0	9	14	0	0	61	12	4	8	18	15	25	10	75	71	65	88	118	43	4
		GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	
		JAPAN	27	42	99	118	84	27	52	45	56	60	68	73	34	45	180	33	41	31	80	29	39	25	66	14	8
		KOREA	33	16	18	49	12	6	18	147	37	2	2	82	39	1	9	4	23	3	7	2	0	0	0	0	
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	8	0	5	6	11	18	44	15
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	50	50	50	50	0	0	0	0	
		PANAMA	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		TRINIDAD & TOB.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5
		U.S.A	109	110	116	78	57	81	81	75	116	124	42	10	17	13	11	19	13	7	12	8	5	5	1	3	6
		U.S.S.R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK-BERMUDA	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	
		VENEZUELA	129	183	113	142	113	234	155	155	151	154	42	47	79	47	187	226	148	171	164	90	80	61	13	72	110
	AT.S	ARGENTINA	0	0	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0	0	0	0	0	0	0	
		BELIZE.SH.OB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	
		BRAZIL	175	133	58	100	76	81	61	87	143	93	149	204	205	377	211	301	91	105	75	105	217	158	105	172	407
		CAMBODIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	

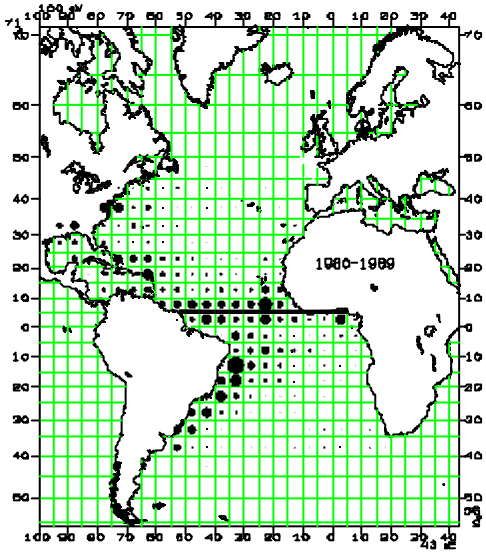
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	4	5	10	1	13	19
		CHINESE TAIPEI	198	155	145	136	227	87	124	172	196	613	565	979	810	790	506	493	1080	726	420	379	401	385	378	84	115
		COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	5	1	2	
		CUBA	127	205	212	116	45	112	153	216	192	62	24	22	6	10	10	0	0	0	0	0	0	0	0	0	
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	1	1	0	9	4	8	0	18	32	3	4	45	68	18	2
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	406	0	0	0	0	0	
		GHANA	0	0	6	45	21	142	54	15	22	6	88	68	31	17	14	22	1	2	1	3	7	6	8	21	2
		HONDURAS-OB.SH	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	14	15	7	25	27	17	24	81	73	74	76	73	92	77	68	49	51	26	32	29	17	15	17	42	4
		KOREA	5	24	0	36	57	9	44	225	34	25	17	53	42	56	1	4	20	20	52	18	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	50	50	50	50	0	0	0	0	
		PANAMA	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	
		SAO TOME & PRIN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	
		SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
		U.S.S.R	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		URUGUAY	0	0	0	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0	0	0	22	0	0	0	
	UNCL	EC-FRA.ESP	25	23	27	31	32	31	22	23	25	25	25	27	37	11	10	12	11	9	7	7	9	8	7	0	
		HONDURAS-OB.SH	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	
Discards	AT.N	U.S.A	0	0	0	0	0	0	0	0	0	62	60	107	81	90	88	66	42	100	64	33	32	57	41	17	33
	AT.S	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	1	0	0	0	
	UNCL	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	

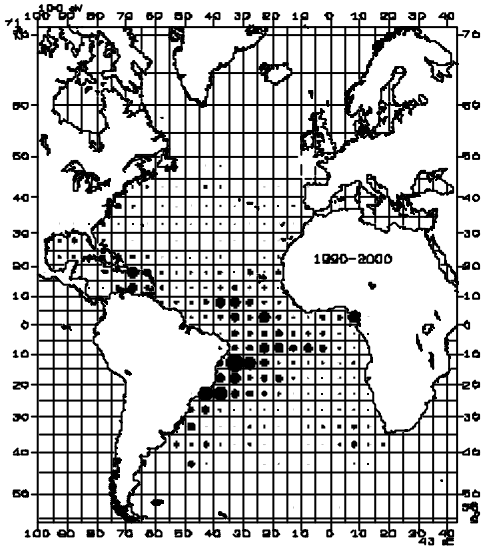
Blank cells for 2002 indicate that catches were not reported to ICCAT.



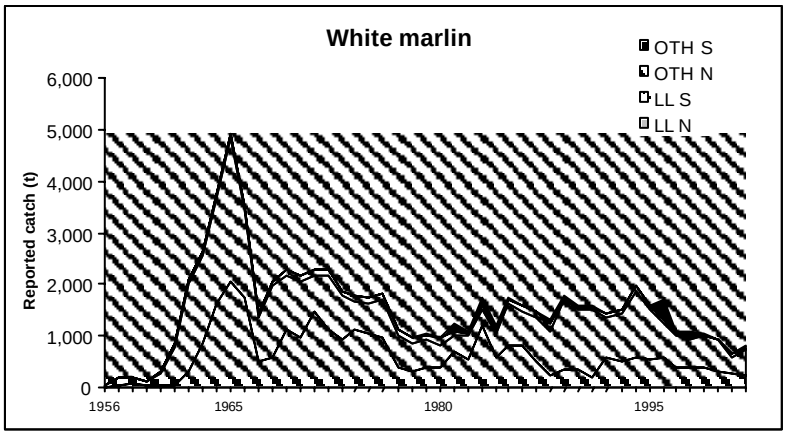




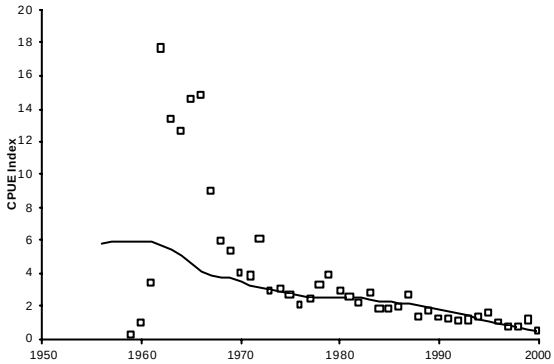




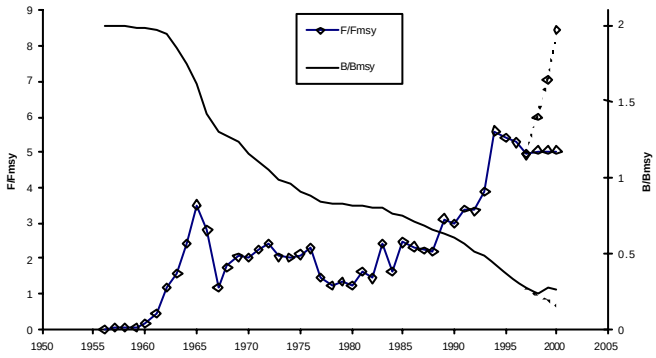
WHM-Figure 1. Average catch (t) distribution of white marlin by decade. Source: ICCAT Task II database.



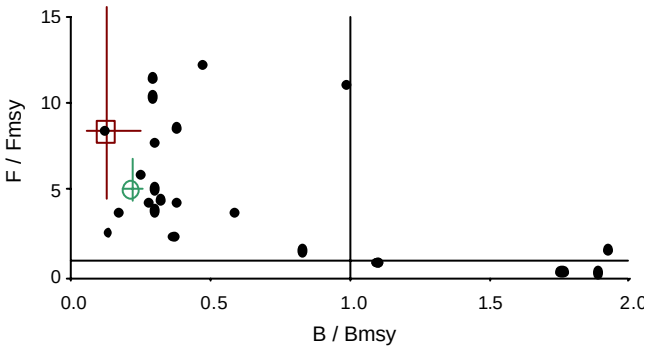
WHM-Figure 2. Reported catch of white marlin (Task I) for North and South Atlantic for longline (LL) gear and for all other gears (OTH) combined for the South (S) and North. (N) Atlantic. The 2002 catch is preliminary and is likely to be an underestimate.



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



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



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

8.8 SAI - SAILFISH/SPEARFISH

No new sailfish or spearfish assessments were conducted in 2003.

SAI-1. Biology

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

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

Sailfish spawn in tropical and subtropical waters in the spring through summer. Due to their relative rare abundance in offshore waters, little is known about spearfish life history. Both sailfish and spearfish are considered to be fast growing species compared to other teleosts. Female sailfish grow faster and reach a larger maximum size than males.

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

SAI-2. Description of the fisheries

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

Catches of sailfish/spearfish for the total Atlantic which first developed in the early 1960s, are presented in **SAI-Table 1** and **SAI-Figure 2,** respectively**.** The Committee continues to recognize that uncertainties in the catch data still persist, particularly in the East Atlantic and Caribbean Sea. However, new catch data are becoming available from some of these fisheries. The Committee decided that when the catch data are missing for a fishery, the figures for the last year for which data were available should be carried over. In some cases, this procedure was maintained for about 10 years. In the table, catch values that were carried over are identified by shading. Because the 2001-2002 catch data are preliminary, no carryovers are shown for those two years in **SAI-Table 1**. The reported catches of sailfish/spearfish (landings and discards) for 2002 are 1,464 t for the west and 755 t for the east. The overall trend in Atlantic catches is very much governed by the large catches from coastal fisheries off West Africa. Recently, catches from the west are larger than those from the east. However this may be partially due to recent lack of reporting from some of the coastal fisheries off West Africa that in the past had reported large catches. The Committee notes that some sailfish 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 2001-2002 reported catch of unclassified billfish was 13% of the reported catch of all billfish, but a much larger proportion of the reported catch of some fisheries. The Committee recommends that every effort be made to report catches by species for all fisheries.

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

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

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

SAI-3. State of the stocks

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

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

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

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

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

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

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

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

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

SAI-4. Outlook

The SCRS noted that the methods for splitting sailfish/spearfish in the offshore longline catches are tentative and are subject to other possible methods in future analyses. Therefore, the results could change in the future. Based on the methods applied and considering these limitations, it is unknown if the western or eastern sailfish stocks are undergoing over-fishing ($F>F_{MSY}$) or if the stocks are currently over-fished ($B<B_{MSY}$) and for these reasons the outlook for future conditions of the stocks are best interpreted based on the recent trends of CPUE and catch.

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

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

SAI-5. Effect of current regulations

No ICCAT regulations for sailfish or spearfish are in effect.

SAI-6. Management recommendations

The previous management recommendations indicated that the Commission should consider methods for reducing fishing mortality rates. The current western Atlantic assessment leads the Committee to recommend that the West Atlantic sailfish "only" catches should not exceed current levels. For the East Atlantic, sailfish "only" catches should not exceed current levels and the Commission should consider practical and alternative methods to reduce fishing mortality and assure data collection systems.

The Committee is concerned about the incomplete reporting of catches, particularly for the most recent years, the lack of sufficient reports by species, and evaluations of the new methods used to split the sailfish and spearfish catch and to index abundance. The Committee recommends all countries landing sailfish/spearfish or having

dead discards, report these data to the ICCAT Secretariat. The Committee should consider the possibility of a spearfish "only" assessment in the future.

ATLANTIC SAILFISH "ONLY" SUMMARY

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

[1] Estimated yield includes that carried over from previous years.
[2] Recent yield (2000) was estimated during the 2001 sailfish assessment. To estimate the 2001 and 2002 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 (landings and discards, t) of Atlantic sailfish and spearfish by major area, gear and flag, 1978-2002.

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total SAI + SPF			*3596*	*4394*	*3276*	*3503*	*4321*	*5195*	*3935*	*3649*	*3692*	*4059*	*3624*	*3006*	*3914*	*2785*	*3137*	*4108*	*2608*	*2932*	*3182*	*2499*	*2976*	*2501*	*2472*	*2013*	*3055*
Tot Sai			*3342*	*4159*	*3006*	*3187*	*3995*	*4883*	*3713*	*3421*	*3386*	*3737*	*3358*	*2729*	*3540*	*2678*	*3045*	*3923*	*2471*	*2815*	*3089*	*2399*	*2856*	*2324*	*2296*	*1899*	*2249*
Tot Spf			*254*	*235*	*270*	*316*	*326*	*312*	*222*	*228*	*306*	*322*	*266*	*277*	*374*	*107*	*92*	*185*	*136*	*117*	*93*	*100*	*120*	*177*	*177*	*114*	*806*
SAI	AT.E		2547	3256	2099	2131	2876	3687	2492	2328	2105	2566	2064	1664	2314	1482	1706	2473	1206	1559	1927	1292	995	1209	1004	777	755
	AT.W		795	903	907	1056	1119	1196	1221	1093	1281	1171	1294	1065	1225	1197	1339	1450	1265	1256	1162	1107	1860	1115	1291	1120	1464
	UNCL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30
Landings	AT.E	Longline	114	83	151	202	309	270	224	148	140	112	126	152	153	57	51	523	178	240	164	213	198	265	165	159	220
		Other Surf.	2290	3066	1623	1432	1999	2911	2107	1940	1394	1870	1401	1067	1143	734	717	1040	718	657	596	385	535	537	433	618	535
		Sport	143	107	325	497	568	506	161	240	571	584	537	445	1018	507	738	833	227	588	531	555	263	407	407	0	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	184	200	77	83	75	636	139	0	0	0	0	
	AT.W	Longline	279	378	360	408	471	320	512	506	489	451	558	417	382	241	371	657	552	386	346	226	1031	452	766	801	1043
		Other Surf.	90	84	97	0	95	50	53	68	43	45	54	44	224	72	156	131	196	224	362	282	349	245	205	64	88
		Sport	338	350	368	561	475	735	536	313	497	491	471	353	267	371	333	232	217	357	240	360	277	173	86	58	103
		Unclass.	88	91	82	87	78	91	120	206	252	142	154	194	290	449	443	367	272	260	145	182	176	174	189	187	222
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7
		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	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Landings	AT.E	BELIZE.SH.OB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		BENIN	0	0	0	36	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5	0	
		CAP-VERT	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	5	9	4	5	11
		CHINESE TAIPEI	7	19	5	12	67	20	8	9	1	0	0	7	13	0	0	420	101	155	65	150	117	178	120	0	
		COTE D'IVOIRE	0	0	0	0	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45	47	
		CUBA	69	40	79	79	158	200	115	19	55	50	22	53	61	184	200	77	83	72	533	0	0	0	0	0	
		EC-ESPAÑA	0	0	0	0	10	0	4	7	9	0	28	14	0	9	2	30	7	13	25	26	18	19	8	148	188
		EC-FRA.ESP	405	375	432	504	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98	0	
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	11	3	8
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	7	0	0	0	1	
		GHANA	1885	2691	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275	568	529
		HONDURAS-OB.SH	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	11	19	33	50	38	47	63	84	71	37	57	57	63	16	42	58	45	52	47	19	58	16	26	6	12
		KOREA	18	5	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6	6	14	5	0	0	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	15	10	10	10	0	0	0	0	
		PANAMA	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		SAO TOME & PRIN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	0	0	
		SENEGAL	143	107	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412	0	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	3	1	0	0	0	0	0	
		U.S.S.R	5	0	0	37	0	0	0	0	2	5	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	AT.W	ARUBA	30	30	30	30	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10	0	
		BARBADOS	0	0	0	0	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44	0	
		BRAZIL	246	201	231	64	153	60	121	187	292	174	152	147	301	90	351	243	129	245	310	137	184	356	598	412	547
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	9	4	3	1
		CHINESE TAIPEI	10	18	36	81	22	31	45	39	64	31	300	171	83	73	33	223	233	38	37	4	129	33	22	0	

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		CUBA	51	151	119	134	181	28	169	130	50	171	78	55	126	83	70	42	46	37	37	0	0	0	0	0	
		DOMINICAN REP.	0	0	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	101	89	27	67	0	
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	5	3	36	3	15	20	6	14	277	471
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2
		GRENADA	37	40	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	151	148	164	187	
		JAPAN	9	20	22	44	135	22	34	38	28	6	22	22	25	73	1	2	8	2	4	17	3	10	8	3	3
		KOREA	14	19	51	41	19	0	52	72	14	1	0	17	25	0	3	0	8	8	22	8	0	0	0	0	
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	19	19	0	9	646	40	118	36	34
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	30	30	30	30	0	0	0	0	
		NETH.ANTILLES	21	21	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15	0	
		PANAMA	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		SEYCHELLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	0	0	131
		TRINIDAD & TOB.	0	0	0	0	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	0	4	3	7	6
		U.S.A	308	308	308	533	452	734	495	282	462	454	451	324	242	343	294	202	179	345	231	349	267	163	76	58	103
		VENEZUELA	66	93	58	72	57	119	81	81	77	80	22	24	24	65	71	206	162	103	165	185	258	179	93	126	159
	UNCL	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	
		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	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	30
Discards	AT.W	U.S.A	0	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	72	45	11	7
	UNCL	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SPF	*Total*		*254*	*235*	*270*	*316*	*326*	*312*	*222*	*228*	*306*	*322*	*266*	*277*	*374*	*107*	*92*	*185*	*136*	*117*	*93*	*100*	*120*	*177*	*177*	*114*	*806*
	AT.E		254	235	270	316	326	312	222	228	252	247	256	270	373	107	92	120	134	107	85	99	111	144	103	28	35
	AT.W		0	0	0	0	0	0	0	0	54	75	10	7	1	0	0	65	2	10	8	1	9	33	74	86	52
	UNCL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	718
Landings	AT.E	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	36	29	26	31	25	63	43	28	19
		Other Surf.	254	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60	0	16
	AT.W	Longline	0	0	0	0	0	0	0	0	54	75	10	7	1	0	0	65	2	4	5	1	9	33	74	86	52
		Sport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Unclass.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287
		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	431
Discards	AT.W	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	
Landings	AT.E	CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	3	1	1	1	30	14	8	21
		EC-FRA.ESP	254	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60	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	
		JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	26	25	30	22	33	29	20	14
	AT.W	BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	56	39
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	22	50	22	5
		JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	4	1	8	11	11	3	8
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
		TRINIDAD & TOB.	0	0	0	0	0	0	0	0	54	75	10	7	1	0	0	62	0	0	0	0	0	0	0	0	
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	
		VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	4	0
	UNCL	EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	718
Discards	AT.W	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0	0	

Empty cells for 2002 indicate that catches were not reported to ICCAT. Shaded cells indicate carry-overs.

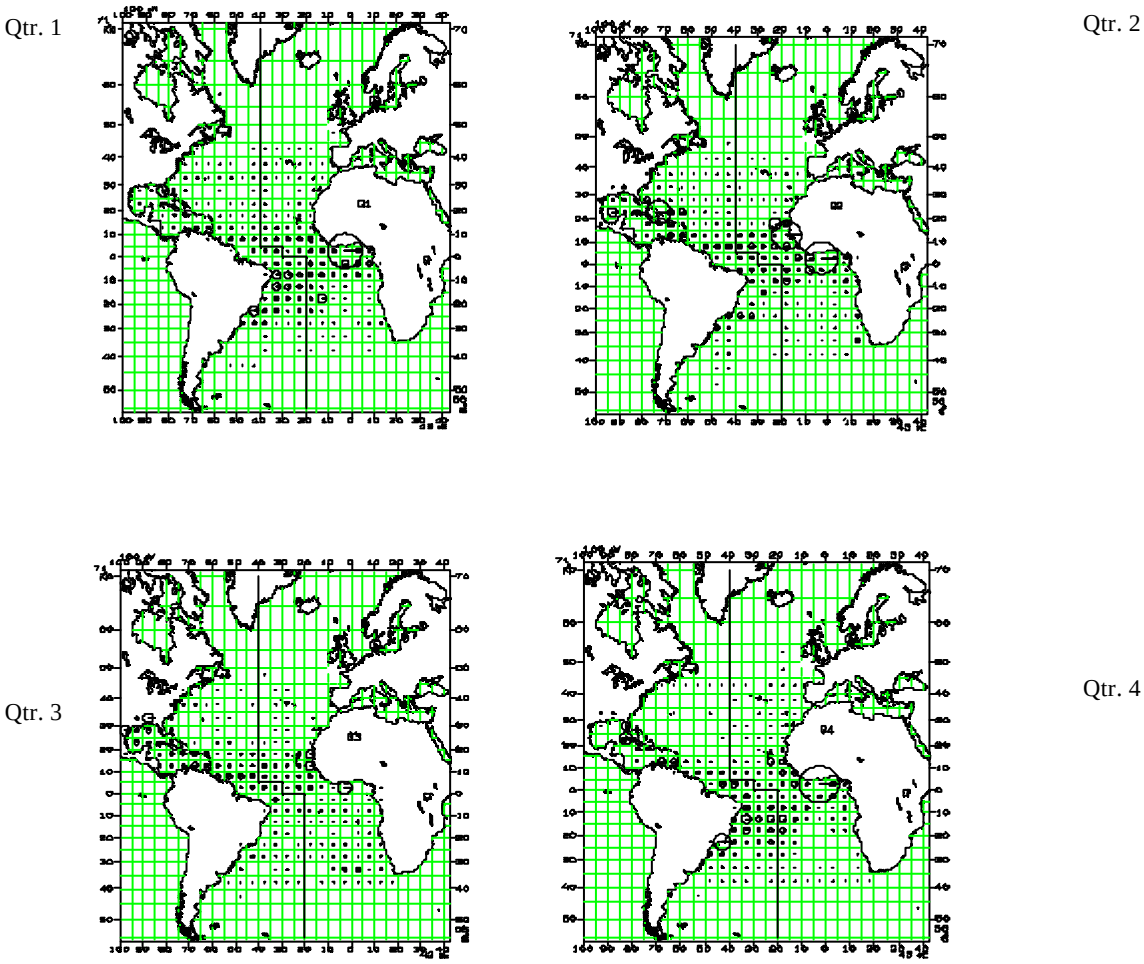
SAI-Table 2. Estimated catches (including landings and dead discards, in t) of sailfish "only" in the Atlantic Ocean, by fisheries and by gears, 1976-2000 (as modified by the Working Group for use in the 2001 assessment).

			1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL CATCH			5632	1790	2927	3720	2548	2718	3296	4405	3133	2964	2810	3227	2712	2263	3092	2307	2837	2786	1739	2065	2494	1814	1510	1651	1475
CATCH	AT. E		5225	1371	2463	3189	1974	2008	2692	3504	2352	2240	2028	2478	2008	1568	2214	1445	1678	2043	1097	1404	1874	1152	933	1123	969
	AT.W		407	419	464	531	574	711	604	902	781	724	782	749	705	695	878	862	1159	743	642	662	619	663	576	527	506
LANDING	AT.E	LL	187	47	30	16	26	79	125	87	84	60	63	24	70	56	53	20	23	93	69	84	111	73	136	179	134
		SURF	4961	1231	2354	3096	1886	1841	2498	3368	2227	2155	1920	2381	1892	1475	2110	1194	1410	1813	895	1211	1075	940	798	944	835
		SPORT	76	93	79	77	62	88	69	49	41	25	45	73	46	37	51	47	45	60	50	34	52	0	0	0	
		UNCL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184	200	77	83	75	636	139	0	0	
	AT.W	LL	88	25	48	99	75	115	158	108	132	212	106	162	124	147	194	83	304	159	171	173	183	131	224	120	174
		SURF	62	119	90	84	97	0	95	50	53	68	23	45	54	44	224	72	156	131	196	224	355	221	300	258	178
		SPORT	266	311	315	321	398	510	327	657	486	256	405	366	326	256	203	291	246	134	115	175	115	171	143	99	47
		UNCL	48	79	88	91	82	87	78	91	120	206	252	142	154	194	290	387	430	332	232	228	119	182	112	174	173
DISCARD	ATW	LL	0	0	0	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	71	45
LANDING	AT.E	BENIN	0	0	0	0	0	36	48	0	53	50	25	32	40	8	21	20	21	20	20	20	19	6	4	5	5
		CAP-VERT	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	5	3
		CHINESE TAIPEI	68	9	2	2	1	2	24	6	2	1	0	0	0	1	3	0	0	31	14	17	28	25	58	97	79
		COTE D'IVOIRE	0	0	0	0	0	0	0	0	40	40	40	40	66	55	58	38	69	40	54	66	91	65	35	80	45
		CUBA	58	10	16	4	8	14	56	55	30	2	2	0	4	8	14	184	200	77	83	72	533	0	0	0	
		EC-ESPANA	0	0	0	0	0	0	10	0	4	7	9	0	28	14	0	9	2	30	7	13	25	26	18	19	8
		EC-FRA.ESP	327	400	405	375	432	504	521	499	354	364	403	394	408	432	595	174	150	182	160	128	97	110	138	131	98
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	53	6
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	109	7	0	0	
		GHANA	4517	764	1885	2691	1191	891	1426	2408	1658	1485	925	1392	837	465	395	463	297	693	450	353	303	196	351	305	275
		JAPAN	1	5	2	9	14	22	20	25	39	46	49	19	31	27	33	7	16	30	45	52	47	19	58	17	37
		KOREA	52	7	4	1	3	4	12	1	9	3	0	0	3	2	4	3	0	0	1	1	6	1	0	0	
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4	2	0	0	
		PANAMA	13	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		SAO TOME & PRINCIPE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139	0	0	
		SENEGAL	189	160	143	107	325	498	572	510	163	241	572	596	587	552	1092	546	917	936	260	678	610	556	270	412	412
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	1	1	3	1	0	0	0	
		U.S.S.R	1	13	5	0	0	37	0	0	0	0	2	5	4	4	0	0	0	0	0	0	0	0	0	0	
	AT.W	ARUBA	20	20	30	30	30	30	30	30	30	30	30	23	20	16	13	9	5	10	10	10	10	10	10	10	10
		BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	69	45	29	42	50	46	74	25	71	58	44	44
		BRASIL	28	14	41	53	51	16	43	7	15	73	46	52	27	48	148	23	286	40	17	34	96	66	28	51	81
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1

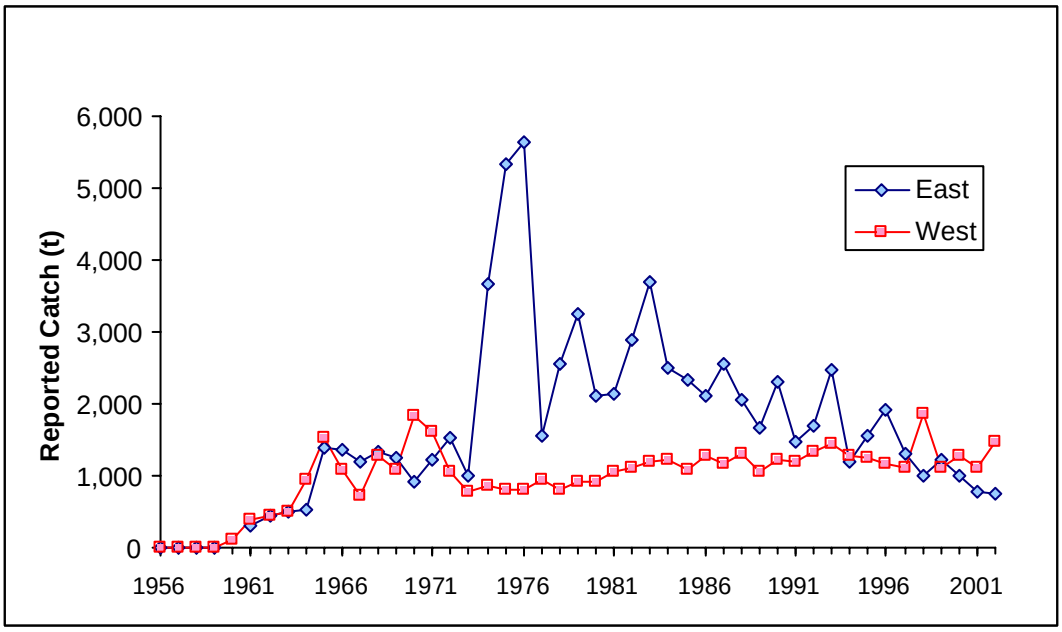
			1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
		CHINESE TAIPEI	19	0	2	5	8	20	6	4	6	15	10	9	54	56	41	18	27	36	31	5	11	2	19	5	6
		CUBA	0	4	9	40	26	33	51	3	22	51	8	52	14	18	62	21	57	7	6	5	11	0	0	0	
		DOMINICAN REP.	0	0	0	0	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90	40	40	40	40	40	40
		EC-ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	5	3	36	3	15	20	6	14
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
		GRENADA	0	31	37	40	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151	119	56	83	87	148	148
		JAPAN	42	8	3	4	1	26	63	16	20	20	11	3	9	13	15	33	0	1	8	2	4	17	3	11	3
		KOREA	0	3	2	5	11	10	5	0	7	28	2	0	0	6	12	0	2	0	1	1	7	4	0	0	
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	4	97	6	29
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	4	9	14	0	0	
		NETHERLAND.ANT	28	28	21	21	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15	15	15	15	15	15	15
		PANAMA	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4	4	4	2	1	3	0	1	
		TRINIDAD & TOBAGO	0	0	0	0	0	0	0	64	58	14	25	35	24	11	9	4	4	56	101	101	104	10	0	4	3
		U.S.A	261	308	308	308	382	502	319	656	478	241	399	354	328	243	188	281	213	122	102	168	106	160	133	89	37
		VENEZUELA	9	3	11	25	13	18	16	14	10	32	12	24	4	8	12	16	58	34	21	14	51	89	39	26	23
DISCARD	AT.W	U.S.A	0	0	0	0	0	0	0	0	0	0	0	42	57	57	62	64	36	63	28	29	69	57	27	71	45

SAI-Table 3. Estimated catches (including landings and dead discards, in t) of spearfish "only" in the Atlantic Ocean, by fisheries and by gears, 1976-2000 (as modified by the Working Group for use in 2001 assessment).

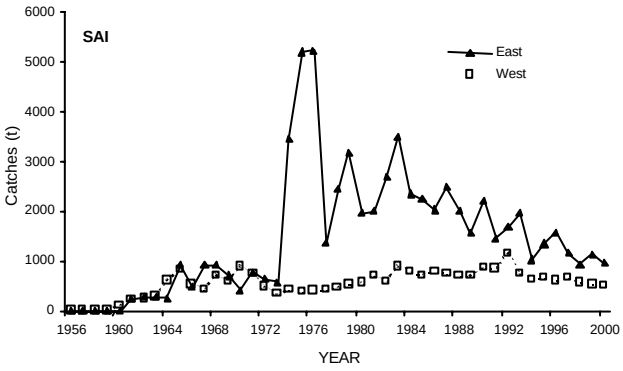
				1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TOTAL CATCH				966	804	573	581	680	763	823	708	742	611	768	704	760	646	662	363	200	1078	634	485	299	314	951	584	502
LANDING	AT. E			617	434	342	302	395	470	510	495	362	316	331	340	316	370	473	144	120	550	242	262	138	239	171	233	135
	AT.W			349	370	231	279	285	293	313	212	380	294	437	364	444	277	189	220	80	528	391	217	160	75	780	351	367
LANDING	AT.E	LL		412	184	88	67	125	154	184	183	140	88	79	93	60	100	100	37	28	438	144	184	79	171	85	152	75
		SURF		205	250	254	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60
	AT.W	LL		349	370	231	279	285	293	313	212	380	294	437	364	444	277	189	158	67	493	352	185	135	75	780	351	367
		UNCL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	13	35	40	32	26	0	0	0	0
DISCARD	ATW	LL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0
	EAST	CHINA.PR		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	3	2	4	1
		CHINESE TAIPEI		149	50	5	17	4	10	43	14	6	8	1	0	0	6	10	0	0	389	87	138	37	125	59	81	41
		CUBA		127	55	53	36	71	65	102	145	85	17	53	50	18	45	47	0	0	0	0	0	0	0	0	0	0
		EC-ESPANA		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	3	1	1	1	30	14
		EC-FRA.ESP		205	250	254	235	270	316	326	312	222	228	252	247	256	270	373	107	92	112	98	78	59	68	86	81	60
		JAPAN		3	19	9	10	19	28	18	22	24	38	22	18	26	30	30	9	26	28	36	26	25	30	22	37	19
		KOREA		104	39	14	4	31	20	21	2	25	26	2	20	13	15	12	27	3	3	5	5	8	4	0	0	
		NEI-1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	13	9	6	8	0	0	
		PANAMA		28	11	3	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		1	11	4	0	0	31	0	0	0	0	2	5	3	3	0	0	0	0	0	0	0	0	0	0	
	WEST	BRASIL		105	132	107	57	60	29	42	53	70	84	195	93	94	84	50	49	53	168	51	84	53	36	90	238	191
		CHINA.PR		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	2	2	2	7	3
		CHINESE TAIPEI		107	5	8	13	28	61	16	27	39	24	54	22	246	115	42	55	6	187	202	33	26	2	110	28	17
		CUBA		0	87	42	111	93	101	130	25	147	79	42	119	64	37	64	62	13	35	40	32	26	0	0	0	
		EC-ESPANA		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	22	50
		JAPAN		91	15	6	16	21	18	72	6	14	18	17	3	13	9	10	40	1	1	2	3	4	1	8	13	9
		KOREA		0	62	12	14	40	31	14	0	45	44	12	1	0	11	13	0	1	0	7	7	15	4	0	0	
		MEXICO		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	16	16	0	5	549	34	89
		NEI-1		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	26	26	21	16	0	0	
		PANAMA		0	17	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		TRINIDAD & TOBAGO		0	0	0	0	0	0	0	0	0	0	54	75	10	7	1	0	0	62	0	0	2	0	0	0	
		VENEZUELA		46	51	53	67	43	53	40	101	65	45	62	52	16	13	10	14	7	45	44	13	12	10	21	8	9
DISCARD	AT.W	Sum	U.S.A.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0



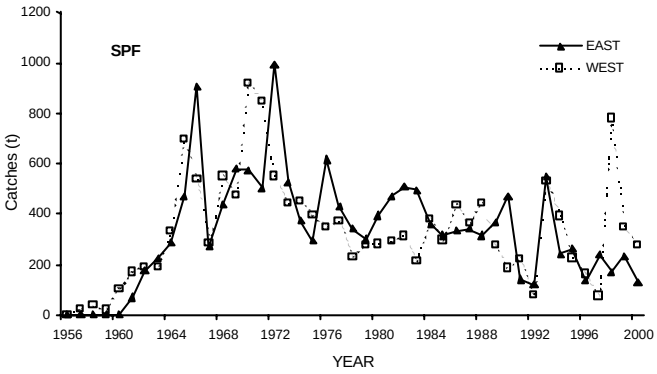
SAI-Fig. 1. Distribution of estimated sailfish/spearfish catches in the Atlantic (landings and dead discards, reported and carried over) during 1956-1997. The east/west boundary is indicated by the bold line.



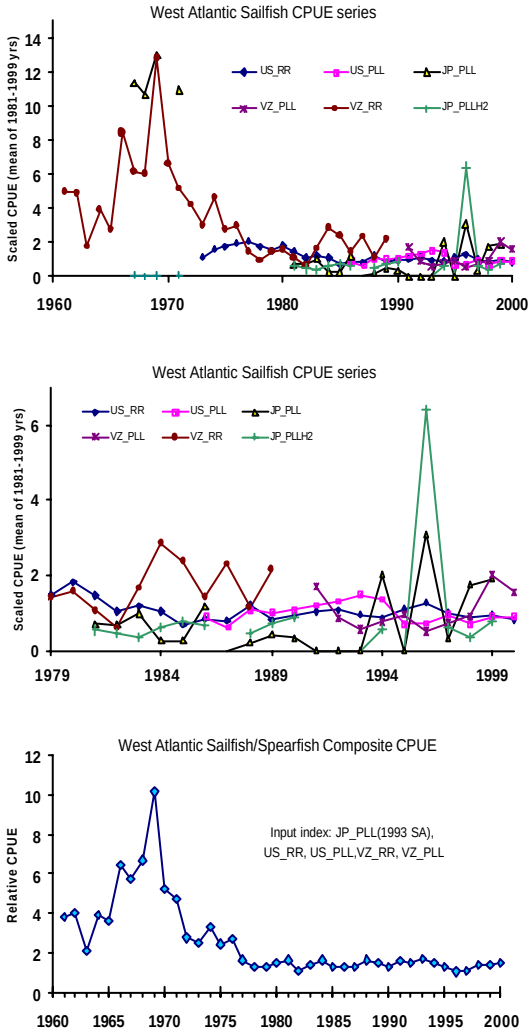
SAI-Fig. 2. Evolution of estimated sailfish/spearfish catches in the Atlantic (landings and dead discards, reported and carried over) in the ICCAT Task I database during 1956-2002 for the east and west stocks. The 2002 catch is preliminary and is likely to be an underestimate.



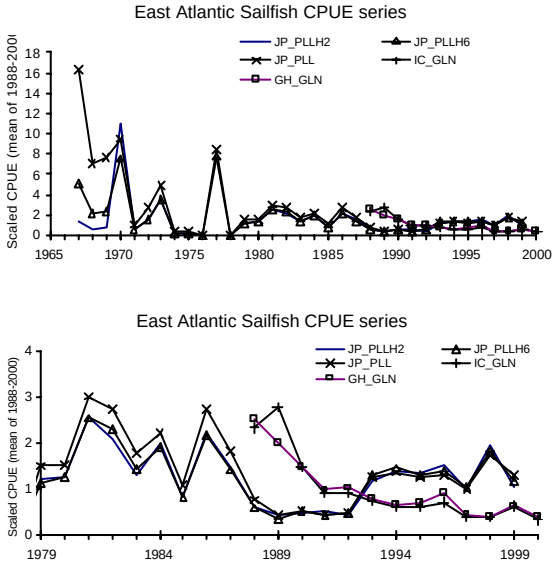
SAI-Fig. 3. Estimated sailfish "only" catches based on the new procedure for splitting combined SAI/SPF catches from 1956-2000.



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



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



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

8.9 SWO-ATL-ATLANTIC SWORDFISH

SWO-ATL-1. Biology

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

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

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

SWO-ATL-2. Description of the fisheries

Directed longline fisheries from EC-Spain, the United States and Canada have operated since the late 1950s or early 1960s, and harpoon fisheries have existed since the late 1800s. Other directed swordfish fisheries include fleets from Brazil, Morocco, Namibia, EC-Portugal, South Africa, Uruguay, and Venezuela. The primary by-catch or opportunistic fisheries that take swordfish are tuna fleets from Chinese Taipei, Japan, Korea and EC-France. The tuna longline fishery started in 1956 and has operated throughout the Atlantic since then, with substantial catches of swordfish that are produced as a by-catch in their tuna fisheries.

As a result of ICCAT and domestic regulatory recommendations, there are three recent developments in the fisheries of some nations: (1) Starting in February 2000, Japanese vessels fishing in the North Atlantic were required to discard all swordfish as the Japanese block quota had been reached; (2) For 2001 and thereafter, U.S pelagic longline fishing was prohibited or restricted in five areas and times to reduce incidental catches including juvenile swordfish; and (3) The Canadian directed swordfish longline fishery has finished at the end of August from 1999-2000 due to reduced quota. The season was extended to November in 2002 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. One concern of all these developments is the effect on the data available, its continuity and complexity and therefore its interpretation.

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

Total Atlantic. The total Atlantic estimated catch of swordfish (North and South, including discards) reached an historical high of 38,624 t in 1995, 13% higher than the previous peak catch of 34,098 t in 1989 **(SWO-Table 1** and **SWO-Figure 2**). The 2002 reported catch was 23,176 t. A substantial number of countries have reported their 2002 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 13,200 t **(SWO-Table 1** and **SWO-Figure 2)**, although the 2002 landings plus discards were reduced to 9,607 t in response to ICCAT regulatory Recommendations. In 2002, there has been a 53% decrease in reported catches (including discards) since the 1987 peak in North Atlantic landings (20,236 t), in response to ICCAT Recommendations. Reduced landings have also been attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic. In addition, some fleets, including the

United States, EC-Spain, EC-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates for swordfish.

South Atlantic. The South Atlantic estimated catch (landings plus discards) was relatively low (generally less than 5,000 t) before 1980. Since then, landings increased continuously through the 1980s and the early 1990s to a peak of 21,780 t in 1995 (levels that match the peak of North Atlantic harvest). The increase of landings was in part due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Then the estimated landings decreased to 13,835 t by 1998 (36% reduction). The reduction in catch following the peak in 1995 was in response to the regulations, and partly due to a shift to other oceans and to a shift in target species. In 2002, the 13,569 t reported catches were similar to the 2001 level. The Committee noted that data provided to ICCAT indicated that chartering arrangements have increased in the South Atlantic with a concurrent increase in reported catch.

Discards. Only the U.S. (1991-2002), Canada (1997-2002), and Japan (2000-2002) 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 2000-2002 are based on radio reports and logbooks.

SWO-ATL-3. State of the Stocks

A new assessment of North and South Atlantic swordfish stocks was conducted in 2002. In the assessment, updated CPUE and catch data were examined. Sex and age-specific (North Atlantic) and biomass standardized catch rates (North and South Atlantic) from the various fleets were updated. The updated North Atlantic CPUE data show similar trends to previous years, and also show signs of improvement in stock status since 1998. In particular, the recruitment index (1997-2001) and the catch at age used in the 2002 North Atlantic assessment show signs of substantially improved recruitment (age 1), which has manifested in several age classes and the biomass index. The updated recruitment index also showed a high value in 1999 and 2000. These recent improvements in recruitment have already manifested in several age classes and in the biomass index of some fisheries, and have allowed for increases in spawning biomass and a more optimistic outlook. The CPUE patterns in the South Atlantic by fleet show contradictory patterns. Lack of important CPUE information from some fleets fishing in the South Atlantic prevents the Committee from reconciling these conflicts.

North Atlantic

In 2002, the status of the North Atlantic swordfish resource was again assessed using both non-equilibrium stock production models and sequential population analyses (SPA) based on catch **(SWO-Table 1)** and CPUE data through 2001. The current Base Case assessment indicates that the North Atlantic swordfish biomass has improved due to strong recruitment since 1997 (1996 year-class), combined with recent reductions in reported catch, especially compared to the peak catch values of 1987 **(SWO-Figure 3).** In particular, strong recruitment since 1997 has manifested in several age classes and is evident in the catch rates from several fleets. The strong recruitments of the late 1990s have already promoted improvement in spawning stock biomass and should result in further improvement, if these year-classes are not heavily harvested. The pattern of decline in stock size followed by stabilization and rebuilding is reflected in the CPUEs for several fisheries. An updated estimate of maximum sustainable yield from production model analyses is 14,340 t (with estimates ranging from 11,500 to 15,500 t). Since 1997, North Atlantic swordfish catches have been below 14,340 t **(SWO-Figure 4)**; preliminary estimates (reported plus carried over) of catches in 2001 were about 9,800 t, but this level is probably an underestimate.

The biomass at the beginning of 2002 was estimated to be 94% (range: 75 to 124%) of the biomass needed to produce MSY. The 2001 fishing mortality rate was estimated to be 0.75 times the fishing mortality rate at MSY (range: 0.54 to 1.06). The replacement yield for the year 2003 was estimated to be about the MSY level. As the TAC for North Atlantic swordfish for 2002 is 10,400 t, it is likely that biomass will increase further under current catch levels. The TAC set for 2003-2005 is 14,000 t [Ref. 02-02].

Overall, the sequential population analysis conducted for North Atlantic swordfish in 2002 was consistent with the stock production model results, particularly in terms of the trends in population trajectories. The SPA point estimates for age 1 gradually increased in the early 1980s, shifting to a somewhat higher level from 1985 to 1989 **(SWO-Figure 5)**. Subsequently, the abundance of age 1 shifted back to a lower level between 1990 and 1996 and then increased to the highest levels of the time series in 1999 and 2000. The trends for ages 2, 3 and 4 are

similar with the appropriate time lags, but the pattern is less pronounced. The estimated abundance of older (5+) fish declined to about one-third of the numbers in 1978, but increased somewhat after 1998. The estimated fishing mortality rate generally increased for all ages until 1996, after which they decreased sharply. The fishing mortality rate during the last three years averaged about 0.38/year for age 5+. Given this fishing mortality pattern, the spawning biomass likely will increase to a level exceeding 30% of the maximum at equilibrium, largely owing to the very large recruitments estimated for 1997-2000.

South Atlantic

The Committee noted that total catches have been reduced since 1995, as was recommended by the SCRS although some countries have increased their reported catch levels. 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 that could result in rapid stock depletion, and in declining CPUE trends of some by-catch fisheries.

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

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

SWO-ATL-4. Outlook

North Atlantic

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

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

South Atlantic

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

SWO-ATL-5. Effects of current regulations

This report only takes into account catch data transmitted to the SCRS by the different countries and which were available during the meeting. Total catch is considered provisional and subject to revision for 2002 (**Table 1**, see footnote).

Canada, Chinese Taipei, Japan, South Africa, EC-Spain, and the United States provide catch-at-size data based on national sampling. Other nations are either partially (e.g., Brazil, EC-Portugal) or completely substituted from

these data. The SCRS considers that it is not appropriate to apply these scientific estimates for purposes of evaluating compliance, and therefore only summary data are provided.

Catch limits

The total allowable catch in the North Atlantic in 2002 was 10,400 t (10,200 t retained and 200 t discarded). The reported landings were 9,000 t and the estimated discards were 607 t. Reports for year 2002 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 13,569 t and reported discards were 1 t. Reports for year 2002 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 2002.

In 2000, the percentage of swordfish reported landed (throughout the Atlantic) less than 125 cm LJFL was about 21% (in number) overall for all nations fishing in the Atlantic. If this calculation is made using reported landings plus estimated discards, then the percentage less than 125 cm LJFL would be about 25%. The Committee noted that this proportion of small fish did not increase very much even though recruitment in the North has been at a high level in recent years.

Other implications

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

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

For 2001 and thereafter, the United States introduced time and area closures in the North Atlantic to protect small swordfish and other species caught incidentally by longline. These closures have reduced the catches attributed to the United States, and may also have redistributed the fleet. The effects on the CPUE data are unknown, although analyses conducted to examine this impact did not reveal a measurable effect on catch rates in 2001.

SWO-ATL-6. Management recommendations

North Atlantic

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

South Atlantic

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

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

ATLANTIC SWORDFISH SUMMARY

	North Atlantic	**South Atlantic**
Maximum Sustainable Yield[1]	14,340 t (11,580-15,530)[4]	Not estimated
Current (2002) Yield[2]	9,607 t	13,569 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 [Ref. 99-2]; 125/119 cm LJFL minimum size [Ref. 99-2].	TAC target [Ref. 01-2]; 125/119 cm LJFL minimum size [Refs. 90-2 & 95-10].

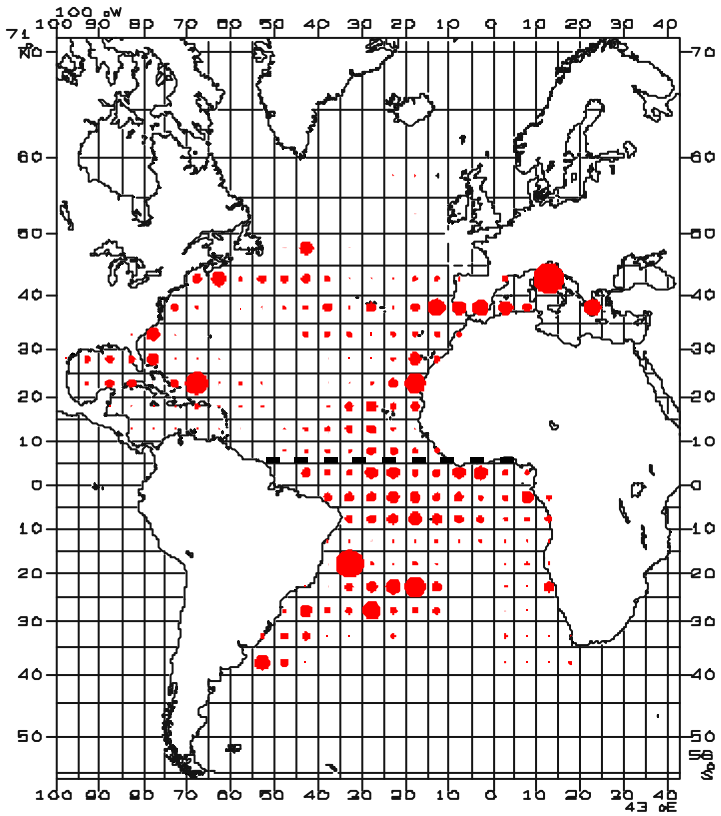
[1] Base Case production model results based on catch data 1950-2001.
[2] Provisional and subject to revision, see footnote on SWO-ATL-Table 1.
[3] For next fishing year.
[4] 80% confidence intervals are shown.

SWO-Table 1. Estimated catches (landings and discards, t) of Atlantic swordfish, by major area, gear and flag, 1978-2002.

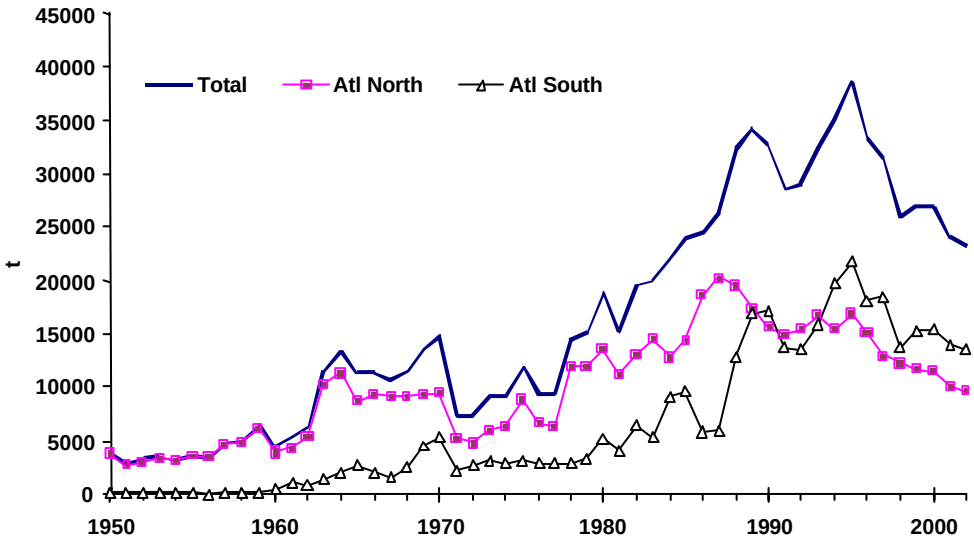
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		TOTAL	*14601*	*15231*	*18881*	*15155*	*19662*	*19929*	*21930*	*23969*	*24380*	*26266*	*32469*	*34098*	*32796*	*28647*	*29027*	*32659*	*35104*	*38624*	*33324*	*31432*	*26031*	*26897*	*26929*	*24092*	*23176*
		AT.N	*11835*	*11937*	*13558*	*11180*	*13215*	*14527*	*12791*	*14383*	*18486*	*20236*	*19513*	*17250*	*15672*	*14934*	*15394*	*16717*	*15475*	*16844*	*15172*	*12997*	*12195*	*11590*	*11421*	*9977*	*9607*
		AT.S	*2766*	*3294*	*5323*	*3975*	*6447*	*5402*	*9139*	*9586*	*5894*	*6030*	*12956*	*16848*	*17124*	*13713*	*13633*	*15942*	*19629*	*21780*	*18152*	*18435*	*13835*	*15306*	*15508*	*14078*	*13569*
		UNCL	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*37*	*0*
	AT.N	Longline	11123	11177	12831	10549	13019	14023	12664	14240	18269	20022	18927	15348	14026	14208	14288	15641	14309	15765	13787	12186	10783	10449	9642	8401	8599
		Other Surf.	712	760	727	631	196	504	127	143	217	214	586	1902	1646	511	723	669	458	553	797	360	928	612	659	686	401
Discards	AT.N	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	562	439	476	525	1119	885	600
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	12	9	4	1	6	8
Landings	AT.N	BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	16	12	13	19	10
		BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0
		CANADA	2314	2970	1885	561	554	1088	499	585	1059	939	898	1247	911	1026	1547	2234	1676	1610	739	1089	1115	1119	968	1079	959
		CANADA-JPN	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	73	86	104	132	40	337	304	22	102	90
		CHINESE TAIPEI	164	338	134	182	260	272	164	152	157	52	23	17	270	577	441	127	507	489	521	509	286	285	347	299	286
		CUBA	281	128	278	227	254	410	206	162	636	910	832	87	47	23	27	16	50	86	7	7	7	7	0	0	10
		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-ESPANA	3622	2582	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6953	5547	5140	4079	3993	4595	3968	3957
		EC-FRANCE	0	0	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	84	97	164	110	104	122	0	74
		EC-IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	15	132	81	35	17	5
		EC-ITALY	8	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-MARTINIQUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		EC-PORTUGAL	17	29	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1617	1703	903	773	777	732	735	765
		EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	5	11	0	2	1	0	0
		FAROE-ISLANDS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	
		GRENADA	0	0	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1	4	15	15	42	84	0	54
		ICELAND	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
		JAPAN	946	542	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	933	1043	1494	1218	1391	1089	161	0	0
		KOREA	634	303	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16	19	15	0	0	0	0	0
		LIBERIA	0	0	5	38	34	53	0	24	16	30	19	35	3	0	7	0	0	0	0	0	0	0	0	0	
		MAROC	11	208	136	124	91	129	81	137	181	197	196	222	91	110	69	39	36	79	462	267	191	119	114	523	223
		MEXICO	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	0	0	14	28	24	37	27	34
		NEI-1	0	0	0	0	0	0	0	0	0	0	76	112	529	0	0	0	0	0	0	0	0	0	0	0	
		NEI-2	0	0	0	12	0	0	0	0	14	3	131	190	185	43	35	111	0	0	0	0	0	0	0	0	
		NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		PANAMA	76	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
		POLAND	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		RUMANIA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		SENEGAL	0	0	0	0	0	0	0	0	0	0	0	1	0	6	6	0	0	0	0	0	0	0	0	0	
		SEYCHELLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0
		SIERRA LEONE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	23	0	4	3	1	0	1	0	0	0
		TRINIDAD & TOB.	0	0	0	0	0	21	26	6	45	151	42	79	66	71	562	11	180	150	158	110	130	138	41	75	92
		U.S.A	3684	4619	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4310	3852	3783	3366	4026	3559	2987	3058	2908	2863	2217	2400
		U.S.S.R	23	10	21	0	69	0	16	13	18	4	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	1	5	5	3	3	2	2
		VENEZUELA	46	182	192	24	25	35	23	51	84	86	2	4	9	75	103	73	69	54	85	20	37	30	30	21	34

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Discards	AT.N	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	52	35	50	26	33
		JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	580	571	314
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	215	383	408	708	526	588	446	433	494	490	293	261
Landings	AT.S	Longline	2749	3265	5179	3938	6344	5307	8920	8863	4951	5446	12404	16398	16705	13287	13173	15547	17365	20806	17799	18239	13649	14752	15348	13372	13171
		Other Surf.	17	29	144	37	103	95	219	723	943	584	552	450	419	426	460	395	2264	974	352	175	176	548	158	706	398
Discards	AT.S	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	1
		Other Surf.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landings	AT.S	ANGOLA	0	0	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0	0	0	0	0	0	0	
		ARGENTINA	4	0	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	0	0	0	0	0	0	5	
		BELIZE.SH.OB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	17	8	0	0
		BENIN	0	0	0	18	24	0	86	90	39	13	19	26	28	28	26	28	25	24	24	10	0	3	0	0	
		BRAZIL	372	521	1582	655	1019	781	468	562	753	947	1162	1168	1696	1312	2609	2013	1571	1975	1892	4100	3847	4721	4579	4082	2910
		BULGARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		CAMBODIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	
		CHINA.PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	534	344	200	423
		CHINESE TAIPEI	625	1292	702	528	520	261	199	280	216	338	798	610	900	1453	1686	846	2829	2876	2873	2562	1147	1168	1303	1149	1073
		COTE D'IVOIRE	0	0	0	0	0	0	10	10	10	10	12	7	8	18	13	14	20	19	26	18	25	26	20	19	19
		CUBA	319	272	316	147	432	818	1161	1301	95	173	159	830	448	209	246	192	452	778	60	60	0	0	0	0	0
		EC-ESPANA	0	0	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290	9622	8461	5832	5758	6388	5789	5741
		EC-FRA.ESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0
		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	380	389	441	384	381	392	393	380
		EC-U.K	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
		G.EQUATORIAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	
		GHANA	0	0	110	5	55	5	15	25	13	123	235	156	146	73	69	121	51	103	140	44	106	121	117	531	372
		HONDURAS-OB.SH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	4	5	2	8	0	0	0
		JAPAN	503	782	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	4699	3619	2197	1494	1186	775	788	694	814
		KOREA	699	303	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164	7	18	7	0	10	0	2
		LIBERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	26	28	28	28	28	28	0	0	
		LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794	0	0	0	0	0	0	0	
		NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	730	469	751	504
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	856	439	0	0	0	0	0	0	0	0	0	0	0	
		NIGERIA	0	0	0	0	0	83	69	0	0	0	0	0	0	0	3	0	857	0	9	0	0	0	0	0	
		PANAMA	83	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105	0	0	
		PHILIPPINES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1
		SAO TOME & PRIN.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	14	14	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	6
		SOUTH AFRICA	0	28	31	9	3	7	0	8	5	5	4	0	0	5	9	4	1	4	1	1	169	76	230	397	500
		TOGO	0	0	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	14	64	0	0	0	0	0	
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	171	396	160	179	142	43	53
		U.S.S.R	161	70	154	40	26	46	158	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UK-S.HELENA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4
		URUGUAY	0	0	0	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	499	644	760	889	650	713		768
Discards	AT.S	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	21	10	6	1	0	1
Landings	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0
Discards	UNCL	Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0
Landings	UNCL	St. Vincent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0
Discards	UNCL	U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0

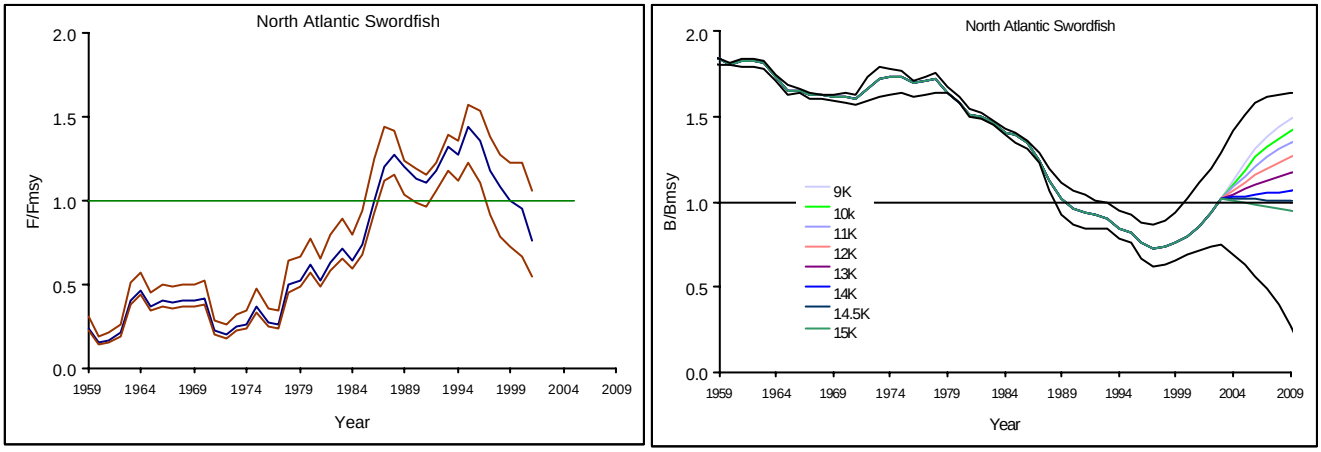
Blank cells indicate that catches were not reported to ICCAT.



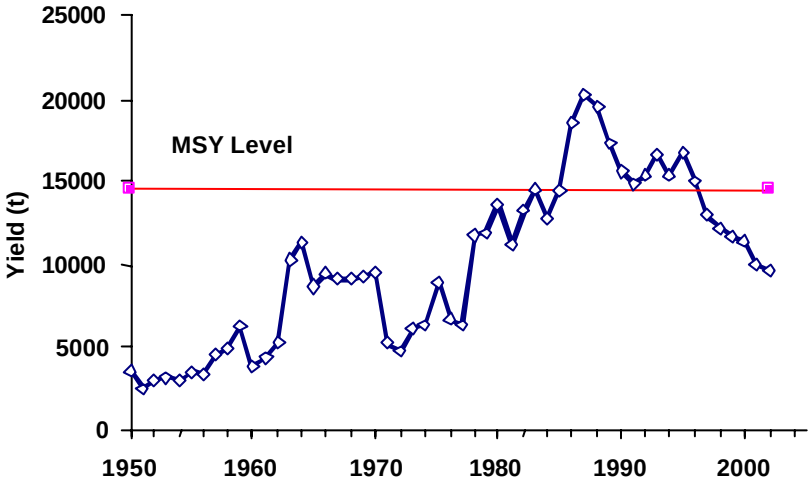
SWO-ATL-Fig. 1. Geographical distribution of swordfish longline catches in 1997. The dashed line at 5° is the assumed boundary between North and South management units.



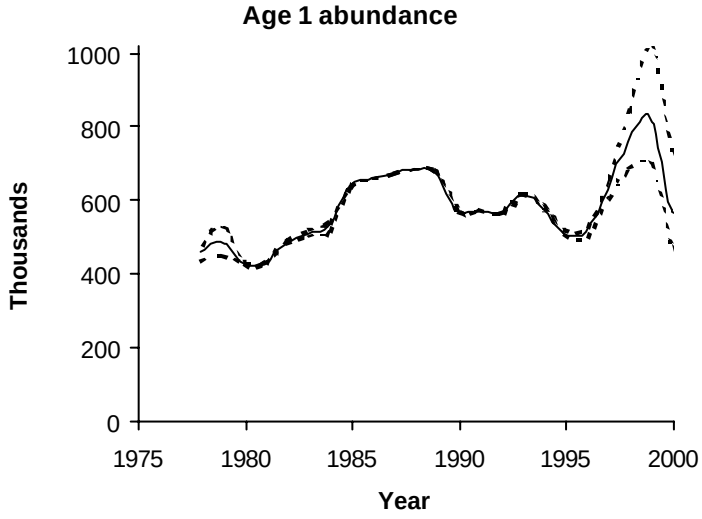
SWO-ATL Fig 2. Reported catches of Atlantic swordfish (in t, including discards) for 1950-2002.



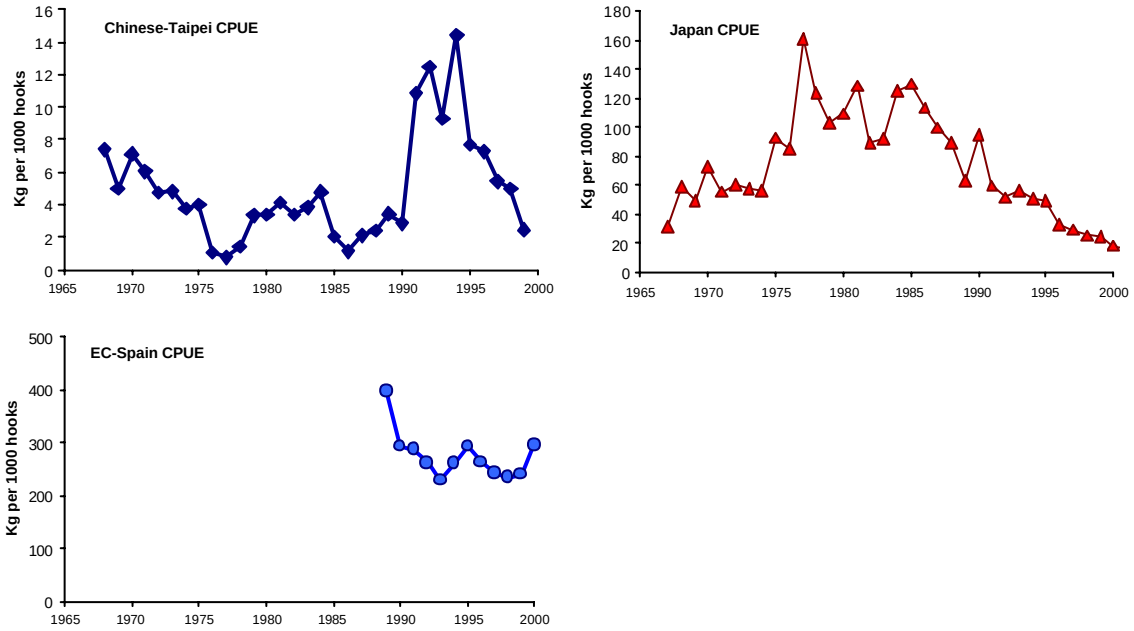
SWO-ATL-Fig 3. North Atlantic swordfish assessment results. Left panel: Estimated fishing mortality rate relative to F_{MSY} (F/F_{MSY}) for the period 1959-2001 (median with 80% confidence bounds based on bootstrapping are shown). Right panel: Estimated biomass relative to biomass at MSY (B/B_{MSY})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



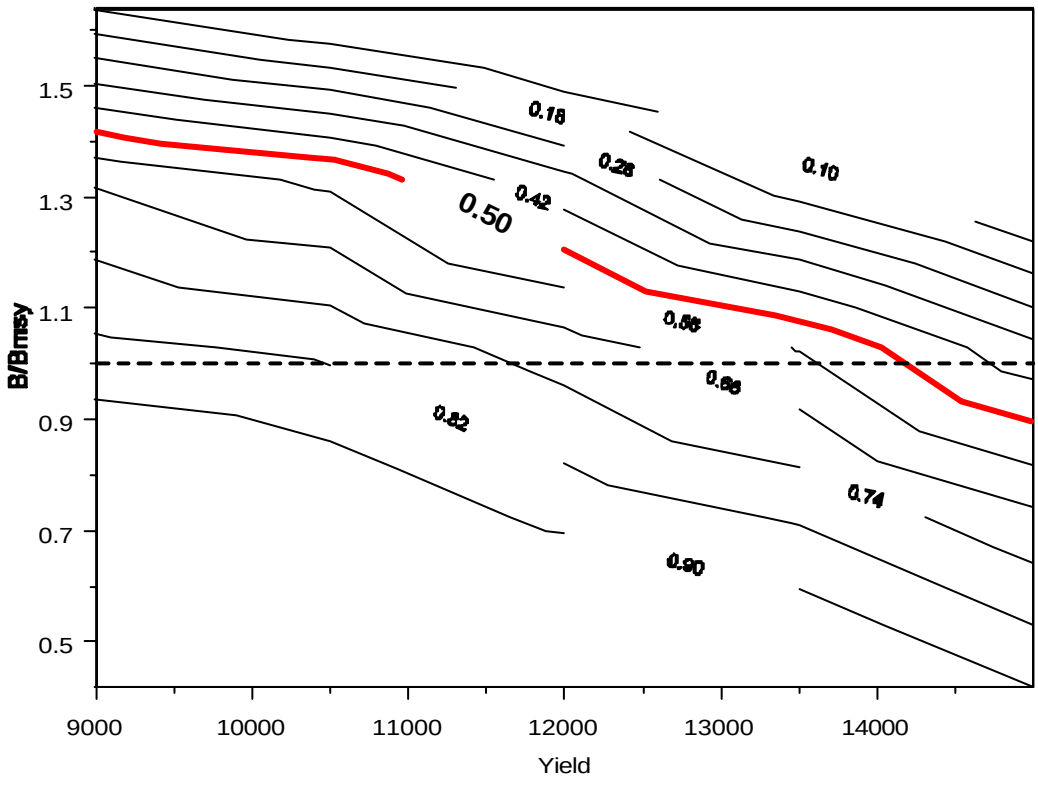
SWO-ATL Fig 4. Annual yield (t) for North Atlantic swordfish relative to the estimated MSY level.



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



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



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

8.10 SWO-MED – MEDITERRANEAN SWORDFISH

SWO-MED-1. Biology

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

Swordfish feed mainly in the pelagic zone and its prey is comprised mostly of cephalopods and pelagic fish species. Spawning occurs in the central Mediterranean Sea and around the Balearic Islands and probably in other locations. It has been described that in the Mediterranean, swordfish spawn during the spring-summer months and young swordfish grow very rapidly, reaching more than 80 cm by the end of their first year of life. Females grow faster than males and reach a larger maximum size. Female swordfish may first reach sexual maturity in their third year of life at a length of about 125 cm, while males may first reach maturity one year earlier; this is substantially younger than the age of maturity assumed for females of the Atlantic stocks (age 5).

SWO-MED-2. Description of the fisheries

Mediterranean swordfish fisheries are characterized by high catch levels. It should be noted that average annual reported catches (on average about 14,500 t from 1984 to 2001; **Table 1**) are similar to those of the North Atlantic. The Mediterranean is a much smaller body of water compared to the North Atlantic. However, the potential reproductive area in the Mediterranean is probably relatively larger than that in the Atlantic. Further, the productivity of the Mediterranean Sea is thought to be very high.

Swordfish fishing has been carried out in the Mediterranean using harpoons and driftnets (drifting gillnets) at least since Roman times. Currently, swordfish fishing is carried out all over the Mediterranean Sea. The biggest producers of swordfish in the Mediterranean Sea in the recent years (1997-2001) were Italy (44%), Morocco (23%), EC-Greece (10%), and EC-Spain (9%). Also, Algeria, Cyprus, Malta, Tunisia, and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, Libya, and EC-Portugal. The Committee recognized that there may be additional fleets taking swordfish in the Mediterranean, for example, Israel, Lebanon, Egypt and Monaco, but the data are not reported to ICCAT or FAO.

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. In 2001 catches were 15,155 t.

In recent years, the main fishing gears used are surface longline (47% of the total catch) and gillnet. Most of the above-mentioned countries operate longline fisheries, and in 2001 large-scale driftnet fisheries were mostly limited to Italy (>4,000 t) and Morocco (>2,000 t). There are also other countries known to be fishing with driftnets that do not report their catches. Swordfish are also caught with harpoons and traps, but trap gears are not used for targeting swordfish. It should be noted that since the beginning of 2002 driftnet fishing has been banned in EC countries and this will influence the catch data beginning in 2002.

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

SWO-MED-3. State of the stocks

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

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

SWO-MED-4. Outlook

Assessment results indicated the presence of a stable recruitment pattern and suggested that the current exploitation pattern and level of exploitation are sustainable, at least in the short-term. Average catch over the past decade has been about 15,000 t per year (**SWO-MED-Table 1, SWO-MED-Figure 1**). The Committee expects that annual catches of about this magnitude will keep the stock at about the present level, at least over the short-term.

SWO-MED-5. Effects of current regulations

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

SWO-MED-6. Management recommendations

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

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

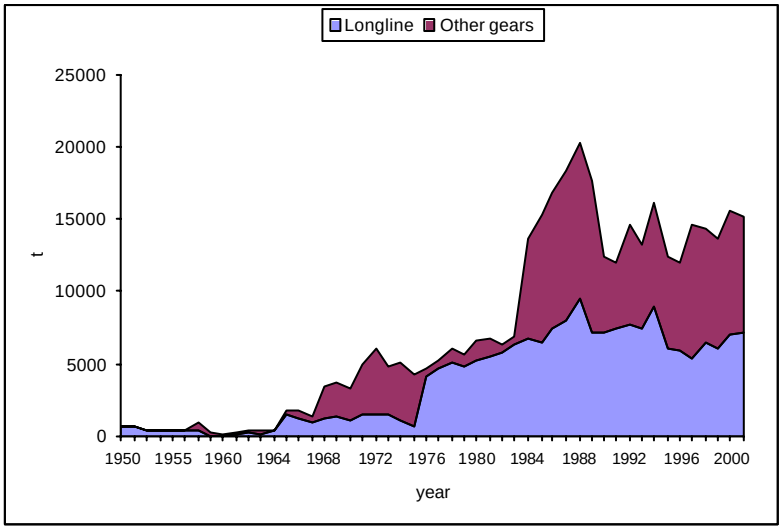
In addition, given the uncertainty of the location of the boundary between the Mediterranean and North Atlantic stocks, it is important to identify the biological origin of those catches reported at or near the boundary so that the resulting knowledge can be considered in the management of the North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

MEDITERRANEAN SWORDFISH SUMMARY	
Maximum Sustainable Yield	Not estimated
Current (2001) Yield	15,155 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

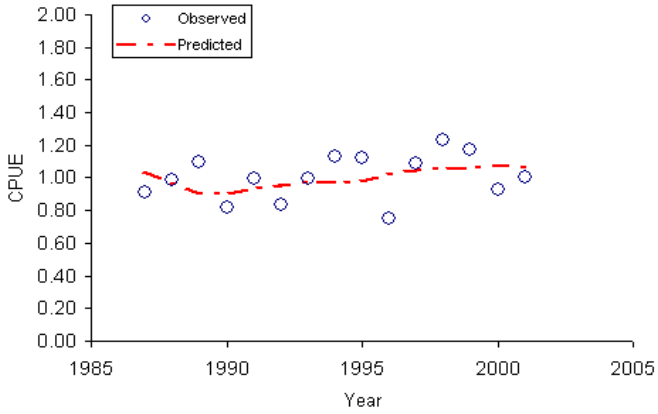
SWO-MED-Table 1. Estimated catches (landings and discards, t) of swordfish in the Mediterranean Sea, 1978-2002.

	1978	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002***
Total	5958	5547	6579	6813	6343	6896	13666	15292	16765	18320	20365	17762	12441	11997	14726	13265	16082	12430	12053	14693	14369	13700	15570	15155	10596
Longline	*5046*	*4877*	*5115*	*5418*	*5770*	*6313*	*6749*	*6493*	*7505*	*8007*	*9476*	*7065*	*7184*	*7393*	*7648*	*7377*	*8985*	*6084*	*5884*	*5389*	*6496*	*6098*	*6961*	*7179*	5849
Other gears	*912*	*670*	*1464*	*1395*	*573*	*583*	*6917*	*8799*	*9260*	*10313*	*10889*	*10697*	*5257*	*4604*	*7078*	*5888*	*7097*	*6346*	*6169*	*9304*	*7873*	*7602*	*8609*	*7976*	4747
ALBANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13	0	0	
ALGERIE	320	521	650	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	807	807	807	825	709	816	1081	814
CHINESE TAIPEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	3	0	0	0	0	
CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	
CYPRUS	82	98	72	78	103	28	63	71	154	84	121	139	173	162	73	116	159	89	40	51	61	92	82	135	104
EC-ESPANA	720	800	750	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1379	1186	1264	1443	906	1436	1484	1498
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	12	27
EC-GREECE	0	0	0	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2520	974	1237	750	1650	1520	1960	1730	975
EC-ITALY	4506	3930	4143	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	6725	5286	6104	6104	6312	7515	6388	3539
EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	115	8
JAPAN	2	3	1	0	5	6	19	14	7	3	4	1	2	1	2	4	2	4	5	5	7	5	0	0	
LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	8	6	
MALTA	136	151	222	192	177	59	94	172	144	163	233	122	135	129	85	91	47	72	72	100	153	187	175	102	253
MAROC	172	0	0	0	0	43	39	38	92	40	62	97	1249	1706	2692	2589	2654	1696	2734	4900	3228	3238	2708	3026	3379
NEI-2	0	0	728	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0	0	0	0	0	0	0	
TUNISIE	0	0	0	7	19	15	15	61	64	63	80	159	176	181	178	354	298	378	352	346	414	468	483	567	
TURKEY	20	44	13	70	40	216	95	190	226	557	589	209	243	100	136	292	533	306	320	350	450	230	373	510	

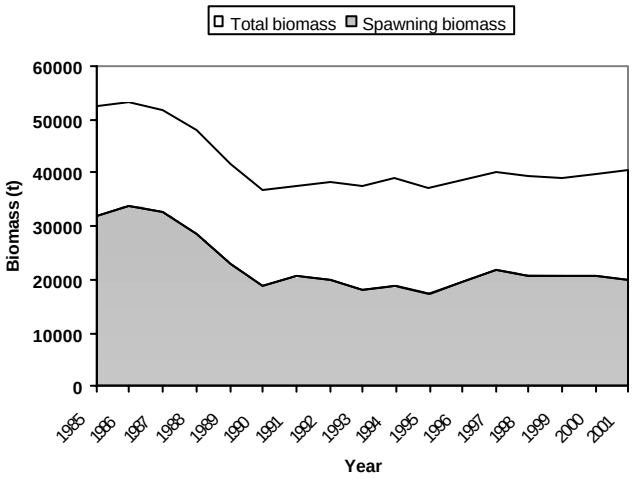
* 2002 data were not used in the assessment.
This table was valid in May 2003. Since the assessment, a revised figure for T urkey 2001 of 360 t was received.
Blank cells for 2002 indicate that catches were not reported to ICCAT.



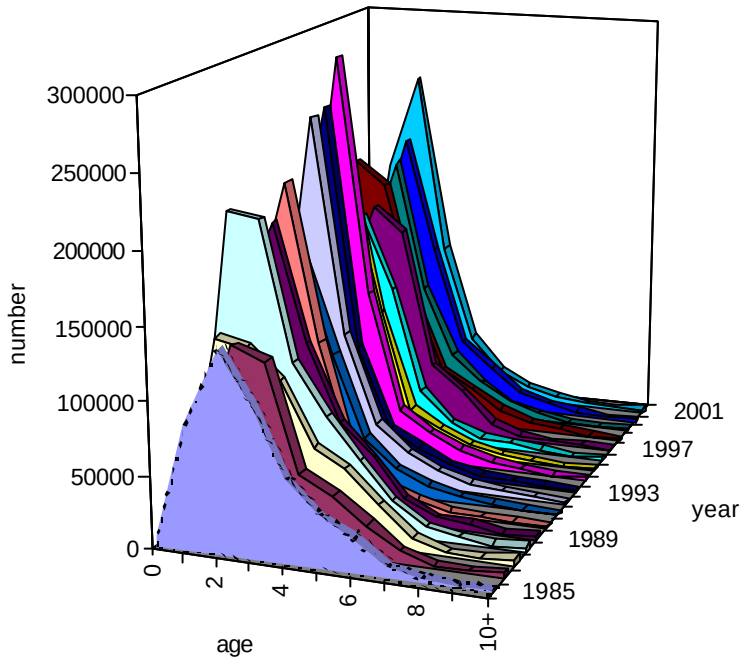
SWO-MED-Fig. 1. Cumulative estimates of swordfish catches (t) in the Mediterranean by major gear type, 1950-2001.



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



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



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

8.11 SBF-SOUTHERN BLUEFIN TUNA

No formal stock assessment was conducted in 2003. However, this report updates description of fisheries and state of stock sections, and relevant catch and fishery information

SBF-1. Biology

Southern bluefin tuna are distributed exclusively in the southern hemisphere of three oceans. The only known spawning ground is located in an area south of Java, Indonesia and off northwest Australia. Juveniles migrate southwards along the Australian west coast and stay in the coastal waters of southwest, south, and southeast Australia. As fish grow, they extend their distribution to cover the circumpolar area throughout the Pacific, Indian and Atlantic Oceans.

Southern bluefin tuna are considered to be mature at age 8 at a length of 155 cm. Though the life span of this species was considered to be about age 20 from the tagging results, recent analysis revealed that a significant number of fish larger than 160 cm were older than age 25. The maximum age obtained from otolith analysis was age 42. Age-specific natural mortality, higher for young fish and lower for old fish, is supported by tagging experiments and applied for stock assessment. Southern bluefin tuna are a unique example of an acceleration of growth rate observed through the 1960s to the 1980s, that was supported by tagging experiments in that period. This acceleration of growth rate is partially due to the fact that the stock has been faced with high fishing pressure in the last fifty years.

Results from recaptured archival tags suggest that young fish migrate seasonally between the south coast of Australia and the central Indian Ocean. Archival tagging is noted as a powerful tool to investigate the biology and movement of fish.

SBF-2. Description of fisheries

Historically, the stock has been exploited by Australian and Japanese fishermen for more than 40 years. During this period, the Japanese longline fishery (taking older aged fish) recorded its peak catch of 77,927 t in 1961 and the Australian catches of young fish by surface fishery peaked at 21,501 t in 1982. New Zealand, Chinese Taipei and Indonesia have also exploited southern bluefin tuna, and Korea started a fishery in 1991.

The proportion of catch made by surface fishery peaked around the 1980s at the level of close to 50% of the total catch, dropped to 13-14% in 1992 and 1993, but increased again afterward and has remained around 30% since1996. (**SBF-Table 1 and SBF-Figure 1**).

The catches of Australia, Japan and New Zealand have been controlled by quota since 1985. The current catch limits are 5,265 t for Australia, 6,065 t for Japan, and 420 t for New Zealand, which has remained at the same level since 1990. However, the catches by nations other than the aforementioned three have increased steadily and stayed at the level around 2,500 t during 1991-1995 and then doubled to 4,697 t in 1996. The highest catch by these nations was 5,963 t in 1999. Japan caught an additional 1,464 t in 1998 and 2,198 t in 1999 for the Experimental Fishing, which was conducted to evaluate fish density in an area where no commercial operations have occurred in recent years. Korea and Chinese Taipei joined the southern bluefin tuna management scheme with their respective catch limit of 1,140 t in 2002.

The Atlantic catch has varied widely between 400 and 6,200 t since 1978 (**SBF-Table 1 and SBF-Figure 2**), reflecting the shifts of longline effort between the Atlantic and Indian Oceans. The fishing ground in the Atlantic is located off the southern tip of South Africa (**SBF-Figure 3**).

SBF-3. State of the stock

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT), established in 1994, has updated the stock assessment of this species. The information described below is based on the results of the Sixth Scientific Committee of CCSBT held in Tokyo, Japan, from August 19 to 31, 2001. Formal stock assessment has not been held since then. However, an updated review of various indicators at the Eighth Scientific Committee of CCSBT in 2003 concludes that there is no reason to change the conclusion of the 2001 assessment, noting concern on the apparent coincidence of a number of indicators of poor recruitment in 1999/2000.

The nominal CPUE of Japanese longline CPUE for ages 4-7, and 8-11, CPUE in the New Zealand zone, and Chinese Taipei longline CPUE indicated an increase since 1988, but Japanese longline CPUE for age 12+ declined in the same period. Trends in CPUE by cohort suggested that the reduced quotas after 1988 had resulted in lower fishing mortality rates, leading to better survival to age 8. Tagging estimates of fishing mortality rates showed an increasing trend in mortality at ages 3 and 4 for the 1993 and 1994 cohorts.

The Japanese longline CPUE are standardized based on interim approaches representing two hypotheses on fish density in cells without fishing effort (**SBF-Figure 4**). The CPUE for the parental stock (age 8 and older) continued to decline to the early 1990s and then stayed at about the same level except the last year. The juvenile CPUE declined through the 1970s to the mid-1980s but increased in 1993 to different levels according to the hypotheses and then stayed about the same level afterward. The sequential increases in the global CPUE by age for fish born in the late 1980s can be followed from 3 year-olds in 1990 to 8 year-olds in 1995.

Various assessment procedures were utilized in 2001 including the ADAPT-type VPA using various model structures, hypotheses on biological parameters, and different interpretations of Japanese CPUE series, forward VPA incorporating errors in data, forward VPA based on catch-at-size data, and production models (**SBF-Figure 5**). The results consistently indicated a decline in recruitment with recruitments in the 1990s less than half of those in earlier years.

The estimated parental biomass showed substantial differences in absolute levels as well as relative trends according to assessment procedures and model hypotheses but models were much more consistent regarding trends in abundance during the last decade. The parental biomass is notably lower than the 1980 level, the management target level for stock recovery. Overall, parental biomass has been roughly stable since the mid-1990s or early 1990s depending on the models, and it was considered that the recent removals are close to recent surplus production. The recent trend in parental biomass varied from a continuous gradual decline to a slight upturn.

SBF-4. Outlook

Future projections were performed to examine the medium to long-term consequences of current global catch on parental biomass. In general, assessments that resulted in low historical abundance/high fishing mortality scenarios indicated higher productivity and thus higher probability of stock recovery. The opposite was true for trajectories with high historical abundance and low fishing mortality. Projection under the current global catches resulted in either increasing or decreasing biomass trends depending on model assumptions and input data. The current global catch levels appeared to be roughly close to replacement yield. Consequently, projections showed divergent trends under the current catch level ranging from recovery to continued decline. Overall, few of the scenarios resulted in recovery to the 1980 parental biomass level by 2020 under the current global catches.

SBF-5. Effects of current regulations

Southern bluefin tuna has been managed through quota among Australia, Japan and New Zealand since 1985. The global quota was reduced several times from 38,650 t in the 1984-1985 season and the current quota has been maintained at 11,750 t since the 1989-1990 season. These quota reductions and subsequent changes in the selectivity pattern for the surface fishery have resulted in an increase in abundance of younger fish. At the current catch level, the probability of the parental biomass being larger in 2020 than it is now is about 50%, with an equal probability the stock will be smaller in 2020. There is little chance that the stock will be rebuilt to the 1980 levels by 2020, and substantial quota reductions would be required to achieve this goal.

Regarding the choice of quota levels over the next few years, the CCSBT made the following comments: Any growth in non-party catches would be of very serious concern and every effort should be made to decrease total removals or at least keep them at their current level. The low level of parental biomass in relation to historical level is recognized and there is an associated risk of further recruitment declines. This risk is not felt to be particularly high, thus an immediate reduction in total removals is not recommended as a necessary action to prevent stock collapse. It is believed that as the stock has changed relatively slowly under current catches, a policy of maintaining current removals would most likely enable to react in a timely fashion to future stock trends. This ability would be enhanced if more certain monitoring of recruitment and parental biomass could be developed. There is a risk of stock declines if current removals are maintained, and depending upon members' aversion to this risk, differing level of catch reductions would be appropriate forms of insurance for the sustainability of the current fishing industries.

SBF-6. Management recommendations

The Committee noted that the ICCAT statistical system will continue to be important for monitoring the fishery for this species in the Atlantic Ocean. While the CCSBT established in May 1994 has competence on the management of this species as a whole in the three oceans, ICCAT is responsible for the management of southern bluefin tuna in the Atlantic Ocean. Therefore, close collaboration should be maintained between the two organizations as regards of stock assessments and management measures.

No recommendation was made for the management of southern bluefin tuna in the Atlantic.

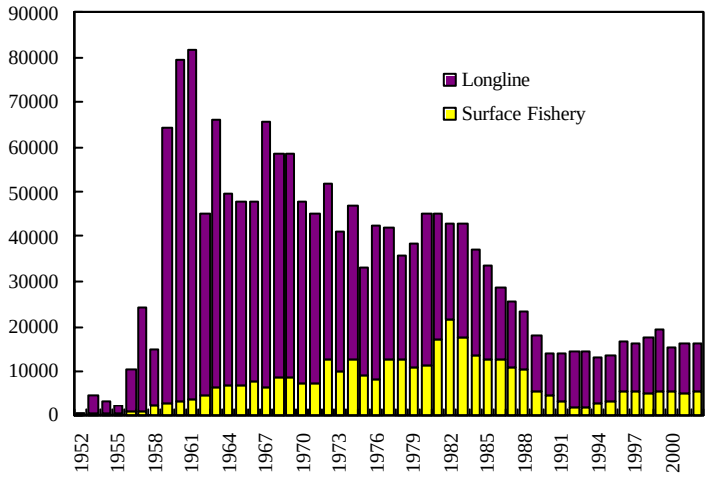
SOUTHERN BLUEFIN TUNA SUMMARY
(for global stock)

Maximum Sustainable Yield	Not estimated
Current (2002) Yield	16,096 t (preliminary)
Current Replacement Yield	Around 16,000 t
Relative Biomass SSB(2000)/SSB (1980)	0.17 - 0.76
Current Management Measures in Effect:	- Global quota at 14,030 t (applicable only to Australia, Chinese Taipei, Korea, Japan, and New Zealand)

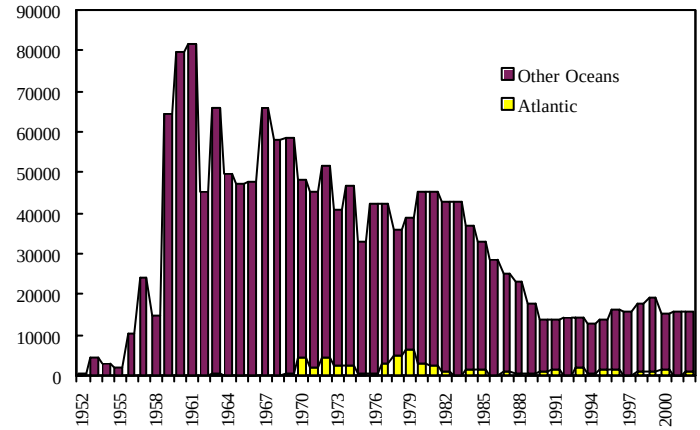
SBF-Table 1. Atlantic and world southern bluefin catch (t) by gear, area and flag, 1978-2002.

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001*	2002*
ATLANTIC TOTAL	4685	6205	2827	2578	1138	525	1636	1497	432	1204	622	711	1266	1346	539	2144	767	1612	1376	365	1054	1045	1483	739	1110
-CATCH BY GEAR																									
Longline	4685	6205	2814	2572	1138	525	1636	1497	432	1200	620	705	1266	1346	539	2144	767	1612	1376	365	1054	1045	1482	739	1110
Baitboat	0	0	13	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
Sport	0	0	0	0	++	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	4	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0
-CATCH BY FLAGS																									
Chinese-Taipei	34	13	26	66	3	20	0	29	43	80	72	80	64	15	14	456	172	168	157	47	137	71	215	205	115
Japan	4651	6192	2788	2506	1135	505	1636	1468	389	1120	548	625	1202	1331	525	1688	595	1444	1219	308	917	946	1205	376	995
Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	28	62	158	
Poland	0	0	0	0	0	0	0	0	0	4	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0
South Africa LL	0	0	13	6	++	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
South Africa BB																							1		
World Catches (all oceans)	*35908*	*38673*	*45054*	*45104*	*42788*	*42881*	*37090*	*33325*	*28319*	*25575*	*23145*	*17843*	*13869*	*13692*	*14216*	*14345*	*13155*	*13637*	*16356*	*16077*	*17775*	*19530*	*15472*	*16002*	*16095*
Longline	*23718*	*27890*	*33859*	*28261*	*21276*	*25174*	*23679*	*20736*	*15721*	*14673*	*12467*	*12175*	*9231*	*10260*	*12215*	*12443*	*10602*	*10732*	*11228*	*10761*	*12878*	*13978*	*10215*	*11149*	*10721*
Surface Fishery	*12190*	*10783*	*11195*	*16843*	*21512*	*17707*	*13411*	*12589*	*12598*	*10902*	*10678*	*5668*	*4638*	*3432*	*2001*	*1902*	*2553*	*2905*	*5128*	*5316*	*4897*	*5552*	*5257*	*4853*	*5374*

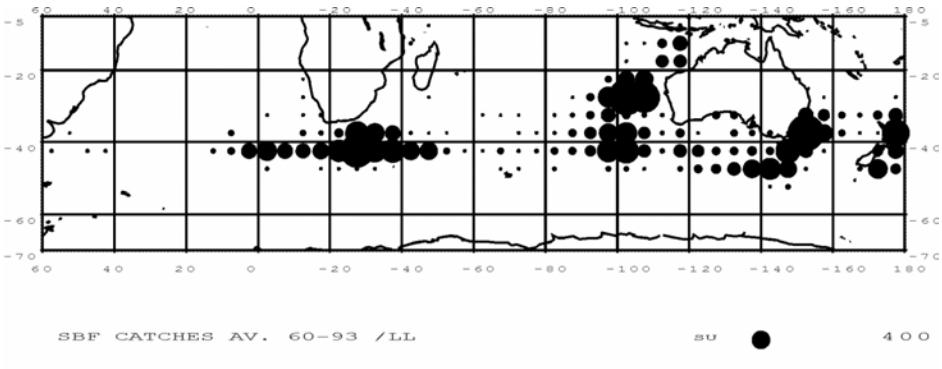
* Preliminary.
++ Catch < 0.5 t.
Source: Catch by Japan – ICCAT Japanese National Report.
World catches – Report of the Eighth Meeting of the Scientific Committee of CCSBT held in Christchurch, 1-4 September 2003.
Australian domestic catch was considered to be made by the surface fishery, unless the catch estimate by the Australian domestic vessels available.
Catches by the other fleets except those taken by Chinese Taipei gillnets were assigned to the longline fishery.



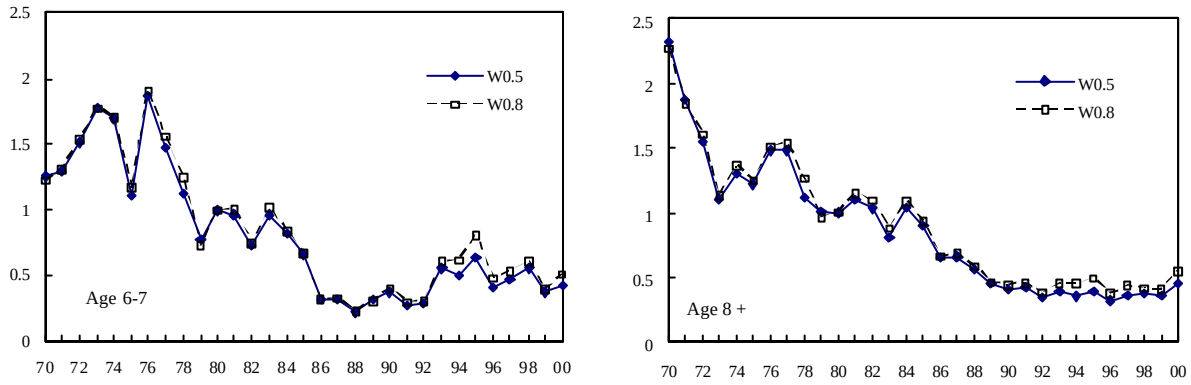
SBF-Fig. 1 Southern bluefin tuna global catches, by fishery (in t).



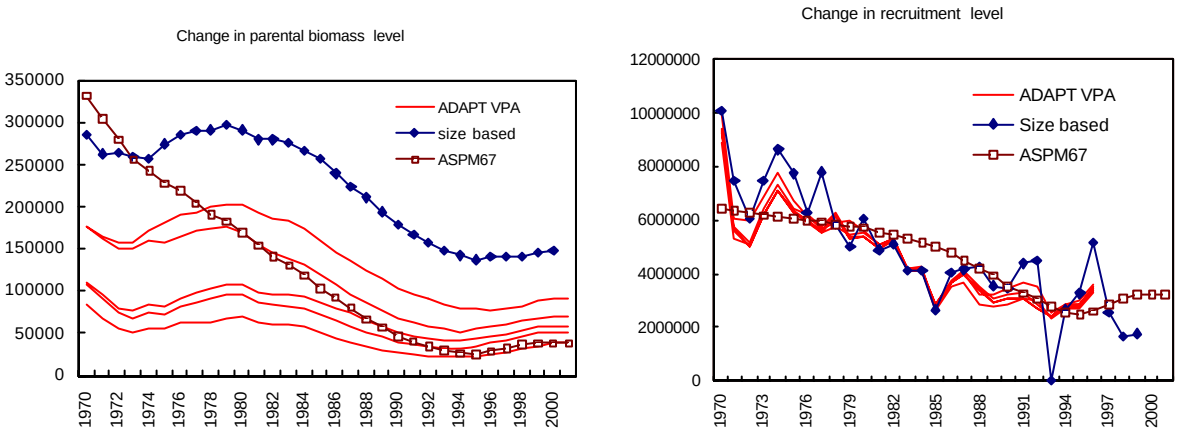
SBF-Fig. 2 Global and Atlantic catches of southern bluefin tuna (in t).



SBF-Fig. 3 Geographical distribution of southern bluefin tuna catches by longline, 1960-1993.



SBF-Fig. 4 Standardized CPUE of Japanese longline relative to 1980 for juvenile (age 6-7) and parental (age 8+) southern bluefin tuna. Different lines corresponded to different hypotheses on fish abundance within time-area strata without fishing effort.



SBF-Fig. 5 Estimated trends of parental biomass and recruitments by various assessment procedures by Japan. (Reference: Report of the Second Stock Assessment Group Meeting of the CCSBT.)

8.12 SMT - SMALL TUNAS

SMT-1. Biology

Small tunas include the following species:

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

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

These species are widely distributed in the tropical and subtropical waters of the Atlantic Ocean, the Mediterranean Sea, and the Black Sea. They are often found in large schools with other small sized tunas or related species in coastal and offshore waters. They have a varied diet with a preference for small pelagics (e.g., clupeids, mullets, carangids and ammodytes), crustaceans, mollusks and cephalopods. The reproduction period varies according to species and spawning generally takes place near the coast, where the waters are warm.

A recent report on the Turkish bonito (*Sarda sarda*) fishery in 2000-2001 presents the fork length composition and the length-weight relationship of this species, caught by purse seines during the migration from the Black Sea to the Mediterranean Sea. Almost 91% of the total sampled catch is within the size range of 25-39 cm.

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

In the eastern tropical Atlantic, the size-at-first-maturity is about 42 cm for Atlantic black skipjack (*Euthynnus alletteratus)*, 30 cm for *Auxis* spp., 38 cm for Atlantic bonito (*Sarda sarda)*, and 45 cm for mackerel (*Scomberomorus* spp.). The growth rate currently estimated for these species is very rapid for the first two or three years, and then slows as these species reach size-at-first maturity.

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

SMT-2. Description of the fisheries

Small tunas are exploited mainly by coastal fisheries and often by artisanal fisheries, although substantial catches are also made, either as target species or as by-catch, by purse seiners, mid-water trawlers (i.e., pelagic fisheries of West Africa-Mauritania), handlines and small scale gillnets. Unknown quantities of small tuna also comprise the incidental catches of some longline fisheries. Some U.S. sport fisheries target Spanish and king mackerels on a seasonal basis.

Historical landings of small tunas for the period 1978 to 2002 are shown in **SMT-Table 1**. This table does not include species reported as "mixed" or "unidentified", as was the case in some previous years as these categories include large tuna species. There are over ten species of small tunas, but only five of these account for 86% of the total reported catch by weight each year. These five species are: Atlantic bonito *(Sarda sarda)*, frigate tuna *(Auxis thazard* which may include some catches of *Auxis rochei)*, Atlantic black skipjack *(Euthynnus alletteratus)*, king mackerel *(Scomberomorus cavalla)*, and Atlantic Spanish mackerel *(Scomberomorus maculatus)* **(SMT-Figure 2)**. In 1980, there was a marked increase in reported landings compared to previous years, reaching a peak at about 139,412 t in 1988 **(SMT-Figure 1)**. Landings reported for the period 1989-1995 decreased to about 87,941 t, and then an oscillation in the values in the following years up to 2001 is observed, when the catch reached 84,093 t. This decrease seems to be related to unreported catches, as these species usually comprise part of the by-catch, and are often discarded, and do not reflect the real catch.

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

In order to improve statistics, cooperation with FAO has continued and FAO figures continue to be incorporated into the ICCAT database for small tuna species where no report is received by ICCAT.

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

Part of the catches of tunas and associated species unsuitable for canning, landed in Abidjan, are sold on the local market. The species and size composition of these fish were monitored in 1993 and the 1998-1999 period **(SMT-Figure 5; SMT-Figure 6)**. The main species observed were frigate tuna (*Auxis thazard*), Atlantic black skipjack (*Euthynnus alletteratus)*, bigeye, yellowfin and skipjack and the proportion of fish is variable from one year to another, due to several factors, among them the price of skipjack. The change in the relative proportion of *Auxis thazard* (20.7% in 1993, 48.7% in 1998 and 48.1% in 1999) and *Euthynnus alletteratus* (7.9%, 18.5% and 19.6%) probably reflect their availability to purse seiners.

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

SMT-3. State of the stocks

There is little information available to determine the stock structure of many small tunas species. It was noted that some size data for small tunas from tropical tuna fleets were available, but these had not been submitted to the Secretariat. The Committee suggests that countries be requested to submit all available data to ICCAT as soon as it is possible, in order to be used in future Committee meetings.

Age-structured stock assessments of Spanish mackerel and king mackerel are carried out for the coastal areas of the southeastern United States and the Gulf of Mexico. These assessments indicated that the stocks of Atlantic Spanish mackerel and king mackerel in the Gulf of Mexico were over-exploited. Reductions in fishing mortality were considered necessary, and hence a number of regulations (commercial trip limits, seasonal and area quotas, and recreational bag limits) have been implemented in order to allow the stocks to recover to levels that could provide high average long-term yields and to provide adequate safeguards against recruitment failure. Improvement in stock status has been observed in the Gulf of Mexico Spanish mackerel and king mackerel and these stocks are no longer considered over-fished mainly due to the management actions taken.

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

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

SMT-4. Outlook

The results of an ICCAT questionnaire circulated in 1996 indicate that small tuna fisheries are very diverse and complex, involving both artisanal and industrial fisheries using a variety of gears, as well as different types and sizes of vessels. The results also indicate that data collection and research, including size sampling, age and growth research, maturity studies and tagging, are being conducted by several countries but the results of such 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 reiterates its previous recommendation that studies should be conducted to determine the state of these stocks and the best way to manage them. Such studies are probably best carried out at the local or sub-regional level.

SMT-5. Effects of current regulations

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

SMT-6. Management recommendations

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

SMT-Table 1. Estimated landings, t, of small tuna species by species and flag, 1978-2002.

			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	TOTAL		*68915*	*76530*	*109760*	*111513*	*125762*	*121942*	*106390*	*88786*	*87999*	*111408*	*139412*	*123071*	*110519*	*105112*	*94552*	*101522*	*85018*	*87941*	*110354*	*105382*	*97626*	*90623*	*81372*	*84093*	*90880*
	ATL		*53281*	*56439*	*84487*	*78222*	*88302*	*79015*	*83345*	*63538*	*65347*	*82901*	*106845*	*102687*	*77758*	*70862*	*72817*	*71528*	*63981*	*65094*	*84999*	*86409*	*62572*	*57298*	*53275*	*54606*	*58634*
	MEDI		*15634*	*20091*	*25273*	*33291*	*37460*	*42927*	*23045*	*25248*	*22652*	*28507*	*32567*	*20384*	*32761*	*34250*	*21735*	*29994*	*21037*	*22847*	*25355*	*18973*	*35054*	*33325*	*28096*	*29487*	*32246*
BLF		***Total ATL***	***1341***	***1205***	***1175***	***1973***	***1941***	***1738***	***1908***	***1403***	***2822***	***3462***	***3322***	***2834***	***3888***	***4202***	***4353***	***3535***	***2719***	***4051***	***4488***	***3027***	***3238***	***3185***	***2358***	***4063***	***4729***
T. atlanticus		BRAZIL	195	173	181	85	89	57	203	133	172	254	229	120	335	130	49	22	38	153	649	418	55	55	38	149	1669
		CUBA	0	0	0	721	622	558	487	157	486	634	332	318	487	318	196	54	223	156	287	287	0	0	0	0	0
		DOMINICA	0	0	0	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	0	0	0	79	83	83	83
		DOMINIC. REP.	78	105	125	124	144	144	106	90	123	199	4	564	520	536	110	133	239	892	892	0	0	0	0	0	0
		EC-ESPAÑA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	0	0	0	0	0	0	0
		EC-FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC-GUADELOUP	530	470	440	460	490	482	490	460	470	470	450	460	470	460	470	440	440	480	500	500	500	500	500	500	500
		EC-MARTINIQ	400	300	300	301	352	327	331	295	259	199	366	395	395	750	700	700	890	890	540	540	540	540	540	540	540
		GRENADA	76	95	68	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	164	126	233	94	164	223	255
		JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	148	0	0	0	0	0	0
		LIBERIA	0	0	0	0	0	0	0	0	0	0	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0
		NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		NETH.ANTILLES	55	55	55	55	55	55	55	55	60	60	70	70	70	60	60	65	60	50	45	45	45	45	45	45	45
		ST.LUCIA	0	0	0	0	0	0	0	0	0	2	1	1	17	14	13	16	82	47	35	40	100	41	45	108	96
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	18	22	17	15	23	24	24
		U.S.A	0	0	0	139	41	7	0	11	32	44	154	87	81	112	127	508	492	582	447	547	707	617	326	474	302
		UK-BERMUDA	7	7	6	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	5	4	6	6	5	4	4
		VENEZUELA	0	0	0	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1224	21	624	758	498	1034	1192	589	1788	1210
		VENEZ--FOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	0
BLT		***Total ATL***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***2***	***0***	***357***	***723***	***3634***	***2206***	***814***	***394***	***177***	***100***	***0***	***0***	***28***	***579***	***1230***	***1577***	***950***
A. rochei		EC-PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	263	494	208	166
		RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	0	0	0	0	420	1053	468
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TURKEY	0	0	0	0	0	0	0	0	0	0	0	0	0	35	0	324	77	0	0	0	0	316	316	316	316
		U.S.A	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.S.R	0	0	0	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	0	0	0	0	0	0	0
BON		***TOTAL***	***17273***	***19971***	***31115***	***38927***	***41106***	***42386***	***21907***	***24905***	***21320***	***29712***	***46382***	***29721***	***28591***	***33561***	***21816***	***30036***	***20356***	***22181***	***24585***	***24511***	***38293***	***34266***	***26984***	***27108***	***299630***
S.sarda		***ATL***	***7854***	***6485***	***12568***	***10760***	***12169***	***6840***	***6849***	***6946***	***5892***	***7395***	***22354***	***17766***	***6844***	***8306***	***6914***	***4587***	***5823***	***5652***	***7390***	***10433***	***8563***	***6096***	***5012***	***4872***	***7002***
		MEDI	***9419***	***13486***	***18547***	***28167***	***28937***	***35546***	***15058***	***17959***	***15428***	***22317***	***24028***	***11955***	***21747***	***25255***	***14902***	***25449***	***14533***	***16529***	***17195***	***14078***	***29730***	***28170***	***21972***	***22236***	***22961***
	ATL	ANGOLA	531	251	377	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	39	32	0	2	118	118	118
		ARGENTINA	1746	1288	2600	846	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	138	0	0	0	0	0	0	0
		BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
		BENIN	0	13	19	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0
		BRAZIL	0	0	0	0	0	0	187	179	523	345	214	273	226	71	86	142	142	137	0	0	0	0	0	0	0
		BULGARIA	22	0	75	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
		CUBA	0	0	0	0	0	0	0	0	0	23	173	26	28	0	0	0	0	0	0	0	230	0	0	0	0
		EC-ESPAÑA	1919	717	220	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	2	1	0	12	12	10	17
		EC-FRANCE	0	0	8	0	0	2	17	1	0	0	0	0	0	0	0	52	0	0	0	0	0	24	32	0	18
		EC-GERMANY	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	714	0	0	0	0	0	38
		EC-GREECE	30	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		EC-GUADEL.	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-MARTINIQ	400	500	500	502	587	545	552	491	431	331	395	427	430	820	770	1000	990	990	610	610	610	0	0	0	0
		EC-PORTUGAL	0	6	13	31	55	86	56	50	168	371	377	80	202	315	133	145	56	78	83	49	98	98	162	47	61
		EC-U.K	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0
		ESTONIA	0	0	0	0	0	0	0	0	0	0	668	859	187	8	0	0	0	0	0	0	0	0	0	0	0

		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
	GEORGIA	0	0	0	0	0	0	0	0	0	0	39	54	0	0	0	0	0	0	0	0	0	0	0	0	0
	GERMANY D.R	0	0	288	440	146	274	26	40	23	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GHANA	9	0	77	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GRENADA	157	53	52	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	6	14	16	7	10	10
	JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
	LATVIA	0	0	0	0	0	0	0	0	0	0	1191	1164	221	7	4	0	3	19	301	887	318	0	416	396	639
	LITUANIA	0	0	0	0	0	0	0	0	0	0	1041	762	162	11	10	0	0	0	0	0	0	0	0	0	0
	MAROC	171	196	312	477	535	561	310	268	251	241	589	566	492	794	1068	1246	584	699	894	1259	1557	1390	2163	1700	2019
	MEXICO	59	174	271	408	396	567	744	212	241	391	356	338	215	200	657	779	674	1144	1312	1312	0	0	0	0	0
	NETH.ANTILLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
	POLAND	44	32	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	225	0	0	0	0	0	0
	RUMANIA	19	0	64	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	0	0	0	0	0	0	0
	RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	948	29	0	0	0	0	0	0	0	0	574	1441
	SENEGAL	523	159	140	1327	202	497	200	495	510	463	2066	869	558	824	378	227	600	354	570	1513	1857	1441	1441	1441	1441
	SIERRA LEONE	0	0	57	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	0	0	0	0	0	0	0
	SOUTH AFRICA	16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ST.LUCIA	0	0	0	0	0	0	0	0	0	0	1	0	3	3	3	4	1	1	1	0	0	0	0	0	0
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
	TOGO	0	0	0	0	0	0	0	254	138	245	400	256	177	172	107	311	254	145	197	197	197	197	0	0	0
	TRINIDAD&TOB.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	703	169	266	220	30	117	117	56	508
	U.S.A	224	502	198	333	209	253	217	110	84	130	90	278	299	469	498	171	128	116	156	182	76	83	142	120	162
	U.S.S.R	1602	2125	6433	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	0	0	0	0	0	0	0	0	0	0	0	0
	UKRAINE	0	0	0	0	0	0	0	0	0	0	1385	985	0	0	25	0	0	0	342	2786	1918	1114	399	399	399
	URUGUAY	0	16	3	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0
	VENEZUELA	382	443	861	833	864	554	748	774	1401	1020	1153	1783	1514	1518	1454	5	1661	1651	1359	1379	1659	1602	2	0	61
MEDI	ALBANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0
	ALGERIE	196	515	640	740	860	867	874	880	459	203	625	1528	1307	261	315	471	418	506	277	357	511	475	405	350	597
	BULGARIA	11	1	13	191	4	24	1	1	0	13	0	0	17	17	20	8	0	25	33	16	51	20	35	35	35
	CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	0	0	25	120	0	0	0
	CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	10
	EC-ESPAÑA	711	713	480	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	632	690	628	333	433	342	349	461
	EC-FRANCE	0	0	0	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	0	0	0	0	0	0	27
	EC-GREECE	610	712	809	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	2116	1752	1559	945	2135	1914	1550	1420
	EC-ITALY	1378	1403	1180	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1512	2233	2233	2233	4159	4159	4159	4579
	EGYPT	17	10	3	2	23	14	48	62	68	35	17	358	598	574	518	640	648	697	985	725	724	1442	1442	1128	1128
	LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	0	0	0	0	0	0	0
	MALTA	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	2	1	0	0
	MAROC	128	155	62	309	71	92	75	57	51	127	108	28	69	69	31	25	93	37	67	45	39	120	115	5	61
	NEI-2	0	0	295	274	276	452	694	359	359	537	561	342	311	311	311	300	300	300	300	75	0	0	0	0	0
	RUMANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TUNISIE	791	865	700	381	748	600	600	482	504	500	600	422	488	305	643	792	305	413	560	611	855	1350	1528	1183	1183
	TURKEY	5536	9082	14292	23174	23397	29034	7220	12281	10756	16793	17613	4667	14387	19151	8654	19000	8944	10284	10284	7810	24000	17900	12000	13460	13460
	U.S.S.R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	YUGOSLAVIA	39	29	72	39	61	31	37	34	38	62	36	98	79	0	0	0	0	0	0	0	0	0	0	0	0
	YUGO. REP. FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	3	2	6	10	12	12	14	17	17	0
BOP	***TOTAL***	***970***	***492***	***698***	***1448***	***584***	***38***	***49***	***133***	***87***	***564***	***1482***	***1116***	***457***	***588***	***600***	***601***	***775***	***640***	***2136***	***476***	***159***	***844***	***1193***	***984***	***917***
O. unicolor	***ATL***	***817***	***464***	***698***	***1448***	***584***	***38***	***49***	***124***	***86***	***538***	***1474***	***1109***	***420***	***487***	***424***	***349***	***599***	***525***	***2004***	***249***	***29***	***627***	***1048***	***830***	***780***
	MEDI	***153***	***28***	***0***	***0***	***0***	***0***	***0***	***9***	***1***	***26***	***8***	***7***	***37***	***101***	***176***	***252***	***176***	***115***	***132***	***227***	***130***	***217***	***145***	***154***	***137***
ATL	BENIN	0	1	1	2	2	1	1	1	3	1	2	1	1	1	1	1	1	1	1	3	1	1	0	0	0

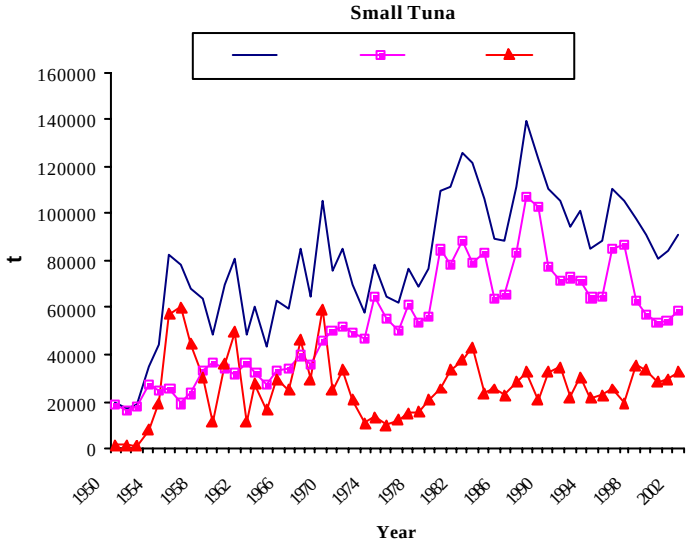
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		EC-PORTUGAL	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MAROC	727	373	596	968	483	0	0	83	33	487	1422	1058	369	486	423	348	598	524	2003	246	28	626	1048	830	780
		MAURITANIE	90	90	101	478	99	37	40	40	50	50	50	50	50	0	0	0	0	0	0	0	0	0	0	0	0
	MEDI	ALGERIE	0	0	0	0	0	0	0	0	0	0	0	0	0	87	135	198	153	92	119	224	128	216	135	145	128
		LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	0	0	0	0	0	0	0
		MAROC	153	28	0	0	0	0	0	9	1	26	8	7	37	14	1	14	23	23	13	3	2	1	10	9	9
BRS		***Total ATL***	***3484***	***3722***	***5617***	***5841***	***6019***	***6632***	***8129***	***3501***	***6549***	***6212***	***9510***	***10778***	***7698***	***8856***	***6051***	***8049***	***7161***	***7006***	***8435***	***8004***	***7923***	***5754***	***4785***	***4553***	***7750***
S.brasiliensis		BRAZIL	1522	1191	2826	3466	4342	4511	6259	1504	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	3047	2125	1516	1516	988	251	3071
		GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0
		GUYANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	211	571	625	1143	308	329	441
		TRINIDAD&TOB.	0	0	0	0	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	1816	1568	1699	2130	1328	1722	2207	2472
		VENEZUELA	1962	2531	2791	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	4670	2772	5077	3882	3882	3609	3609	3651	1766	1766	1766	1766
CER		***Total ATL***	***698***	***586***	***604***	***628***	***687***	***677***	***680***	***574***	***500***	***392***	***219***	***234***	***225***	***375***	***390***	***450***	***490***	***429***	***279***	***250***	***250***	***0***	***3***	***5***	***1***
S.regalis		DOMINICAN REP.	98	86	104	106	76	110	106	63	52	48	57	59	50	45	79	50	90	29	29	0	0	0	0	0	0
		EC-GUADELOU	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-MARTINIQ	600	500	500	522	611	567	574	511	448	344	162	175	175	330	310	400	400	400	250	250	250	0	0	0	0
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0
		ST.VINCENT	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
FRI		***TOTAL***	***8343***	***12575***	***20912***	***15913***	***25240***	***21690***	***25903***	***22876***	***20306***	***23407***	***25151***	***21416***	***23333***	***15425***	***8027***	***11210***	***10477***	***9861***	***17808***	***16513***	***14440***	***12608***	***12192***	***14457***	***16791***
A.thazard		***ATL***	***4776***	***8868***	***16960***	***12235***	***19197***	***15870***	***19566***	***17636***	***15249***	***19667***	***19025***	***15029***	***14973***	***8854***	***3126***	***8183***	***5354***	***5560***	***11899***	***13449***	***12160***	***10548***	***9506***	***10223***	***10332***
		MEDI	***3567***	***3707***	***3952***	***3678***	***6043***	***5820***	***6337***	***5240***	***5057***	***3740***	***6126***	***6387***	***8360***	***6571***	***4901***	***3027***	***5123***	***4301***	***5909***	***3064***	***2280***	***2060***	***2686***	***4234***	***6459***
	ATL	ANGOLA	357	357	256	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	29	12	31	2	38	38	38
		ARGENTINA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		BENIN	0	25	37	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0
		BRAZIL	0	0	0	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	558	527	215	162	166	106	98	1117
		BULGARIA	0	0	3	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CAP-VERT	0	0	0	0	0	0	0	0	0	2	86	105	75	135	82	115	86	13	6	22	191	154	81	171	206
		EC-ESPAÑA	1249	1211	6260	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	541	228	362	297	386	947	581	570	23	17	722	438
		EC-FRA.ESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5174	0	0	5269	4458	4502	5772	6768	6768	6768
		EC-FRANCE	0	0	0	0	0	0	640	416	1904	3392	3392	3008	3872	0	121	63	105	126	161	147	146	0	91	127	91
		EC-PORTUGAL	0	0	0	0	0	0	14	30	32	2	2	4	26	3	0	0	0	0	0	1	31	5	9	28	5
		ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	198	0	0	0	0	0	0	0	0	0	0	0
		F.I.S	0	0	0	1856	1984	2800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GERMANY D.R	0	0	0	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GHANA	1047	4286	7566	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
		JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		LATVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0
		LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	290	0	0	0	0	0	0	0	0	0	0	0
		MAROC	770	694	968	1267	1126	1271	198	424	302	465	194	599	1045	1131	332	274	122	645	543	2614	2137	494	582	418	441
		NEI-1	0	0	0	0	0	333	46	0	0	17	381	155	237	1	4	32	68	62	180	120	309	491	291	420	186
		NETH.ANTILLES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	590	1157	1030	1159	1122	989	710
		PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	243	57	118	341	327	240	91	0	0	0	0	0
		RUMANIA	0	0	0	0	0	0	0	0	51	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	3249	1441	220	505	456	46	500	761	477	0	0	300
		SAO TOME & PR.	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	79	323	0	0	0	0	0
		SENEGAL	0	0	0	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	0	0	0	0	0	0	0
		TRINIDAD&TOB.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	56	199	368	127	138	138	0	0
		U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		U.S.S.R	803	450	694	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	0	0	0	0	0	0	0	0	0	0	0	0

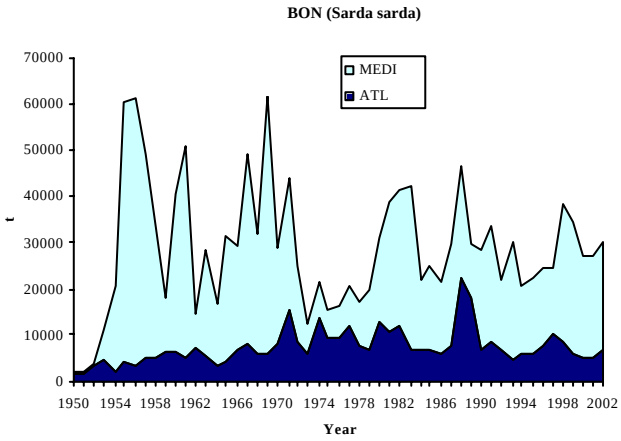
			1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
		UKRAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	48	0	0
		VENEZUELA	550	1845	1176	944	509	1171	1478	1746	2109	2264	2654	2670	3037	1762	368	886	2609	2601	3083	2839	2164	1631	215	425	32
		VENEZ-FOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0
	MEDI	ALGERIE	0	0	0	0	0	0	0	0	0	0	0	0	0	174	270	348	306	230	237	179	299	173	225	230	481
		CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	24	21	52	22	28	26	26	26	26	0	0	0
		EC-ESPAÑA	1676	1771	2120	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	2296	604	487	669	1024	861	493
		EC-FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	0	0	0	0	0	0	0
		EC-GREECE	0	0	0	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1426	1426	0	0	196	125	120
		EC-ITALY	1177	1342	1376	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	229	229	229	462	462	462	2452
		MALTA	33	11	18	4	9	11	4	1	13	5	8	18	21	20	11	10	1	2	3	6	6	3	1	0	0
		MAROC	69	73	10	14	77	57	52	48	175	178	811	1177	2452	1289	1644	170	1726	621	1673	562	1140	682	763	256	621
		TUNISIE	589	493	409	237	517	218	294	367	538	606	588	660	985	985	35	20	13	14	13	26	87	38	7	2292	2292
		YUGOSLAVIA	23	17	19	14	14	18	16	14	32	14	41	42	23	0	0	0	0	0	0	0	0	0	0	0	0
		YUGO. REP. FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	13	1	0	0	2	6	6	6	7	8	8	0
KGM		***Total ATL***	***6769***	***11450***	***15656***	***18513***	***18149***	***14607***	***13182***	***9964***	***12187***	***11890***	***13038***	***10835***	***12232***	***11530***	***12439***	***14462***	***13868***	***14916***	***17775***	***19712***	***12809***	***13558***	***12473***	***11182***	***9088***
S.cavalla		ANTIGUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
		ARGENTINA	379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		BRAZIL	845	848	1598	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	1328	2890	2398	3595	3595	2344	1251	2316
		CHINESE TAIPEI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	35	35	0
		DOMINIC. REP.	0	0	0	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	0	589	288	230	226	226	226
		GRENADA	175	73	25	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	2	4	28	14	9	4	5
		GUYANE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	270	440	398	214	239	267
		JAMAICA	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
		MEXICO	1535	2249	1946	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3097	3214	4661	4661	0	0	0	0	0
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	9	1	1
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TRINIDAD&TOB.	0	0	0	0	0	20	43	11	38	82	752	541	432	657	0	1192	0	471	1029	875	746	447	432	410	1457
		U.S.A	2507	6292	10726	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	7345	7051	8772	7371	6414	6780	6592	2344
		VENEZUELA	1328	1988	1361	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1308	801	2484	2558	2140	2139	340	2424	2424	2424	2424
KGX		***Total ATL***	***424***	***197***	***214***	***339***	***283***	***20***	***485***	***22***	***149***	***261***	***491***	***105***	***131***	***225***	***356***	***301***	***508***	***512***	***824***	***156***	***251***	***1***	***229***	***48***	***0***
Scomb.spp		BARBADOS	157	0	0	0	0	0	0	0	138	159	332	68	51	45	51	55	36	42	49	0	0	0	0	0	0
		BRAZIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		COLOMBIA	92	54	73	160	80	20	485	22	11	102	159	37	25	7	12	21	148	111	539	0	0	0	0	0	0
		CUBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	236	0	0	0	0
		EC-GUADELOU	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-MARTINIQ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	145	79	0	0	0	0	0	0
		GRENADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		JAMAICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0	0	44	48	0
		MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		P. RICO TR.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	84	86	134	106	0	0	0	0	0	0
		RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0
		ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	50	0	0	0	48	0	0
		ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	138	0	0
		TRINIDAD& TOB	175	143	141	179	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		UKRAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	94	90	0	0	0	0	0	0	0	0	0	0
LTA		***TOTAL***	***17633***	***14673***	***19214***	***13847***	***15839***	***22214***	***20625***	***12896***	***8809***	***19741***	***25135***	***29855***	***14359***	***10910***	***21554***	***13682***	***11607***	***12026***	***14786***	***14147***	***14511***	***13343***	***13737***	***12994***	***16897***
E.alletteratus		***ATL***	***15138***	***11803***	***16440***	***12401***	***13359***	***20653***	***18975***	***10856***	***6643***	***17317***	***22730***	***27820***	***11742***	***8587***	***19798***	***12416***	***10402***	***10124***	***12667***	***12543***	***11597***	***10465***	***10443***	***10131***	***14208***
		MEDI	***2495***	***2870***	***2774***	***1446***	***2480***	***1561***	***1650***	***2040***	***2166***	***2424***	***2405***	***2035***	***2617***	***2323***	***1756***	***1266***	***1205***	***1902***	***2119***	***1604***	***2914***	***2878***	***3294***	***2863***	***2689***
	ATL	ANGOLA	826	646	1328	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	121	117	235	75	406	118	132	132	132

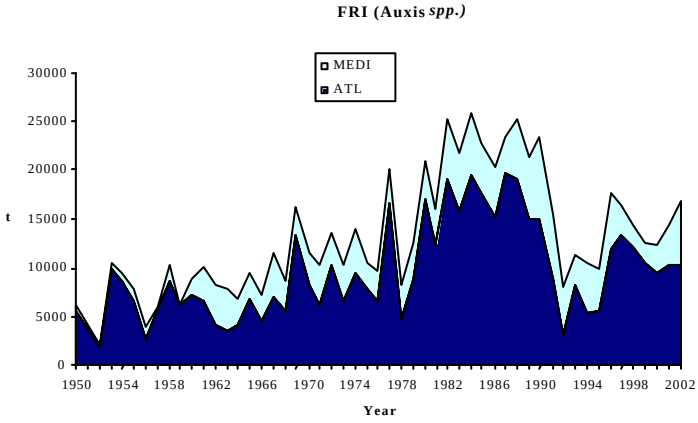
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	ARGENTINA	0	0	0	0	36	0	0	11	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	BENIN	0	16	24	40	45	20	31	30	90	14	7	43	66	61	49	53	60	58	58	196	83	69	69	69	69
	BRAZIL	0	0	0	45	10	0	765	785	479	187	108	74	685	779	935	985	1225	1059	834	507	920	930	615	615	615
	BULGARIA	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAP-VERT	0	0	128	236	258	34	16	160	29	14	1	18	65	74	148	17	23	72	63	86	110	776	491	178	108
	COTE D'IVOIRE	38	57	177	0	0	0	0	0	20	5300	38	4900	2800	100	142	339	251	253	250	114	108	0	108	0	0
	CUBA	0	0	131	53	77	6	15	16	24	55	53	113	88	63	33	13	15	27	23	23	0	0	0	0	0
	EC-ESPAÑA	56	4	485	7	3	2	27	34	12	11	7	11	55	81	1	0	0	10	55	27	110	6	2	22	8
	EC-FRA.ESP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1975	0	0	2087	1766	1710	2352	2681	2681	2681
	EC-FRANCE	0	0	0	1098	1120	0	0	0	0	0	0	195	0	74	13	8	54	59	22	215	21	86	21	0	3
	EC-GERMANY	0	0	0	0	0	0	0	0	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0
	EC-ITALY	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EC-MARTINIQ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	610	610	610	610
	EC-PORTUGAL	0	5	121	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	218	320	171	14	50	0	2
	ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	66	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	182	0	18	159	301	213	57
	GERMANY D.R	0	0	0	0	397	543	99	40	10	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	GHANA	6049	5547	4134	3287	2141	5009	5966	901	649	5551	11588	12511	323	201	11608	359	994	513	113	2025	359	306	707	730	4768
	ISRAEL	0	0	227	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LATVIA	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0
	LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0
	MAROC	21	289	16	19	26	19	15	447	47	108	49	14	367	57	370	44	43	230	588	195	189	67	101	87	308
	MAURITANIE	50	50	31	86	77	54	60	60	50	50	50	50	50	4	0	0	0	0	0	0	0	0	0	0	0
	NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	20	0	0	0	0	0	0	0	33
	PANAMA	3	2	58	36	0	0	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0
	POLAND	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RUMANIA	2	17	9	12	291	216	266	126	81	7	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	617	306	265	189	96	49	0	88	0	0	0	74
	SAO TOME & PR.	0	0	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	40	159	0	0	0	0	0
	SENEGAL	1446	1697	2444	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3768	4088	4883	4072	4125	3773	2972	2936	1096	1097	1094	1094
	SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	0	1	10
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	U.S.A	113	12	88	97	87	107	41	74	104	118	204	129	173	228	597	1286	1142	1312	2230	2015	1546	1623	1209	1451	1381
	U.S.S.R	6127	2184	6307	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	0	0	0	0	0	0	0
	UK-BERMUDA	7	7	11	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	7	6	5	4	2	1	1
	VENEZUELA	390	1270	721	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	1840	1840	2815	2247	2247	2247	2254
MEDI	ALGERIE	0	0	0	0	0	0	0	0	0	0	0	0	0	522	585	495	459	552	554	448	384	562	494	407	148
	CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	0	0	0	0	0	0	0
	CYPRUS	11	17	17	22	33	17	31	32	13	25	41	20	23	25	21	11	23	10	19	19	19	19	19	19	19
	EC-ESPAÑA	1192	993	800	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	18	9	15	0	8	82	32
	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	132
	EC-ITALY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
	GAZA-STRIP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	59	61	60	60	60	60
	ISRAEL	200	170	105	35	110	35	60	259	284	273	135	124	129	108	126	119	119	215	119	119	119	119	119	119	119
	LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	52	0	5	4	4
	MALTA	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	8	8	8	3	3	0	0	0	0	0
	MAROC	0	6	0	61	12	0	1	0	0	0	12	0	16	0	0	0	0	1	0	1	14	8	0	0	3
	NEI-2	0	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	0	0	0

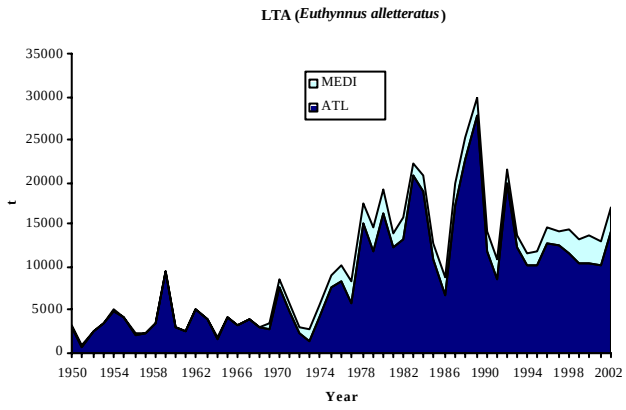
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	SYRIA	109	89	80	73	90	80	96	95	73	121	99	121	127	110	156	161	156	155	270	350	417	390	370	370	370
	TUNISIE	983	1595	1772	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	242	204	696	824	333	1113	752	1453	1036	1036
	TURKEY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	750	750	750	750
	YUGOSLAVIA	0	0	0	0	0	1	6	1	1	2	5	4	9	0	0	0	0	0	0	0	0	0	0	0	0
	YUGO. REP. FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	28	21	35	22	18	20	18	16	16	0
MAW	***Total ATL***	***6716***	***4167***	***4921***	***3156***	***5312***	***4716***	***4498***	***3989***	***3292***	***1799***	***3915***	***2934***	***5610***	***4025***	***1437***	***1775***	***1270***	***1264***	***1316***	***871***	***1108***	***727***	***748***	***727***	***727***
S.tritor	ANGOLA	81	24	70	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BENIN	0	23	35	60	68	30	46	50	104	17	13	334	211	214	202	214	194	188	188	362	511	205	205	205	205
	ESTONIA	0	0	0	0	0	0	0	0	0	0	0	0	0	49	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	85	0	0	0	0
	GERMANY D.R	0	0	0	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GHANA	771	1569	4412	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	0	0	0	0	0	0	0	0	0
	LATVIA	0	0	0	0	0	0	0	0	0	0	0	0	208	34	0	0	0	0	0	0	0	0	0	0	0
	LITUANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	52	4	0	0	0	0	0	0	0	0	0	0
	RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	143	195	1032	242	0	19	0	0	44	0	0	0	0	0	0
	SAO TOME & PR.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
	SENEGAL	1054	1112	404	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	1076	509	512	522	522	522	522
	U.S.S.R	4810	1439	0	0	602	1170	223	206	219	28	143	195	1240	0	0	0	0	0	0	0	0	0	0	0	0
	UKRAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0
SSM	***Total ATL***	***11528***	***10899***	***13945***	***11164***	***13633***	***9574***	***11362***	***11590***	***14117***	***14531***	***12712***	***13946***	***14500***	***15546***	***16346***	***16231***	***14777***	***13857***	***16725***	***15501***	***3241***	***3542***	***4168***	***4791***	***1511***
S.maculatus	COLOMBIA	228	199	213	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	0	0	0	0	0	0	0
	CUBA	600	400	578	657	476	689	544	443	621	1606	803	746	665	538	611	310	409	548	613	613	0	0	0	0	0
	DOMINIC. REP.	317	415	479	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	2042	2042	231	191	125	158	158	158
	GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265
	GRENADA	2	0	1	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	0	0	0	0	0	0	1
	MEXICO	5138	5751	5908	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	8300	7673	11050	11050	0	0	0	0	0
	ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	27
	TRINIDAD&TOB.	1933	1208	1337	939	1218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	U.S.A	3310	2926	5429	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	3523	3020	3606	3050	3417	4010	4632	1061
WAH	***Total ATL***	***452***	***760***	***610***	***2920***	***2280***	***2366***	***2159***	***920***	***1151***	***1235***	***1612***	***1507***	***1470***	***1687***	***1807***	***2571***	***2104***	***2362***	***2515***	***3085***	***2483***	***2943***	***2020***	***2331***	***2284***
A.solandri	ANTIGUA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	ARUBA	115	115	115	115	115	115	115	115	120	90	80	80	70	60	50	50	125	40	50	50	50	50	50	50	50
	BARBADOS	0	189	116	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	35	52	52	41	41	0	0
	BENIN	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BRAZIL	6	69	1	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	16	58	41	0	0	0	0
	CAP-VERT	0	0	24	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	408	503	603	429	587	487	578	552
	DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	58	58	58	50	46	46	46
	DOMINIC. REP.	0	0	0	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	0	325	112	31	35	35	35
	EC-ESPAÑA	0	0	0	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	25	25	29	28	32	38	46
	GRENADA	35	31	25	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	56	56	59	82	51	71	59
	NETH.ANTILLES	215	215	215	215	215	215	215	245	250	260	280	280	280	250	260	270	250	230	230	230	230	230	230	230	230
	SAO TOME & PR.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	52	52	52	52	52	52
	SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	221	223	223	310	243	213	217
	ST.VINCENT	0	0	0	0	0	0	0	0	0	0	4	4	28	33	33	41	28	16	23	10	65	52	46	311	17
	TRINIDAD&TOB.	0	0	0	0	0	0	0	0	0	0	0	0	0	118	1	0	0	0	0	1	1	1	2	1	5
	U.S.A	0	0	0	0	0	0	0	13	13	57	128	110	82	134	203	827	391	764	608	750	614	858	640	633	906
	UK-BERMUDA	23	33	46	24	40	49	46	46	65	43	61	63	74	67	80	58	50	93	99	105	108	104	61	56	56
	UK-S.HELENA	4	7	10	12	9	16	23	15	15	18	18	17	18	12	17	35	26	25	23	0	0	0	0	0	0
	VENEZUELA	54	100	57	77	175	66	125	147	113	106	141	101	159	302	333	514	542	540	487	488	360	467	4	17	13

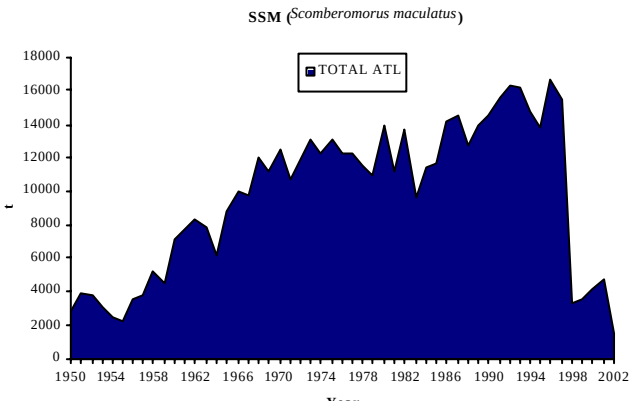
SMT-Fig. 1. Estimated landings (t) of small tunas, all species combined, in the Atlantic and Mediterranean, 1950-2002. Data for recent years are incomplete.

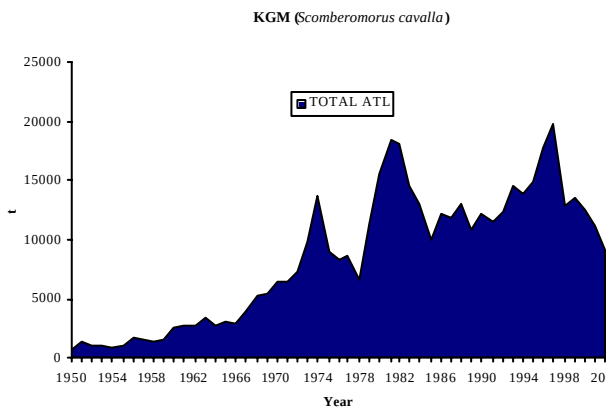


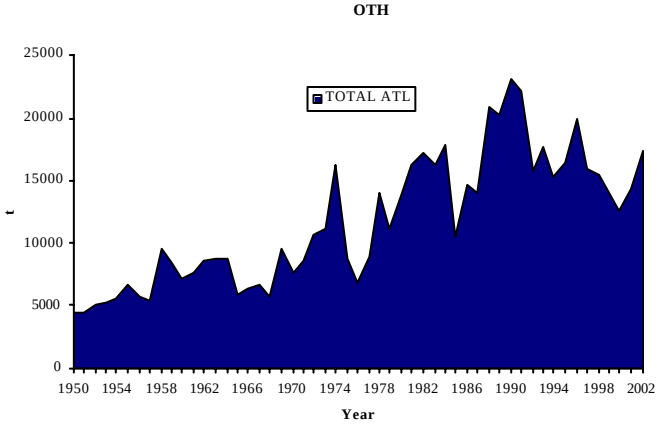




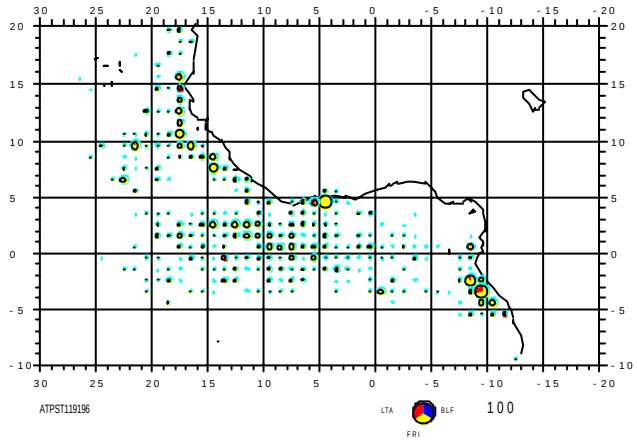




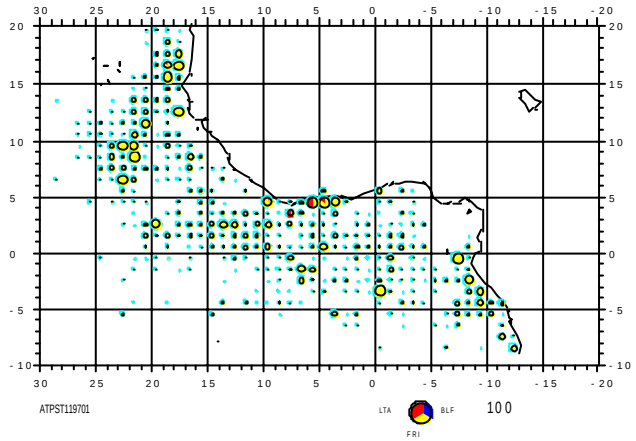




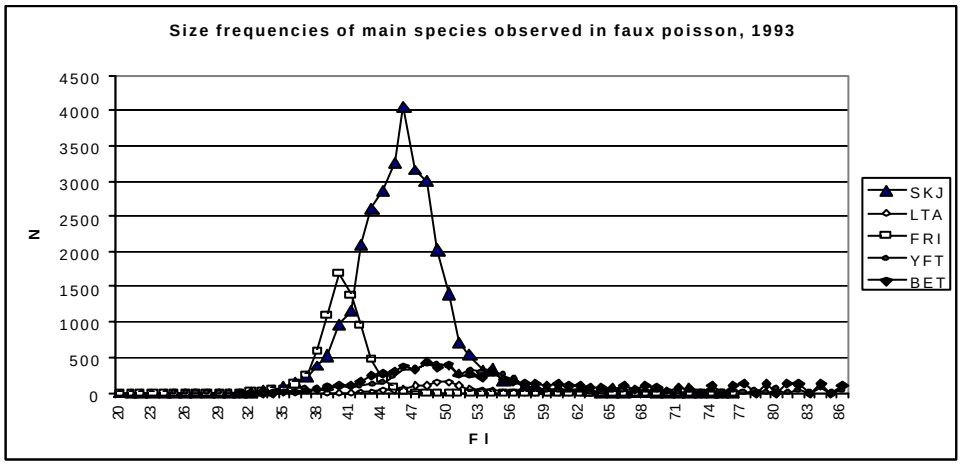
SMT-Fig. 2. Estimated landings (t) of the major small tuna species in the Atlantic and Mediterranean, 1950-2002. Data for recent years are incomplete.



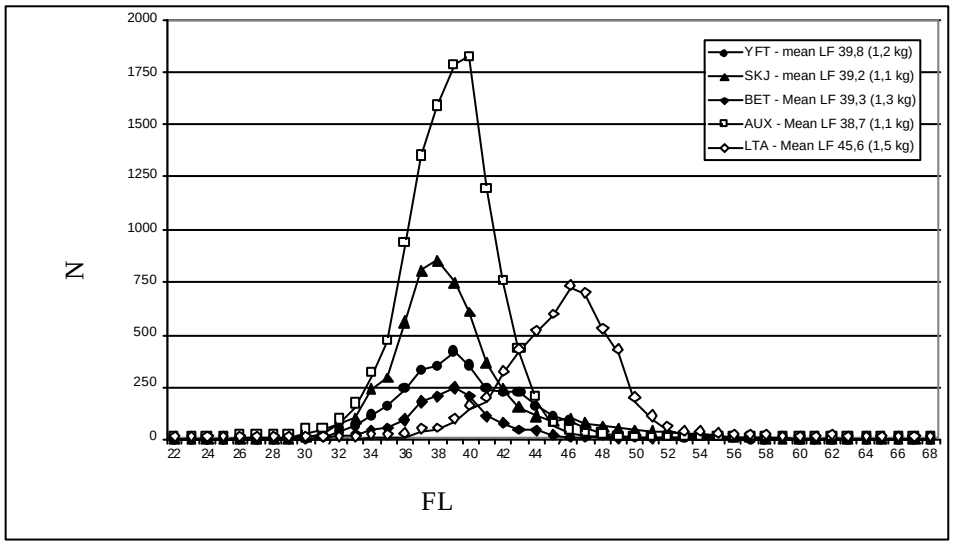
SMT-Fig. 3. Catches of small tunas (FRI, LTA) from the European and associated purse seine fishery, 1991-1996 average.



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



SMT-Fig. 5. Size of the main species observed in "faux poisson" (false tuna) monitored in Abidjan in 1993.



SMT-Fig. 6. Size of the main species observed in "faux poisson" (false tuna) monitored in Abidjan in 1998-1999.

9. Report of GFCM-ICCAT activities

The Assistant Executive Secretary noted that the main work under this item was the activity of the *Ad Hoc* GFCM/ICCAT Working Group on Sustainable Tuna Farming/Fattening Practices in the Mediterranean. This Working Group met in May 2003, chaired by Dr. Victor Restrepo, and the report is found in SCRS/2003/020. The mandate of the Working Group is to develop practical guidelines to address known problems and propose research needed in order to investigate potential problems. Emphasis of known problems should be given towards the solution of those issues related to the collection of fishery and farming statistics. A questionnaire was sent out to all countries involved in bluefin tuna farming and current task of the Working Group is to summarize and analyze these "national reports" and to identify key problems and offer potential solutions. There will be a follow-up meeting to discuss this in Turkey (15-17 December 2003).

The SCRS Chairman discussed the future work of the *Ad Hoc* GFCM/ICCAT Working Group. It was noted that there is a need for a data preparatory meeting prior to the 2005 eastern bluefin assessment, although not necessarily in the GFCM-ICCAT framework. In addition, collection of Mediterranean albacore statistics has been identified as a priority. EC-Italy also pointed out the need for the improvement of Mediterranean small tuna statistics. It was agreed that there is the need for two meetings, and that they might be held consecutively: a GFCM-ICCAT meeting for two days to focus on Mediterranean albacore and small tunas, and a five-day ICCAT meeting for bluefin data preparation (including both Mediterranean and eastern Atlantic, possibly in May or June 2004). It was agreed that this would be further discussed under Agenda item 15.5.

10. Report of the *Ad Hoc* Working Group on Assessment Methods

The Chairman of the Working Group presented the report of the meeting held in Shimizu, Japan, in April 2004 (SCRS/2003/013). An Executive Summary is presented in **Appendix 4**. The Chairman explained that the meetings had been a good mechanism to initiate the research required to improve our knowledge of alternative methods for CPUE standardization that take habitat data into account.

The Chairman of the Working Group also explained that Dr. John Hampton (Secretariat of the Pacific Community) had attended the meeting as an external peer reviewer. In addition to sharing his expertise at the meeting, Dr. Hampton had made a number of useful recommendations (see SCRS/2003/039). Several of these suggested that the ICCAT Secretariat should take a more active coordination role as a data repository and by acquiring all of the necessary software to carry out the simulation experiments proposed by the Meeting in Shimizu. The SCRS commented that, although these recommendations would give a more efficient approach to the research and improve the Secretariat's scientific strength, they could only materialize with an increase in the number of staff and other costs.

On the issue of the ICCAT assessment software catalog, the Chairman indicated that there had been updates to the VPA-2BOX software and a new addition for a population simulator (FSIM), and that the cataloguing screening committee was currently considering a proposed addition for a Bayesian stock production model.

The Chairman of the Working Group also reported on progress made towards implementing "integrated statistical models" by having invited Dr. David Fournier to the Secretariat to train several scientists on the use of MULTIFAN-CL. This invitation was made with shared contributions from the Secretariat and the BETYP, and was used to develop test cases for Atlantic bigeye tuna and southern albacore. These test cases continue to be developed through direct collaboration between ICCAT scientists and the Secretariat. It is expected that a more fully-developed application for bigeye will be presented at the 2004 BETYP Symposium.

11. Report of special research programs

11.1 Bigeye Tuna Year Program (BETYP)

The Report on BETYP activities from October 2002 to September 2003 (**Appendix 5**) was presented by the Program Coordinator, Mr. Guillermo Fisch, who described the status of the activities of the Program and the plan for 2004. The proposed date of the final BETYP meeting, which will be in the form of a symposium, was confirmed as 8-9 March 2004.

The Committee continues to endorse this Program and accepted the report (with minor revisions), and plan for 2004.

11.2 Bluefin Year Program (BYP)

The summary report of the BYP for the previous year was presented to the Committee by the West Atlantic BYP Coordinator, Dr. Gerald Scott (**Appendix 6**). The Committee noted that substantial progress has been made under BYP and that the goals outlined for 2002-2003 had been met. In particular the research undertaken through the FAO-COPEMED program has resulted in large gains in our understanding of the Mediterranean and eastern Atlantic bluefin tuna fisheries that will substantially improve the Committee's ability to advise the Commission on the status of bluefin in the region. The countries of the eastern Mediterranean expressed gratitude for the increased awareness for research in the eastern Mediterranean, and urged that there should be full collaboration by all countries in this area. The Committee was advised that an FAO project to improve data collection is beginning in the eastern Mediterranean. The Committee reviewed and endorsed the 2003-2004 planned research expenditures of the BYP. The Committee has recommended initiation of a large-scale, well-coordinated bluefin research program; upon funding by the Commission, the BYP will become part of this large-scale program (see section 15.2).

Section 16 of this report contains the relevant recommendations of this program to the Commission.

11.3 Enhanced Research Program for Billfish

The report of the Enhanced Research Program for Billfish was presented by the West Atlantic Coordinator, Dr. Eric Prince (**Appendix 7**). The East Atlantic Coordinator, Dr. Nestor N'Goran Ya, also gave a verbal report of his activities during the year. The Committee reviewed the excellent progress made by the Program. The Committee also reviewed and endorsed the 2004 planned expenditures of the Program.

Recommendations relevant to this Program are the same as for the Species Groups, and can be found in Section 16.

12. Report of the Meetings of the Sub-Committee on Statistics

The Sub Committee on Statistics held two inter-sessional meetings in 2003: one dealing with the improvement of collection of Statistics in Ghana (SCRS/2003/010), and the second to discuss the current data exchange protocols, as well as the use of standardized codes, and the inclusion of the age-slicing procedure in the ICCAT database (SCRS/2003/012). In addition, the Sub-Committee on Statistics again met during the week prior to the SCRS Plenary. Dr. Pilar Pallarés presented the report of that meeting (**Appendix 8**). This report was further revised and adopted during the Sub-Committee session during the Plenary.

The Committee adopted the Report of the Meeting of the Sub-Committee, and agreed that having the Sub-Committee on Statistics meet during the week prior to the SCRS was a very productive strategy and should be continued.

Section 16 of this report contains the relevant recommendations of this Sub-Committee to the Commission.

13. Report of the Meeting of the Sub-Committee on By-Catches

The Report of the Meeting of the Sub-Committee on By-Catches was presented by the Convener, Dr. Hideki Nakano (**Appendix 9**). New information concerning by-catches, review of national and international activities, future plans, consideration of Resolution [02-14] on seabirds, and recommendations concerning by-catches were reviewed. The Committee adopted the report of the Meeting of the Sub-Committee on By-catches.

Section 16 of this report contains the relevant recommendations of this Sub-Committee to the Commission.

14. Report of the Meeting of the Sub-Committee on Environment

The Report of the Meeting of the Sub-Committee on Environment was presented by the Convener, Dr. Jean-Marc Fromentin (**Appendix 10**). The Chairman proposed a new direction for the Sub-Committee in order to gain access

to environmental databases. Progress on this activity will be presented to the 2004 SCRS Plenary. The Committee reviewed and adopted the report of this Sub-Committee.

Section 16 of this report contains the relevant recommendations of this Sub-Committee to the Commission.

15. Consideration of plans for future research and coordination activities

15.1 Arrangements for the Second World Meeting on Bigeye Tuna in 2004

The Second World Meeting on Bigeye Tuna will be held in Madrid 10-13 March 2004, immediately following the BETYP Symposium. While the BETYP Symposium will focus strictly on the activities and results of the BETYP, the Second World Meeting on Bigeye Tuna will be broader in scope and emphasize comparisons among oceans.

The delegate from Japan requested that the Secretariat provide the announcement and provisional agenda for this meeting as soon as possible. The Secretariat responded that it would do its utmost. However, the production of this material does not depend exclusively on the ICCAT Secretariat.

15.2 Bluefin Tuna Research Plan

At its November 2002 meeting, the Commission recommended that a Working Group, comprised of scientists and managers, be established to evaluate all available biological information relevant to the issue of stock structure and mixing, and to develop operational options for implementing alternative approaches for managing mixed populations of Atlantic bluefin tuna, considering scientific information on the biology of bluefin tuna, historical data on fisheries, and the feasibility of alternative scenarios [Ref. 02-11]. In anticipation of that meeting, the SCRS Chairman requested a meeting 15-16 May 2003 in Madrid with bluefin tuna scientific advisors to discuss the development of a large-scale ICCAT bluefin tuna research proposal. The report of this meeting (SCRS/2003/014) was considered a starting point for a research plan. This was further discussed during the Species Group meetings and Dr. Joseph Powers, BFT-West Rapporteur, presented the Bluefin Tuna Research Program Planning Executive Summary based on those discussions (**Appendix 11**).

In order to fully respond to the Commission's needs for scientific information, it is the SCRS' scientific opinion that development of a large-scale Bluefin Tuna Research Program is essential and necessary. This program, when fully implemented, is envisioned to enhance and replace the current Bluefin Year Program (BYP) (see **Appendix 6**). Dr. Powers presented initial budgets (on the order of two million dollars annually for 3-5 years), but emphasized that considerably more coordination and development work needs to be done to reevaluate and sharpen the budget estimates and prioritize the projects. The most important concern of the SCRS is that if there is to be a coordinated bluefin research program, then there MUST be a full time coordinator, and that $250,000 is requested for the start-up year. In addition, the research plan and the Report of the ICCAT Workshop on Bluefin Mixing have suggested mechanisms to develop management alternatives by which the Commission may wish to address medium-term management. However, the Commission and the Working Group established in [Ref. 02-11] should provide the SCRS some guidance on future directions.

The Committee accepted the research plan and recommended that it be presented to the Commission. It was reiterated that should this proposal be funded, it would replace the current BYP. However, if it is not funded, then the current BYP should continue and be funded at the same level.

Section 16 of this report contains the relevant recommendations of this proposal to the Commission.

15.3 Partnership with FAO's FIRMS-FIGIS

Document SCRS/2003/023 was presented by the Assistant Executive Secretary. The Fisheries Resources Monitoring System (FIRMS) is a project for the global dissemination of information on fisheries coordinated by FAO. This document provides information on current and potential collaboration between ICCAT and FAO on this project. Since the last update, ICCAT has participated in a training session, prepared case studies of ICCAT Executive Summaries adapted to the FAO application, and the Partnership Arrangement has been finalized for signature and the basis for a FIRMS Steering Committee established.

Formal partnership would enable ICCAT to globally distribute its assessment results in a standard and state-of-the-art format, while still keeping closer control of such worldwide dissemination than currently. The costs would

include one week of training, an initial investment of about two months to transform the ICCAT Executive Summaries to the FAO application, one week of travel when the Steering Committee meets, and two to three weeks of editing each year.

In 2003, Dr. Restrepo emphasized that the SCRS should advise the Commission if it recommends that ICCAT be a signatory to the FIRMS Partnership Arrangement. In addition, the SCRS should examine and endorse the proposed Annex 2 to the Partnership Arrangement (Appendix 2 of SCRS/2003/023), which describes the information contributed to FIGIS-FIRMS by the ICCAT SCRS (only the SCRS Executive Summaries, including the tables and figures).

The Committee endorsed the Secretariat's proposal and recommended that the Commission be a signatory to the formal FIRMS Partnership Arrangement. The Committee also agreed to the proposed text of Annex 2 of the Partnership Arrangement.

15.4 Report of the Ad Hoc Working Group on SCRS Organization

Dr. Gerald Scott, Convener of the *Ad Hoc* Working Group on SCRS Organization, presented the report of the meeting that was held during the previous week, and which is attached as **Appendix 12**. The report presents the Working Group's recommendations related to the assessment schedule for 2004-2005, continuation of peer review for quality assurance purposes, review of the Guidelines for Meeting Reports, consideration of stricter standards for SCRS paper formats, the availability of electronic versions of SCRS documents prior to the SCRS, a policy for the submission of scientific documents, and the availability of National Reports. The Committee generally endorsed the recommendations of the Working Group with some clarifications and additions to the meeting schedule (see section 15.5).

In 2004, the agenda of the *ad hoc* Working Group will include discussion of how to improve the efficiency of the schedule and frequency of SCRS meetings (inter-sessional meetings and Plenary).

Section 16 of this report contains the relevant recommendations of this proposal to the Commission.

15.5 Inter-sessional meetings proposed for 2004

The Committee's proposed meeting schedule for 2004-2006, which modifies the proposal of Appendix 12, is as follows:

Meeting	*Proposed Dates*	*Proposed Venue*	*Comments*
2004			
BETYP Symposium	8-9 March	Madrid	Already decided
2nd World Meeting on BET	10-13 March	Madrid	Already decided
Shark assessments	?? April	Japan?	Res. [01-11]
GFCM/ICCAT data preparatory meeting (ALB and small tunas)	(6-7) May	Madrid	
BFT-East data preparatory meeting	(10-14) May	????	To review data and substitutions in preparation for 2005 assessment
BFT-West Assessment	(7-11) June	Madrid	Rec. [98-07]
SKJ Assessment	(28) June-(2) July	Madrid	Last assessed in 1999
2005			
SWO Stock Structure	(February 2005)		
BFT-East assessment			
BUM+WHM assessments			
2006			
SWO-Atl. Assessments			

15.6 Date and place of the next meeting of the SCRS

The next SCRS meeting will be held from 4-8 October 2004, in Madrid.

16. General recommendations to the Commission

Many of the recommendations made by the Committee require an increase in the workload of national scientists and can only be carried out with the corresponding support, through human resources and access to information. The Committee notes increasing difficulties in the access to the necessary fisheries information and to funding, and therefore recommends that the required steps be taken by Contracting Parties to facilitate the scientists and provide the resources necessary to carry out their mandate.

16. 1 Tropical tuna species

General

The last assessment for skipjack was carried out in 1999, and two meetings dealing with bigeye will be convened next year. Consequently, the Committee recommends that the next assessment be dedicated to skipjack, as was suggested last year.

Considering the uncertainties in IUU catches, in particular those of 2002, the Committee stresses the importance of full participation in the Statistical Document Program for all countries that trade tuna.

Noting the absence of scientists from several countries with important fisheries during the last yellowfin stock assessment (such as Brazil, Ghana and Venezuela), the Committee stresses the importance of regular participation from all major fishing nations during assessments and other evaluations.

Statistics

Some deficiencies in the catch-at-size database were identified during the work of the Tropical Tuna Species Group, preventing it from achieving part of its expected analysis. The Committee recommends that the size database be attentively examined next year, especially for yellowfin, skipjack and bigeye.

The Committee recommends that relevant port sampling on Ghanaian Fisheries (purse seine and baitboat) be conducted, in order to provide better catch by species and size data. The historical species composition should be verified and corrected if necessary before the next assessment of skipjack.

The available abundance indices for bigeye tuna are still limited. All Countries, Entities or Fishing Entities conducting fisheries for this species should provide detailed information on fishing practices so that more indices can be developed and used in the assessment. The development of abundances indices for younger ages, necessary for tracking recruitment trends, should be particularly encouraged.

Research

As a skipjack stock assessment is planned in 2004, scientists are particularly encouraged to conduct studies on the biology, historical tagging data and population dynamics for this species and provide results to the meeting.

The Committee recognized that many problems identified in bigeye research are common to all oceans. These include catches by non-target fisheries and IUU fleets, lack of indices of juvenile fish abundance, uncertainty in biological parameters, and assessment modelling. Also, many fleets move easily between the oceans. Therefore, it is recommended to also participate actively in the Second World Meeting on Bigeye Tuna, which will be held in conjunction with the BETYP symposium.

The BETYP symposium is scheduled for March 2004. In order to make that meeting successful, national scientists should cooperate and participate actively in the process of preparing for this meeting.

The Committee recommends that the next evaluation of the moratorium not take place before the next bigeye tuna assessment.

16.2 Albacore

Statistics

The Committee recommends that albacore data be reported by the ICCAT deadlines, even when no analytical stock assessment is scheduled. All Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities catching albacore (directed or by-catch) should report basic data such as Task I and II (*e.g.*, catch and effort, size, and catch-at-size) by as small an area as possible (5-degree rectangles for longline, and 1-degree rectangles for other gears), and by month. Efforts to increase or maintain adequate collecting and processing systems for basic statistics should be applied in the future by all fleets participating in the fishery.

The Committee recommends that efforts be made to estimate a consistent catch at age from the available data for the North Atlantic.

There is a general lack of information and data from the Mediterranean albacore fisheries especially for recent years. It is recommended that future GFCM-ICCAT joint meetings consider, as a priority task, the compilation of albacore fishery statistics for the Mediterranean Sea.

The Committee recommends that detailed information on the origin of the catches submitted by St. Vincent and the Grenadines be submitted to ICCAT.

It was recommended that a procedure for the calculation of catch-at-age directly from the ICCAT database be established at the Secretariat.

Research

The SCRS should consider analyzing global climatic and oceanographic changes on a routine basis for both North and South Atlantic albacore. Further research is needed on the relationships between environmental factors (*e.g.*, sea surface temperature) and the distribution of albacore, including studies using historical satellite data.

16.3 Bluefin tuna

In order to fully respond to the Commission's needs for scientific information for management of bluefin tuna, the Committee's scientific opinion is that the development of a large-scale Bluefin Tuna Research Program is essential and necessary. To that end, the Program outlined in SCRS/2002/014, and the Executive Summary on the Bluefin Tuna Research Program Planning **(Appendix 11)** should be supported to the extent possible.

Within the overall research and statistics needs expressed in the program plan, there are several specific recommendations for research:

1) Basic catch data (catch statistics, statistics related to bluefin farming, size frequency data, and catch and effort data) should be improved;

2) Stock identification research should be carried out, including spawning site fidelity, mixing and broad-scale tagging experiments, including electronic tagging, biological markers and micro-constituent analyses; and

3) Biological parameters, including natural mortality and reproductive biology, should be determined.

Regarding (i) the high uncertainties in the catch and effort data for the East Atlantic and Mediterranean bluefin tuna, and (ii) the recurrent problems with substitutions and ageing, and (iii) following a 2002 recommendation of the Species Group (see 2002 BFT Detailed Report), the Committee recommends that an ICCAT data exploratory meeting for East Atlantic and Mediterranean bluefin tuna be held in 2004. The main objectives of that meeting will be to explore in depth: (i) Task I and Task II data over the last ten years, (including the estimation of NEI), (ii) the substitutions of size data, (iii) the ageing procedure, and (iv) biological information of interest for stock assessment (such as growth and maturity, etc.). This meeting will imply preparatory work for both the ICCAT Secretariat and national scientists, who should provide all necessary information prior to the meeting (at a date to be determined and communicated later). A minimum of five working days appears necessary to achieve the proposed plan. The Committee also recommends that no stock assessment take place for East Atlantic and Mediterranean bluefin tuna in 2004.

Bluefin Year Program Research Plan for 2004

There has been considerable progress to date on the sampling plan developed by the Bluefin Year Program (BYP) in 1999 and continued through 2003, 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, BYP research funds in 2003 and 2004 permit some further broadening of the research plan to include additional high priority research. Should the Commission support the large-scale Bluefin Research initiative in 2004, the research elements identified in this plan shall be incorporated into that activity and the €15,000 expected from the Commission for 2004 would not be necessary.

As highest priority for the BYP in 2003-2004, the Committee recommends expenditures of €21,500 to cover expenses associated with stock structure and maturity sampling during the upcoming year as described in the BYP sampling plan.

As next priority for the BYP in 2003-2004, the Committee recommends expenditures of €50,500 to contribute to the expenses for planning, conduct, and coordination of four research activities viewed as important to the future of BYP and in support of providing scientific advice to the Commission on bluefin tuna.

The specifics of the 2003-2004 BYP Research Plan can be found in **Appendix 6**.

16.4 Billfish

The Committee recommends that, when possible, on-board observer programs be enhanced to define the species composition of billfish by-catch from longline and purse seine fisheries by considering the distribution and abundance of billfish in the design of these programs, or alternatively, that statistically robust procedures which improve estimations of catch for all billfish species be developed and applied. It is recommended that the analytical procedures used to estimate catch by species always be documented, so that uncertainty in the estimates of catch can be better quantified.

Sampling/reporting procedures for separating billfish species for those fisheries that continue to report unclassified billfish should be developed.

Knowledge about the landings of billfish from countries that have traditionally not reported billfish but from where substantial catches are likely to be occurring should continue to be improved, by making contacts with the scientists/administrators of those countries, especially those in West Africa.

The Committee also recommends the continuance of fostering international collaboration of the billfish research programs of the different countries, as exemplified by the successful collaboration that occurred with the 2002 *Shoyo-Maru* cruise, the development of the SEEPA model and, the imp roved capacity to use standard statistical methods for developing relative abundance indices and running assessments.

The Committee recommends that the Commission continue to support the involvement of the ICCAT Enhanced Research Program for Billfish on this type of research by, if possible, increasing its contribution to €15,000 or at least maintaining it at the level of 2003.

16.5 Swordfish

The Committee recommends that a comprehensive symposium on the topic of swordfish stock structure be held in late 2004 or early 2005 (preferably) and that a Symposium Steering Committee, led by the Mediterranean swordfish rapporteur and assisted by the Secretariat, be established to prepare a symposium agenda, decide a venue, and broadly distribute an announcement for the symposium and call for papers, no later than February 2004.

Atlantic

In view of the improved condition of North Atlantic swordfish and considering the apparent stability of the fisheries for swordfish in the South Atlantic, and further considering the heavy workload of SCRS in 2004 and the planned assessment schedule for 2005 (see section 15.5), it is recommended that the next Atlantic swordfish assessments be conducted in 2006. It should be noted that the data required for the session should be up to and

including the year prior to the meeting, if possible. The Committee reiterated the need for catch, size and effort data from all fleets.

The Committee recommends utilizing the observer data and other methods to crosscheck self-reported logbook and radio-report based estimation procedures as used, for example, in SCRS/2003/134, to estimate discarded swordfish catch.

Mediterranean

It is recommended that Mediterranean catch and effort be monitored biennually, and that the next swordfish stock assessment be conducted not sooner than 2008, so long as there is no signal from the stock indicating a dramatic decline. This allows time to increase the time series of catch and effort data, and to advance basic research and assessment methods. It should be noted that the data required for that session should be up to and including the year prior to the meeting. The Committee stressed the need for detailed catch effort and size data from all fleets.

16.6 Southern bluefin tuna

The Committee recommends that, starting in 2004, the Secretariat investigate the possibility that the draft Executive Summary for southern bluefin tuna be prepared by the CCSBT Secretariat, in consultation with the ICCAT Secretariat.

16.7 Small tunas

Catch and effort statistics as well as biological information for small tuna are incomplete or lacking for many Contracting Parties and non-Contracting, Parties, Entities or Fishing Entities catching these species in the Atlantic and Mediterranean. The Committee strongly recommends that these data be provided.

Once again, the Committee also recommends that a Working Group on Small Tunas be held in the future.

16.8 Sub-Committee on Statistics

The Committee recommends that, according to the ICCAT Statistical Data Exchange Protocols be adopted by the SCRS, Task I and Task II data must be submitted within the established deadline dates and in standard formats.

Ghana should continue the new sampling regime during the unloading period, and should provide a full report on the whole 2003 sampling exercise. The Ghanaian scientists, with the help of knowledgeable scientists from the Tropical Species Group, should develop a standardized sampling method and develop a procedure to estimate the species composition of the historical catches.

The Committee reiterates its recommendation that information from the individual Bluefin, Swordfish and Bigeye Statistical Documents, as well as the bi-annual reports, should be submitted in electronic format. In addition, the farming data reports, as required under the Recommendation by ICCAT on Bluefin Tuna Farming [Ref. 02-10] should be made available to the SCRS.

The Committee recommends the Secretariat be provided with basic information (type of tag, date tagged, etc.) on the tagging programs and that the Secretariat revise the historical tagging database. In the case of archival tags, the Secretariat could facilitate the payment of rewards if it has a complete inventory of tags and a commitment that the rewards will be reimbursed by the tagging investigators.

It is recommended that the plans to publish an ICCAT Manual should proceed. In order to do this in a reasonable timeframe (i.e., two years), €50,000 is requested.

The Committee recommends that €50,000 be allocated each year for the maintenance and necessary updates of computer equipment and software. An itemized request will only be presented in the case of a special request above and beyond the fixed amount.

The Committee recommends that all Task II data (effort and sizes) available in ICCAT database be published on CD ROM and on the Internet.

16.9 Sub-Committee on By-catch

Given that the Commission has decided that the SCRS shall conduct assessments of Atlantic blue and shortfin mako sharks in 2004, the Committee recommends that:

Contracting Parties and Cooperating non-Contracting Parties Entities or Fishing Entities establish and/or maintain scientific research programs on pelagic sharks.

For assessment purposes, the Committee encourages Contracting Parties and Cooperating non-Contracting Parties Entities or Fishing Entities catching sharks in the Atlantic and Mediterranean, or which caught sharks in the past in these waters, submit species-specific catch statistics, including estimation of shark catch, dead discards and size data and conversion factors for estimating whole weight from product weight for various species. Emphasis should be on blue and shortfin mako sharks.

Further coordination and collaboration take place with other international organizations, especially ICES and GFCM, for the assessment of Atlantic and Mediterranean stocks of blue and shortfin mako sharks.

Wider participation be encouraged in the assessment session by Contracting Parties and Co-operating non-Contracting Parties, Entities or Fishing Entities and experts in general. For this purpose, financial aid for travel may be required from the Commission or from Contracting Parties.

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.

16.10 SCRS Organization

The Committee recommends that, in order to further the work of the SCRS, National Reports (Sections 1 and 2: National Fisheries Information and Statistics and Research) should be made available at the beginning of the SCRS Plenary, prior to the "Review of National Fisheries and Research Programs."

Noting that with the available means it would be difficult to prepare for both billfish and swordfish assessments in the same year, and considering the optimistic fishery indicators discussed in 2003 for swordfish, the Committee recommends that the SCRS and Commission consider postponing the Atlantic swordfish assessments until 2006.

The Committee was very pleased with the progress of the peer review system, especially with the results of the decision made by the SCRS in 2002 to have the reviewers participate actively in the meeting (as opposed to conducting a review of a report after the meeting has taken place). The Committee recommended that the program be continued with adequate funding (of at least €10,000 per year).

The Committee recommends the implementation of the general policy that documents should be available for and presented to the relevant Species Groups, in order to be included in the current *Collective Volume of Scientific Papers*. No documents shall be accepted after the first morning of the SCRS.

17. Responses to the Commission's requests

17.1 Swordfish stock structure

[Resolution 99-3 Regarding Stock Structure and Boundaries of Atlantic Swordfish Stocks]

In 1999, the Commission resolved that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities should report national and international research programs in order to reduce the current uncertainties about stock structure, mixing and boundaries of swordfish stocks.

The Committee noted that research on stock structure using different methodologies had been carried out by National Scientists during the decades preceding Resolution 99-3, but with limited research funding. The results of these studies presented to SCRS were the basis for the current swordfish stock structure hypotheses used by SCRS. More recently, several countries have continued or established research programs related to swordfish stock structure. The preliminary results of some of these programs were presented and discussed at the 2002 assessment meeting and at the 2003 SCRS meeting. Noting that additional research was underway and scheduled

for completion in 2004, the SCRS decided to defer the Committee's response to the Commission until more conclusive results are available and recommended that a comprehensive workshop on the topic of swordfish stock structure should be conducted.

During the 2003 SCRS meeting, the Committee recognized the value of obtaining a broader scientific perspective on the issue of stock structure and decided that a Symposium format (similar to the upcoming 2004 Second World Meeting Bigeye Tuna) would be the preferred approach. In order to progress on this issue, the Committee further recommends the implementation and improvement of national research projects directed at stock structure study and formation of a Symposium Steering Committee, comprised of 5-7 individuals, including one from the Secretariat, the SCRS Chair, the SWO-MED rapporteur, plus national scientists from Europe, Japan, North America and others with expertise in stock structure analysis. The Steering Committee shall develop an agenda, decide a venue, and produce an announcement for this global symposium to be widely distributed no later than January 2004. These materials shall be circulated amongst SCRS Officers for review and comment and will be finalized no later than February 2004. To provide adequate preparation time for interested scientists from around the world, the Symposium should take place in late 2004 or early 2005.

17.2 Review of Japanese catch, including discards

[Recommendation 02-02 Regarding the Rebuilding Program for North Atlantic Swordfish]

In 2002, the Commission recommended that SCRS shall, in 2003 and 2004, review the Japanese swordfish catch, including discards. The Committee reviewed the swordfish catches reported by Japan, as outlined in the Japanese National Report and estimated dead discards and live releases for 2000-2002, as documented in SCRS/2003/134. Japan reported landings of swordfish for the years 2000-2002 of 161, 0, and 0 t from the North Atlantic management area and of 788, 694, and 814 t from the South Atlantic management area, respectively. Japan also reported dead discards from the North Atlantic management area of 580, 571, and 314 t for 2000-2002, respectively. The Committee noted that the 2002 landings and discard reports should be considered provisional and subject to a general upward revision, as additional logbook reports from Japanese vessels become available.

In SCRS/2003/134, a new estimation method for dead discards and live releases was described and results presented for the years 2000-2002. The method makes use of logbook data, radio reports of fishing activities by Japanese longline fleet vessels and multiple sources of size frequency data. Estimates by this methodology were similar to those presented previously. While the method applied makes use of the available data on reported catch and size of the catch, the Committee noted additional improvements to this estimation procedure should result through the modified logbook data collections being implemented in the fleet. The Committee recommended utilizing the observer data and other methods to crosscheck the self-reported logbook and radio-report based estimation procedures used in SCRS/2003/134.

17.3 Analysis of the impact of the moratorium on tropical tuna stocks

[Recommendation 99-1 Regarding the Establishment of a Closed Area-Season for the Use of FADs]

Background

Following an initiative of the EC frozen tuna producers' associations, the Commission adopted in 1998 a Recommendation prohibiting for all purse seiners flying flags of Contracting Parties and non-Contracting Parties, Entities, or Fishing Entities, to launch fishing objects and to fish with floating objects in a wide area of the Atlantic Ocean, between the African coast and 20º West longitude and between 5º North and 4º South latitude, during the months of November, December and January.

In 1999, the Commission extended this recommendation to all surface fleets and requested that the Committee analyze the impact of the moratorium on the stocks and recommend any changes considered necessary to increase its effectiveness, in order to evaluate possible modifications to be applied to the moratorium. The Committee carried out the required analyses in 2000, and updated them in the following years to incorporate data through 2002.

In 2002, the Committee recommended that part of the meeting time (2-3 days in the middle of the week) of the Working Group on Tropical Tuna Species during the week preceding the 2003 SCRS be dedicated to an analysis of the impact that the moratorium on floating objects has on the stocks of tropical tuna species.

This summary outlines the work done by the Committee.

Framework

The effects of the moratorium were estimated by considering the five moratoria affecting purse seine vessels from 1998 to 2002. For practical reasons, "annual" moratoria including January, November and December of the same calendar year (whereas in fact individual moratoria straddle years) were considered, and in consequence, the 1997 moratorium, which included only two months, was not taken into account. As for the preceding evaluation, the Committee thus decided to take into account the five moratoria jointly (1998 to 2002) and to compare their results with the "pre moratorium" period which is the average of 1993-1996.

The analyses were carried out by gear, fleet and species, with more detailed analysis being concentrated on the purse seine fleets. Seven "fleets" were considered for the analysis: "Ghana fleet" (purse seine and baitboats), "Purse seine EC," "Purse seine NEI" (EC-associated), "Baitboat Dakar," "Baitboat North" (Azores, Madeira and Canary Islands fleets fishing north of 25°N), "Longline" and "Other fleets."

Since some inconsistencies occurred when disaggregating catches and size frequencies from some mixed fleets into the original flag of their vessels, results obtained during the analysis may be slightly different from estimates made at yellowfin and bigeye stock assessments. These differences should not affect the general results of the analysis as those vessels have similar characteristics and strategies, leading to a similar distribution of size frequencies.

Descriptive statistics

European and NEI associated fleets

Trends of the EC and NEI fleet catches (total and by species) on logs and free schools are reported in **Figure MOR-1**. During the period of the moratorium, the EC purse-seine fleet was subject to a large decrease of its total catches (-34%), all species combined and for all fleets, particularly on logs but also on free schools (**Table MOR-1a** and **Figure MOR-2**). This decrease is obviously greatest during the moratorium area and period (November-January: -68% on logs and -22% on free schools), but also notable during the traditional "large yellowfin" fishing season (February-April, respectively -56% and -16%) as well as for the rest of the year on logs (-14%); however, this is most probably a consequence of the decrease in fishing effort (**Figure MOR-3**). This catch reduction during the months of the moratorium is mainly observed on bigeye (-61%) and skipjack (-64%) as well as for yellowfin to a lesser extent (-38%).

Figure MOR-4 shows the development in the number of vessels as nominal effort. A continuous reduction in the fleet is observed during the period. Nevertheless, the development of effort in fishing days shows an additional decrease during the moratoria years.

From a time/area consideration, the decrease in the catches from floating objects occurs entirely during the months of the moratorium, within the area of the moratorium **(Figure MOR-3)**. Comparing the time-area distribution of the catches during the two periods **(Figure MOR-2)**, one can see that the drastic reduction in catches from floating objects in the closed area is not compensated by similar increases in catches of free schools and/or floating objects outside the moratorium area. Similarly, no expansion of the fishing grounds as a result of the moratorium has been noted.

An estimate of the losses in weight resulting from the implementation of the moratorium (*i.e.*, within its area and period) for the European fleet is presented in **Table MOR-1b**; it leads to a total amount close to 35,000 t (21,000 t for skipjack, 7,000 t for yellowfin, and 6,000 t for bigeye). However, this loss has to be shared between effort reduction, the effect of the moratorium, and/or other factors, which are difficult to evaluate.

In order to try to identify the share of the losses that correspond to the moratorium, the variation of the mean annual catch per boat was examined (**Table MOR-1c)**. According to these estimates, the moratorium effect appears to be lower, 8% for total catches; reduced for bigeye tuna (-32%) and skipjack tuna (-18%), while yellowfin tuna catches increased (+10%).

Ghana based fleet

Yearly catches (in tons) of the purse-seine fleet of Ghana from 1996 to 2002 and changes in these catches prior to and during the moratorium years are reported in **Tables MOR-2a, 2b and 2c**, while **Figure MOR-5** shows cumulative monthly catches of yellowfin, skipjack and bigeye taken by the Ghanaian purse seine fleet from 1996 to 2002. A continuous increase can be observed for the three species during the period, as this fleet began operations in 1996 and has been expanding during the moratoria years, from two boats in 1996 to ten in 2002 **(Figure MOR-4)**, although economical problems led to strong variations of the activity of those vessels since 2000.

Yearly catches (in tons) of the baitboat fleet of Ghana from 1996 to 2002 and changes in these catches prior to and during the moratorium years are reported in **Tables MOR-3a, 3b and 3c**, while **Figure MOR-5** shows accumulated monthly catches of yellowfin, skipjack and bigeye by the Ghanaian baitboat fleet for 1996-2002. An increase in the catches of the three species is observed during the moratoria years due, in part, to the association of this fleet with the purse seine fleet (the baitboats help in the search and in the transport of the catch) and possibly also due to the effects of the moratoria. The increase in CPUE **(Figure MOR-6)** of this fleet during the moratoria years can be similarly explained.

Taken together, the Ghanaian purse seine and baitboat catches, which are made up of the same range of sizes and taken in the same area as the European and associated fleet, have increased by an average of 22,800 t during the moratoria years. Total catches as well as bigeye catches of the EC (including NEI) and Ghanaian (purse seine and baitboat) fleets are reported in **Figure MOR-6**.

Dakar-based fleet

Yearly catches (in tons) of the Dakar-based baitboat fleet from 1996 to 2002 and changes in these catches prior to and during the moratorium years are reported in **Tables MOR-3a** and **3b**, while **Figure MOR-7** shows the catch rate for this fleet, which is comprised of European and associated NEI baitboats, as well as some boats from Senegal and Cape Verde. The stable values of these rates indicate that the moratoria do not seem to have any effect on this fleet.

Northern baitboat fleet

Yearly catches (in tons) of the northern baitboat fleet from 1996 to 2002 and changes in these catches prior to and during the moratorium years are reported in **Tables MOR-3a** and **3b.** This fleet is comprised of boats from Azores, Madeira and Canary Islands. These fleets do not seem to be affected by the moratorium.

Longline

Figure MOR-8 shows the development of catch rates for the Japanese and Chinese Taipei fleets. As Japanese and Chinese Taipei nominal CPUEs decreased at different rates since the 1993-1996 period, no influence of the moratorium can be observed. **Table MOR-4** shows the development of longline catches between 1993 and 2002 in the Atlantic.

Other than those two fleets, China, United States and Brazil substantially produced bigeye tuna catch by their longline fishery. Catches from IUU fishing fleets were important during the 1990s; however, this fishing seems to have been gradually declining since 2000.

Other fleets

There was no information relevant to other gears or fleets.

Analyses

Fishing mortality and selectivities

To estimate selectivities, forward cohort analysis was used because the imprecision in the estimates of fishing mortality in recent years obtained by tuned VPA did not allow the detection of changes that may have occurred. This method assumes constant recruitment. The Base Case recruitment values used (50 million for bigeye tuna and 90 million for yellowfin tuna) were the same as were used in previous moratorium analyses; these had in turn

been based on the estimates of previous assessments. Forward cohort analyses suggest that there have been substantial changes in the selectivity and fishing mortality trends of each fishery between the pre-moratorium period (1993-1996) and the years in which a full three months of moratorium took place (1998-2002).

Bigeye

Catch-at-size was converted to catch-at-age by the slicing method traditionally used for bigeye assessments. Since there were some changes in the definitions of fisheries this year, the catch-at-age developed in 2002 during the bigeye assessment was used up to 2001. The catch-at-age corresponding to 2002 was created this year. The effect of this change for catch-at-age calculated in 2002 seems to be minimal.

Fishery group-specific partial fishing mortality and selectivities are calculated from the partial catch-at-age (**Figure MOR-9a-g**). Compared to the pre-moratorium years (1993-1996), fishing mortality in moratorium years (1998-2002) has been reduced for EC purse seine, EC NEI purse seine and northern baitboat fleets while the fishing mortality vectors of Ghana, Dakar baitboat and other fisheries have increased, particularly for small fish. Longline also has slightly increased fishing mortality vectors for older fish. The changes in selectivities are much less and stable between the two periods.

Yellowfin

The inconsistencies in catch-at-size that resulted from the catch and size frequency dis-aggregation process caused a number of difficulties in the preparation of catch-at-age for the yellowfin analyses. Catch-at-age was recombined to reflect as much as possible the fleets defined for this analysis. However, the resulting catch-at-age matrix differed considerably in distribution among ages from the matrix from the data used for the most recent yellowfin assessment. For these reasons, the group decided not to consider these results.

Yield per recruit and spawning biomass per recruit

Fishing mortality-at-age was calculated for five different scenarios on the basis of the results from the forward VPAs described in the previous section. For the purpose of describing these scenarios, it was assumed that the change in the European purse seine fishing mortality is fully due to the moratorium. The five scenarios modeled corresponded to (1) the pre-moratorium situation remained unchanged, (2) the condition observed during the moratorium, (3) the condition predicted if the whole purse seine fleet and the equatorial baitboat fleet complied with the moratoria, (4) the condition predicted if all the equatorial surface fleets had complied with the moratoria and did not increase the total effective effort above the 1993-1996 levels, and (5) the condition predicted if there have been no moratoria. Technical specifications for these scenarios are summarized in the table below and presented in a comprehensive fashion in the Detailed Report.

For the purpose of the analysis, the Ghanaian fleet was considered as a single unit. Years used to calculate the average fishing mortalities (F) are shown by fleet categories. The moratorium factor was calculated as the ratio of the average F from the European fleet in the period 1998-2002 and relative to the F for the same fleet in the period 1993-1996.

Scenario	*European purse seine fleet*	*Ghanaian baitboat, NEI and Ghanaian purse seine fleets*	*All other fleets*
1) Pre-moratoria	F of 93-96 applied	F of 93-96 applied	F of 93-96 applied
2) Moratoria	F of 98-02 applied	F of 98-02 applied	F of 98-02 applied
3) Moratoirum compliance	F of 98-02 applied	F98-02* moratorium factor	F of 98-02 applied
4) Full compliance	F of 98-02 applied	F98-02* moratorium factor	F of 93-96 applied
5) No moratoria	F of 93-96 applied	F of 98-02 applied	F of 98-02 applied

Arithmetic means were used to estimate all average fishing mortalities except for those used in the escapement calculations where yearly Fs were weighted by the total catch in number for the fleet and year. Pre-moratorium and moratorium periods were defined as 1993-1996 and 1998-2002, respectively, judging from the condition of fisheries and duration of moratorium months. To estimate the effect of the moratorium on survival of small fish, the Committee made projections of population abundance for the period 1997 to 2002. These projections were done by starting with the abundance-at-age matrix for 1996 obtained from the forward cohort analyses. These matrices of abundance were then subject to a fishing mortality-at-age vector that was kept constant for the period 1997 to 2002. The fishing mortality vectors used in these projections were those described above for the five scenarios.

Bigeye

The results (**Figure-MOR 10**) were very similar to the last evaluation and this is easily expected as only one more year was added on the data. During the years of the moratorium, the overall F has been reduced by 3%, yield-per-recruit (YPR) increased by 4% and spawning-biomass-per-recruit (SBPR) increased by 10%. Moratorium compliance (scenario 3) would decrease F by 8%, increased YPR slightly (9%) and SBPR by 24%. Finally full implementation of this moratorium and the freeze on fishing effort to 1993-1996 levels (scenario 4) would reduce F by 27%, increase YPR slightly (7%) and SBPR by 53%.

Yellowfin

The 2003 yellowfin tuna assessment supports the results of previous moratorium analyses that indicated fishing mortalities on the youngest age-classes increased during the moratorium years. However, it should be kept in mind that the moratoria were not aimed at reducing fishing mortality of juvenile yellowfin, as recruitment of this species mainly occurs outside the period of the moratoria. Changes in the fishing mortality may be unrelated to the moratoria.

Skipjack

During the moratoria, skipjack catches of the European and NEI fleets decreased by 41%. However, this decrease is a combined result of the decrease in effort and the moratorium impact; this is supported by the observation that the mean annual catch by boat has only decreased 18% between the two periods.

Summary of the results

The results of the analyses of the statistics show that the behavior of the fleets was different during the years in which the moratorium was implemented (1997-2002). Some fleets have maintained a continual decrease in nominal effort since the beginning of the 1990s, with larger decreases in the years in which the moratorium was implemented, while other fleets have drastically increased effort during the moratorium years. For bigeye tuna, after six years of implementation of the moratorium, the overall trend has resulted in fishing mortality-by-age comparable to the pre-moratorium situation, but higher for ages 1 and 4.

Despite the assumption of constant recruitment, which affects the scale of fishing mortality estimates, there remains a strong suggestion from the above analyses and from the most recent assessments that substantial changes in fishing mortality for both yellowfin and bigeye have occurred for some fisheries during the period of the moratorium years. These changes may be the direct or indirect result of the moratoria, but also may be related to other factors (such as decreasing effort for some fleets). The Committee has been unable to identify all the sources of these changes.

Conclusions

For bigeye, the species which the moratorium was intended to benefit most, the effect of the increase in effort from some fleets during 1997 to 1999 (the period in which most of the effort increase occurred) was larger than the effect of the moratorium and resulted in an increase in juvenile selectivity and a decrease in yield-per-recruit, and in spawning-biomass-per-recruit.

In comparing the different scenarios and taking as a reference that of no moratorium, the expected total catch would be very similar, but the gains in spawning-biomass-per-recruit would be much more beneficial, from 24% (scenario 3) to 50% (scenario 4) comparatively to the scenario of no moratorium (scenario 5). Therefore, the Committee reiterates the need of full implementation of this program. A consistent conclusion of the analyses is that the situation would have been worse had the moratoria not been implemented.

The moratorium was not designed to affect yellowfin either positively or negatively because yellowfin recruitment mainly occurs outside the period of the moratorium. However, during the moratorium years, fishing mortality on small yellowfin increased beyond what would have been expected by changes in fishing effort. It is possible, however, that this increase in fishing mortality resulting from an increase in catchers of ages 0 and 1, is not real and only reflects increases in recruitment of yellowfin.

During the years of the moratoria, catches in weight of skipjack associated with floating objects made by the European fleet and the European components of the NEI fleets decreased by 41%. Such a decrease in the catch of skipjack associated with floating objects may have lessened the possibility of local depletion that had been suggested in the last skipjack assessment.

MOR-Table 1a. Yearly catches (in t) of the European (French and Spanish) and NEI purse-seine fleet from 1993 to 2002, and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics).

Year	*Yellowfin*		*Bigeye*		*Skipjack*		*Others*		*Total*	
1993	90266		31179		125493		2693		249631	
1994	88061		32378		105632		3314		229385	
1995	84684		25095		99207		2713		211699	
1996	82475		25006		83928		4055		195464	
1997	68310	*-21%*	15918	*-44%*	60204	*-42%*	2848	*-11%*	147280	*-34%*
1998	73338	*-15%*	12622	*-56%*	56438	*-46%*	3496	*9%*	145894	*-34%*
1999	58672	*-32%*	15838	*-44%*	78097	*-25%*	2266	*-29%*	154873	*-30%*
2000	64047	*-26%*	13752	*-52%*	64625	*-38%*	1773	*-44%*	144197	*-35%*
2001	77097	*-11%*	14002	*-51%*	60891	*-41%*	2162	*-32%*	154152	*-30%*
2002	74131	*-14%*	14244	*-50%*	47848	*-54%*	1046	*-67%*	137269	*-38%*
Average										
1993-1996	86372		28415		103565		3194		221545	
1998-2001	68289	*-21%*	14054	*-51%*	65013	*-37%*	2424	*-24%*	149779	*-32%*
1998-2002	69457	*-20%*	14092	*-50%*	61580	*-41%*	2149	*-33%*	147277	*-34%*

MOR-Table 1b. Catches (in t) realized during the months of the moratorium (November, December and January) by the European (French and Spanish) and NEI purse-seine fleet from 1993 to 2002, and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics).

Year	*Yellowfin*		*Bigeye*		*Skipjack*		*Others*		*Total*	
1993	16105		10299		34816		341		61561	
1994	20285		9788		28677		1037		59787	
1995	21866		8971		33496		871		65204	
1996	19244		8424		32770		1501		61939	
1997	10133	*-48%*	5129	*-45%*	17773	*-45%*	1015	*8%*	34050	*-45%*
1998	10102	*-48%*	2530	*-73%*	8290	*-74%*	964	*3%*	21886	*-65%*
1999	12856	*-34%*	3885	*-59%*	7851	*-76%*	405	*-57%*	24997	*-60%*
2000	9126	*-53%*	4056	*-57%*	15391	*-53%*	271	*-71%*	28844	*-54%*
2001	14450	*-25%*	3425	*-63%*	13947	*-57%*	177	*-81%*	31999	*-48%*
2002	13212	*-32%*	4311	*-54%*	13274	*-59%*	368	*-61%*	31165	*-50%*
Average										
1993-1996	19375		9371		32440		938		62123	
1998-2001	11634	*-40%*	3474	*-63%*	11370	*-65%*	454	*-52%*	26932	*-57%*
1998-2002	11949	*-38%*	3641	*-61%*	11751	*-64%*	437	*-53%*	27778	*-55%*

MOR-Table 1c. Yearly catches (in t) by boat of the European (French and Spanish) and NEI purse-seine fleet from 1993 to 2002, and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics).

Year	*No of vessels*		*Yft catch/vessel*		*Bet catch/vessel*		*Skj catch/vessel*		*Total catch/vessel*	
1993	64		1410		487		1961		3900	
1994	59		1493		549		1790		3888	
1995	55		1540		456		1804		3849	
1996	54		1527		463		1554		3620	
1997	52	*-10%*	1314	*-12%*	306	*-37%*	1158	*-35%*	2832	*-26%*
1998	44	*-24%*	1667	*12%*	287	*-41%*	1283	*-28%*	3316	*-13%*
1999	41	*-29%*	1431	*-4%*	386	*-21%*	1905	*7%*	3777	*-1%*
2000	41	*-29%*	1562	*5%*	335	*-31%*	1576	*-11%*	3517	*-8%*
2001	44	*-24%*	1752	*17%*	318	*-35%*	1384	*-22%*	3503	*-8%*
2002	41	*-29%*	1808	*21%*	347	*-29%*	1167	*-34%*	3348	*-12%*
Average										
1993-1996	58		1492		489		1777		3814	
1998-2001	43	*-27%*	1603	*7%*	332	*-32%*	1537	*-14%*	3528	*-7%*
1998-2002	42	*-27%*	1644	*10%*	335	*-32%*	1463	*-18%*	3492	*-8%*

MOR-Table 2a. Yearly catches (in t) of the purse-seine fleet of Ghana from 1996 to 2002 and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1996 prior moratorium situation are in italics).

Year	*Yellowfin*		*Bigeye*		*Skipjack*		*Total*	
1996	3641		1623		3312		8576	
1997	5754	*58%*	2863	*76%*	6043	*82%*	14660	*71%*
1998	5452	*50%*	3483	*115%*	13027	*293%*	21962	*156%*
1999	14191	*290%*	6345	*291%*	15685	*374%*	36221	*322%*
2000	6572	*81%*	3481	*114%*	10386	*214%*	20440	*138%*
2001	13184	*262%*	7522	*363%*	11128	*236%*	31834	*271%*
2002	13312	*266%*	1516	*-7%*	20602	*522%*	35429	*313%*
Average								
1998-2001	9850	*171%*	5208	*221%*	12556	*279%*	27614	*222%*
1998-2002	10542	*190%*	4469	*175%*	14165	*328%*	29177	*240%*

MOR-Table 2b. Catches (in t) realized during the month of the moratorium (November, December and January) by the purse-seine fleet of Ghana from 1996 to 2002 and changes of these catches prior and during the moratorium years(relative changes in catch compared to the 1996 prior moratorium situation are in italics)

Year	*Yellowfin*		*Bigeye*		*Skipjack*		*Total*	
1996	908		405		826		2138	
1997	1315	*45%*	654	*62%*	1381	*67%*	3350	*57%*
1998	1471	*62%*	940	*132%*	3515	*326%*	5926	*177%*
1999	3758	*314%*	1680	*315%*	4154	*403%*	9592	*349%*
2000	1025	*13%*	543	*34%*	1619	*96%*	3187	*49%*
2001	2410	*166%*	1375	*240%*	2034	*146%*	5820	*172%*
2002	2765	*205%*	315	*-22%*	4280	*418%*	7360	*244%*
Average								
1998-2001	2166	*139%*	1135	*180%*	2831	*243%*	6131	*187%*
1998-2002	2286	*152%*	971	*140%*	3120	*278%*	6377	*198%*

MOR-Table 2c. Yearly catches (in t) by boat of the purse-seine fleet of Ghana from 1993 to 2002, and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics).

Year	*No of vessels*		*Yft catch/vessel*		*Bet catch/vessel*		*Skj catch/vessel*		*Total catch/vessel*	
1996	2		1821		812		1656		4288	
1997	5	*150%*	1151	*-37%*	573	*-29%*	1209	*-27%*	2932	*-32%*
1998	6	*200%*	909	*-50%*	581	*-28%*	2171	*31%*	3660	*-15%*
1999	8	*300%*	1774	*-3%*	793	*-2%*	1961	*18%*	4528	*6%*
2000	9	*350%*	730	*-60%*	387	*-52%*	1154	*-30%*	2271	*-47%*
2001	10	*400%*	1318	*-28%*	752	*-7%*	1113	*-33%*	3183	*-26%*
2002	10	*400%*	1331	*-27%*	152	*-81%*	2060	*24%*	3543	*-17%*
Average										
1998-2001	8	*313%*	1183	*-35%*	628	*-23%*	1600	*-3%*	3411	*-20%*
1998-2002	9	*330%*	1212	*-33%*	533	*-34%*	1692	*2%*	3437	*-20%*

MOR-Table 3a. Yearly catches (in t) of baitboat fleets from 1993 to 2002 and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics)

Year	*BB Ghana*		*BB Dakar*		*BB Europe*	
1993	36856		8945		19118	
1994	36973		10296		25697	
1995	33905		8937		27551	
1996	33266		8511		25974	
1997	38338	*9%*	10942	*19%*	21600	*-12%*
1998	43497	*23%*	14747	*61%*	20115	*-18%*
1999	47196	*34%*	17078	*86%*	15608	*-37%*
2000	32364	*-8%*	14992	*63%*	5915	*-76%*
2001	56538	*60%*	14546	*59%*	6629	*-73%*
2002	37775	*7%*	15398	*68%*	6079	*-75%*
Average						
1993-1996	35250		9172		24585	
1998-2001	44899	*27%*	15341	*67%*	12067	*-51%*
1998-2002	43474	*23%*	15352	*67%*	10869	*-56%*

MOR-Table 3b. Catches (t) realized during the month of the moratorium (November, December and January) by baitboat fleets from 1993 to 2002 and changes of these catches prior and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics)

Year	*BB Ghana*		*BB Dakar*		*BB Europe*	
1993	5339		2609		6165	
1994	5717		3081		6296	
1995	8251		2308		5538	
1996	11834		2007		3333	
1997	10107	*30%*	2980	*19%*	4068	*-24%*
1998	10177	*31%*	2664	*7%*	3964	*-26%*
1999	12917	*66%*	3756	*50%*	3053	*-43%*
2000	4723	*-39%*	3014	*20%*	510	*-90%*
2001	12945	*66%*	3274	*31%*	185	*-97%*
2002	7366	*-5%*	3806	*52%*	235	*-96%*
Average						
1993-1996	7785		2501		5333	
1998-2001	10191	*31%*	3177	*27%*	1928	*-64%*
1998-2002	9626	*24%*	3303	*32%*	1589	*-70%*

MOR-Table 3c. Yearly catches (in t) by baitboat fleet from 1993 to 2002, and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics)

Year	*No of vessels*		*Total catch/vessel*	
1993	25		1474	
1994	26		1422	
1995	30		1130	
1996	31		1073	
1997	28	*0%*	1369	*9%*
1998	27	*-4%*	1611	*28%*
1999	25	*-11%*	1888	*50%*
2000	26	*-7%*	1245	*-1%*
2001	26	*-7%*	2175	*73%*
2002	26	*-7%*	1453	*15%*
Average				
1993-1996	28		1259	
1998-2001	26	*-7%*	1727	*37%*
1998-2002	26	*-7%*	1672	*33%*

MOR-Table 4. Yearly catches (t) of longline fleet from 1993 to 2002 and changes in these catches prior to and during the moratorium years (relative changes in catch compared to the 1993-1996 prior moratorium situation are in italics).

Year	*Yellowfin*		*Bigeye*		*Total*	
1993	14032		62871		76903	
1994	17966		78296		96262	
1995	16788		74816		91604	
1996	17304		74900		92204	
1997	14787	-10,50%	68251	-6,15%	83038	-6,95%
1998	16831	1,87%	71825	-1,23%	88656	-0,66%
1999	19091	15,55%	76513	5,21%	95604	7,13%
2000	19901	20,45%	70902	-2,50%	90803	1,75%
2001	17815	7,82%	54842	-24,59%	72657	-18,59%
2002	15873	-3,93%	43772	-39,81%	59645	-33,17%
Average						
1993-1996	16523		72721		89243	
1998-2001	18410	11,42%	68521	-5,78%	86930	-2,59%
1998-2002	17902	8,35%	63571	-12,58%	81473	-8,71%

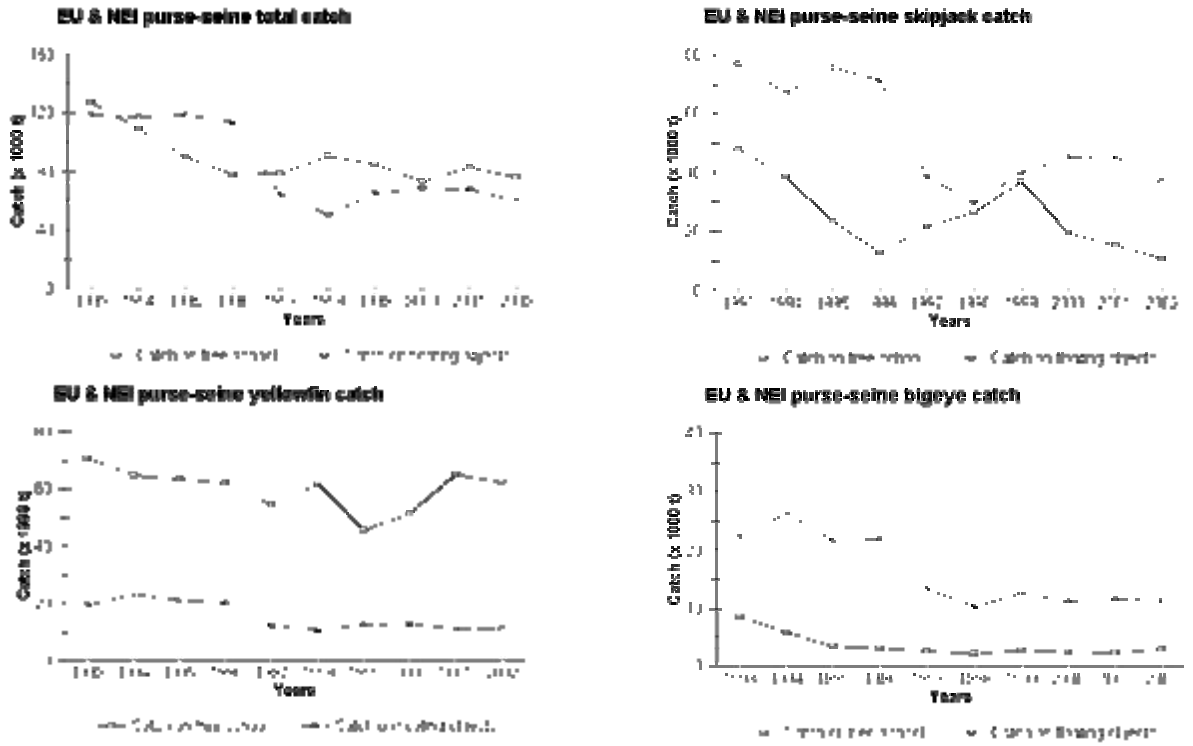


Figure MOR 1. Evolution of the catch on floating objects and on free schools of the EC and NEI purse-seine fleet from 1993 to 2002.

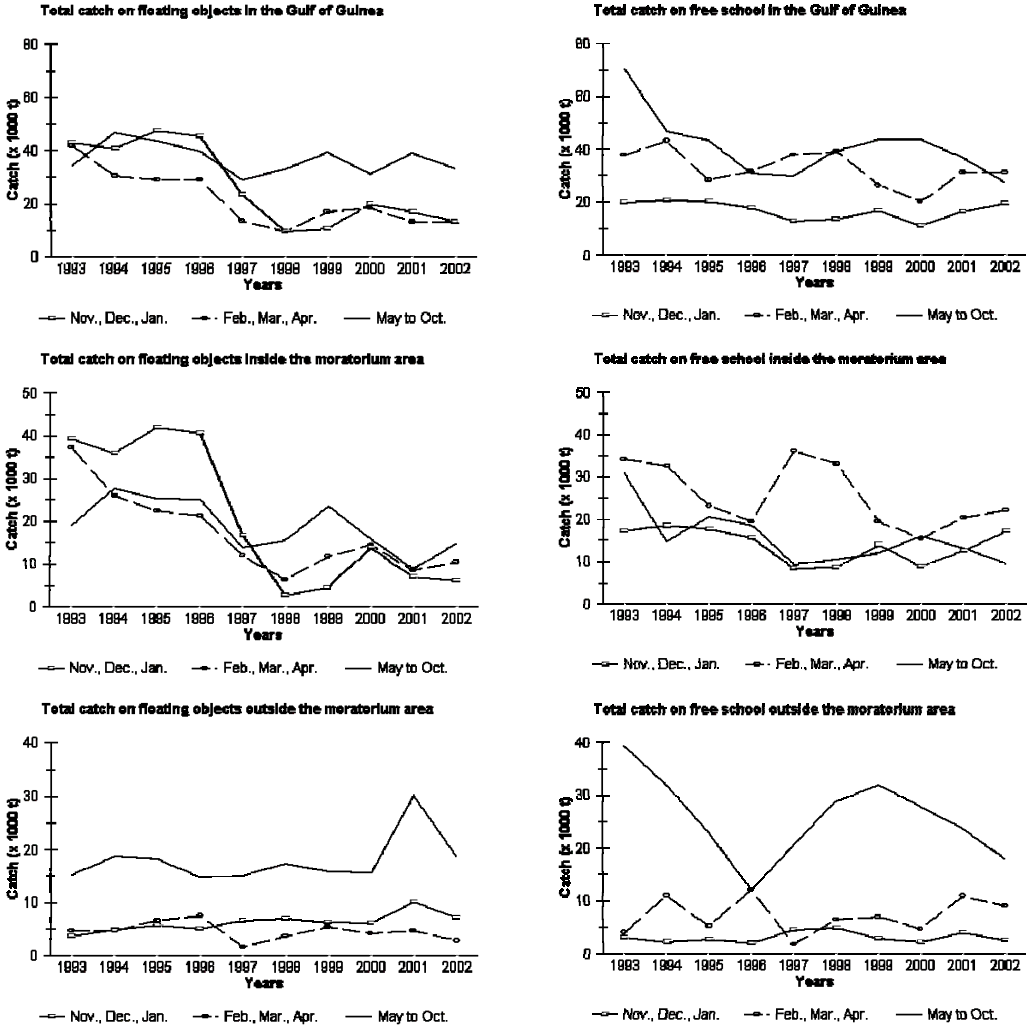


Figure MOR 2. Evolution of the catch on floating objects and on free schools by the EC and NEI purse-seine fleet from 1993 to 2002 for 3 different periods of the year (including the period corresponding to the moratorium months).

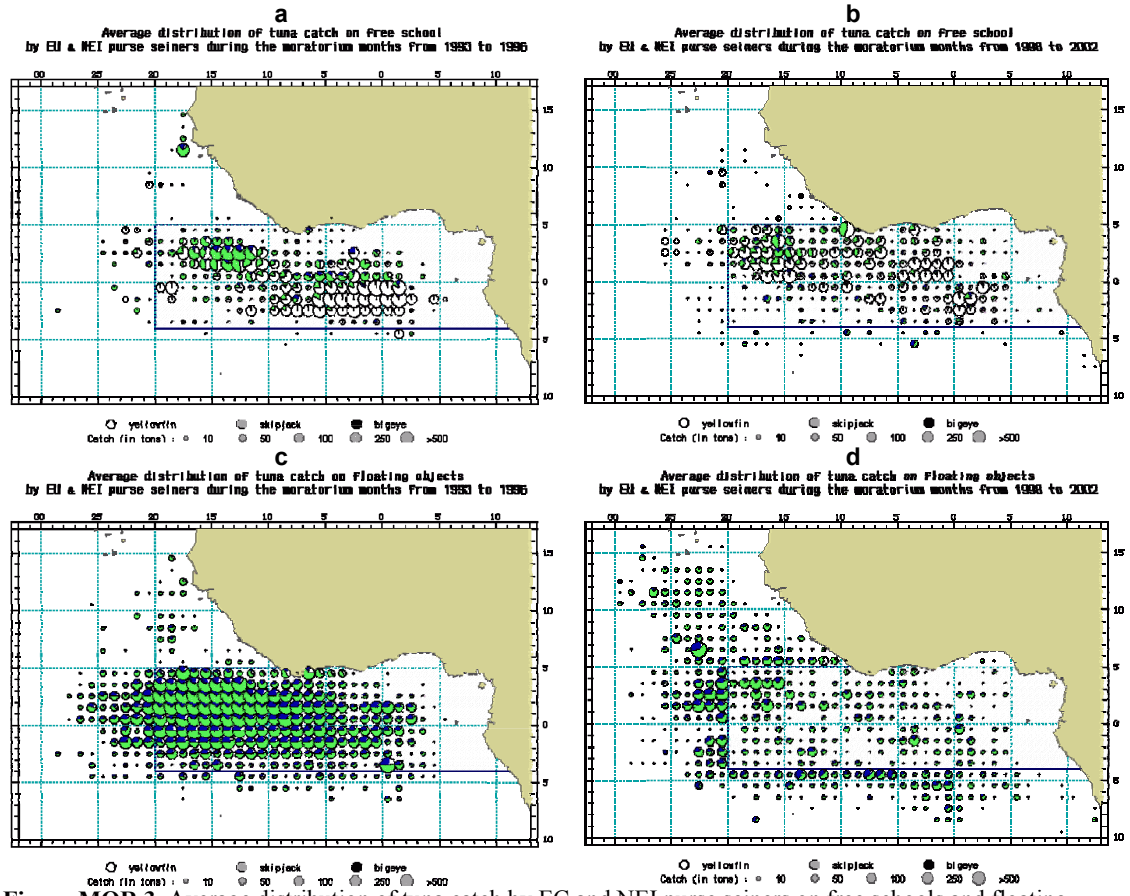


Figure MOR 3. Average distribution of tuna catch by EC and NEI purse seiners on free schools and floating objects during the moratorium months from 1993 to 1996 (a, c) and from 1998 to 2002 (b,d).

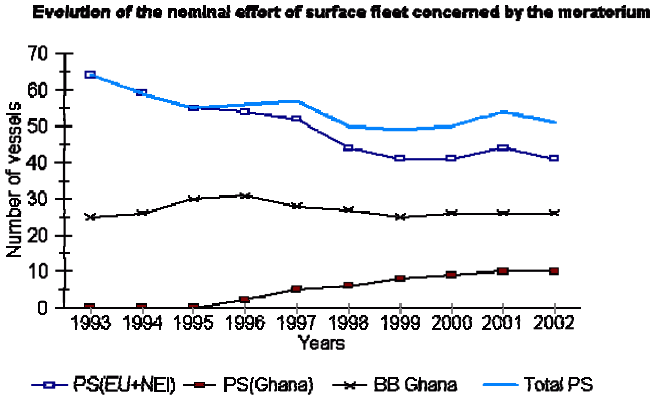


Figure MOR 4 Evolution of the nominal effort (number boats) of EC purse-seine fleet (including NEI managed by EC tuna boat owners) and Ghana purse seiners and baitboats from 1993 to 2002.

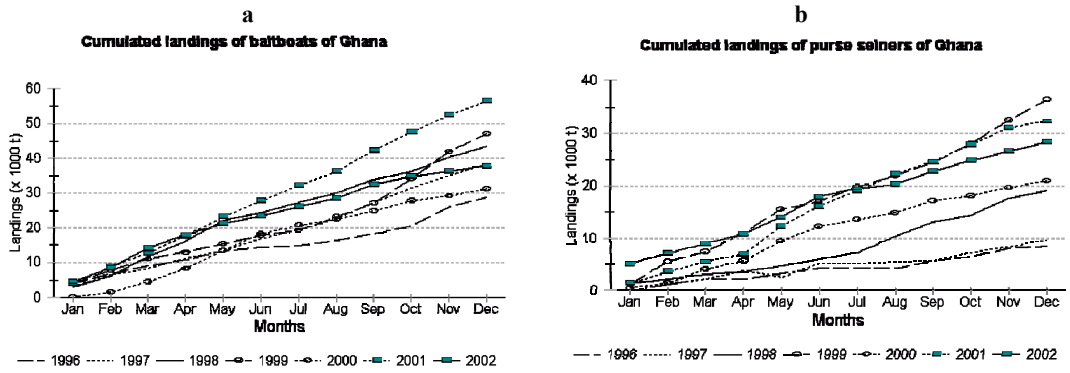


Figure MOR 5. Evolution of the cumulated landings of Ghanaian baitboats (a) and purse seiners (b) from 1996 to 2002.

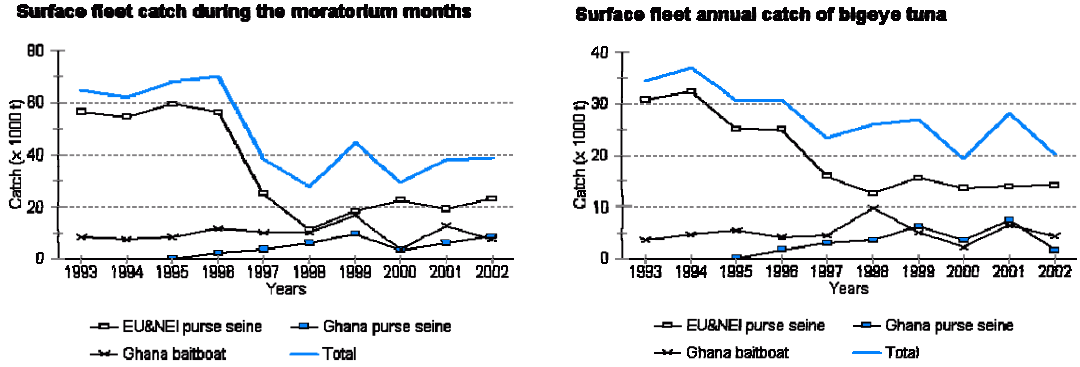
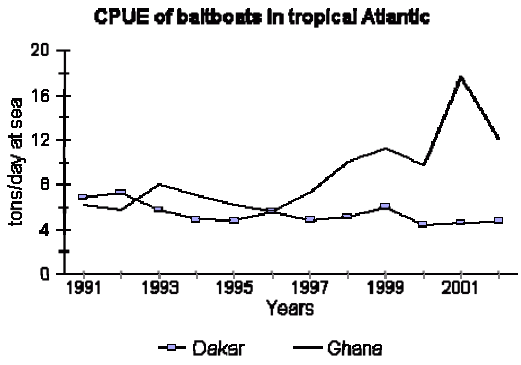


Figure MOR 6. Total catches (left) and bigeye catches (right) of the EC (including NEI) and Ghanaian (purse seine and baitboats) fleets from 1993 to 2002.

Figure MOR-7. Evolution of the catch per unit of effort of the eastern tropical Atlantic baitboats from 1993 to 2001.



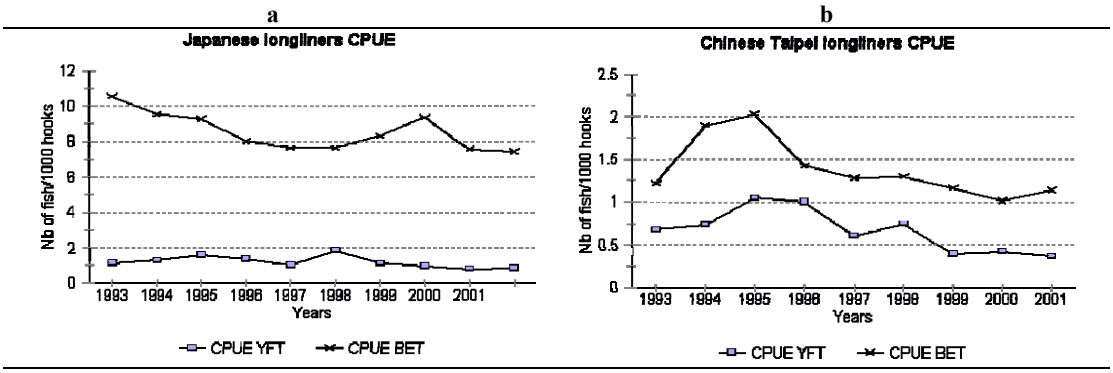


Figure MOR 8. Evolution of the longline nominal catch per unit of effort for the Japanese (a) and the Chinese Taipei fleets (b) from 1993 to 2002.

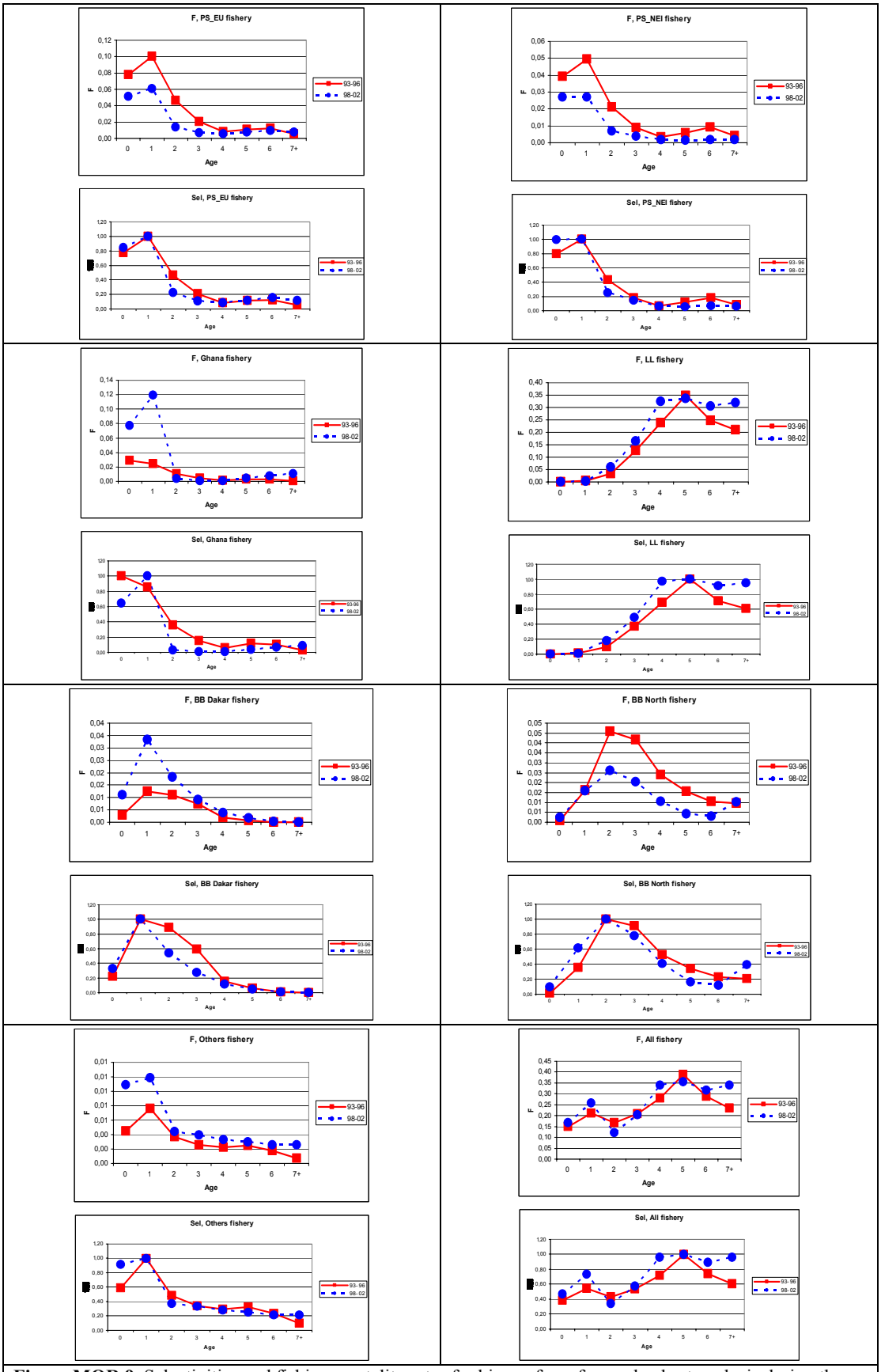


Figure MOR 9. Selectivities and fishing mortality rates for bigeye from forward cohort analysis during the pre moratorium (1993-96) and moratorium periods (1998-2002).

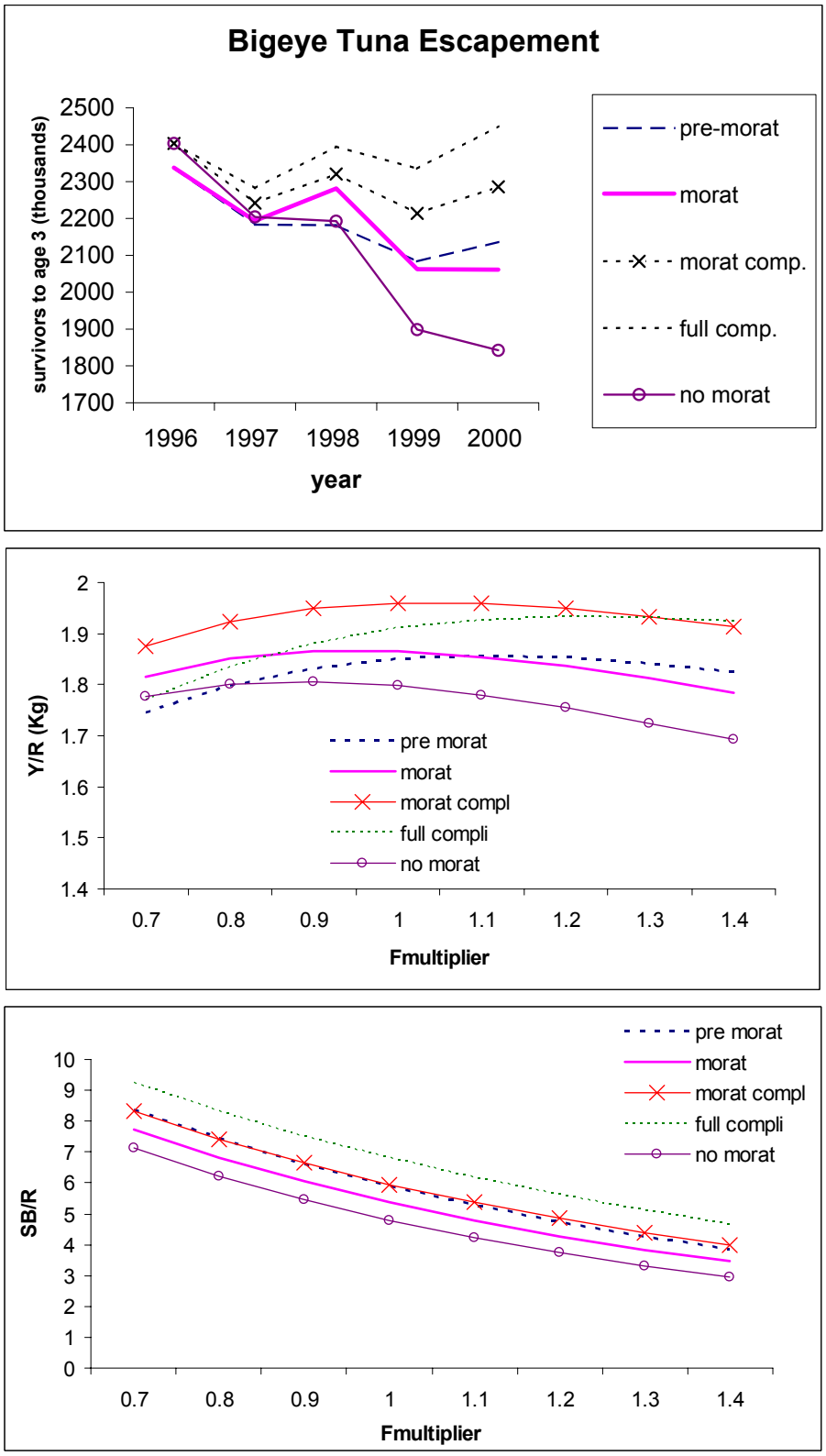


Figure MOR-10. Number of survival of age 3 (top), yield per recruit (center) and spawning biomass per recruit (bottom) of bigeye

18. Other matters

The delegate of Turkey noted that a Workshop on Farming, Conservation and Management of Bluefin Tuna was held 5-7 April 2003 in Istanbul, Turkey. A Second Workshop on the same topic will be held 1-3 April 2004, also in Istanbul, Turkey.

The representative of FAO noted that throughout the meeting there has been reference to ICCAT's cooperation with FAO, in particular with GFCM. He also noted ICCAT's contribution to the FAO project on Tuna Fishing Capacity. On behalf of FAO and GFCM, Dr. Jacek Majkowski thanked ICCAT, in particular the ICCAT Secretariat, for their support of FAO and GFCM.

The delegate from Turkey noted National Reports should not be political, and requested a modification to the revised version of the National Report of Cyprus. Cyprus noted that the text in question had been modified in the revised version of their National Report, and felt it was necessary to provide an explanation for why certain important fishing grounds were not fished. The SCRS Chairman stressed that the SCRS Plenary should be devoted to scientific matters and requested that further discussion on this topic be referred to the Commission.

19. Election of the SCRS Chairman

Dr. Joseph Powers nominated Dr. Joao Pereira to continue as the SCRS Chairman for a second 2-year term. The Committee then re-elected Dr. Pereira by acclamation. Dr. Pereira thanked the Committee for its confidence in him and welcomed the opportunity to serve as SCRS Chairman for a second term.

20. Adoption of report and closure

The Report of the SCRS was adopted by the Committee.

The SCRS Chairman thanked the participants, noting that 2003 was again a very busy year with many meetings. He noted that because of the hard work during the inter-sessional period, the level of preparedness for the SCRS was excellent, thus making the Plenary a relatively easy session.

Dr. Pereira thanked both the Secretariat and the interpreters for their important contributions to the meeting.

The SCRS meeting was adjourned.

Appendix 1

SCRS 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 in data and research
7. Review of national fisheries and research programs
8. Executive Summaries on species:
   YFT-Yellowfin, BET-Bigeye, SKJ-Skipjack, ALB-Albacore, BFT-Bluefin, BIL-Billfishes, SWO-Atl. Swordfish, SWO-Med. Swordfish, SBF-Southern Bluefin, SMT-Small Tunas
9. Report of GFCM-ICCAT activities
10. Report of the *Ad Hoc* Working Group on Assessment Methods
11. Report of Special Research Programs
    11.1 Bigeye Tuna Year Program (BETYP)
    11.2 Bluefin Year Program (BYP)
    11.3 Enhanced Research Program for Billfish
12. Report of the Meetings of the Sub-Committee on Statistics
13. Report of the Meeting of the Sub-Committee on By-catches
14. Report of the Meeting of the Sub-Committee on Environment
15. Consideration of plans for future research and coordination activities
    15.1 Arrangements for the Second World Meeting on Bigeye Tuna in 2004
    15.2 Bluefin Tuna Research Plan
    15.3 Partnership with FAO's FIRMS-FIGIS
    15.4 Report of the *Ad Hoc* Working Group on SCRS Organization
    15.5 Inter-sessional meetings proposed for 2004
    15.6 Date and place of the next meeting of the SCRS
16. General recommendations to the Commission
17. Responses to the Commission's requests
    17.1 Swordfish stock structure [Ref. 99-3]
    17.2 Review of Japanese catch, including discards [Ref. 02-02]
    17.3 Analysis of the impact of the moratorium on tropical tuna stocks [Ref. 99-01]
18. Other matters
19. Election of the SCRS Chairman
20. Adoption of report and closure

Appendix 2

LIST OF SCRS PARTICIPANTS

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Appendix 4

REPORT OF THE *AD HOC* WORKING GROUP ON ASSESSMENT METHODS
EXECUTIVE SUMMARY

The *Ad Hoc* Working Group on Assessment Methods met in Shimizu-orido, Japan (see SCRS/2003/013). The meeting was hosted by the National Research Institute of Far Seas Fisheries of Japan. The objectives of the meeting were to further develop the research related to the estimation of relative indices of abundance for longline-caught fish. Specifically, the SCRS previously recommended that biological research on the habitat requirements of tuna and billfish species be coupled with the development of models that can properly incorporate habitat information in the process of relative abundance estimation. The SCRS also highlighted the need to develop experimental designs to test the appropriateness of various assumptions made in relative abundance indexing methods and directed the Working Group on Assessment Methods to address model development and experimental design guidance.

The Working Group examined papers and conducted analyses directed at basic habitat requirements of tuna and billfish and data available to quantify those requirements. Methods of incorporating these data were examined and compared. In particular comparisons were made between General Linear Model (GLM) standardizations of catch-per-unit-effort (CPUE) data with Habitat Based Standardizations (HBS), combined HBS/GLM and a more statistical characterization of the HBS, termed statHBS. While there were differences in results derived from the different methods, there was no basic understanding of the reasons why. Therefore, further analyses of simulated data were discussed to determine the performance of alternative models used to estimate trends in relative abundance. These analyses will generate simulated data sets that mimic the structure of Japanese longline catch and effort data in the Atlantic, producing catch data for a target (bigeye tuna-like) and non-target species (blue marlin-like) without error. Then the simulated data will be analyzed using available methods, including GLM (with area, time and HPB as categorical variables), HBS, HBS/GLM, statHBS and a neural network model.

Analyses will investigate the robustness of these approaches to uncertainties, in particular, in habitat specification and the depth distribution of longline gear. Progress on these analyses will be reported to the SCRS in 2003.

Additionally, the Working Group specified the types of further research required to understand the depth distribution of longline hooks, and its variability in relation to gear configuration and oceanic currents. This research should include: wide-scale deployment of Time Depth Recorders (TDR's) on longline gear, possibly utilizing various national observer programs, according to an experimental design to be developed; the development of models to provide better prediction of fishing depth distributions; and deployment of research cruises to quantify the fishing depth characteristics of longline gear and gear configurations. The ICCAT Secretariat should play a coordinating role in the research outlined above. In particular, involvement in the following areas would add value to research conducted by national agencies: establishing data repositories for habitat data (archival and pop-up tagging and hook timer data) and fishing gear depth data (TDRs) to facilitate integrated data analysis across a range of fleets and geographical locations in the Atlantic; and development of experimental design and coordinating TDR deployment by national observer programs of ICCAT members.

Appendix 5

REPORT ON BETYP ACTIVITIES FROM OCTOBER 2002 TO SEPTEMBER 2003

The Bigeye Tuna Year Program (BETYP) was proposed to the Commission in 1996 due to its concern about the increase of catches and uncertainties on the status of the stock. The Commission approved the recommendation but activities started only in 1999 when funds were made available. The BETYP is an ambitious program which includes conventional and electronic tagging, improvement of bigeye statistics, studies on genetics, growth and natural mortality, the development of a comprehensive integrated modeling program, and at the same time encourages the national laboratories of the Contracting Parties to undertake expanded research on reproductive biology, ethology and technology.

From October 2002 to September 2003, the following BETYP activities were continued: conventional tagging was carried out in the Canary Islands; pop-up tagging was attempted in the Azores (without successful deployment of tags due to lack of bigeye in the area); improvement in fisheries statistics in Ghana (see SCRS/2003/010); genetic and hard part studies; and development of the integrated modeling program (see SCRS/2003/022).

The Coordinator of the BETYP concluded his full time contract with ICCAT as scheduled, on 31 May 2003. Since then he has continued coordinating the activities of the BETYP from his place of residence and traveling as required.

1. Contributions

The contributions received from January to September 2003 are shown on **Table 1**, totaling US$ 213,883.

2. Expenditures (Table 2)

2.1 Salaries

The salary of the Coordinator and the accounting assistant are included in this line item in **Table 2**.

2.2 Coordination

This line item includes office supplies, telephone, eventual secretarial and translation services and the external auditing services.

2.3 Travel

The Coordinator traveled to Ghana in February 2003 to participate in the SCRS Meeting for the Improvements of Statistics in Ghana (ICCAT/MFRD Super Sampling) and in May of the same year to follow up the activities of the same program.

2.4 Meetings

The Coordinator participated at the SCRS Meeting for the Improvements of Statistics in Ghana held in Tema, Ghana from 2-5 February 2003, for the establishment of the ICCAT/MFRD Super Sampling Program for Tunas Landed at Tema, where it was decided that the BETYP would contribute US$ 1,800 towards the local expenses of the program (see SCRS/2003/010).

2.5 Conventional tagging operations

During the period covered by this report, conventional tagging operations were carried out only in the Canary Islands. From 26-29 August 2003 a total of 263 bigeye tuna and 2 yellowfin tuna were tagged (**Table 3**). During the BETYP more than 22,000 fish have been tagged with conventional tags (**Table 4**).

2.6 Pilot study using electronic tags

Due to lack of bigeye in the Azores, it was not possible to deploy pop-up tags in 2003. The remaining tag in possession of the DOP (Department of Oceanography and Fisheries) of the University of Azores will be re-calibrated for deployment next season in the same area. A total of 19 pop-up tags have been deployed in the Azores and four during the *Shoyo-Maru* cruise within the BETYP **(Table 4)**.

2.7 Statistics improvement, Tema, Ghana

Extensive work has been carried out at MFRD regarding support to improve the sampling, statistics and tagging operations. The sampling program designed the previous year was not carried out and the Coordinator of the BETYP participated in the Meeting for the Improvements of Statistics in Ghana held in Tema in February of 2003 under the organization of the SCRS. From this meeting a new Super Sampling Program was designed, carried out by MFRD with the collaboration of Alain Hervé from IRD and financed with BETYP funds.

2.8 Otoliths and hard parts

The agreement signed between the BETYP and IRD, for the purpose of carrying out a program to study the growth of bigeye, continued during this period. Results will be presented at the BETYP Symposium in March 2004.

2.9 Genetic studies

In continuation of the program established with the *Museo Nacional de Ciencias Naturales*, Madrid, Spain, further samples were submitted from the Canary Islands and the Gulf of Guinea. Results will be presented at the BETYP Symposium in March 2004.

2.10 Printing and publications

There has been no activity regarding this item, as publication of the final report will occur at the termination of the project, following the BETYP Symposium.

3. Proposed BETYP activities for 2004

The remaining activity of the BETYP is the organization and celebration of the final Symposium, scheduled to take place 8-9 March 2004. During the SCRS Meeting in October 2002, a decision was made to hold the Second Worldwide Bigeye Conference during the two days immediately following the BETYP Symposium (that was originally proposed for four days). During subsequent communications between the Steering Committees of both groups, it was agreed that the papers specifically dealing with the BETYP activities should be presented the first two days (8-9 March 2004) and those papers originally scheduled to be presented at the BETYP Symposium dealing with more general themes, should be included in the Second Worldwide Bigeye Conference meeting (10-13 March 2004).

4. Budget

The proposed budget for 2003-2004 is shown in **Table 2**. In accordance with Chapter 7 of the Report of the Coordinating Meeting of the ICCAT Bigeye Year Program (SCRS/1999/22), the funds for this budget, including the costs associated with the Symposium and publication of the final report, were held from the 2002 funds.

Table 1. Contributions received from January to September 2003.

Source	*Amount (US$)*
European Commission (20% from 2002)	38,900
Japan	174,983
Total income	**213,883**

Note: The exchange rate of the month when the contribution was received was used for the Euro/Dollar conversion.

Table 2. BETYP 2003-2004 Budget and situation on September 25, 2003 (US$)

Item	*2003-2004Budget*	*Expenses to 9/15/03**
Salaries	140,377	111,503
Coordination expenses	28,000	14,824
Travel	22,000	14,637
Meetings	100,000	0
Tagging activities, conventional tags	42,000	12,407
Pilot study, electronic tags	0	0
Statistics improvements Tema	5,000	1,771
Sampling for growth hard parts	1,000	0
Integrated model	22,000	14,000
Genetic studies	20,000	0
Printing and publications	33,000	0
External audits	9,000	0
Contingencies	5,000	0
Total expenses	**427,377**	**169,142**

*Some expenses are best estimates

Table 3. Total tagged tuna from October 2002 to September 2003

Species	*No. of fish tagged*
Bigeye tuna	263
Yellowfin tuna	2
Total	**265**

Table 4. Summary of BETYP tagging activities, June 1999-September 2003

4.a Conventional tags

Location	*Number of tags applied*			
	BET	*SKJ*	*YFT*	*Total*
Azores	45	217		262
Madeira				
Canarias	2,681	45	66	2,792
Senegal	946	1,404	105	2,455
Ghana	1,024	2,056	1,419	4,499
São Tomé	824	8,197	3,645	12,666
Total	**5,520**	**11,919**	**5,235**	**22,674**

Year	*Total recaptures*			
	BET	*SKJ*	*YFT*	*Total*
1999	1,035	507	110	1,652
2000	496	65	10	571
2001	11	141	27	179
2002	45	621	190	856
2003	1740	320	68	528
Total	**1,727**	**1,654**	**405**	**3,786**
Percentages	31.29%	13.88%	7.74%	16.70%

4.b Electronic tags

Pop-up

Location	*2000*	*2001*	*Total*
Azores	8	11	19
Central Atlantic (*Shoyo-Maru*)	4	--	4
Total	**12**	**11**	**23**

Archival

Location	*2000*
Central Atlantic (*Shoyo-Maru*)	19
Total	**19**

One fish was tagged with a pop-up and an archival tag.

Appendix 6

BLUEFIN YEAR PROGRAM (BYP)
EXECUTIVE SUMMARY

The Bluefin Tuna Year Program Working Group reviewed the progress made under the Bluefin Year Program, concluding that most of the research goals outlined for 2001 to 2003 had been met.

The current financial status is reviewed below and recommendations for direct BYP-funded research, for 2003 in particular, and for the future in general, are made. The two primary areas of research considered important by the Working Group are stock structure and maturity, and the particular expenditures needed to accomplish the Working Group objectives in 2004 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 initiation of a large-scale Bluefin Research Program, which if approved by the Commission, shall incorporate the BYP.

Financial report

The financial status of the BYP funds through 21 September 2003 was reviewed. Including a recent contribution of €5,000 from Chinese Taipei, there is a balance of approximately €57,000. With the expected 2004 Commission contribution of €15,000, the 2003 BYP operating budget should be on the order of €72,000.

Progress made on 2003 BYP Research Plan

Biological sampling

The Committee reviewed the progress to date in late 2003 with respect to the sampling plan detailed in the 2000 BYP report to evaluate progress in accomplishing the plan. It was noted that expenses to date had been lower than anticipated, though a number of the objectives from the research plan described in the 2000 BYP report have yet to be fully met, largely due to the multi-year nature of the sampling plan. Much of the planned sampling in 1999, 2000, 2001 and 2002, to date, was conducted at lower direct cost to the BYP than originally anticipated, due in large part to national contributions and the existence of the FAO's COPEMED program. Notable contributions from the Icelandic sampling of bluefin harvested largely within its EEZ were described in NAT/2003/018. In total, samples from more than 1,200 bluefin were obtained by Icelandic scientists. Also it should be noted that biological sampling in Turkey is being accomplished as planned. Stock structure sampling targets for 2000 to 2002 were generally met. Stock structure sampling targets for 2003 were met or partially met in the western Mediterranean and eastern Mediterranean. Sampling targets for the most part in the West Atlantic were not met due to budgetary constraints which impacted sampling of summer fisheries; limited sampling success was achieved from the winter and spring fisheries. Some planned sampling activities are expected to come to completion in the months remaining in the calendar year.

Research on maturity

The BYP noted the progress made on maturity research, reported in documents SCRS/2001/127 and SCRS/2001/128 dealing with the histological analysis and corresponding sexual maturity of bluefin tuna caught in the traps of Tunisia and Libya. The aforementioned research, coordinated by the FAO-COPEMED Project, stressed that all the analyzed bluefin tuna belonging to age-class 4 were mature and showed spawning and/or post spawning characteristics. In SCRS/2003/124 the first record of sexually mature bluefin tuna in the eastern Mediterranean is presented, and the author suggests this area as a possible spawning ground. In 2003 the EC REPRO-DOTT Project has begun, with the main objective of developing an aquaculture farming technology for bluefin tuna, and improving the knowledge of the reproductive biology of the species in captivity in comparison to wild populations.

Research on tuna farming

In 2001, the BYP Working Group endorsed the proposed research activities on tuna farming in the Adriatic Sea submitted by Croatian scientists at the 2001 SCRS meeting and provided partial support to initiate this research

in 2002 (which could take two or more years to complete). A progress report on this research was provided in SCRS/2002/171. The research has progressed as proposed. Fish purchased for this research in 2002 will also be used to obtain the appropriate biological specimens identified in the BYP research plan for stock structure and maturity sampling (according to the sampling protocol provided to Croatian scientists at the 2002 BYP meeting). Continuation of funding for the third (of 3) year of this research is contingent upon review and approval of progress made thus far.

In collaboration with the farming sector, conversion factors between the various commercial products and the live weight of tunas and length-weight prior and after fattening were obtained (SCRS/2001/124 and SCRS/2003/083).

In May 2003, the countries involved in farming activities participated in the first meeting of the GFCM/ICCAT *Ad Hoc* Working Group on Sustainable Tuna Farming/Fattening Practices in the Mediterranean (see SCRS/2003/020), reviewing available information and identifying key problems and designing a protocol for collecting comprehensive and detailed data on the development of tuna farming practices in the Mediterranean.

Research on spawning areas

At the 2000 SCRS meeting, SCRS/2000/125 presented a plan to attempt to catch adult and larval bluefin in an hypothesized spawning area in the central North Atlantic, and Spanish scientists reported that the Spanish government was planning a study of spawners and larvae in the Balearic Islands area. The Working Group endorsed these proposals and recommended that a coordination meeting be held in early 2001. That meeting was held and was reported on in SCRS/2001/022. Data collection protocols were standardized for fishing effort and fishing strategies, hydrographic sampling and biological sampling and were developed to the extent possible given that the Spanish sampling would be conducted aboard both research and commercial vessels while the central Atlantic sampling would be conducted aboard only commercial vessels.

Since 2001 Spanish annual surveys have been carried out during the bluefin tuna spawning season in waters around the Balearic Island (SCRS/2001/129 and SCRS/2002/041). The main aim of these surveys is to estimate bluefin tuna larval abundance as well as characterizing the spawning habitat. For the first survey (2001), a total of 124 bluefin tuna larvae were collected; the highest concentrations were found to the east of Ibiza, in the Majorca Channel and to the south of Menorca. Larval distribution seems to indicate a relationship with the most outstanding hydrographic mesoscale phenomena (p.e., anticyclonic eddies and frontal features). As regards the second survey (2002), 265 bluefin tuna were collected mainly at sampling stations to the south of Menorca (waters of Atlantic origin). Regarding the third survey (2003), the preliminary analyses yielded a total of 385 bluefin tuna larvae, which represent a considerable increase as compared to previous surveys. Nevertheless, this increase may be related to the improved timing of the survey, which was brought backward to July, and the smaller net used for collection (500 µm mesh size). On the other hand, it is confirmed that highest abundances are found in waters of Atlantic origin (south of the Majorca Channel and Ibiza island).

The central North Atlantic longline fishing conducted in 2001 caught no bluefin, though other large pelagic species were caught (SCRS/2001/031 Rev.); results from the larval sampling in 2001did not reveal bluefin tuna. Results from the 2002 central North Atlantic longline fishing were also reported at the 2002 SCRS in the form of an "Information Release" from the central North Atlantic Steering Committee, in September, 2002 (see Detailed Report), which indicated no catch of bluefin, but catches of other large pelagic species. No longline catch of bluefin was made on the Japanese R/V *Shoyo-Maru* cruise in the central North Atlantic study area in 2002 (SCRS/2002/170). In combination, the fishing effort expended in the central North Atlantic research area in 2002 (59 fishing days, ~51,000 hooks) was larger than that expended in 2001. Results from larval sampling from the 2002 cruises in the central North Atlantic are not yet available. Ichthyoplankton samples are being examined by U.S. scientists and these results should soon be available.

Following the framework of collaboration between scientists involved in this research, a U.S. scientist participated in the Spanish larval surveys. Also Turkish and Tunisian scientists have shown their interest in collaborating in this research activity in order to develop a larval survey in the eastern Mediterranean.

Research on genetics

The BYP Working Group endorsed the research for genetic analysis of available samples proposed during the 2001 SCRS by scientists from several Mediterranean countries involved in the COPEMED project and noted the progress made and reported upon in SCRS/2002/172. Recent studies have shown dissimilar conclusions in discriminating stock structures, these discrepancies might be related to sample size and/or genetic techniques

(DNA and proteins). Additional studies should be performed in order to discern the possible causes that would explain the lack of concordance between analyses, and thus clearly determine the existence or non-existence of any differentiation between the two Atlantic populations.

Electronic tagging

Electronic tagging in the eastern Atlantic and Mediterranean has lagged behind similar efforts in the western Atlantic. Although the BYP Working Group endorsed the proposed research for electronic tagging in the eastern Atlantic and Mediterranean submitted by EC scientists at the 2001 SCRS meeting, progress has been limited due to the high cost of the research and thus far, limited research funding for this activity. The BYP Working Group noted that the Committee has previously recommended research into bluefin stock structure making use of high-technology electronic tags. The recent report on bluefin tuna mixing recommended increasing effort on electronic tagging, especially in the Mediterranean as well as the central Atlantic, and encouraged cooperation between scientists/organizations of coastal countries through the current organizational structures (*e.g.* COPEMED, European Union, United States, or others), with technical collaboration by scientists from the west involved in these research applications.

A total of 34 bluefin tuna were electronically tagged in the eastern Mediterranean in a joint Turkish-Italian campaign, with the collaboration of U.S. scientists. The aim was to identify migrations within the Mediterranean and to the Atlantic from this area. Two groups from the United States continue to release bluefin tuna with electronic tags. The Stanford University/Monterey Bay Aquarium group released 55 bluefin with electronic tags from the North Carolina area in 2002 (SCRS/2002/092) and 8 bluefin from the Gulf of Mexico. In 2003 that group released 123 fish with electronic tags from the North Carolina area. In cooperation with Irish scientists they have also begun releasing fish off Ireland and are cooperating with European and African scientists in the Mediterranean Sea. The University of New Hampshire/New England Aquarium group released 67 bluefin tuna with electronic tags in 2002, released two bluefin with such tags off North Carolina in 2003 and has released at least 59 tagged fish in the New England area in 2003.

Research Plan for 2004

There has been considerable progress to date on the sampling plan developed by the BYP in 1999 and continued through 2003, but at a lower cost than originally anticipated. While there is a need to maintain sampling to achieve the plan outlined in the BYP sampling plan (see BYP Detailed Report), the BYP research funds in 2003 and 2004 permits some further broadening of the research plan to include additional high priority research. Should the Commission support the large-scale Bluefin Research Initiative in 2004, the research elements identified in this plan shall be incorporated into that activity and the €15,000 expected Commission for 2004 would not be necessary. The Committee notes that the COPEMED program has been extended for another year and again highly endorses the objectives of this program.

As highest priority for the BYP in 2003-2004, the BYP Working Group recommends expenditures of €21,500 to cover expenses associated with stock structure and maturity sampling during the upcoming year as described in the BYP sampling plan.

As next priority for the BYP in 2003-2004, the BYP Working Group recommends expenditures of €50,500 to contribute to the expenses for planning, conduct, and coordination of four research activities viewed as important to the future of BYP and in support of providing scientific advice to the Commission on bluefin tuna.

i) The BYP Working Group previously endorsed the proposed research activities on tuna farming in the Adriatic Sea submitted by Croatian scientists (see proposal in 2002 BYP Detailed Report). The Committee recognizes that full conduct of this research as proposed would require more resources than the current BYP could contribute and that the results will be useful for addressing the growth of fish farmed in the Adriatic, but probably not generalizable to other farming areas. Progress along the lines identified in the Croatian proposal has been made and the BYP Working Group recommends that €15,000 be contributed in partial support to continue this research in 2004 (year 3 of a three-year proposal) and that fish purchased for this research also continue to be used to obtain the appropriate biological specimens identified in the BYP research plan for stock structure and maturity sampling, contingent upon BYP review and approval of progress made on this project thus far.

ii) The Committee endorsed the proposed research sampling of larvae and spawning-sized bluefin tuna and the associated oceanographic conditions in and around the Balearic Islands and in the eastern

Mediterranean (near Turkey and Cyprus, for example). After several years of field sampling, there is a need to review and revise, as necessary, sampling plans associated with these studies. The BYP Working Group recognizes that this research is very expensive and is beyond the current capability of the BYP, but recommends that €15,000 (€10,000 Turkey, €5,000 Balearic Islands) be contributed to support larval sampling coordination and future research planning of these research projects.

iii) The Committee endorsed the concept of the proposed program of investigation into intensive satellite tagging of large bluefin tuna in the Mediterranean and eastern Atlantic. This research addresses the Committee's recommendation to conduct research to better quantify the origin of fish, mixing and its implications for assessment and management of bluefin fisheries. The BYP Working Group recognizes that this research is very expensive and is beyond the current capability of the BYP, but recommends that in 2004, €10,000 be contributed to support further planning, coordination, and further implementation of this research. It is recognized that the actual cost of this research is much higher than can be supported by BYP funding alone. Increasing effort on electronic tagging, especially in the Mediterranean, is strongly encouraged and cooperation between scientists/organizations of coastal countries through the current organizational structures (*e.g.* COPEMED, European Union, United States, or others), with technical collaboration by scientists from the west involved in these research applications is required for success of this research.

iv) Direct ageing of bluefin catch has been recommended as a superior means of estimating catch-at-age for the purposes of stock assessment. Whereas ageing of young bluefin is usually not difficult, the age determination of medium sized and giant tuna may often be problematic. There are some recent ageing studies that demonstrate the feasibility of using hard parts for ageing. However, a procedure of age determination of bluefin catch has not been implemented in many fisheries. If age determination of bluefin catch is to be implemented as a routine procedure, as recommended, a standardized protocol of procedure is urgently needed. It is therefore recommended that a bluefin ageing network of people who have worked on age determination of bluefin be initiated. The aim of the network will 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. To this end, the BYP Working Group recommends that coordination of such a network be established, making use of the expertise in Spain as a focal point for this activity. The BYP Working Group recommends that €10,000 be contributed to support the coordination activities needed for initiating such a network, coordinated by Dr. E. Rodríguez-Marín (EC-Spain).

Table 1. Recommended 2003-2004 BYP contributions to bluefin research (€)

Project description	*2003-2004 Request*	*BYP Fund Balance*
		57,000
Planned expenditures in 2003		
Shipping 2003 samples	-2,000	55,000
Genetic analysis	- 500	54,500
Collect samples from Cantabrian Sea	-4,000	50,500
Anticipated 2004 Commission contribution	**15,000**	65,500
Planned expenditures in 2004		
Croatian Bluefin Farming Research (year 3)	-15,000	50,500
Larval sampling coordination and future research planning (10,000 Turkey, 5,000 Balearic Is.)	-15,000	35,500
Mediterranean Electronic Tagging Coordination	-10,000	25,500
Direct Ageing Coordination	-10,000	15,500
Tissue sampling in Turkey	-10,000	5,500
Tissue sampling in Canada	- 4,000	1,500
Shipping 2004 samples	- 1,500	0

Appendix 7

ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH - EXECUTIVE SUMMARY

(Expenditures/ Contributions 2003 & Program Plan for 2004)

Program objectives

The original plan for the ICCAT Enhanced Research Program for Billfish (IERPB, SCRS 1986) included the following specific objectives: (1) to provide more detailed catch and effort statistics, and particularly size frequency data; (2) to initiate the ICCAT tagging program for billfish; and (3) to assist in collecting data for age and growth studies. The plan was initially formulated in 1986 and implemented in 1987 with the intention of developing the data necessary to assess the status of the billfish stocks. Efforts to meet this goal have continued through 2003 and are highlighted below. During the 2003 Billfish Working Group meeting, the Working Group requested that the IERPBF refocus its objectives to accomplish age and growth estimates for adult marlin. 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 2003. The Secretariat coordinates the transfer of funds and the distribution of tags, information, and data. The General Coordinator of the Program is Dr. Joseph Powers (USA); the East Atlantic Coordinator is Dr. Nestor N'Goran Ya (Côte d'Ivoire), while the West Atlantic Coordinator is Dr. Eric Prince (USA). The billfish database is maintained at the NMFS Southeast Fisheries Science Center (Miami, Florida) and at the ICCAT Secretariat.

The objectives of this program follow the research recommendations made by the ICCAT Billfish Working Group. These recommendations are directly relevant to the objectives of the IERPB and highlight the need to increase the resources devoted to support the work pursued by the IERPB. The development of the IERPB research plan is also coordinated with the "Atlantic Billfish Research Plan"[1] from the NMFS Southeast Fisheries Science Center because both plans attempt to address similar research needs.

2003: Budget and Expenditures

This report presents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 2003. In 2003, funding for the ICCAT Enhanced Research Program for Billfish operated under the financial arrangement established by the 1997 SCRS (see 1997 STACFAD Report, item 9.3). The STACFAD specified that the Commission should make at least a symbolic contribution to the Enhanced Research Program for Billfish and this was continued in 2003 (1997 STACFAD Report, items 9.5 and 9.9). As a result of this development, the Program in 2003 was fully coordinated by the Secretariat in consultation with area coordinators and member countries.

Contributions in 2003 included an allocation of €10,944.67 from the regular Commission budget **(Table 1)**. In addition, reimbursement of a tag recovery reward (€877.00) paid for return of a electronic tag from a bluefin tuna was also received during 2003. Other funds that are normally contributed to the Billfish Program were not made available in 2003 therefore it was again necessary (as in 2002) to reduce major expenditures for 2003 Billfish research activities by about 50% (**Table 2)**.

The total funds available (as of 26 September 2003) for the 2004 Billfish Program amount to €23,227.68 plus any contributions that will be made during 2004. Several additional expenditures are expected to be incurred before the end of 2003 and into the first quarter of 2004, such as Program coordination travel. Therefore, there is a need to carry over the 2003 balance in Billfish Program funds to the 2004 Budget, as has been the practice for this and other special programs in previous years.

Although no new cash contributions were obtained in 2003, in-kind contributions to the Program continued to be made during 2003. Since 1996, the FONAIAP (Venezuela) and since 1997, the *Instituto Oceanográfico* (University of Oriente) has provided personnel and other resources as in-kind contributions to the at-sea sampling program, thereby reducing the amount of funds needed for this activity from the ICCAT billfish funds. Also, the ICCAT billfish rapporteur (Dr. David Die) assisted in overseeing shore-based sampling work and

[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.

standardization of recreational CPUEs in Venezuela in 2003 and this cost was absorbed by the U.S. National Marine Fisheries Service and the University of Miami Center for Sustainable Fisheries, and as such represented an in-kind contribution to the Billfish Program for 2003. The Department of Environmental Protection of Bermuda also contributed in-kind contributions by providing personnel and other resources used for assessing habitat preferences of Atlantic blue marlin in the recreational fishery.

Research contributions

The result of the reduction of cash contributions has been that part of the Program Plan for 2003 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 18 observer trips on Venezuelan longline vessels were accomplished in 2003, the same as in 2002, but half of what had been planned.

Research carried out during 2003 is summarized by the area coordinators in SCRS/2003/025 and in a separate report from the Eastern Atlantic coordinator. Additional working documents on billfish were submitted to the 2003 SCRS, including: SCRS/2003/030, SCRS/2003/031, SCRS/2003/032, SCRS/2003/033, SCRS/2003/035, SCRS/2003/036, SCRS/2003/037, SCRS/2003/094, SCRS/2003/098, SCRS/2003/104, and SCRS/2003/129.

2004: Coordination, Protocols, and Program Plan

It was confirmed that Drs. Powers and Prince (U.S.A.) will continue to function as the General Coordinator and West Atlantic Coordinator, respectively. Dr. N'Goran Ya (Côte d'Ivoire) will act as Co-Coordinator for the East Atlantic Ocean.

The summary of the 2004 proposed budget, totaling €55,750 is attached as **Table 3**. The Working Group requests that, if possible, that the commission increases its contribution for 2004 to €15,000 to cover the most critical parts of the 2004 IERPB. At a minimum the Commission should again provide at least the same level of research funding in 2004 as it did in 2003. 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 2004. Detail or planned activities are provided in the section below.

Highlight reports of research activities will be provided to interested parties annually. In addition, names and addresses of individuals receiving the reports and those involved or interested in the research program will continue to be made available upon request. Projected funds for future research activities will be available in subsequent annual plans.

All agencies and/or personnel receiving funding from the special Billfish Program account are required to summarize annual expenditures of funds to the Commission and research activities, either in the form of a working document to the SCRS or a report to the Program Coordinators. Due to changes in the financial structure of the ICCAT billfish account, all participating cooperators in this Program are now required to request the release of funds (via fax or email) directly from the ICCAT Secretariat, as well as General Program Coordinator and area Coordinators. In other words, the release of Program funds is not automatic, even if expenditures are described in the Program Plan-- release of funds is contingent upon requests being received by the ICCAT Secretariat and Program Coordinators. In addition, Program participants are required to submit data collected in previous years to area Coordinators or directly to the ICCAT Secretariat.

Detail of Research Activities planned for 2004

Shore-based sampling

West Atlantic

Bermuda. Shore-based sampling of the annual billfish tournaments will be conducted in Bermuda in 2004. 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).

Brazil. Shore-based sampling of selected billfish tournaments will be continued in Brazil for 2004 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 2004.

Cumaná, Playa Verde, Punto Fijo, and Margarita Island, Venezuela. Shore-based sampling of size frequency data for billfish carcasses off-loaded from industrialized longline boats at the port of Cumaná will be continued in 2004. Funding will be €300 since some of this activity occurs on weekends and after normal working hours. Likewise, sampling artisanal fisheries in Playa Verde will be accomplished by contracting a technician on a part-time basis. Funding for this activity in 2004 is €700. Sampling artisanal longline boats and artisanal fisheries in Punto Fijo and Margarita Island will be conducted in 2004 and the requested funding for these segments is as follows: Punto Fijo €200, and Margarita Island €300. Trips by the West Atlantic Coordinator or his designee may be necessary to organize sampling, collect data, and transport biological samples to Miami in 2004. In addition, the amount of €900 will be required for tag rewards in Venezuela for 2004 that are made by the *Instituto Nacional de Investigaciones Agrícolas* (INIA) staff (this budget item is identified in the Section on Tagging).

La Guaira, Venezuela. Shore-based sampling and detailed analysis of the recreational fishery (centered in La Guaira, Venezuela) will be continued in 2004. 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 2004 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 2004 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, hardparts for ageing, and total landings from the artisanal and recreational fishery for billfish will be continued by the Ministry of Agriculture, Lands, Forestry, and Fisheries (coordinated by Mr. Crofton Isaac and Mr. Paul Phillip) in 2004. Much of this activity will occur in early November 2004, to coincide with the start of the pelagic fishery at this location. This activity may also include sampling of the Spice Island Billfish tournament. Requested funding for 2004 is €1,500.

Jamaica. Shore-based sampling of the size frequency, total landings, and catch and effort statistics from the recreational fishery can not be continued in 2004 until a new contact can be made in this location. Dr. Guy Harvey has since moved to the Cayman Islands and can no longer continue this work. Requested potential funding, should contacts be made, will be €1,000 for 2004.

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 2004 through the Nichirei Carib Corporation. If this activity does occur, the requested funding in 2004 is €1,500. Shore-based sampling of the annual recreational billfish tournament, initiated in 1992, may be continued in 2004 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 2003 SCRS concerning this activity but will not require funding in 2004.

U.S. Virgin Islands. Shore-based sampling of recreational billfish tournament in the U.S. Virgin Islands maybe continued in 2004 if staff from the Virgin Islands Big Game Fishing Club in St. Thomas are agreeable. Requested funding for 2004 is €2,000.

Trinidad and Tobago. Shore-based sampling of size frequency data for off-loaded billfish carcasses from Chinese-Taipei and longline vessels from Trinidad may be re-initiated in 2004. This work, if conducted, will be supervised by Ms. C. Chan A Shing of the Ministry of Food Production and Marine Exploitation (Fisheries

Division). At least one trip by the West Atlantic Coordinator, or his designee, will be necessary to review the research plan and organize field research activities. Requested funding for 2004 is €1,000.

East Atlantic

The Coordinator for the East Atlantic may need to travel to West African countries to check on data collections and thus a plan for coordination travel maybe submitted to the General Program Coordinator/Secretariat in 2003. We anticipate that this work, if in fact it occurs in 2003, will have to be done within the budgetary constraints and this may prevent full implementation.

Dakar, Senegal. Shore-based sampling of the Senegalese artisanal, recreational and industrial fisheries for billfish size frequency, sex determination, and catch and effort data may be continued in 2004 by Dr. Taib Diouf. Requested funding for 2004 is €1,500.

Côte d'Ivoire. Abidjan shore-based sampling of the artisanal and recreational fisheries for billfish will be continued and directed by the East Atlantic Coordinator, Dr N. N'goran of CRO in 2004. Funding for 2004 will be €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 2004 by Mr. Paul Bannerman. Funding for 2004 will be €1,500. Some travel by the East Atlantic Coordinator may be required to accomplish this task in 2004.

Sao Tome and Principe. As a result of the Eastern Atlantic Coordinators trip to this location in 2003, a sampling plan for shore-based sampling has been proposed for Sao Tome and Principe for 2004. Such a plan, if received by the General Coordinator and ICCAT Secretariat, is not anticipated to exceed €1,000 for 2004.

Canary Islands. Shore-based sampling of size frequency of off-loaded billfish carcasses from Chinese Taipei longline vessels may be accomplished in 2004. Requested funding for 2004 is €400.

Morocco. Inquires may be made by Dr. Abdallah Srour, of the *Institut National de Recherche Halieutique,* to improve the knowledge of the recreational fishery for billfish in Morocco and for establishing a sampling program in 2004. Funding for this activity in 2004 is not anticipated.

At-sea sampling

West Atlantic

Venezuela. At-sea sampling out of the ports of Cumaná, Puerto La Cruz, and Margarita Island will be continued in 2004. A total of about 10 tuna trips and 7 swordfish trips on mid-sized industrial longline vessels will be made in 2004, and the cost will be €8,000. In addition, two long-range trips on large Korean-type vessels (€1,500), and two trips on smaller longline vessels (€400) will be made in 2004. Therefore, the total West Atlantic at-sea sampling for 2004 will be €9,900. In addition, insurance for at-sea sampling for 2004 will be €1,200.

Brazil. At-sea sampling on Brazilian longliners will be continued in 2004 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.

Bermuda. At-sea sampling of home based longline vessels targeting pelagic species maybe initiated in 2004 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 2004. In addition, the Department of Environmental Protection will continue to facilitate deployment of pop-up satellite tags on billfish in the West Atlantic. This proposed work represents a continuation of a commitment to study habitat use and critical habitat 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 2004 are shown in the next section.

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 2004.

Uruguay. At-sea sampling aboard home based longline vessels was initiated in 1998 by the *Instituto Nacional de Pesca* (INAPE) of Uruguay, but no detailed data are collected on billfish, except for measuring length. However, it is uncertain if this activity will take place in 2004 and funding of this project will not be required.

Habitat use, and critical habitat identification of billfish using pop-up satellite tags

Several projects to evaluate habitat use and critical habitat needs of blue and white marlin using pop-up satellite tag technology are planned by scientists from several scientific entities in the west Atlantic Ocean in 2004. These projects are independently funded but may require funding of airfare for research associates to travel to various Atlantic locations for the deployment of tags in 2004 in the amount of €5,000.

Tagging

The following conventional tagging activities and expenditures are proposed. The purchase of tags and tagging equipment (distributed to participants by the ICCAT Secretariat) for East Atlantic billfish tagging is not anticipated in 2004 as substantial tagging equipment was purchased previously. The total for tag rewards (including the €900 needed in Venezuela) will amount to €1,500 for 2004. A lottery reward of €500 will also be necessary for 2004.

Age and growth

Requested funding for biological sampling of billfish for age and growth studies, as well as tag-recaptured billfish, is €500 for 2004. As the 2003 Billfish Working Group identified this work during the 2003 SCRS as critical, it is possible that a research proposal and request for additional funds may be submitted to the ICCAT Secretariat during 2004. Implementation of any newly submitted work will be contingent on the availability of funds.

Coordination

Training and sample collection

Experience in the West Atlantic continues to indicate that it will be necessary to make a series of trips to specific Caribbean island locations, and occasionally to West Africa, Madeira (Portugal), Bermuda, and Brazil, to maintain quality control of on-going research. The purpose of this travel will be to train samplers in data collection, pick up data, assist in pop-up tagging and data analysis, hand-carry frozen biological samples back to Miami, monitor the rapidly changing pelagic fisheries, and maintain contacts with project cooperatives. The travel to West Africa will be to assist the East Atlantic Coordinators in refining sampling programs, particularly to encourage tag release and recapture activities. Travel by the East Atlantic Coordinator will be to establish sampling programs and oversee sampling activities. Funding for West and East Atlantic Coordinators in 2004 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
  Other Caribbean countries
  Ascension Island

- *East Atlantic*
  Dakar (Senegal)
  Abidjan (Côte d'Ivoire)
  Ghana
  Madeira (Portugal)
  Gabon
  Other West African countries

Miscellaneous/Mailing

The requested funding for 2004 for east Atlantic miscellaneous and mailing is €100. Similar needs for the West Atlantic Coordinator are covered by the U.S. domestic budget.

Data base management

During the 1999 SCRS meeting, a problem surfaced relative to data base quality control and data entry for the at-sea and shore-based sampling components of this program. Given quality control and data entry is still lagging behind due to shortage of NMFS staff to accomplish these duties, it may be necessary to have a work study student from the University of Miami again be contracted for these data entry functions. However, there are no anticipated costs for quality control and data entry for 2004 at this time.

Bank charges

Charges by the bank for the transfer of funds and bank checks in 2004 are estimated to be €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 2004 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 2003.

Table 1. Summary budget for the Billfish Program

Source	€
Balance at start of Fiscal Year 2003	32,043.80
Income (Allocation from ICCAT Regular Budget*)	11,821.67
Expenditures (see **Table 2)**	- 20,637.79
BALANCE (as of September 26, 2003)	**23,227.68**

* Income includes €10,944.67 contribution from ICCAT and a €877 reimbursement of a tag reward payment made on behalf the Bluefin Research Program.

Table 2. 2003 Budget & Expenditures of the Enhanced Research Program for Billfish (as of September 26 2003)

	Budget €	*Expenditures €*
West Atlantic sampling		
Venezuela	16,593	14,396
Grenada	1,098	1,221
Other	6,044	0
East Atlantic sampling		
Ghana	1,648	1,366
Other	3,736	0
Tagging		
Rewards	2,198	911
Pop-up satellite study	5,495	0
Travel by Program coordinators		
West	10,989	
East	10,989	2,631
Mailing & miscellaneous--East Atlantic	100	0
Bank charges on Billfish account	275	112
	59,165	**20,638**

Table 3. ICCAT Enhanced Research Program for Billfish Budget for 2004 (The release of funds is contingent upon conditions described in the text.)

Budget Chapters	*Amount* (€)
STATISTICS & SAMPLING	
West Atlantic shore-based sampling:	
Venezuela	4,000
Grenada	1,500
Jamaica	1,000*
St. Maarten, Netherlands Antilles	1,500*
U.S. Virgin Islands	2,000*
Trinidad & Tobago	1,000*
West Atlantic at-sea sampling:	
Venezuela (Cumaná, Puerta la Cruz, and Margarita Island)	11,000
East Atlantic shore-based sampling:	
Dakar, Senegal	1,500
Ghana	1,500
Côte d'Ivoire	1,500
Canary Islands	400*
Soa Tome & Principe	1,000*
TAGGING	
Tag rewards	1,500
Lottery rewards	500
Pop-up Satellite Study (Bermuda)	5,000*
AGE AND GROWTH	
Purchase of hard parts	500*
COORDINATION	
Coordination travel (training of samplers, collection of statistical and biological samples)	20,000*
Mailing & miscellaneous-East Atlantic	100
Bank charges	250
GRAND TOTAL:	**55,750**

*Authorization of these expenditures depends, in part, on sufficient funds being available from new contributions in 2004.

Appendix 8

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON STATISTICS

1. Opening, adoption of Agenda and meeting arrangements

The meeting of the Sub-Committee on Statistics (2-3 October 2003) was opened by the Convener, Dr. Pilar Pallarés. After assigning a rapporteur (J. Porter), the Agenda was adopted, and is attached as **Addendum 1 to Appendix 8**.

2. Review of the Meeting for the Improvement of Ghanaian Statistics and follow up

The Report of the Meeting for Improving the Collection of Fisheries Statistics in Ghana, held in February 2003 (SCRS/2003/010), was introduced by the Convener. The objective of this meeting was to describe the Ghanaian tuna fishing operations and processing, review the current sampling system, identify potential problems, and make recommendations for improvements to the sampling system. A three-month pilot study was set up to determine and define the best sampling strategy for the Ghanaian catch, taking into account the difficulty in identifying the catch by gear and the sorting of landings by commercial categories. This included a "super-sampling experiment" consisting of intensive sampling both before and after the sorting process, for each boat, to determine the necessary level of sampling (number of samples and number of fish per sample) and to compare with the efficiency of the traditional sampling method. Regular progress reports were to be submitted to ICCAT to enable ICCAT scientists to follow the work and give advice if necessary. The sampling scheme is fully described in SCRS/2003/010.

P. Bannerman, representing MFRD in Tema, reported that the April data were collected incorrectly, and had to be discounted. Therefore, the pilot study was extended for one month, to include July. Preliminary analyses indicated that a larger sample (500-600 fish) would be better, and sampling at this level would continue through December. He noted that the companies changed their off-loading/sorting system in June such that the sorting by species was done at the canneries instead of at the port. That precluded the continuation of the sampling after sorting. As the canneries are under the jurisdiction of another Ministry, samplers could not work in the canneries. The representative of Ghana noted that Task I data are collected by the companies and may be biased, as regards to the species composition of the catch.

It was recommended that the Ghanaian scientists, with the help of knowledgeable scientists from the Tropical Species Group, should define a standardized sampling procedure, and develop a method to re-estimate the species composition of the historical catches. It was also recommended that the Ghanaian scientists should continue sampling 500 fish per boat at different times during the unloading period (to cover the entire unloading period in order to sample fish in all parts of the hold), and that sampling be extended to determine seasonal variation in species composition. It was recommended that Ghana should provide a comprehensive report covering the whole period of sampling.

3. Review of the 03/2003 Inter-sessional Meeting of the Sub-Committee

The Inter-sessional Meeting of the ICCAT Sub-Committee on Statistics held in March 2003 (SCRS/2003/012) was introduced by the Convener. The objective of this meeting was to discuss the current data exchange protocols, as well as the use of standardized codes, and the inclusion of the age-slicing procedure in the Secretariat. For the age slicing, it was noted that there must be more cooperation between National Scientists and the Secretariat in order to proceed.

The Secretariat presented in detail Appendix 3 to SCRS/2003/012, the "ICCAT Statistical Data Exchange Protocols," which had been agreed to in principle at the March meeting. The Protocol document was created to address the complexities associated with the collection and dissemination of statistical information, and included data submission protocols and the ICCAT policy system for data dissemination. The Sub-Committee reviewed and endorsed the Protocols and agreed that the document, in its revised form, should remain attached to SCRS/2003/012 (with a footnote indicating that it had been reviewed by the Sub-Committee and subsequently adopted by the SCRS). The Protocols should also be published on the ICCAT web site, and become a part of the proposed ICCAT Manual.

4. Issues regarding capture data submission (see SCRS/2003/021 and the Secretariat´s Report on Statistics and Coordination of Research in 2002-2003, hereafter referred to as the Secretariat's Report)

The Secretariat requested that all data submissions be made to info@iccat.es.

4.1 Task I and Task II

The main issues regarding Task I and II data submission are the widespread disregard for the submission deadlines and that submissions are often incomplete (missing gear, area information). Late and incomplete data compromise the ability of the Secretariat to prepare data for the SCRS, and also compromise the ability of the Species Groups to conduct meaningful stock assessments (e.g., East Atlantic bluefin in 2002 and North Atlantic albacore in 2003). The Sub-Committee reiterated its recommendations that data be complete and reported to ICCAT by the required deadlines. Any stronger action can only be taken by the Commission. It was also recommended that ICCAT continue to collaborate with FAO in data exchange.

4.2 Tagging data

The Secretariat's Report reviews the new data received for conventional and archival tags. There is still a need to revise the historical conventional tagging database. In particular, the skipjack data should be examined and made available for the 2004 skipjack assessment. The Secretariat advised that a protocol for submission of tagging data would be available and circulated in 2004, and it would be most efficient for data to be provided according to the Secretariat's templates.

The archival tagging data are very scant, and the Secretariat emphasized that this slows the process of tag retrieval, and may jeopardize the overall reporting rates of other studies. It important to quickly identify which program applied the tag, and the tag retrieval will be facilitated by timely payment of the reward as well as feedback to the finder about the fish that had been tagged. The Sub-Committee agreed that it is useful to have ICCAT facilitate and coordinate this process, but in order to do so, the following are needed: (1) an inventory of all archival tagging programs, including the tag number, the type/make of the tag, the contact person, and the date and location of tagging; and (2) commitment from laboratories deploying archival tags to immediately reimburse ICCAT for rewards they pay. When both the commitment and the inventory are assured, then ICCAT can proceed to facilitate the payment of rewards. It was noted that although ICCAT has made the request for these data for at least two years data have been very slow in coming. If the inventory database is not up-to-date, then it will be impossible for the Secretariat to facilitate payment of rewards. The Secretariat noted that due to a lack of resources, a generic poster has not yet been designed and posted on the ICCAT web site.

4.3 Revisions to historical data

Revisions to historical Task I and II data were reviewed (Section 6 of the Secretariat's Report). In particular, the revised Task I data series of bluefin tuna 1991-1997 submitted by Algeria in 2002 was not accepted by the SCRS, pending justification by Algeria for these changes.

It was agreed that a timeframe should be established to define what constitutes a revision and what constitutes the change from preliminary to final data. It was agreed that three years after its submission, preliminary data automatically become final (*e.g.*, 1999 preliminary data become final in 2003), unless a final data set is provided during this period. Any revision to final data requires full documentation in the form of an SCRS paper (including a change from zero catch to positive catch).

4.4 Shark statistics

Both the Secretariat´s Report (Section 5) and SCRS/2003/021 (Table 7) summarize the state of the ICCAT shark database. It was emphasized that there are many gaps in the data; that in some cases the data are only in numbers, not weight; and that conversion factors are lacking or not verified. These deficiencies need to be improved before the 2004 shark assessments. It was recommended that shark data should be collected in the same way as the Task I and II data for tuna and tuna-like species. Collaboration with FAO and other organizations on the conversion factors was also recommended. This topic should be further discussed by the Sub-Committee on By-Catch.

4.5 Bluefin, Swordfish, Bigeye Statistical Documents and other trade information

The ICCAT Statistical Document Programs were reviewed. The Sub-Committee agreed that these document programs are a valuable source of unreported catch. It was again recommended to request to the Commission that information from individual documents be provided (in an electronic format), emphasizing the need to have this detailed information available in order to confirm the ocean of the catch, and to eliminate duplication in the case of re-exports. It was also recommended that the BFTSD should identify farmed tuna, as requested by the Commission, in order to better estimate catch.

Response to the ICCAT request for farming data [Ref. 02-10] has been very poor (one Contracting Party responded). However, it was noted that the information would be very useful to better determine catches of eastern bluefin. The Sub-Committee strongly recommended that the Commission submit the farming data reports. In particular, it is important to track the different stages of transactions between the capture and the market in order to identify the country of origin of the catches.

The Sub-Committee discussed how to report NEI in the catch tables attached to the Executive Summaries. Two options were proposed: (1) calculate "NEI-combined" categories (NEI aggregated from all countries), by gear, if appropriate, and provide an SCRS paper to document how the estimate was derived; or (2) add the estimated catch to the total for the country and denote that with a footnote in Table 1. The SCRS decided on the first option. It was emphasized that there should be a standard protocol across species.

5. Updated report on relational database system

The status of the ICCAT relational database system was summarized in SCRS/2003/026. A brief summary was also presented outlining the future development strategies for the short-term, focusing on the various mechanisms that can effectively improve the integration of data submitted and increase the quality of statistical information was discussed. The Sub-Committee reiterated its support for this work and commended the Secretariat on the progress that had been made.

6. Updated report on survey of fishery reporting systems

The Secretariat had sent out a questionnaire on national statistic collection systems (see Section 3 of the Secretariat´s Report). Of the 90 surveys sent out to parties believed to be fishing in the Convention area, only 17 responded (13 Contracting Parties). The Sub-Committee recommended that this survey be sent again to parties that did not respond. It was noted that the questionnaire is available on the ICCAT web site. However, though the response was very limited, the answers provided indicated that in many cases, data collection systems are poor.

7. National and international statistical activities

The Secretariat referred to Appendix 1 of the Secretariat's Report, and in particular to the participation in the meeting of the Coordinating Working Party on Fishery Statistics (CWP; January 2003), and the meeting of the IOTC Scientific Committee (November 2002). The attention of the Sub-Committee was drawn to the workshop that FAO plans to hold before the meeting of CWP-21 in 2005 to evaluate the general-purpose fishery data systems, which are under development by the various Regional Fisheries Bodies. It was recommended that the work of the SCRS, especially that of the Sub-Committees on Environment and By-catch, and the Methods Working Group, should coordinate with similar groups in IOTC.

8. Review of publications

8.1 Data Record

The Secretariat proposed to publish future Data Records only in CD form and on the web, including the complete historical database. An index of links will allow easy access to specific portions of the data. The Secretariat noted that it is expected that the next Data Record will be available in 2004. The delay since the last published version (two years) is due to the transition associated with the establishment of the relational database.

The Sub-Committee agreed that it is most useful to have the Data Record in electronic format (CD and web), and supported the Secretariat's proposal.

8.2 Statistical Bulletin

The Statistical Bulletin was published in February 2003, and the Secretariat recommended that the paper publication be continued. More updated versions of the Task I database are also available on the ICCAT web site. A new, more interactive application is in the testing phase and is available on the web site.

8.3 Web files

It was noted that ICCAT "owns" iccat.es, iccat.org and iccat.int. Following the Commission meeting, all three sites will link users with the same site (presently iccat.org links to the vessel list).

9. Review of progress made for a revised Field Manual

The 2002 SCS proposed that the ICCAT Field Manual be updated and expanded to include more information on biological sampling as well as the collection of fishery statistics. The Secretariat introduced a draft structure and work plan for an ICCAT Manual (**Addendum 2 to Appendix 8**). Given current resources (human and financial of both national administrations and the Secretariat), additional resources will be required to complete the project in the short-term. The Sub-Committee agreed that such a Manual is fundamental and proposed to the Commission that €50,000 would be necessary to out-source (to a tuna expert) the development, coordination and writing of chapter 4 (Data for Assessment and Research), with the remainder of the Manual to be completed by the Secretariat and National Scientists (with possible collaboration with other tuna bodies). Once funding is secured, it is expected that it would take two years to complete the project. Otherwise a project of this magnitude would take much longer.

10. Other matters

10.1 Confidentiality policy

It was agreed that a confidentiality policy would be included in the ICCAT Statistical Data Exchange Protocols (Appendix 3 to SCRS/2003/012). Task I and II data are considered public, as are other data and information provided on the ICCAT web sites. Any data on a scale of less than 1º, would be considered confidential, but could be made available in a more aggregated form. By default, observer data are considered confidential.

10.2 Review of ICCAT logbook

During the Sub-Committee on Statistics inter-sessional meeting (SCRS/2003/012) it was noted that the Ghanaian data did not include if FADs were used, and it was thought that the ICCAT logbook was deficient. In closer examination during this meeting, and in discussion with the representative of Ghana, it was determined that the ICCAT log has a space for "type of school," the problem is that the logs are not being properly completed.

10.3 Preparation for Data Workshop

SCRS/2003/021 was reviewed and it was agreed that this was a good template for a document for the 11 October 2003 *Ad Hoc* Data Workshop [Ref. 02-30]. The Convener agreed to request Species Group rapporteurs to review and revise section 6 (Species Group concerns).

10.4 Software and hardware requirements for Secretariat

The Sub-Committee recommends that €50,000 be allocated each year for the maintenance and necessary upgrades of computer equipment and software. An itemized request will only be presented in the case of a special request above and beyond the fixed amount. Purchases during the previous year should be reported annually in the Secretariat's Report on Statistics and Coordination of Research.

11. Future plans and recommendations

11.1 In relation to Task I and II

- The ICCAT Statistical Data Exchange Protocols (SCRS/2003/012) should be adopted.

- Task I and Task II data must be submitted within the established deadline dates and standard formats.

- Ghana should continue the new sampling regime during the unloading period, and should provide a full report on the whole 2003 sampling exercise. The Ghanaian scientists, with the help of knowledgeable scientists from the Tropical Species Group, should define a standardized sampling procedure, and develop a method to re-estimate the species composition of historical catches.

- The questionnaires sent by the Secretariat to obtain information on the data collection systems should be resent to parties that did not respond.

- Information from individual Bluefin, Swordfish and Bigeye Statistical Documents as well as the bi-annual reports should be submitted, in an electronic format.

- The farming data reports [Ref. 02-10] should be made available to the SCRS. It is essential for the SCRS to have information about the origin of the catch, the magnitude of total volume, and the size distribution from farming.

- Collaboration with FAO and other organizations in the exchange of statistics and conversion factors, as well as in specific projects, should be continued.

- The Data Record should be published in CD form and on the web, including the complete historical database.

11.2 In relation to other information

- The Secretariat should be provided with basic information (type of tag, date tagged, etc.) on the tagging programs that are carried out and that the Secretariat revise the historical tagging database. In the case of archival tags, the Secretariat could facilitate the payment of rewards if they have a complete inventory of tags and commitment the rewards will be reimbursed by the tagging investigators.

- The distribution of information on tagging programs should be intensified through various means (updating of the posters, web page, electronic format, etc.).

- Work should continue on the specific forms necessary to develop a catalog of information not available to ICCAT, as proposed by the 2001 Methods Working Group.

11.3 Other matters

- Plans to publish an ICCAT Manual should proceed. In order to do this in a reasonable timeframe (i.e. two years), €50,000 is requested.

- The Sub-Committee recommends that €50,000 be allocated each year for the maintenance and necessary upgrades of computer equipment and software. An itemized request will only be presented in the case of a special request above and beyond the fixed amount.

- It was recommended that the 2004 Agendas for each Species Group should include the content and priorities associated with the completion of the ICCAT Atlas (see Addendum 2 to Appendix 10 of the 2002 SCRS Report).

- It was agreed that the Sub-Committee on Statistics should meet on the Friday prior to the SCRS Plenary in 2004, but that every effort should be made to avoid concurrent sessions.

12. Adoption of the report and closure

The Report was adopted by the Sub-Committee. The Convener thanked the participants, and the meeting was closed.

Addendum 1 to Appendix 8

Agenda of the Sub-Committee on Statistics

1. Opening, adoption of Agenda and meeting arrangements
2. Review of the Meeting for Improving the Collection of Fisheries Statistics in Ghana, and follow up
3. Review of the 03/2003 Inter-sessional Meeting of the Sub-Committee
4. Issues regarding capture data submission
   4.1 Task I and Task II
   4.2 Tagging data
   4.3 Revisions to historical data
   4.4 Shark statistics
   4.5 Bluefin, Swordfish, Bigeye Statistical Documents and other trade information
5. Updated report on relational database system
6. Updated report on survey of fishery reporting systems
7. National and international statistical activities
8. Review of publications
   8.1 Data Record
   8.2 Statistical Bulletin
   8.3 Web files
9. Review of progress made for a revised Field Manual
10. Other matters
   10.1 Confidentiality policy
   10.2 Review of ICCAT logbook
   10.3 Preparation for Data Workshop
   10.4 Software and hardware requirements for Secretariat
11. Future plans and recommendations
12. Adoption of the report and closure

Addendum 2 to Appendix 8

Proposed ICCAT Manual Structure and Work Plan

Summary. The 2002 SCRS proposed that the ICCAT Field Manual be updated and expanded to include more information on biological sampling as well as the collection of fishery statistics. This document presents the outline of the proposed ICCAT Manual. Given current resources (human and financial of both National Administrations and the Secretariat), additional resources will be required to complete the project in the short-term.

1. Introduction

For several years, SCRS scientists have recognized the need to update the ICCAT Field Manual (the last version was published in 1990). In addition, it has been noted that a revision should be broader in scope than the current version. At its October 2002 meeting, the SCRS endorsed the following from its Sub-Committee on Statistics:

> "A more ambitious proposal [for updating the Manual] would consist of extending the scope of this manual (centered mainly on the collection of fishery statistics) to biological sampling (e.g. for studies on reproduction, etc.). If this extension is approved, it would however involve the active participation of SCRS scientists to write the different chapters of this new manual; coordination would be handled by the Secretariat, which will draft an outline of the manual, and circulate this by e-mail for discussion by the scientists."

As a result, the Secretariat prepared an outline that details the possible contents of the Manual, and circulated it to key SCRS scientists for comment. The attached paper incorporates that input. In addition the Sub-Committee on Statistics at its inter-sessional meeting (SCRS/2003/012) endorsed the general proposal.

2. Objectives of the ICCAT Manual

The proposed objective is to produce a publication that would be of use to a wide audience, though still maintaining scientists as the primary intended users. The Outline contains chapters of a general nature that should allow readers to understand how ICCAT works and what is the role of statistics and research within the system. Other chapters are more detailed, such as those containing technical guidelines for species identification or for sampling, or the appendices that specify the formats with which data should be submitted to the Secretariat.

It is proposed to make the Manual a publication that would have periodic updates. The main chapters in the text would only be updated sporadically, *e.g.*, on a scale of 5-10 years; this is roughly the time scale in which major advances in biological knowledge are achieved. On the other hand, the appendices would contain tables, formats, and other information that, with a few exceptions, would need more frequent (*e.g.*, annual) updates; this is roughly the time scale in which changes are made to data codes, conversion factors, population parameters, etc.

It is also proposed to maintain the document up-to-date on the web, but to print it on paper/CD very infrequently after the first edition. The Manual's organization into subjects should be such that the various chapters would be almost stand-alone documents (with links to the appropriate appendices). This way, users would be able to create (print/save) their own manuals that cover only the chapters and appendices of interest to the user.

3. Contents of the ICCAT Manual

The proposed contents are presented in the attached annotated Outline (**Attachment 1**). Chapter 1 explains what ICCAT is, laying down the foundation for the remaining chapters. Chapter 2 provides species profiles for the major target and stocks, as well as basic information for the main by-catch species. Chapter 3 provides fishery profiles for the major fleets/gears. Chapter 4 covers conceptual and technical aspects of collecting and compiling statistics and biological samples. Chapter 5 touches upon other types of data that are not collected by scientists but that, nevertheless, have an impact on the work of the SCRS. Chapter 6 covers the subject of publications, and provides guidelines for authors.

It could be said that the proposed Chapters 2 and 4 address most of the contents of the current (1990) Field Manual. The remaining chapters in the proposed Outline broaden the scope of the publication.

4. Work plan for completion of the ICCAT Manual

The proposed Manual is an ambitious project. As noted by the Sub-Committee on Statistics, it cannot be written by Secretariat staff alone and thus will need the active involvement of other scientists. Some suggestions are provided below.

4.1 Responsibilities. The Secretariat will essentially assume the responsibility for putting together and translating the entire document, and for writing Chapters 1, 5 and 6, and the appendices. In addition, the Secretariat could write summaries for the other chapters once they are completed (Sections. 2.4, 3.2, 4.11, 4.12). Other scientists outside the Secretariat would need to write Chapters 2, 3 and 4. Given the complexity of this task, it will be necessary to follow a specified and consistent format.

4.2 Priorities. Chapters 2 and 4 (species and data) should be the priority, together with the appendices.

4.3 Formats. Formats should follow the outline provided including the template for Chapter 2 in Appendix 2 of this document.

4.4 Timing. The entire project should be completed in 2-3 years. Chapters should be placed on the ICCAT web as they are completed; translation should be done opportunistically with an aim to make progress as the chapters are completed.

4.5 Resources. It is almost certain that the Secretariat and most National Scientists will not have the necessary spare time to work on this ambitious project without the availability of additional resources. These resources could be in the form of financing part-time scientific personnel that could do the necessary research, and/or by other means. The Sub-Committee on Statistics noted that it would be particularly beneficial to have a tuna expert to coordinate Chapters 2 to 4 and to write part of Chapter 4; otherwise the project will take considerably longer.

5. Conclusions and recommendations

The revision and expansion of the current ICCAT Field Manual has received support in the SCRS, at least in principle. Given current resources (human and financial of both National Administrations and the Secretariat), additional resources will be required to complete the project in the short-term. The SCRS should discuss a realistic Work Plan, addressing both the timeline and the considerable resources required to complete the project.

Attachment 1

ANNOTATED ICCAT MANUAL OUTLINE

Chapter 1 Overview

The objective of this chapter is to put the manual in the context of ICCAT and to explain how it is organized.

1.1 What is ICCAT?

Explain the Commission's objectives and how it functions (Panels, Standing Committees, Subcommittees, etc.) from the pursuit of fisheries to the regulation of fisheries. Much of this information would be organized along the way that appears on the Web today under "About ICCAT". Emphasis should be given to the advisory role of the SCRS and the importance that stock assessment has in the whole system. A schematic of stock assessments should be given so that the reader can place fishing and data collection in perspective.

1.2 The Main Types of Data

The chapter makes a distinction in terms of the use of data (for research/assessment or for other Commission business) and mentions the various types of data used at ICCAT. Also, it would contrast fishery-dependent *vs.* fishery-independent.

1.3 Reporting of Data to the ICCAT Secretariat

Summarize reporting requirements and procedures with an emphasis on the need to report on as fine a scale as possible. Explain data dissemination procedures.

1.4 How this Manual is Organized

Provide a map to the publication (with hyperlinks for the electronic version).

Chapter 2 Description of Species[1]

2.1 Species Directly Covered by the Convention

These should be species profiles describing basic life history traits, types of measurements, distribution and identification keys. More detail should be given for the stocks that have been assessed by ICCAT. Links should be given to FAO species sheets. Link also to an appendix with key population parameters.

2.1.1 Yellowfin
2.1.2 Bigeye
2.1.3 Skipjack
2.1.4 Albacore
2.1.5 Bluefin
2.1.6 Blue Marlin
2.1.7 White Marlin

[1] See template for Chapter 2 in **Attachment 2**.

2.1.8 Sailfish/Spearfish
2.1.9 Swordfish
2.1.10 Southern Bluefin
2.1.11 Small Tunas

2.2 By-catch Species of Special Importance

This describes the main by-catch species for which ICCAT collects statistics. It mentions other fishery organizations that have competing data collection requirements (*e.g.*, ICES for sharks).
2.2.1 Mako, Porbeagle, Blue sharks
2.2.2 Other?

2.3 Other By-catch Species

Essentially this provides a link to an Appendix that contains the list of bycatch species that has been put together by the Subcommittee on By-catches

2.4 Summary of Species and Codes

Introduce an appendix with species, stock definitions, scientific names, common names and codes.

Chapter 3 Description of Fisheries

3.1 Basic Types of Tuna Fisheries

This defines what constitutes a "fishery" (or a "fleet") and how they can be classified (surface, etc.). The main purpose of the chapter is to describe how they operate, where they operate and what species they target. The chapter should give useful insights into sampling for the various types of fisheries. Details on different types of operations for each gear should be given (*e.g.* the various types of longlines, or purse seines on free school vs FADs).

3.1.1 Purse seine
3.1.2 Longline
3.1.3 Gillnet
3.1.4 Trawl
3.1.5 Pole-and-line
3.1.6 Rod-and-reel
3.1.7 Harpoon
3.1.8 Trap
3.1.9 Others [Include tuna farming, even though it is not strictly a gear.]

3.2 Summary on Fisheries, Statistical/Sampling Areas and Gear/Country Codes

Introduce an appendix with the codes that define the various fisheries.

Chapter 4 Data for Assessment and Research

Note differences between fishery-dependent and fishery-independent. Highlight the types of data collection used for different parts of the assessment (*e.g.*, growth may come from tagging or from hard parts)

4.1 Sampling for Catch, CPUE and Size Data

Provide technical guidelines for sampling fishery data at the finest scale possible (which probably depends on the type of fishery): set-by-set, trip-by-trip, etc. Also, provide guidelines about sample sizes. This is one of the key chapters of the manual.

4.2 Estimating Total Catch Statistics

Provide guidelines for extrapolating the samples in the preceding section to grouped statistics (*e.g.*, annual catch in numbers, annual catch in weight, weight of dead discards, etc). Explain how raising and substitutions are done and the basic rules.

4.3 Estimating Catch-at-Age

Explain age-slicing and age-length keys.

4.4 Obtaining Relative Abundance Indices

Explain the need for indices in stock assessment and basic features of CPUE standardization

4.5 Genetics Sampling

Explain the use in stock ID, species ID, etc.. Give the various techniques and guidelines for storage of samples.

4.6 Conventional Tagging

Types of conventional tags and tips on application. Distinguish between opportunistic and scientific tagging. Ways to improve reporting rates. Use of conventional tagging data in research and assessment. Explain ICCAT tagging database and ICCAT lottery.

4.7 Pop-up and Archival Tagging

State-of-the-art; tips on applications; types needed for different species (*e.g.* depth tolerance).

4.8 Sampling for Maturity

Histological and chemical samples. GSI and spawning cycles. Fecundity.

4.9 Hard Parts

Sampling of otoliths, fin spines and vertebrae; their analysis for growth and other uses.

4.10 Observer Data and Other Biological Samples

By-catch data; discards, etc.

4.11 Reporting data to ICCAT

Most of the raw data collected are not reported to ICCAT. Specify Task I, Task II, and other required/optional data, reporting deadlines, and data exchange protocols. Link to data formats in appendices.

4.12 Obtaining data from ICCAT

Public domain data; standard database views; statistical correspondents.

Chapter 5 Other Data Used by ICCAT

This is a short chapter mentioning some of the other data required by the Commission that do not have a very substantial bearing on the scientific work.

5.1 Statistical Documents and other Trade Information

Explain how these are summarized and how they are used to calculate unreported catches.

5.2 Other information

Other information if relevant to the SCRS (bluefin farming, etc.).

5.3 Reporting to ICCAT

A link to an appendix with the reporting forms.

Chapter 6 Publications

6.1 List of ICCAT Publications

Biennial Reports, Collective Volume, Statistical Bulletin, etc. Explain purpose, availability, etc.

6.2 Submitting Documents to ICCAT

6.2.1 Scientific papers

Explain the Red Books, provide guidelines, deadlines, and link to formats.

6.2.2 National Reports

Explain their purpose (scientific part, plus Commission part), provide guidelines and link to contents.

6.3 ICCAT Database of Publications

Appendices

A1. ICCAT Data Reporting Forms
Task I. Task II. Tagging. Observers. Sharks. Everything used by the SCRS.

A2. ICCAT Codes
Basically all of the codes used in the database.

A3. ICCAT Sampling/Statistical Areas
Include stock definitions, ICCAT statistical and "biological" areas, Convention Area; maps

A4. Population Parameters for Key ICCAT Species
Growth; mortality; maturity; morphometrics; conversion factors. Photos and identification keys.

A5. By-catch Species
Essentially a list of by-catch species with caveat that listing does not imply magnitude of catches.

A6. Guides for Authors
Scientific papers and national reports (both scientific and Commission parts)

A7. Glossary of ICCAT Terms
Needs updating of both Commission and SCRS terminology

Index

Attachment 2

TEMPLATE FOR CHAPTER 2 OF ICCAT MANUAL

(...Chapter 2. Description of Species
...2.1 Species Directly Covered by the Convention
...2.1.4 ALB - *Thunnus alalunga*)

1. Names
Classification
Species name: Thunnus alalunga
Synonyms still in use: Germo alalunga
Family: Scombridae
Order: Perciformes
Class: Actinopterygii
ICCAT Names: Albacore (EN); Germon (FR); Atún blanco (SP).
ICCAT Species Code: ALB
Common names:
Angola : Avoador.
Brazil : Albacora branca.
Canada : Albacore, Germon atlantique.
Greece : Tonnos macropteros.
Italy : Alalunga
Spain: Hegalutzea, Bonito del Norte, Albacora

2. Identification
((general text)) A large species, deepest at a more posterior point than in other tunas ... Gillrakers 25 to 31 on first arch....Caudal fin with a narrow white posterior margin; .... liver striated on ventral surface .....
Larvae:
((include drawing))
Juveniles:
((include drawing))((include picture))

Adults:

((include drawing))((include picture))

[REFERENCES :]

3. Distribution and exploitation

Cosmopolitan in tropical and temperate waters of all oceans including the Mediterranean Sea extending north to 45° to 50°N and south to 30° to 40°S. Juveniles are found ..... Abiotic variables such as sea surface temperature and global oceanographic and climatic indices play an important role in the distribution of Albacore in both the North and South Atlantic. These factors impact the local availability of fish and consequently affect estimated catch rates thereby causing changes in catch rates that are not linked to changes in abundance....

((Include dist. Map))

Major Atlantic fisheries occur in the Bay of Biscay, ...

((Include surface fisheries (by gears and combined?) catch distribution map))

((Include LL fisheries catch distribution map))

((Describe effort and catch (by size/age)))

[REFERENCES :]

4. Biology and population studies

Habitat preferences

Abundant in surface waters of 15.6° to 19.4° C; deeper swimming large albacore are found in waters of 13.5° to 25.2° C; temperatures as low as 9.5° C may be tolerated for short periods..... ((include maps if needed))

[REFERENCES :]

Stock structure

For assessment purposes the existence of three stocks is assumed: northern and southern Atlantic stocks (separated at 5ºN) and a Mediterranean stock. Mitochondrial DNA studies suggest that ..... Furthermore, an analysis of the ICCAT tagging database shows no evidence to reject the stock structure assumed in the SCRS at present....

((include genetics and parasites here))

[REFERENCES :]

Growth

Albacore tuna grow quickly, although the environment can moderate this effect.... For assessment purposes, the following equations are used:

Stock	**L_{inf}**	**K**	**t_0**	**Birth date**	**Reference**	**Comments**
North	122.8 cm FL	0.217 yr^{-1}	0 yr	June 1	Santiago et al. 2000	Estimated with MULTIFAN; Average SD of length at age = 3.59; Average SD ratio at age = 1.391
South	...					
Med	...					Poorly estimated

The following length-weight relationships have been estimated ($w = a\ l^{b}$):

Stock	A	b	Ref.	Comments
North	Cccccc	dddddd	ddddddddd	xxxxxxxxxxxxxx
South				
Med				

The largest size recorded in the Atlantic is XXXX.

Sex-ratio

Sex ratio of albacore varies according to the geographical location and season…
[REFERENCES:]

Maturity

A maturity ogive has been estimated for the northern stock based on GSI:
((Provide equation))
For assessment purposes, the following maturity vectors are assumed:

Age	North	South	Med
1	0	0	unk.
2	0	0	
3	0	0	
4	0.5	0.5	
5+	1.0	1.0	

[REFERENCES:]

Spawning

Albacore spawning areas in the Atlantic are found in subtropical western areas of both hemispheres and throughout the Mediterranean Sea. Spawning takes places during austral and boreal spring-summer. In the Mediterranean, larvae have been found around the Balearic Islands. Maturity is considered to occur at about 90cm FL (age 5) in the Atlantic, and somewhat smaller in the Mediterranean.....
[REFERENCES :]

Recruitment

Albacore are recruited to surface fisheries (especially bait boats) at about xxx cm FL (age xxx). ....
(((include distribution map with catch of small fish))
[REFERENCES]

Migrations

There is little direct evidence to demonstrate migration patterns for albacore. The current hypothesis is based on distribution of fisheries and on conventional tag-recapture information. In the northern stock, ... etc etc....
((include map))
[REFERENCES :]

Diet

Albacore have a varied diet…
[REFERENCES:]

Physiology

As with other species of tunas, albacore have physiological attributes that adapt them to…
[REFERENCES:]

Behavior

The behavior of albacore…
[REFERENCES:]

Natural mortality

For assessment purposes, natural mortality is assumed to be 0.3 yr^{-1} (25.9% per year) for all age classes.
[REFERENCES]

5. Conversion factors for statistics

The following conversion factors are applied in the ICCAT database.

Equation	**Ref.**	**Comment**
RWT = 1.16 GWT	xxx 1953	Gilled-and-Gutted to Round Weight
...		
RWT = $6.303\ 10^{-6}$ $FL^{3.2825}$	Beardsley (1971)	FL(cm) to Round weight (Kg). Estimated in the North

Appendix 9

REPORT OF THE MEETING OF THE SUB-COMMITTEE ON BY-CATCHES

1. Opening of the meeting, adoption of Agenda, and arrangements for the meeting

At the request of the Chairman of the SCRS, the Convener of the Sub-Committee on By-Catches, Dr. H. Nakano (Japan) opened the meeting. The Agenda, which was circulated before the meeting, was reviewed, modified and adopted and is attached to this report as **Addendum 1 to Appendix 9**. Dr. G. Scott (United States) agreed to serve as Rapporteur.

2. Review of new information concerning by-catches

New information concerning by-catch species submitted to the 2003 ICCAT SCRS was reviewed.

SCRS/2003/038 and the reports of Brazil, Canada, China, Cote d'Ivoire, Cyprus, Japan, South Africa, Trinidad and Tobago, United States, the Caribbean Regional Fisheries Mechanism (CRFM), St. Vincent and Grenadines (SVG), and Chinese Taipei provided shark catch statistics, research activities and other information related to the Sub-Committee. The U.S. report included a seabirds by-catch table and a description of research activity on gear modification to reduce sea turtle by-catch and attached "Final U.S. National Plan of Action for reducing the incidental catch of seabirds in Atlantic tuna, swordfish, and shark longline fisheries" as an appendix.

Documents SCRS/2003/088, SCRS/2003/110, SCRS/2003/120, SCRS/2003/129, SCRS/2003/135, SCRS/2003/-137, and SCRS/2003/138 introduced the results of National Observer Programs, including lists of species, species composition and biological parameters of by-catch species for the Ghanaian-registered tuna purse seiners and pole and line vessels, longline fishery in Venezuela, French purse seiners, Japanese longline, swordfish longline in the western Mediterranean and bluefin tuna longline in the West-central Mediterranean, respectively. Various National Reports also provided information on scientific observer programs.

Document SCRS/2003/085 introduced conversion factors between the wet fin and body weight of some pelagic sharks caught by the Spanish surface longline fleet. The wet fins of blue shark and shortfin mako shark consist 6.5% and 5.8-6.8% to the body weight (live weight), respectively. The report concludes that there is a need to establish conversion factors between wet fin weight and other body parts for each species and fleet due to the different criteria used for processing sharks and the different fins or parts of fin used.

3. Review of other national or international activities concerning by-catches

The following activities by other international organizations related to by-catch were noted:

1) The FAO COFI meeting was held in February 2003. FAO activities on sharks and seabirds were discussed, i.e., IPOA shark (International Plan of Action on the conservation and management of sharks) and IPOA seabirds (International Plan of Action on the reducing incidental catch of seabirds by longline fisheries).

2) The APEC Shark Workshop was held in March 2003 in Huatulco, Mexico. APEC encouraged member countries to promote their own NPOA shark with cooperation of FAO.

3) An International Technical Expert Workshop on Marine Turtle By-catch in Longline Fisheries was held in Seattle, USA, from 11-13 March 2003. Several SCRS scientists attended this meeting and presentations on seasonal distributions of catch and effort, gear configuration, target species, and effort trends for Atlantic, Mediterranean, Pacific, and Indian Ocean longline fisheries were made. The Atlantic Ocean summary was based on ICCAT data, kindly provided by the Secretariat and a copy of the presentation resides at the ICCAT Secretariat.

4) The ASEAN/SEAFDEC Workshop on the conservation and management of sharks was held in May 2003, in Vientiane, Laos P.D.R.

5) The IATTC Commission meeting was held in June 2003, in Antigua, Guatemala. The by-catch problem of juvenile tunas caught by the purse seine and baitboat fisheries, and by-catch of sea turtles, billfish, sharks, rays and other species were discussed. It was noted that IATTC has achieved some recommendations on handling and live release of by-catch of turtles intended to promote reduction of mortality of sea turtles incidentally taken in these fisheries and submission of by-catch data on sea turtles was requested.

6) At the Nineteenth Meeting of the CITES Animals Committee (18-21 August 2003, Geneva, Switzerland), reports on progress made on developing and implementing the IPOA-Sharks from several countries were made available. These reports are available on the CITES web site (copies are available at the ICCAT Secretariat).

7) The ASEAN/SEAFDEC Workshop on the conservation and management of sea turtles was held in September 2003, in Kuala Lumpur, Malaysia.

8) The World Fish Center based in Penang, Malaysia and the U.S. National Marine Fisheries Service (NMFS) in California, USA are organizing a workshop on "Conservation and Sustainable Management of Sea Turtles in the Pacific Ocean" to be held in November 2003 at Lake Como, Italy.

9) The Meeting of the IATTC Working Group on By-catches will be held in January 2004, in Tokyo, Japan. The by-catch problem of juvenile tunas caught by the purse seine and baitboat fisheries, and the by-catch of sea turtles, billfish, sharks, rays and other species will be further discussed.

10) FAO will organize Inter-governmental consultation on the conservation and management of sea turtles in early 2004.

4. Work plan for the 2004 shark assessment meeting

Japan proposed to host the shark assessment meeting. The date and place were suggested April or May, 2004 in Tokyo, Japan. The assessment meeting will discuss the stock status of blue and shortfin mako shark in the Atlantic Ocean. Côte d'Ivorie reported that efforts will be made to separate pelagic sharks, including blue and shortfin mako sharks from other species. The following were recommended and encouraged to the Contracting Parties, non-Contracting Parties, Entities or Fishing Entities to prepare the meeting.

1) For assessment purposes, the Sub-Committee encourages Contracting Parties, non-Contracting Parties, Entities or Fishing Entities catching sharks in the Atlantic, or having caught sharks in the past in these waters, to submit species-specific shark catch statistics including estimation of shark catch, dead discards and size data and conversion factors for estimating whole weight from product weight for various species. Emphasis should be on blue and shortfin mako sharks.

2) It is recommended that all conversion factors related to sharks be provided to the Secretariat by national scientists so that these conversion factors can be incorporated in the ICCAT database.

3) The Sub-Committee recommends the use of several models such as non-equilibrium production models and statistical age/length-structured models for the assessments.

4) Use of tag-recapture data should be made in the stock assessments.

5) The Sub-Committee recommended that scientists undertake to expand and update the summary of the available biological and fishery information on blue and shortfin mako sharks in the Atlantic and Mediterranean.

6) Scientists should investigate the use of the ratio of the catch of sharks to the catch of target species as a tool for the estimation of historical shark catches by fleet.

5. Consideration of Resolution [02-14] on seabirds

The Committee carefully studied the language of Resolution [02-14]. It requests information from Contracting Parties and non-Contracting Parties, Entities or Fishing Entities on progress related to the implementation of

NPOAs for seabirds. It also encourages the collection of all available information on interactions with seabirds and voluntarily provided to the SCRS. At the end, the Commission resolved that SCRS should present to the Commission an assessment of the impact of incidental catch of seabirds resulting from the activities of all fleets in the Convention area, when feasible and appropriate. The Committee encouraged Contracting Parties, Entities and Fishing Entities to implement the Resolution.

The United States reported that available information on progress made on its implementation of an NPOA for seabirds was included in the U.S. National Report, as were available observations of the by-catch of seabirds in the U.S. Atlantic pelagic longline fleet.

The Secretariat also reported that it had received a letter from the National Audubon Society, U.S. and Hawaii Longline Association including the report entitled "Performance assessment of underwater setting chutes, side setting, and blue-dyed bait to minimize seabird mortality in Hawaii longline tuna and swordfish fisheries". The letter informed ICCAT on the results of experiments conducted around Hawaii to avoid seabird by-catch and encouraged to adopt some methods on the fisheries catching seabirds in the Atlantic Ocean. It was pointed out that ICCAT has not collected quantitative data on seabird by-catch, but that this information might be available from the observer programs conducted by various Contracting Parties and Cooperating non-Contracting Parties, Entities, or Fishing Entities.

The Committee noted that the implications of element 3 of Resolution [02-14] could be quite broad. The Committee was concerned that to achieve this would require expertise not yet held by SCRS. In all, this request would require significantly enhanced commitments by national scientific delegations and greater expertise available at the Secretariat. To further work along the lines recommended by the Commission, the Committee recommends that the Commission consider hiring a By-catch Coordinator at the Secretariat and to encourage Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities to enhance their scientific delegations to include experts in seabird and turtle biology and population dynamics.

6. Recommendations

Given that the Commission has decided that the SCRS shall conduct assessments of Atlantic blue and shortfin mako sharks in 2004,

1) The Sub-Committee recommended that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities establish and/or maintain scientific research programs on pelagic sharks.

2) For assessment purposes, the Sub-Committee encourages Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities catching sharks in the Atlantic and Mediterranean, or who have caught sharks in the past in these waters, to submit species-specific shark catch statistics, including the estimation of shark catch, dead discards and size data and conversion factors for estimating whole weight from product weight for various species. Emphasis should be on blue and shortfin mako sharks.

3) The Sub-Committee recommends further coordination and collaboration with other international organizations, especially ICES and GFCM, for the assessment of the Atlantic and Mediterranean stocks of blue and shortfin mako sharks.

4) The Sub-Committee encouraged wider participation in the stock assessment session by Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities and experts in general. For this purpose, financial aid for travel may be required from the Commission or from Contracting Parties.

5) It is recommended that all conversion factors related to sharks be provided to the Secretariat by national scientists, so that the ICCAT database can incorporate these conversion factors.

6) It is recommended that Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities develop and conduct observer programs for their own fleets to collect accurate data on shark catches by species (including discards).

7) The Sub-Committee recommends the use of several models, such as non-equilibrium production models, statistical age/length-structured models, or catch-free population dynamic models be considered for the assessments.

8) Use of available tag-recapture data should be made in the stock assessments.

9) The Sub-Committee recommended that scientists undertake to expand and update the summary of the available biological and fishery information on blue and shortfin mako sharks in the Atlantic and Mediterranean.

10) Scientists should investigate the use of the ratio of the catch of sharks to the catch of target species as a tool for the estimation of historical shark catches by fleet.

11) Development of a detailed work plan leading up to the 2004 shark assessment shall be developed by the Convener of the Sub-Committee on By-catch.

12) 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.

7. Other matters

The United States in its National Report indicated that research is continuing on measures to mitigate the interactions between pelagic longline and by-catch of marine turtles under a cooperative research program involving the U.S. Atlantic pelagic longline fishery. Thus far, testing of five potential by-catch reduction techniques during research sets on the Grand Banks has indicated that U.S. longline fishermen can avoid unintentional catches of loggerhead sea turtles in the region by reducing the time their hooks are in the water during daylight hours. The results also indicate important sea turtle by-catch reduction can be achieved by the fleet by using circle hooks instead of the J hook historically used in the fishery, and by using mackerel for bait rather than squid, the primary bait used in the fishery. The vessels participating in the experimental fishing effort reduced loggerhead sea turtle interaction by a significant amount using circle hooks with mackerel bait while actually increasing swordfish catch rates over J hooks with squid bait used as control effort. The gear and techniques developed by this program are being tested in research programs in several countries.

The Secretariat noted that the data reporting protocols for shark Task I and II have been modified and indicated that the new data reporting formats should be used by all Contracting Parties and Cooperating non-Contracting Parties, Entities or Fishing Entities reporting their shark catches to ICCAT. The Secretariat also noted the U.S. tagging data for sharks are available for future assessment.

8. Adoption of the report and closure

After review, the Report was adopted and the 2003 Meeting of the Sub-Committee on By-Catches was closed.

Addendum 1 to Appendix 9

Agenda of the Sub-Committee on By-Catches

1. Opening, adoption of agenda and meeting arrangements
2. Review of new information concerning by-catches
3. Review of other national or international activities concerning by-catches
4. Work plan for the 2004 shark assessment meeting
5. Consideration of Resolution [02-14] on seabirds
6. Recommendations
7. Other matters
8. Adoption of the report and closure

Appendix 10

REPORT OF THE MEETING OF THE SUB -COMMITTEE ON ENVIRONMENT

1. Opening, adoption of the agenda and meeting arrangements

The meeting of the Sub-Committee on Environment was held on October 7, 2003 at the Hotel Reina Victoria, Madrid. Dr. J. M. Fromentin (EU-France) chaired the session. By decision by the SCRS in 2002, the Sub-Committee did not meet in 2003; therefore, this year's agenda **(Addendum 1 to Appendix 10)** was aimed at presenting new information regarding the environment and planning the Sub-Committee´s work for 2004.

2. Review of new information concerning environment

Contrary to other years, during the various working groups no documents were presented this year that specifically concerned the influence of the environment on the stocks of Atlantic tunas or on their catchability. However, various papers more or less directed related to the environment were presented during the Methods Working Group, specifically concerning the standardization of CPUE indices taking into account the habitat of the tuna stocks exploited (see SCRS/2003/013). This report will be limited to providing some general information regarding the environment.

As regards the North Atlantic, the winter index of the North Atlantic Oscillation (NAO) was close to zero during the course of the winter of 2002-2003, that is, a situation very close to average. Therefore, this could be surprising in view of the exceptionally harsh winter in western Europe (generally a characteristic of a negative NAO). In fact, this shows the limitations of the calculation of a synthetic index summarizing the climatic conditions over several months (there are generally strong variations from one winter month to another) and over an area as wide as the North Atlantic. With respect to the tropical and equatorial Atlantic, partly under the influence of the Southern El Niño Oscillation, it should be noted that the last El Niño episode that took place in 2002 and which was of an average magnitude, has given way to a normal situation in 2003, although an episode of La Niña was expected. This indicates that the hydro-climatic conditions of the tropical and equatorial Atlantic could have presented some anomalies in 2002, and particularly in 2003, in response to the moderate El Niño episode in 2002.

With regard to the scientific aspects, it should be noted that an ICES symposium will be held in May 2004 in Bergen, which will discuss the impact of the environment on the fish stocks exploited in the North Atlantic. The objective of this symposium is to discuss ways to apply our current knowledge of climate in the processes for assessment and management of the stocks exploited. This symposium will focus, in particular, on the following points:

– the impact of the climate on the distribution and migration of the fish populations;
– the effects of climatic variations on growth, maturity, recruitment and mortality;
– the role of zooplankton on the climate-fish stocks relationship;
– the consideration of climate in the assessments of the stocks exploited; and
– the management of the stocks exploited under different climatic scenarios and with climatic uncertainties.

The details of this symposium, which should be interesting for the ICCAT scientists, are available on the ICES web site (www.ices.dk).

3. Work plan for the 2004 Environment Workshop

At its 2002 meeting, the SCRS approved the proposal of the Sub-Committee on Environment and recommended that contacts be established in 2003 among the scientists and the ICCAT Secretariat on the one hand, and the scientists and secretariats of other international tuna commissions on the other, to plan a meeting in early 2004. The objective of this meeting will be to decide on the best means to establish an environmental database or a link with the existing bases so that this information is easily accessible and usable by the ICCAT scientists and those of other tuna commissions.

At the time of the SCRS plenary meeting in 2003, the secretariats of the three international tuna commissions, i.e., IATTC, IOTC and SPC, were contacted, and they did not show any particular interest in participating in such a meeting. It is noted, however, that some scientists working in these tuna commissions and who have already started working the development of environmental databases have, on the contrary, shown an interest in participating in such a working group.

Consequently, the Convener of the Sub-Committee on Environment asked the SCRS about the possibility of organizing this working group on environmental data in 2004, knowing beforehand that this meeting would be limited to the ICCAT community only, which has limited experience in this field. An alternative would be to work on the extraction and validation of environmental databases that are currently operational for the Indian Ocean and the tropical Atlantic, i.e., the GAO program developed by Francis Marsac (EU-France). The SCRS discussed these two options, reiterating the importance of having easy access to the environmental databases and thus be able to improve some indices or models used in the stock assessments. The second proposal, which is somewhat less ambitions, was also supported since it seemed better adapted and more realistic.

4. Recommendations

In view of this, F. Marsar and the Convener of the Sub-Committee on Environment were asked to prepare a working document on the environmental databases and the GAO program and to present this documents during the 2004 ICCAT plenary. The objective is to initiate discussion within the SCRS on the possibility of using the GAO program as a common platform to access the environmental databases and to study, if warranted, the any necessary changes to be made.

5. Other matters

There were not other matters discussed.

6. Adoption of report and closure

The report was adopted and the meeting was adjourned.

Addendum 1 to Appendix 10

Agenda of the Sub-Committee on Environment

1. Opening, adoption of agenda and meeting arrangements
2. Review of new information concerning environment
3. Work plan for the 2004 Environment workshop
4. Recommendations
5. Other matters
6. Adoption of the report and closure

Appendix 11

BLUEFIN TUNA RESEARCH PROGRAM PLANNING
EXECUTIVE SUMMARY

At its November 2002 meeting, the Commission recommended that a Working Group, comprised of scientists and managers, be established to evaluate all available biological information relevant to the issue of stock structure and mixing, and to develop operational options for implementing alternative approaches for managing mixed populations of Atlantic bluefin tuna, considering scientific information on the biology of bluefin tuna, historical data on fisheries, and the feasibility of alternative scenarios [Ref. 02-11]. In anticipation of that meeting, the SCRS Chairman requested a meeting May 15-16 in Madrid with bluefin tuna scientific advisors (BFT Rapporteurs, and BYP Coordinators present and past) to discuss the development of a large-scale ICCAT bluefin tuna research proposal. In order to fully respond to the Commission's recommendation [Ref. 02-11], it is the SCRS' scientific opinion that development of a large-scale Bluefin Tuna Research Program is essential and necessary. While the Commission's recommendation has focused on stock structure and mixing, scientific solutions cannot be fully achieved without improvements in other scientific inputs such as basic catch data and biological data. Therefore, a large-scale research program is needed. This program, when fully implemented, is envisioned to enhance and replace the current Bluefin Year Program (BYP; see Appendix 6).

The objective was to initiate the development of a research proposal to identify clear lines of research on bluefin tuna both to improve future assessments and to address management issues. An initial proposal with a budget was drafted which requires research efforts to improve basic data (catch inputs; statistics related to BFT farming; inventory of fisheries; size frequency data and their use; ageing of the catches; effort and catch per effort time-series; reproductive biology; and natural mortality at age); stock identification and issues associated with spawning site fidelity, migration paths, and mixing through broad-scale tagging experiments, biological markers, surveys of spawning sites and spatial distribution of fish and fisheries; evaluation of environmental variability related to spawning and reproduction, larvae and recruitment, catches and catch rates, and abundance of forage species; and the development of modeling and assessment procedures through operational models of underlying biological and fishery dynamics, assessment models which can utilize the data quality that exists now (as well as data quality of the future), and models of management procedures and scenarios. The report of that meeting is in SCRS/2003/014.While the draft research plan specifies the research requirements for improved bluefin tuna assessment and management, the Commission should recognize that success will still be dependent upon the extent to which Contracting Parties fulfill their required responsibilities for collecting and reporting basic catch and effort data. The SCRS has addressed elements of this research plan through ongoing National Scientists' research contributions to the understanding of bluefin dynamics through their monitoring of traditional fisheries statistics of catch, catch-at-size, effort and the examination of catch-per-unit-effort data, as well as tagging and other biological studies. However, much remains to be learned. There is continued commitment for ICCAT's National Scientists to contribute to these research goals in a substantial way. The present proposal will establish an enhanced bluefin tuna research program within ICCAT to support and coordinate both on-going and new research.

Initial budgets were proposed for each of the research components addressed above. However, considerably more coordination and development work needs to be done to reevaluate and sharpen the budget estimates and prioritize the projects. Nevertheless, it is the SCRS' expectation that a budget in the order of $2 million annually is likely for a period of 3-5 years. The most important concern of the SCRS is that if there is to be a coordinated bluefin research program, then there MUST be a full time coordinator. Therefore, the SCRS' recommends that in order to achieve the goals of the proposed research:

– A Scientific Coordinator should be hired to coordinate, initiate and report on the required research. While this Scientific Coordinator would work with an Advisory Committee established by the SCRS Chairman, he/she would be empowered to make decisions to implement the research developed under the guidelines of the proposal and the guidance of the Committee, as required. Therefore this Scientific Coordinator should be an experienced scientist with considerable experience in planning and undertaking fisheries research.

– Funds should be made available to support the Scientific Coordinator and the Coordinator's initial responsibility to refine and fully develop the plan and establish mechanisms for soliciting, evaluating scientific merits of, and selecting research proposals from, interested scientists; the SCRS is requesting $250,000 for this initial start-up effort in 2004.

The SCRS notes that to meet the science requirements of [Ref. 02-11], the research program described above is essential. The SCRS further recognizes that given the scope of the work envisaged, significant progress in our understanding of bluefin tuna population dynamics is expected, providing an improved basis for ICCAT assessments and advice.

The research plan and the Report of the ICCAT Workshop on Bluefin Mixing (Madrid, 3-7 September, 2001) have suggested mechanisms to develop management alternatives by which the Commission may wish to address medium term management (circa five years). However, the Commission and the Working Group established in [Ref. 02-11] should provide the SCRS some guidance on future directions.

Appendix 12

REPORT OF THE *AD HOC* WORKING GROUP ON SCRS ORGANIZATION
EXECUTIVE SUMMARY

The Working Group[1] met on 3 October 2003 and discussed the matters summarized below. This report contains the recommendations made by the WG to the SCRS.

1. Proposal for 2004-2005 assessment and scientific meeting schedule

In discussing this item, the Working Group took into account the assessment schedule mandated by various Commission Recommendations and Resolutions as well as recommendations made in the past by Species Groups. The Commission mandates assessments for West Atlantic bluefin tuna and for blue and shortfin mako sharks. In addition, the Tropical Species Group is considering a skipjack analysis for 2004. The 2004 schedule also includes a BETYP Symposium and a Second World Meeting on Bigeye Tuna, which have been already agreed to. The other two meetings proposed for 2004 are a Workshop on Environment (perhaps meeting jointly with the Methods Working Group to examine the incorporation of environmental data into CPUE standardization and stock assessments), and a data revision meeting for eastern bluefin tuna (in preparation for the 2005 assessment mandated by the Commission). A Workshop on swordfish stock structure is proposed for late 2004 or early 2005 (preferably).

The Working Group discussed that the 2005 meeting schedule may be too busy with Commission-mandated meetings for Atlantic swordfish, East Atlantic bluefin, white marlin and blue marlin, in addition to the swordfish stock structure meeting and any other inter-sessional meetings that may be recommended by the SCRS. Noting that with the available means it would be difficult to prepare for both billfish and swordfish assessments in the same year, and considering the optimistic fishery indicators discussed in 2003 for swordfish, the Working Group recommended that the SCRS and Commission consider postponing the swordfish assessments until 2006.

The proposed meeting schedule is as follows:[2]

Meeting	*Proposed Dates*	*Proposed Venue*	*Comments*
2004			
BETYP Symposium	8-9 March 2004	Madrid	Already decided
2nd World BET Meeting	10-13 March 2004	Madrid	Already decided
Shark assessments	(22-26) March 2004	Japan?	Res. [01-11]
Data Revision for BFT-East	(10-14) May 2004	Madrid	To review data and substitutions in preparation for 2005 assessment
BFT-West Assessment	(7-11) June 2004	Madrid	Rec. [98-07]
SKJ Assessment	(28) June-(2) July 2004	Madrid	Last assessed in 1999
Environment Workshop	(13-16) September 2004	Madrid	
2005			
- SWO Stock Structure (February 2005) - BFT-East assessment - BUM+WHM assessments			
2006			
- SWO-Atl. Assessments			

[1] Present at the meeting were G. Scott (WG Chairman, USA), J. Pereira (SCRS Chairman, EC-Portugal), J. Mejuto (EC-Spain), R. Pianet (EC-France), Z. Suzuki (Japan), V. Restrepo (Assistant Executive Secretary) and J. Porter (Scientific Editor). F. Hazin (Brazil) was unable to attend.

[2] This proposed schedule for meetings was subsequently modified by the SCRS (see Section 15.5).

2. Update on the peer review system

The Secretariat explained that two peer reviews had taken place this year. One by J. Hampton who attended the Methods Working Group meeting (see SCRS/2003/039). The other one was by J. J. Maguire who attended the albacore assessment (see SCRS/2003/113). The Working Group was very pleased with the progress of the peer review system, especially with the results of the decision made by the SCRS in 2002 to have the reviewers participate actively in the meeting (as opposed to conducting a review of a report after the meeting has taken place).

The Working Group recommended that the rapporteurs of the meetings that are subject to a peer review take responsibility for noting the reviewer's recommendations and bringing them up for discussion at the SCRS.

The Working Group recommended to the SCRS that the program be continued with adequate funding (of at least €10,000 per year). It also recommended to the Species Group rapporteurs and the SCRS Chairman that they consider having two reviews in 2004; for the shark assessment, and for either skipjack or the environment meeting.

3. Review of the Guidelines for Meeting Reports

The Secretariat presented a document entitled "Publication guidelines: Executive Summaries and Detailed Reports" which was prepared earlier in the year and posted on the ICCAT web site after consultation with the SCRS Chairman and other SCRS Officers. The document presents the guidelines (format, content) for Executive Summaries that were adopted by the SCRS in the 1990s. It also presents analogous guidelines for the preparation of Detailed Reports.

The Secretariat explained that several detailed reports in recent years were getting extremely long, creating difficulties for it's over-committed translation capacity. Also, much of the text in some reports is highly technical in nature and not essential as a basic record of the analyses conducted during the assessment meetings. Furthermore, it was explained that there were substantial differences in the way different detailed reports were structured, although not in terms of content. Therefore, the new Guidelines should serve to standardize the format of detailed reports (as has been done with Executive Summaries) and to limit the amount of text to be translated (as has also been done for the Executive Summaries). Finally, the proposed guidelines would not limit a group's ability to add as much detail as they wanted to add, because the length of appendices was not limited (the technical appendices would remain in the original language).

The Working Group endorsed the idea of limiting the amount of text to be translated and of moving technical text to appendices that would not be translated. In making this adjustment, Rapporteurs should work carefully with the draft reports in order to ensure a proper balance in information content between the translated body of the report and the un-translated appendices. The Working Group also endorsed the concept of a common outline for the Detailed Reports.

4. Consideration of stricter standards for SCRS paper formats

The Secretariat explained that the staff spends up to one month reformatting SCRS documents so that they follow a common format for publication in the Collective Volume of Scientific Papers. Two options were presented for lessening the burden of preparation on the Secretariat staff: (1) Placing the burden on the scientists by making them conform to the standards or risk delaying the publication of their documents for one year or longer, and (2) publishing the documents more or less as they are received, with little formatting by the Secretariat.

The Working Group recommended to shift the burden of formatting to the scientists. The Scientific Editor should check all documents against the "Guidelines for Authors of Scientific Papers" and request that those authors who clearly do not conform to the format resubmit their documents after fixing the problem. In making this judgment, the Editor should maintain some flexibility, keeping in mind that the Guidelines have changed often during recent years. The Editor should consult with the SCRS Chairman as to what papers are finally deemed to be inappropriate for publication in the Collective Volume series due to not following the format.

The Working Group also discussed the issue of those papers whose contents are criticized during a meeting but that are not revised before publication in the Collective Volume series. It was recommended that species rapporteurs keep track of such discussions during the meetings and take an active role in prompting the authors to make the necessary corrections.

5. Other matters

5.1 Availability of electronic versions of SCRS documents prior to the SCRS

The Secretariat reported that it had implemented the 2002 recommendation from the Working Group to make available electronic versions of the SCRS documents that were submitted electronically for that purpose. In addition, the Secretariat had also made electronic copies of all SCRS papers that had been presented during inter-sessional meetings, and made them available as well (on an FTP site and on CD). The Working Group expressed satisfaction with this approach, as many scientists participating in the Species Group meetings were making use of the electronic documents. The Working Group recommended that the Secretariat continue this practice next year. When meetings are announced, potential participants should know that their documents will be posted on the FTP site after the meeting, unless they explicitly request the opposite.

5.2 Policy for submission of documents

The issue of late SCRS documents that are submitted during SCRS was also discussed. The Working Group recommended that scientists be reminded that they can submit documents electronically in advance of the SCRS. It was proposed that the general policy be that documents should be available for and presented to the relevant Species Groups, in order to be included in the current *Collective Volume of Scientific Papers*. No documents shall be accepted after the first morning of the SCRS.

5.3 Availability of National Reports

The Working Group emphasized the importance of having National Reports available at the beginning of the SCRS Plenary, prior to the "Review of national fisheries and research programs".