INTERNATIONAL COMMISSION
for the
CONSERVATION of ATLANTIC TUNAS

R E P O R T
for biennial period, 1996-97
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INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

Contracting Parties (as of January 1, 1997)

Angola, Brazil, Canada, Cape Verde, People's Republic of China, Côte d'Ivoire, Equatorial Guinea, France, Gabon, Ghana, Republic of Guinea, Japan, Republic of Korea, Libya, Morocco, Portugal, Russia, Sao Tomé & Principe, South Africa, Spain, United Kingdom, United States, Uruguay, Venezuela.

Chairman of Commission

Mr. R. CONDE DE SARO, Spain
(from November 17, 1995)

First Vice-Chairman of Commission

Mr. S. GALANTE LIATTI, Uruguay
(from November 29, 1996)

Second Vice-Chairman of Commission

Dr. L. KOFFI, Côte d'Ivoire
(from November 17, 1995)

Panel Membership (as of January 1, 1997)

Panel	Contracting Parties	Chairman
1	Angola, Brazil, Canada, Cape Verde, Côte d'Ivoire, France, Gabon, Ghana, Japan, Republic of Korea, Libya, Morocco, Portugal, Russia, Sao Tomé & Principe, Spain, United Kingdom, United States, Venezuela.	Côte d'Ivoire
2	Canada, France, Japan, Republic of Korea, Libya, Morocco, Portugal, Spain, United Kingdom, United States.	Morocco
3	Japan, Republic of Korea, South Africa, Spain, United States.	United States
4	Angola, Brazil, Canada, France, Japan, Republic of Korea, Portugal, Spain, United Kingdom, United States, Venezuela.	Japan

Council

No election was conducted for the 1996-97 biennial period.

Standing Committees

Standing Committees:	Chairman
Committee on Finance and Administration (STACFAD)	Mr. C, DOMÍNGUEZ, Spain (from November 29, 1996)
Committee on Research and Statistics (SCRS)	Dr. Z. SUZUKI, Japan (from November 29, 1996)
Conservation and Management Measures Compliance Committee	Mr. G. TAYLOR, United Kingdom (from November 29, 1996)
Permanent Working Group for the Improvement of ICCAT Statistics and Conservation Measures (PWG)	Mr. B. S. HALLMAN, USA (from November 12, 1993)

Secretariat

Address: Corazón de María, 8, Madrid 28002 (Spain)
Executive Secretary: Dr. ANTONIO FERNÁNDEZ (up to February 28, 1997)/ Dr. ADOLFO RIBEIRO LIMA (from March 3, 1997)
Assistant Executive Secretary: Dr. PETER M. MIYAKE

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, 1996-97, Part I (1996)"***, which describes the activities of the Commission during the first half of said biennial period.

This issue of the Biennial Report contains the reports of the Tenth Special Meeting of the Commission, held in San Sebastian, Spain, in November, 1996, 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.

Given that the combined length of these reports is too great for them to be included in one volume, the Report for 1996 has been published in two volumes. ***Volume 1*** includes the Reports of the Secretariat on its activities, 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 Report of the Standing Committee on Research and Statistics (SCRS) and its appendices, as well as the National Reports mentioned above.

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.

R. Conde de Saro
Commission Chairman

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(Madrid, October 27 to November 1, 1996)

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NATIONAL REPORTS

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

(Madrid, Spain - October 27 to November 1, 1996)

1. Opening of the meeting

1.1 Dr. Z. Suzuki, Chairman of the Standing Committee on Research and Statistics (SCRS), opened the 1996 SCRS Plenary Sessions at the Hotel Chamartin, in Madrid, on Monday, October 27, 1996. He welcomed all the scientists.

1.2 Dr. A. Fernandez, the ICCAT Executive Secretary, also welcomed all the SCRS participants. In his opening remarks, he commended the Committee's work and its importance to the Commission as a whole. Dr. Fernandez's address is attached as **Attachment A**.

1.3 Dr. Suzuki thanked the Executive Secretary for his favorable comments and, on behalf of the scientists, expressed the Committee's regrets that Dr. Fernandez will soon be leaving the Commission.

1.4 The SCRS Chairman then referred to the various inter-sessional meetings held in 1996. He specially drew the participants' attention 1996 ICCAT Tuna Symposium, where various important matters were discussed concerning tuna research, and which the Committee should take into consideration in its planning of tuna research. He also called attention to the fact that the International Union for the Conservation of Nature (IUCN) is recommending that CITES list various species of marine fish as endangered species, including west Atlantic bluefin tuna, southern bluefin tuna, and southern albacore. In addition, several shark species are also being listed for consideration as endangered species. Dr. Suzuki considered that such actions may have some detrimental effects on the tuna fisheries.

1.5 Dr. P. M. Miyake, ICCAT Assistant Executive Secretary, in referring to numerous 1996 inter-sessional meetings, expressed a special note of appreciation to the meeting hosts, Chairmen and Conveners, and all those who collaborated with the Secretariat in preparing and submitting the data necessary for these various meetings.

1.6 The SCRS Chairman, on behalf of the Committee, also expressed special thanks to Dr. Miyake, whose dedication to tuna science and his expertise represented valuable contributions to all the scientific meetings held this year.

2. Adoption of Agenda and arrangements for the meeting

2.1 The Agenda, distributed in advance the meeting, was modified slightly and then adopted by the Committee (**Appendix 1**).

2.2 Various scientists served as rapporteurs for the 1996 SCRS Report. The following scientists presented the Report to the SCRS:

YFT:	Yellowfin tuna	P. Pallares
BET:	Bigeye tuna	N. Miyabe
SKJ:	Skipjack tuna	J. Ariz
ALB:	Albacore	J. Santiago
BFT:	Bluefin tuna	J. Porter
BIL:	Billfish	E. Prince
SWO:	Swordfish	J. Porter
SBF:	Southern bluefin tuna	K. Hiramatsu
SMT:	Small tunas	A. Srour
Other SCRS Agenda Items:		P. M. Miyake

3. Introduction of Contracting Party delegations

3.1 Scientists from 16 of the 23 ICCAT Contracting Parties attended the 1996 SCRS Meeting, and each delegation introduced its members. The List of Participants is attached as **Appendix 2.**

4. Admission of observers

4.1 Observers from three countries and three international organizations were represented at the 1996 SCRS Meeting. The observers were introduced and duly admitted, since all been invited in accordance with the criteria approved by the Commission. The list of observers is included in the List of Participants (**Appendix 2** to this Report).

5. Admission of scientific documents

5.1 The Committee noted that a total of 180 scientific documents had been presented to this year's SCRS meetings. It was noted that papers presented at the inter-sessional meetings were all accepted by the SCRS, but that they were not re-distributed at this time, unless the national scientists brought an additional 80 copies to the meeting. However, all the papers are available for review. The List of Documents is attached as **Appendix 3.**

6. Review of national fisheries and research programs

6.1 ANGOLA: During the 1994-1995 period, Angolan tuna catches increased due to the inclusion of the Japanese longline catches. The local fleet remained stable (baitboat and trap). The local fleet caught yellowfin, skipjack and bonito, while the longliners caught bigeye and yellowfin. Yellowfin is one of the main species in the catches, representing 59% of the local catch in 1995. The total catch in 1995 was 910 MT, of which 366 MT were taken by the local fleet and 544 MT by the longliners. In comparison, the local catches amounted to 291 MT in 1994.

The Institute of Research of Lobito (IIP) is responsible for the collection and processing of catch and effort data, and the results are regularly submitted to ICCAT. The IIP Luanda is at present restructuring the data collection system, by reorganizing the log book coverage and monitoring the artisanal fleet.

Efforts continue to be made to effectively apply the ICCAT recommendations.

6.2 BRAZIL: In 1995, the Brazilian longline fleet was comprised of 16 vessels, and showed no changes in relation to 1994. There were 21 foreign flagged leased longliners, which is less than the number of boats in operation in recent years. The baitboat fleet consisted of 53 Brazilian vessels and three Portuguese flagged baitboats. The total catch of tuna and tuna-like species taken by longliners in 1995 was 6,153 MT, which represents an increase of 41.6% over the previous year's catch. Baitboat catches amounted to 19,809 MT, a decrease of 16.6% from the 1994 catch. The species composition of the leased longline fleet changed, with a predominance of bigeye in the catch. As regards the Brazilian longline fleet, there was a marked increase in the catch of the dominant species (swordfish) and, as a result, there was a marked decrease in shark catches.

A major development which occurred in the Brazilian longline fishery was the introduction of monofilament longline in 1994. Since then some vessels have initiated a direct fishery for swordfish. Another change occurred in 1996, with the initiation of fishing activities by two Spanish and one American leased longliner, targeting swordfish.

In addition to the regular collection of catch and effort statistics and sampling for size frequency of the main tuna species, research activities in 1995 included port sampling for size of swordfish landed by the Brazilian longline fleet, initiated this year. In 1996, this sampling activity was extended to cover swordfish landings made by the Spanish leased longliners. One observer trip was made on a Spanish leased longliner to collect information on fishing operations, size measurements, and to carry out some opportunistic tagging for billfishes and small sized tunas. To improve the monitoring of shark catches taken by the longline and the pelagic driftnet fisheries, a new logbook format was implemented in 1996, requiring fishermen to provide catch information (in weight and number) for the main shark species.

6.3 CANADA: In 1995, bluefin tuna and swordfish regulations, consistent with ICCAT regulatory measures were in effect. The Canadian nominal landings of swordfish were 1,609 MT, taken mainly by longline. This was 9% over the Canadian quota and the overrun was attributed to unexpectedly high catches of unusually large swordfish late in

the season and to an anomaly in monitoring catch at sea. These problems have been addressed for 1996. Bluefin tuna landings were 576 MT, leaving 78 MT of the 1995 quota uncaught. Other tuna and shark landings are maintained, and Task I and Task II data were submitted for 1995.

Research responsibility for both swordfish and tuna resides at the Biological Station, St. Andrew's, New Brunswick. In 1995 and 1996, tagging studies and biological sampling continued. In 1995, data entry of historical Canadian bluefin CPUE was completed, and a standardized index of relative abundance was presented for the first time in 1996. Both the age-specific and biomass indices for swordfish were updated in 1995 and 1996. The sex-specific catch-at-size was prepared for the 1996 assessment using sex-ratio data from Canadian research cruises and sampling.

6.4 CAPE VERDE: Fishery resources are comprised of a wide variety of species. Tunas and small pelagic fish are the most common. Tunas were the target species of the industrial fleet until 1992, but these have been replaced by small coastal pelagic species due to the development of interest of the domestic market in these species.

The tuna catches of the industrial fishery in 1995 (1,068 MT) continued to increase slightly as compared with those of 1994. The estimates for all the boats of all the islands are not yet available, and catches will be approximately 2,000 MT. These catches generally represent 65% of the total tuna catches.

Research work is described in two papers presented to the 1996 SCRS: "The Islands of Cape Verde: a stage for yellowfin during their transatlantic migrations? (draft)" by J.P. Hallier and M.H. Vieira; and an "Estimation of the length-weight relationship of *Aconthocybium solandri* (Cuvier 1832) caught around the islands of Cape Verde 1994-1995)" by M. H. Vieira and J. P. Hallier.

6.5 EQUATORIAL GUINEA: See Document SCRS/96/48 for details.

6.6 FRANCE: French tuna catches in 1995 were about 72,000 MT, returning to the levels of 1991 and 1993 following the record level of the decade, reached in 1994. The reported catches of bluefin tuna in the Mediterranean (6,357 MT) correspond to that provided by fisheries organizations, fish dealers, and sports fisheries. A significant part of the bluefin tuna catches by French purse seiners still seems to be sold directly to Spanish fish dealers. The 1996 bluefin fishing season, however, does not appear to have been as good as in 1994 and 1995. Albacore catches have decreased since 1993 following the adoption of the 2.5 km limit on driftnets during the 1994 fishing season and a slight reduction in overall fishing effort. The catches of tropical tunas taken by purse seiners has decreased by around 20%, due to a slight reduction in effort and in nominal yields of the three species (yellowfin, skipjack and bigeye). The catch and effort levels of the baitboat fleet based at Dakar remain relatively stable.

French research on temperate tunas is carried out by the scientists of IFREMER, and that of tropical tunas by ORSTOM, in cooperation with Côte d'Ivoire and Senegal. For the temperate species, the main research objectives are monitoring the fisheries (statistics), improving CPUE series of the French purse seine fishery, and the state of the stocks. For tropical tunas, the same traditional research is carried out, particularly that for fishery statistics, and specific programs are conducted in relation to various topics: (1) the MAC Program on the association of the baitboat fishery and tuna schools (Dakar), a method used for fifteen years by this fleet, (2) on the comparative analysis of the fisheries and the environment at the world-wide level (San Diego, USA), (3) the PICOLO program on the enrichment of the north Equatorial region by the Légickis waves (Abidjan), (4) on by-catches of cetaceans taken by the tropical purse seiners (in cooperation with IEO). French scientists actively participated in the ICCAT Symposium, held in the Azores in June 1996, where many documents were presented. The results of this research are regularly presented to the SCRS.

6.7 JAPAN: The longline fishery is the only Japanese fishery currently operating in the Atlantic. The baitboat and purse seine fisheries ceased their activities and withdrew from the Atlantic in 1984 and 1992, respectively. The longline fleet operated in a wide area of the Atlantic between 60°N and 50°S. Less fishing effort was exerted in the western Atlantic. The preliminary 1995 catch is estimated to be 62,000 MT, which is slightly higher (5%) than the 1994 figure. Bigeye, bluefin, southern bluefin, and yellowfin tuna catches increased by 670 MT, 2,100 MT, 850 MT, and 1,200 MT, respectively. On the contrary, albacore and swordfish catches decreased by 520 MT and 840 MT, respectively. Bigeye tuna made up the largest component of the catch (65% of the total), as has been observed in previous years.

Two major changes have been observed in the most recent years. One is the introduction of new materials for longline gear: nylon monofilament, braided nylon, and new synthetic lines. The introduction of these materials was

aimed at improving catches as well as reducing the work load of the crew members since such materials are lighter than the conventional gears. Limited information suggests that the efficiency of these new materials is generally higher than that of conventional ones, though this efficiency fluctuates (and is often less effective), depending on area, season and target species. Another change is the development of new fishing grounds for bluefin tuna in the waters off southern Iceland (50-60°N, 15-30°W), which was first exploited in the Fall of 1994.

Research related to the Bluefin Year Program was one of the major activities. Larval studies and genetic analysis on stock structure have been underway, and the results will be presented in the near future. From the end of 1995 to early 1996, observer trips were made on two Japanese longline boats in the northwest Atlantic between 40-50°N and the waters off Angola. Collection of information on fishing activities and biological sampling on tunas, sharks and other species were carried out. Studies on the improvement of stock assessment methodology and standardization of CPUE are also important research subjects.

6.8 KOREA: In 1995, four Korean tuna longliners were engaged in fishing activities, and the total catch of these vessels amounted to 1,826 MT, showing a similar level to the previous year's catch. The catch composition of the Korean tuna fishery was: 36% bluefin; 25% yellowfin; 23% bigeye tuna; and 16% billfishes and others. The catch of bluefin tuna in 1995 amounted to 663 MT, which is about a 3% decrease compared to 1994. However, the 1995 catch of yellowfin (453 MT) and bigeye tuna (423 MT) increased by 4% and 10%, respectively.

As regards research activities, the National Fisheries Research and Development Agency (NFRDA) carried out routine scientific monitoring work as in past years. This monitoring covers the collection of catch and fishing effort statistics from Korean tuna longliners in the Atlantic to meet the data requirements of ICCAT. To implement the recommendations adopted by ICCAT, Korea has taken the necessary measures, including introduction of new domestic regulations.

6.9 MOROCCO: The main gears used by the Moroccan tuna fishery are trap and driftnet. Other gears are also used, such as longline, purse seine and hand line. In 1995, the total catch reached 6,632 MT, about 50% of which was skipjack. The catches of bluefin tuna are on the order of 580 MT, a reduction of about 30% compared to 1994. Traps produced 189 MT, 99% of which were from the five Atlantic traps. As regards swordfish, there has been a 41% reduction between 1994 (1,068 MT) and 1995 (625 MT),

The year 1995 has also been marked by a record catch of skipjack (5,042 MT). Research carried out by ISPM included the collection of Task I data I, and bluefin and swordfish size data. The ICCAT regulatory measures relative to the minimum size of certain tuna species and to driftnets have been applied by the Moroccan tuna fisheries.

6.10 PORTUGAL: Portuguese catches of tuna and tuna-like species amounted to 25,230 MT in 1995, which represents the highest reported catch in recent years. The fishery operates mainly around the Azores (12,470 MT in 1995) and Madeira (9,450 MT in 1995), where the baitboat fleets seasonally catch tunas using live bait. Baitboat catches in 1995 were comprised up of 9,376 MT of bigeye, 4,960 MT of skipjack and 6,458 MT of albacore. In 1995, the longline fleet which targets swordfish caught 1,997 MT of this species, of which 1,617 were from the north Atlantic and 380 MT from the south Atlantic. Another fleet comprising three longliners caught 446 MT of bluefin tuna in 1995.

Research activities, sampling and the collection of statistics continued in a satisfactory manner. This research mainly concentrates on temperate and tropical species.

6.11 SPAIN: Spanish catches of tunas and tuna-like species reached 159,910 MT in 1995, a 4% decline with respect to the average of the last five years. The purse seine and baitboat fleets caught 94,936 MT in the inter-tropical area, 88% of which was skipjack and yellowfin and the remainder of the catch was comprised of bigeye.

In the area around the Canary Islands 13,896 MT were caught by the baitboat fishery. Of these 88% were bigeye and skipjack tunas. In the temperate areas, 20,870 MT of albacore were caught by hook methods (baitboat and troll), 3,815 MT of bluefin were caught by baitboat and trap in the Atlantic and 4,607 MT were caught by various fishing gears (purse seine, longline and handline) in the Mediterranean.

Swordfish were caught by the longline fishery in the temperate and tropical areas, with catches reaching 19,621 MT.

Small tuna catches were 2,569 MT, or 2% of the total tuna catch.

6.12 UNITED KINGDOM: A seasonal driftnet fishery for albacore has been conducted in the Atlantic to the southwest of the British Isles during July, August and September since 1992. The number of boats reached a peak of 25 in 1994 and total catches have varied from 59 MT in 1992 to 576 MT in 1994. By-catches of swordfish, bluefin, and sharks are taken and the landings of sharks are recorded by species. Although no ICCAT regulations are in effect for north Atlantic albacore, there is a European Union regulation restricting the length of driftnets to 2.5 km with which the UK fleet complies. Whilst no research is being conducted primarily into tuna and tuna-like species, the UK is pursuing a variety of research programs which are complementary to the work of ICCAT and these are detailed in the national report.

The Bermuda fishery consists of approximately 200 local commercial fishing vessels which fish near the Island, seldom venturing more than 40 km offshore. About one-third of the fleet is active on a continual basis and the bulk of the effort occurs during the period April through November. This fleet uses rod and reel for the taking of tuna and tuna-like species. There is also some limited use of longlines within the Bermuda EEZ.

Although 1995 saw no changes in yellowfin tuna landings, there was a marked increase in the amount of wahoo landed. In addition, the use of longlines resulted in promising catches of swordfish and other pelagic species. Total landings of tuna and tuna-like species in 1995 was approximately 155 MT.

In June, 1996, the Governor of Bermuda declared a 200 mile (320 km) Exclusive Economic Zone around the Island, replacing the Exclusive Fishing Zone established some years earlier.

Catch and effort data are collected on all pelagic species of commercial importance on an on-going basis. Biological sampling, including the collection of length, weight, age, sex and reproductive biology, is conducted throughout the year. Bermuda fisheries legislation is reflective of ICCAT recommendations and resolutions.

6.13 UNITED STATES: 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 1995 and 1996 focused on several items. Research continued on development of statistically based sampling programs for estimation of the U.S. recreational harvests of large pelagic species. The U.S. continued activities responsive to ICCAT recommended research primarily directed at determining the reproductive biology of Atlantic swordfish and bluefin tuna. Research on development of methodologies to determine the genetic discreetness of large pelagic fishes in the Atlantic was continued. Larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico was continued. Research continued on development of new methods for estimating and indexing abundance of various large pelagic species, including application of fishery independent methods, such as aerial surveys, as well as robust estimation techniques for sequential population analyses. Investigations into the error structures of catch and catch rate data were continued. U.S. scientists coordinated increased efforts for the ICCAT Enhanced Research Program for Billfish. Cooperators in the Southeast Fisheries Center's Cooperative Tagging Program tagged and released 4,428 billfishes (swordfish, marlins and sailfish) and 2,367 tunas in 1995. This represents a decrease of 7.7% from 1994 levels for billfish, and a decrease of 32% for tunas.

6.14 URUGUAY: Uruguay currently has a small tuna fleet comprised of six longliners, which are mainly dedicated to catching swordfish and bigeye, depending on the time of year and market demands. Of the other species caught, sharks continue to represent about half of the total catch.

Bearing in mind the problems observed in statistical coverage, and the increase in the activities of foreign flag tuna vessels in the region, all efforts have been directed towards obtaining better information on these two subjects. Work is also being carried out on improving statistics of by-catches, and on the relationship of the target species to the environment.

6.15 CARICOM: At present, 12 Caribbean countries participate in the CARICOM Fisheries Resource Assessment and Management Program (CFRAMP). The fisheries in these countries are largely artisanal, with six countries harvesting notable amounts of large pelagic species, mostly by trolling, and recently also by longlining. The species composition of the landings varies with country, but generally yellowfin tuna, skipjack tuna and small tunas are important. Billfishes, several shark species and negligible amounts of swordfish are also landed by some countries. During 1996, CFRAMP continued to work with its participating countries to develop and standardize their fishery and biological data information systems. In April, 1996, CFRAMP commenced an investigation of the movement patterns in the Caribbean of four large pelagic species including blackfin tuna, wahoo and king mackerel. Both Jamaica and Grenada continue to participate in the ICCAT Program for Enhanced Research for Billfish.

6.16 MEXICO: The tuna fishery is carried out in the Gulf of Mexico, using longline as the fishing gear. The target species is yellowfin tuna, which comprises 80% of the total catches, although billfishes (8%), sharks (8%), other species, such as wahoo, oil fish, etc. (4%) are taken as by-catch.

The fleet is comprised of 22 shrimp-type vessels measuring between 28 and 30 meters in length, which are adapted for longline fishing. The annual reported catches amount to about 800 MT, the majority of which is exported. Information on by-catches, mainly on sharks, was sent to the ICCAT Secretariat. The collection of scientific information on this fishery is carried out through a national program of scientific observers, with a coverage rate of approximately 80% of all the fishing trips of the longline fleet.

6.17 TAIWAN: In 1995, the number of longline vessels operating in the Atlantic varied from month to month, ranging from 153 to 186, and 14 vessels operating in the Mediterranean, catching a total of 46,955 MT of tuna and tuna like species, which was a 19% reduction compared with 1994 (SCRS/96/155). Among these, albacore (18,351 MT from the south and 4,158 MT from the north Atlantic), bigeye tuna (15,950 MT) and yellowfin tuna (4,158 MT) are the main species. Bluefin tuna catches amounted to 475 MT, all of which was taken in the Mediterranean.

Taiwan has implemented and complied with the management measure adopted by the Commission in 1994 on south Atlantic albacore, by maintaining the catch at 90% of the average for 1989-1993 period, as well as with the measure to reduce the catch of bluefin tuna from the east Atlantic and Mediterranean from catch levels of 1994 by 25%.

Considerable effort has been exerted to update 1991 and 1992 catch data by recovering new logbooks and chandlers' reports. These updated data were submitted to the ICCAT Secretariat.

7. Reports of 1996 inter-sessional meetings organized by ICCAT

7.1 Shark Working Group (Miami, Florida, U.S.A. - February 26 to 28)

The Working Group meeting was held at the Laboratory of the Southeast Fisheries Science Center Laboratory in Miami, Florida, at the invitation of U.S. Government. The objective of the meeting was to update the information on sharks taken as by-catch in the tuna fishery, based on additional information received in response to the questionnaires. The Working Group also studied the available information on the catch rate of sharks, and developed a new format to report shark by-catch statistics. A response to CITES was also drafted concerning the CITES Resolution on shark catch and trade statistics.

The Report of the Shark Working Group (COM-SCRS/96/13) was transmitted to the Commissioners and head scientists immediately following the February meeting and was duly adopted by the SCRS and reiterated by the Commission, by correspondence, since several official actions required action before the November Commission meeting. Accordingly, the forms to submit statistics were transmitted to the countries concerned and an official letter to CITES was sent out to that organization's Secretary-General.

7.2 Bluefin Tuna Methodology Session (Madrid, Spain - April 16 to 19)

The purpose of the Methodology Session, held at the ICCAT Headquarters, was to arrive at preliminary agreements, prior to the assessment meetings, on CPUE standardization, biological assessment parameters, models to be used (including mixing model), and model fitting procedures. After the discussions, work to develop models and attempts to fit the models were agreed upon, and priorities assigned. The report was presented to the Committee as SCRS/96/14.

7.3 Bluefin Year Program (BYP) Larval Survey (Fano, Italy - April 23 to 25)

This meeting was held in Fano, Italy, at the invitation of the University of Bologna. The purpose of the meeting was to reach agreements on bluefin larvae identification and to calibrate the efficiencies of larvae collections between the Gulf of Mexico and the Mediterranean using the results of the joint surveys conducted in 1995 between Japan and the U.S.A. and between Japan and Italy. The report was presented as SCRS/96/15.

7.4 Third Billfish Workshop (Miami, Florida, U.S.A. - July 11 to 20)

The Billfish Workshop was divided into two parts: (1) data preparation, and (2) billfish stock assessments. Both sessions were held at the NMFS, Miami Laboratory, at the invitation of U.S. Government. The meeting was, for the first time, attended by most of the major high seas longline fishing countries, as well as some of the south Atlantic fishing nations. The report is presented as COM-SCRS/96/19.

At the Workshop, the billfish data base was completely reviewed and revised. Also, as requested by the Commission in it 1995 *"Resolution for the Enhancement of Research Programs for Billfishes"* (Annex 4-12 to the Proceedings of the 1995 Commission Meeting), the stock assessments for blue and white marlins were updated. After reviewing all the available information, including some genetic studies, the Workshop recognized that a single Atlantic stock hypothesis would be more realistic and decided to give priority to the single stock hypothesis, rather than a north-south two-stock hypothesis.

The SCRS expressed its appreciation to The Billfish Foundation for having made additional funds available for the Workshop, which made it possible to invite some experts and a Secretariat staff member to this meeting.

The Workshop Report, considered as an independent inter-sessional meeting report, also served as the 1996 Detailed Report for the billfish stock assessments. After review, the Workshop report was adopted by the Committee. Dr. E. Prince, the Workshop Convener and West Atlantic Coordinator of the Billfish Program, reported that U$ 4,000 was secured for publication of the Workshop Report in an enhanced form. The contribution papers will be reviewed by the editors before inclusion in the publication. Since such papers are normally published in the ICCAT "Red Book" series from the Commission's regular budget, the additional US$ 4,000 should be only applied for the enhancement of the publication (i.e. hard cover, special binding). Thus, the Committee recommended that such procedure be followed for this publication.

7.5 Albacore Stock Assessment Session (Taipei, Taiwan - August 5 to 10)

The Albacore Stock Assessment Session was held at the Institute of Oceanography of the University of Taiwan, at the invitation of Taiwan. The stock assessments were carried out using the catch and catch-at-age data base prepared in advance. The assessments were conducted using production models for both north and south Atlantic albacore, and by Virtual Population Analysis (VPA) for north Atlantic albacore. Progress was also made in the catch at age for the south Atlantic, and it is hoped that VPA can also be conducted in the near future to compare the results with the production model analysis.

The Committee expressed the appreciation for the hospitality extended and facilities provided by the Taiwanese authorities. All the trip expenses for the ICCAT Assistant Executive Secretary was also covered by the Taiwanese authorities. The report was presented as SCRS/96/29.

7.6 Ad Hoc GFCM/ICCAT Joint Working Group on Large Pelagic Stocks in the Mediterranean. Atlantic Bluefin Tuna Stock Assessment Session (Genoa, Italy - September 9 to 20)

The GFCM/ICCAT Joint Working Group meeting was held at invitation of the Aquarium of Genoa. The specific objective of the Joint Working Group was to update the Mediterranean bluefin tuna data base. The Group met for three days and many experts from the GFCM countries participated. As planned, during this period, all the new data for the Mediterranean bluefin tuna were reviewed. Once again, there were problems of under-reporting, and catches taken by fishing vessels flying flags of convenience or without any identification. The amount of under-reporting was estimated at more than 8,000 MT. After a thorough review of the data, the catch-at-size data were updated for the Mediterranean. The report is available as COM-SCRS/96/22.

The SCRS Bluefin Stock Assessment Session was held immediately following the Joint Working Group. At the session, both the east and west Atlantic bluefin stocks were evaluated. Several analytical methods agreed upon earlier were tried. For east Atlantic bluefin, two standardized indices became available, in addition to the Japanese longline index. Unfortunately, the assessment session could not completely finalize the results, due to time constraints. Consequently, the Bluefin Species Group met for two days just prior to the 1996 SCRS Plenary Sessions to finalize the Detailed Report and to draft the Executive Summary report. The report of the meeting (detailed report as completed at the later meeting) was presented as SCRS/96/26.

The Assistant Executive Secretary reiterated his appreciation to Dr. A. Di Natale for hosting the meeting at the Aquarium of Genoa, and to the Commission of the European Communities for providing financial assistance for the meeting and for assuming the travel expenses for scientists/experts as well two members of the ICCAT Secretariat staff.

The Committee decided that the Report of the Stock Assessment Session would serve as this year's Detailed Report for bluefin tuna, whereas the GFCM/ICCAT meeting report would be considered as a special inter-sessional meeting report. The GFCM/ICCAT meeting report was reviewed and adopted by the Committee.

7.7 Swordfish Stock Assessment Session (Halifax, Nova Scotia, Canada - October 2-9)

The Swordfish Stock Assessment Session was held in Halifax, Nova Scotia, Canada, at the invitation of the Canadian Government. The Committee was pleased that a Brazilian scientist had participated in the swordfish, and noted that his extensive knowledge on the south Atlantic fisheries proved most beneficial to the meeting. The Committee stressed the importance of participation of all the member countries scientists involved in the swordfish fishery.

This year, for the first time, two preliminary cases were made for the stock assessments: sex-specific VPA for the north and production model analysis for the south stock. The results, however, are still tentative. It was noted that the absence of the ICCAT Systems Analyst caused some delays in the data processing work. Thus, the Committee recommended that the ICCAT should be represented by the Assistant Executive Secretary as well as the System Analyst at any future swordfish stock assessment meetings. The Swordfish Detailed Report is presented as SCRS/96/30.

8. Report of the 1996 ICCAT Tuna Symposium (Ponta Delgada, Azores - June 10 to 18)

8.1 Dr. A. Fonteneau, the Symposium Chairman, referred the Committee to the Report of the Symposium (SCRS/96/16), and pointed out that the event proved to be most interesting and informative. He noted that the meeting was well organized and that it was considered quite successful, both from the point of view of participation and the quality of the discussions. He reiterated his appreciation to the Regional Autonomous Government of Azores, who hosted the Symposium in Ponta Delgada. Dr. Fonteneau noted the interesting points brought out regarding the pros and cons of the way tuna research is presently conducted by the ICCAT, and indicated that several innovative suggestions were presented for future research.

8.2 Dr. P. M. Miyake, the Symposium Secretary, added that many favorable comments had been received at the Secretariat on the Symposium, concerning the organization, the interesting debates, etc. He expressed the Committee's appreciation to the all the members of Steering Committee for the collaboration which contributed to the success of the Symposium. Dr. Miyake also reiterated the Committee's appreciation to the Commission of the European Communities and the Azorian Government, whose generous funding made it possible to hold the Symposium in 1996, in commemoration of ICCAT's 25th anniversary.

8.3 Dr. Miyake briefly explained to the Committee about the proposal by the Symposium that the report and the contribution papers (after peer review) be published in an enhanced, hard cover edition. He also informed the Committee that it had been tentatively agreed to contract Dr. J. S. Beckett to serve as editor of the special publication, utilizing the funding received from the EU for the Symposium.

8.4 Several participants also commended the organizational work of the Steering Committee and overall success of the 1996 Tuna Symposium.

9. Reports of scientific meetings at which ICCAT was represented

9.1 CITES Animals Committee (Pruhonice, Czech Republic - September 23 to 27, 1996)

Dr. G. Scott, who participated in this Committee meeting in an observer capacity in representation of ICCAT, presented a report on the meeting. He noted that the CITES Animals Committee had reviewed progress made concerning the various Resolutions made by the Tenth Conference of the Parties of CITES, which included a

resolution on shark catch and trade statistics. Dr. Scott indicated that only ICCAT and FAO had reported immediate actions taken in response to this Resolution. In addition, three reports (one from the U.S. and two from NGOs) were presented to the Animals Committee regarding sharks. These reports were introduced as reference documents to the SCRS. Dr. Scott's report to ICCAT is presented as COM-SCRS/96/23.

9.2 Other meetings

The Commission was also officially represented three international meetings which concluded just before the SCRS or during the course of this week, i.e. the Third Meeting of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the 57th Meeting of the Inter-American Tropical Tuna Commission (IATTC), and the 8th Technical Consultation on the Assessment of Western Mediterranean Resources (GFCM).

Dr. Uozumi, who attended the meeting of the IUCN, which was held to update the "Red List" (candidate endangered species to be included in CITES Appendices), by applying the criteria to judge endangered species which the IUCN adopted in 1994. The ICCAT requested to be invited as an observer, but this was declined by IUCN. Hence, Dr. Uozumi, who was attending the meeting on a personal basis, agreed to report back to the Commission. He reported that the criteria were applied to many marine fish and many tunas and sharks were included on the list, although only a few experts in assessments of these species were present. Dr. Uozumi's report is presented as SCRS/96/166.

It was also reported that at its later meetings, the IUCN recognized the problems of applying criteria adopted in 1994 to marine fish and they are now considering to revise this criteria. The Committee considered that discussions relative to sharks and CITES are very important and should be further pursued in the Sub-Committee on By-Catch.

There was a comment made that the Committee might be over reacting concerning this issue, but this was immediately refuted that the Committee should be prepared to respond to such issues that can reflect on its credibility.

10. Review of the progress made by the Program of Enhanced Research for Billfish

10.1 The Billfish Coordinator for the Western Atlantic, Dr. E. Prince, reported on the progress made in billfish research. Details on research in the east Atlantic are reported in SCRS/96/170 and in Document SCRS/956/90 for research carried out for the west Atlantic. Due to difficulties in early 1996 in obtaining adequate funding from the private sector, a part of the 1996 Program Plan had not been accomplished.

10.2 A highlight of Billfish Program activities in 1996 was the Third Billfish Workshop, held in July in Miami, to revise the data base completely and update the stock assessments (COM-SCRS/96/19).

10.3 At a later Plenary Session, Dr. Prince presented the financial status of the Billfish Program (COM-SCRS/96/21A). The Committee reviewed the report and accepted it (attached as **Appendix 4**).

10.4 The Billfish Program Plan for 1997, including the regular Billfish Program Budget (**Table 1**) was also presented by the Dr. Prince, and is attached as **Appendix 5**. The Committee noted that the 1997 Plan included a long-term tag release and recovery program for billfish, as requested in the Resolution adopted by the Commission at its 1995 Meeting. **Table 2** shows the estimated extra budget for the tagging program. The Committee pointed out that the special billfish fund is only enough to cover regular Program activities and that if the Commission intends to initiate the long-term tagging plan, then additional funds must be provided by the Commission.

11. Review of the progress made by the Bluefin Year Program (BYP)

11.1 The Committee reviewed the progress of the Bluefin Year Program (BYP). It noted that the meeting held to calibrate the efficiency of larval collections and to standardize larvae identification was reported under Section 7.3.

11.2 Another important issue which the Committee recognized was the development of archival tagging program being carried out by the U.S. within the framework of the BYP. Dr. E. Prince reported that as of March, 1996, the first 10 Atlantic bluefin tuna have been equipped with archival tags (on mature size fish) in the west Atlantic and therefore there is a need for development of an Atlantic-wide recovery program for these expensive tags

(SCRS/96/160). This pilot program was reported at the ICCAT Tuna Symposium in June, 1996. In order to further develop the program in Atlantic-wide areas, the Symposium created a Tagging Working Group, of which Drs. Cort and Prince are serving as coordinators for east and west, respectively.

11.3 Dr. Prince further noted that additional research funding has been obtained in the west Atlantic to expand the initial archival tagging efforts to include about 150-180 bluefin by March, 1997, and that this research program is planned to continue for at least several years thereafter with similar archival release efforts.

11.4 The Committee recognized that there is also a need for development of an Atlantic-wide recovery program for conventional tags used on tuna, billfish, swordfish, and other highly migratory species. The Committee also recognized that development of an Atlantic-wide recovery program by the Tagging Working Group would, initially, most logically be conducted through the Bluefin Year Program (BYP) in order to expedite funding, but should continue even if the BYP concludes.

11.5 There is also a need for archival tagging activities to be developed in the east Atlantic, as well as the west Atlantic, in order to have a balanced Atlantic-wide release effort. The formation of the Tagging Working Group would enhance efforts to obtain funding for the east Atlantic portion of this research. Consequently, the Committee decided to formalize the Working Group, established by the Symposium, under the BYP.

11.6 It was requested that the Tagging Working Group immediately develop an Atlantic-wide tag recovery program with appropriate west and east Atlantic coordinators and that this Atlantic-wide recovery program be fully functional, including establishing communications, incentive awards, and all logistical arrangements with potential participating parties by June, 1997.

11.7 The SCRS Chairman recalled that US $5,000 had been contributed by Taiwan for 1996, earmarked specifically for bluefin research activities and he considered that these funds would help to start the tagging activities, at least in the initial stage. He asked the Executive Secretary about the status of these funds. The Executive Secretary responded that these funds were utilized to send a Secretariat staff member to the BYP meeting in Fano, Italy.

11.8 The scientists from Taiwan informed the Committee of Taiwan's intention to voluntarily contribute an additional US $5,000 dollars towards ICCAT's bluefin research for 1997. The Committee thanked Taiwan for such contributions. The Committee then recommended that the 1996 Taiwanese voluntary contribution be carried over to 1997, to be combined with the additional $5,000 contribution, once it is received at the Secretariat, to be used for this specific activity regarding bluefin tuna research in 1997. It was also recommended that it might be convenient for the Secretariat to maintain an accounting of how extra-budgetary income is applied, and in particular these funds earmarked for bluefin tuna research. It was proposed that a special BYP account might facilitate the financing of this Program.

11.9 The Committee noted that the budget of US $50,000, proposed by the Bluefin Year Program (BYP) in 1995 (as discussed in the Fano BYP Report), had not been accepted by the Commission for the 1996 budget. The Committee requested that the Commission favorably review the BYP's request for funding, at the same level as was requested in 1995, though the tagging activity mentioned in Section 11.8 would be given first priority.

12. Executive Summaries on species

YFT - YELLOWFIN

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 40 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. Since the inception of the yellowfin tagging program which has been carried out in the North American sport fishery since 1986, individuals of this species have often been recovered in the west Atlantic, but some have also been found in the east Atlantic. Taking into account this east-west transatlantic migration, as well as other information (time-area size frequency distribution, fishing grounds, etc), a single stock for the entire Atlantic is assumed. A general migratory pattern is presented to validate this assumption. The main spawning ground is the Gulf of Guinea at the level of the equator, and continues from December to March. From there the juveniles move towards more coastal waters off Africa. When they reach pre-adult stage (60-80 cm: fish from age 1.5 - 2), it is supposed that they migrate towards the west, towards the American coasts, to return to the east Atlantic fishing grounds when they reach about 110 cm. Growth rates are variable with size, increasing at the time of their leaving the nursery to begin their migration towards the west. Males are predominant in the catches of larger sized fish.

YFT-2 Description of the fisheries

Yellowfin are caught between 45°N and 40°S by surface gears (purse seine, baitboat, troll and handline) and with sub-surface gears (longline) (**YFT-Figure 1**). Troll and handline, although used in the artisanal fisheries, have never played an important role in the yellowfin fisheries. The baitboat fishery was more important in the past than now, and has always targeted juveniles (with an average weight of 5 kg) in coastal waters, together with skipjack, young bigeye and small tunas. The baitboat fisheries are still active in Dakar, Ghana (Tema), the Canary Islands, Cape Verde, Madeira, Azores, Venezuela and Brazil. The fleets which operate in the areas off Senegal, Mauritania and the Canary Islands have developed a new fishing method in which the baitboat acts as a floating object to attract bigeye, although sometimes yellowfin are also caught.

The purse seine fishery (mainly French and Spanish) began operations in the east Atlantic in the 1960's, and developed rapidly in the 1970's. At the same time, the fishing area was extended from coastal waters to high seas, especially at the Equator, where large sized yellowfin which gather to reproduce are caught. In coastal areas, purse seiners catch juveniles in mixed schools. This gear is very efficient as it catches a wide range of sizes (50 to 160 cm) but includes very few intermediate sized fish (70 cm to 100 cm), most of which have migrated towards the west. Venezuelan purse seiners operating mainly in coastal areas of the east Atlantic mainly catch fish of intermediate sizes.

Since 1990, Spanish purse seiners, and later French purse seiners, developed a fishery which targeted schools using artificial floating objects. This translated into an important increase in skipjack, juvenile bigeye and, to a lesser extent, increases in young yellowfin and by-catch, extending the fishing grounds westward to 30°W.

Large yellowfin are caught by purse seiners and longliners. This latter gear, however, mainly target other species (bigeye, swordfish, bluefin) and therefore the proportion of yellowfin caught by longline in the Atlantic is becoming less important (10%). Catches taken by this gear are similar in both the east and west Atlantic.

Landings in the east Atlantic, following the record of 138,000 MT in 1981 and 1982, reached a new record in 1990 of 152,000 MT, later fluctuating between 124,000 MT and 100,000 MT. An average of 80% of the total catches are taken by purse seiners (**YFT-Figure 2** and **YFT-Table 1**). In the west Atlantic, catches have remained more or less stable since 1983, at a mean of 29,000 MT, of which an average of 40% was taken by purse seiners, although this fluctuated quite widely (from 6,034 MT to 25,700 Mt), 15% taken by baitboats and 30% by longliners. Yellowfin catches in the Atlantic as a whole reached an historical high in 1990 (177,304 MT) and six of the ten highest recorded catches since 1981 were within the period 1989-94. Since 1995, however, a decrease of 20% has been reported, compared with the previous year.

Effective effort is standardized to French class 5 purse seiners, adjusted on the assumption of an annual estimated increase of 3% in fishing power since 1981. This adjustment in fishing effort is influenced by the many improvements in the purse seine fishery, including the use of floating objects, bird radar, sonar, etc., and is supported by data analysis. From 1985 to 1995, this effective effort for the whole Atlantic remained stable at around 38,000 fishing days for the period 1985-90, and was more variable, with an average of 48,138 fishing days for the period 1991-95.

YFT-3. State of the stock

In 1994, the status of the Atlantic yellowfin stock was assessed using equilibrium and non-equilibrium production models, and several types of VPAs. In 1995, the equilibrium production model was updated. In 1996, the equilibrium model was updated with data through 1995, a preliminary tuned VPA was attempted (though results were inconclusive and are not presented here), and the 1994 untuned VPA was projected forward using recent data. Results presented in this report are based on the most recent update for each type of assessment. The 1994, 1995 and 1996 analyses all indicate that the stock of Atlantic yellowfin is at a level close to full exploitation. These analyses imply that any increase in effort is likely to result in a fishing mortality rate that exceeds the level corresponding to maximum sustainable yield (MSY) and a stock biomass below the minimum level that can support MSY.

The MSY estimated in the 1996 analyses from an equilibrium production model adjusted to the 1969-95 data is estimated to be 150,000 MT. This is higher than the 1995 landings of 123,528 MT, but similar to the average landings of the 1991-94 period (151,310 MT) (**YFT-Figure 3**). The current estimate of the optimum fishing effort corresponding to MSY is 54,260 standard fishing days, again somewhat higher than the number of fishing days estimated for 1995 (about 45,400 days). No other production models were used during the 1996 SCRS stock assessment meeting. However, at the 1994 SCRS meetings, a non-equilibrium production model using data for the 1969-93 period resulted in an estimate of MSY of 149,000 MT, and a 1994 biomass of 105% (range 81% to 130%) of the biomass associated with MSY (see summary table). The corresponding fishing mortality rate was 0.92 times the fishing mortality rate at MSY, which was estimated in association with a corresponding standardized fishing effort of about 50,000 days. Taking into account the variability of the estimated values, the results of the various analyses applied in the 1994, 1995 and 1996 SCRS assessments are quite similar. All production model analyses indicate that the stock is fully exploited, and that the extent of exploitation has not changed substantially in the past three years.

Due to doubts about available CPUE time series, results from preliminary VPA analyses were inconclusive and are not presented here. Instead, the untuned VPA used in the 1994 SCRS meeting was updated using recent catch at age data, assuming average constant recruitment for the three most recent years. In 1994, several types of VPAs were conducted. These analyses indicated that recruitment has fluctuated without trend, while spawning biomass decreased in the 1970s and the early 1980s due to increasing fishing mortality rates, but had recovered by 1985 because of a decreasing rate of fishing mortality associated with several high recruitment levels in the early 1980s. Fishing mortalities estimated by the alternative VPA models have fluctuated with little trend. The 1996 estimates of recent fishing mortality and stock size have been relatively stable over the last few years, and are similar to the terminal year estimates from the 1994 analyses (**YFT-Figures 4 and 5**). The VPA analyses support the major conclusion of the production model analyses; namely, that the Atlantic yellowfin tuna stock is fully exploited.

Catches of juvenile yellowfin tuna (age 0 and 1) were extremely high in 1993, decreased in 1994, and increased towards the long-term average in 1995 (see below). Yield per recruit analyses indicate that current fishing mortality may be close to F_{max}, and that an increase in effort is likely to decrease the yield per recruit, while an increase in size at first catch would probably increase the yield per recruit (**YFT-Figure 6**).

During the first half of 1995, a large and strong warm-water anomaly occurred in the tropical areas of the eastern Atlantic. Similar anomalies recorded on two previous occasions (1969 and 1984) have been associated with poor recruitment for yellowfin tuna. It is also possible that the anomaly adversely affected purse seine catches in 1995.

YFT-4. Outlook

The Committee noted that the application of the recommended size at first capture of 3.2 kg would increase the yield per recruit by about 11%, but it also recognized the difficulty in implementing this regulation as yellowfin of this size are almost always mixed with similar-sized skipjack and bigeye tuna.

Since reported yellowfin landings appear to be close to the MSY level and effective effort is close to the optimum level, the possibility that fishing power of the purse seiners may is increasing could result in effective effort exceeding optimal levels in future years.

YFT-5. Effects of current regulations

In 1973, the Commission recommended a minimum size of 3.2 kg for yellowfin tuna, with a tolerance level of 15% by number of fish. This recommendation has not been effectively implemented. In 1994, the proportion of the yellowfin catch less than 3.2 kg was relatively "low" at 31.4%, but in 1995, it increased to 49.7%, similar to the long-term average of 48% for the 1975-1994 period.

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". In 1994, overall effective fishing effort was estimated to be above the 1992 level, but in 1995, overall effective fishing effort was estimated to be similar to the 1992 level. However, it is not clear that this reduction in effective fishing effort is the result of explicit regulations to implement the 1993 recommendation.

YFT-6. Management recommendations

The Committee reiterates its previous recommendation to restrict the fishing mortality of Atlantic yellowfin tuna, or its equivalent in fishing effort, to levels not to exceed that estimated for 1992. Currently, MSY corresponds approximately to average 1992-95 landings (142,993 MT); however, MSY will vary depending on the relative mix of juvenile and adult fish. The Committee also recommends finding effective ways to reduce fishing mortality on small yellowfin.

YELLOWFIN SUMMARY (catches in 1,000 MT)

	Results of 1994 SCRS	Results of 1996 SCRS
Maximum Sustainable Yield (MSY)		
Equilibrium model	153.7[1]	150.0[2]
Non-equilibrium model	149.0 (123.0-164.0)[3]	not estimated
Current (1995) Yield		123.5
Current (1994) Replacement Yield	(123.0-164,0)[4]	not available
Relative Biomass (B_{1994}/B_{MSY})	1.05 (0.81-1.30)	not estimated
Relative Fishing Mortality: F_{1993}/F_{MSY}	0.92 (0.67-1.34)	not estimated
Management Measures in Effect	3.2 kg minimum size Effective fishing effort not to exceed 1992 level	3.2 kg minimum size Effective fishing effort not to exceed 1992 level

1. Equilibrium model assuming shape parameter for production function (m=1) calculated at 1994 SCRS using data from 1969-93
2. Equilibrium model assuming shape parameter (m=1) calculated at 1996 SCRS using data from 1969-1995
3. Non-equilibrium production model fit to data 1969-93 at the 1994 SCRS, assumes production function shape parameter m=2, 80% confidence bounds.
4. Replacement yield in 94 estimated within the 80% confidence interval estimated MSY from the non-equilibrium production model since B_{1994}/B_{MSY} was estimated at 1.05.

YFT-Table 1. Reported catch (mt) of yellowfin tuna by east and west and by gear, country and year.

EXECUTIVE SUMMARY

COUNTRY	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	36004	46412	38263	44487	43961	68285	82127	69575	69495	89446	89151	101797	118571	119640	126235	129498	121918	126546	146862	152722	155177	100365	134190	123645	128305	117640	146050	165757	147554	137401	141094	143253	113571
ATLANTIC	353	350	162	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	0	0	0	0	0
CHINA.TAIWA	353	350	162	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	0	0	0	0	0
EAST ATLA	19145	28375	27313	31887	39796	61304	72132	56202	54175	74804	76910	88700	104168	108319	115473	117898	111987	115399	133253	130942	120765	68121	104074	99807	106330	93986	118374	147118	121218	110341	110716	107099	94426
ANGOLA	2209	3635	1941	1331	885	1087	390	361	498	611	603	839	55	1005	2085	2296	904	558	959	1467	788	237	350	59	51	246	67	292	510	441	211	149	216
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	0	0	0	0	0	0	0	0	1
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	95	100	113	49	65	60	19	3	2	7	1	1	1	0	0	0
CANADA	0	0	45	646	680	655	936	191	44	0	61	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	0	0	0	0	0	346	296	455	445	410	360	115	104	470	581	864	5281	3492	4341	2820	1901	3326	2675	2468	2870	2136	1932	1426	1536	1952	1897
CAYMAN ILS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602	1460	100	0	0	0	0	0	0	0	0	0	0	0	0	0
CHINA.TAIWA	0	0	0	800	1900	6600	7000	3900	3400	3500	1500	1000	1300	600	184	180	168	63	382	180	400	77	121	225	163	155	67	906	1914	1375	1151	3831	2373
CONGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	50	0	0	0	11	20	15	15	21	22	17	18	0	0	0
CUBA	0	0	535	367	2412	1224	940	1120	1360	3240	4500	3026	1700	1800	2900	1939	2568	4927	2542	2142	1567	1171	1135	694	769	1417	438	679	658	653	418	0	0
ESPANA	3009	3256	3179	1502	3124	3347	5696	7087	7829	9294	14055	16077	24713	33423	35525	33636	40083	38759	51428	54164	51837	39957	66855	61874	66093	50160	61640	68585	58302	50394	43416	40799	37167
FRANCE	13050	18970	19200	21950	23350	31350	28473	24123	26069	31244	31687	38206	46669	51624	49948	55192	47776	54372	55085	45717	40470	7946	12304	17756	17491	21323	30807	45684	33308	31534	39495	35729	31589
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	0	0	0	0	0	0	12	88	218
GHANA	0	0	0	0	0	0	0	0	0	2	112	274	682	791	621	546	1426	1751	2535	5606	4951	5548	8873	8210	9827	8555	7035	8410	7299	7300	9166	8490	5466
HONDURAS-O	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	0	0	0	0	0	0	0	5
JAPAN	877	2514	2413	5291	6527	9614	5706	1925	3915	5973	7732	7843	1273	4941	2588	1446	962	495	1701	2041	2211	1407	2626	2332	2803	2221	2090	1702	1447	837	0	0	0
KOREA	0	0	0	0	0	1600	4200	8020	6900	7800	9008	11832	10304	7636	11060	8625	6449	5349	4288	4010	1629	1917	1668	965	1221	1248	1480	324	259	174	169	436	453
MAROC	0	0	0	0	0	0	0	0	0	0	0	290	1048	1574	2167	3440	2986	3243	4817	4540	2331	614	2270	2266	1529	0	0	0	0	0	0	0	0
NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14
NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3121	5388	1104	0	0	2077	3140	5436	12513	11736	13816	12543	13614	11743
NORWAY	0	0	0	0	0	0	0	0	0	0	344	0	0	0	0	0	0	0	0	0	0	0	0	0	418	493	1787	1790	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	0	0	510	3709	3172	2016	2892	1736	1477	739	1661	341	1436	1682	2239	1273	327	180	0	0	0	0	0	0	93	0
POLAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	180	62	208	948	1315	266	0	31	0	0	0	0	41	0	0	1	22
RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3200	1862	2160	1503	2936
SAO TOME & P	0	0	0	0	0	0	0	0	0	0	0	25	15	45	39	28	31	97	193	194	177	180	180	178	184	198	228	223	229	140	0	0
SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	20	52	41	6	0
SOUTH AFRIC	0	0	0	0	0	0	0	0	0	54	37	35	11	0	76	127	3844	457	121	16	306	672	294	16	49	99	653	327	36	63	258	256	145
ST. HELENA	0	0	0	0	0	0	0	100	100	100	100	75	52	108	34	37	69	55	59	97	59	80	72	82	93	98	100	92	100	166	0	150	181
U.S.A	0	0	0	0	918	5827	18791	9029	3764	12021	3017	5621	13960	1706	6400	8131	2884	1614	1472	636	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	0	0	0	89	0	192	292	301	327	903	1247	1824	3447	1425	695	2162	3676	3425	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	0	0	0	0	0	0	215	0	0	0	0
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	634	0	0	0	0	0	0	0	0	0	0

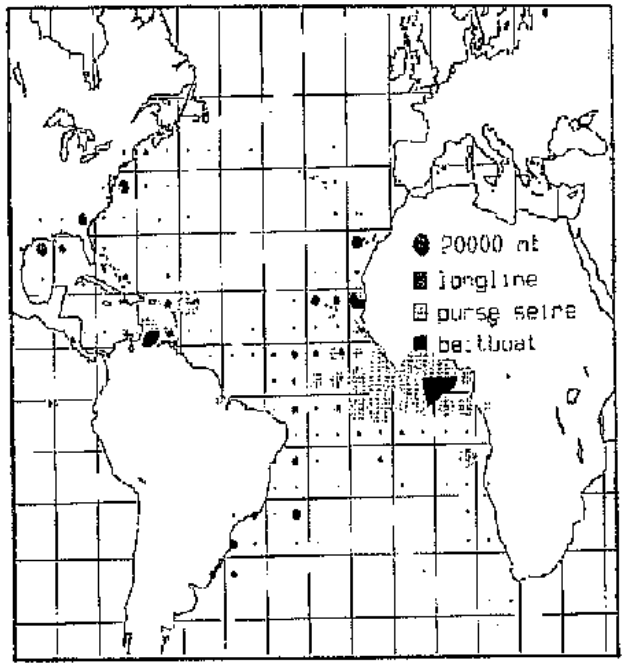
YFT-Table 1. Reported catch (mt) of yellowfin tuna by east and west and by gear, country and year.

FINAL
AS OF OCTOBER 24 17:30

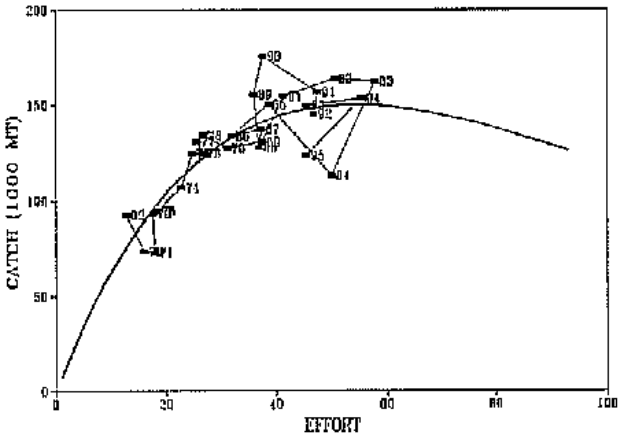
EXECUTIVE SUMMARY

COUNTRY	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
WEST ATLA	16506	17687	10788	12600	4165	6981	9995	13373	15320	14642	12241	13097	14403	11321	10762	11600	9931	11147	13609	21780	34412	32244	30116	23838	21975	23654	27676	18639	26336	27060	30378	36154	19145
ARGENTINA	78	129	100	0	23	139	100	0	150	400	129	112	108	57	43	4	0	0	8	7	0	0	44	23	18	66	33	23	34	1	0	0	0
BARBADOS	0	0	0	0	0	0	0	0	0	0	0	48	79	94	58	67	81	40	30	36	51	90	57	39	57	236	62	89	108	179	161	156	245
BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	10	11	10	12	26	35	21	22	10	11	42	44	25	23	22	15	17	42	58	44	44
BRASIL*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	392	917	1036	1955	1631	2176	751	1560	1596	1376	953	1169	2660	3087	2744	750
CANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	161	0	318	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	4
CHINA.TAIWA	0	0	0	300	775	1262	3798	3171	970	1205	1155	1327	1062	1136	145	160	750	545	385	360	77	495	647	1023	600	1228	532	2108	1778	2632	2562	2883	1785
COLOMBIA	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	0	0	0	0	0	2404	0	0
CUBA	1700	900	219	443	580	652	615	480	340	360	0	374	600	1200	900	661	232	689	1997	1503	793	2538	1906	2081	1062	98	91	53	0	0	0	0	0
DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	12	23	30	31	9
ESPANA	0	0	0	0	0	0	0	0	0	489	0	0	762	0	266	2029	1052	0	0	0	1957	3976	1000	0	0	0	0	0	1451	1290	810	0	0
FRANCE	0	0	0	0	0	0	0	0	0	2600	1677	339	440	0	0	0	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GHANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANADA	100	100	100	100	100	100	100	100	100	100	100	100	100	100	364	166	148	487	64	59	169	146	170	506	186	215	235	530	620	595	858	385	409
JAPAN	14620	16558	10369	11757	2687	4158	3600	4313	9052	4155	2510	3985	2756	3069	1408	1647	1707	1117	2983	3288	1218	1030	2169	2103	1647	2395	3178	1734	1698	1591	469	589	526
KOREA	0	0	0	0	0	670	1782	3486	3001	3278	4547	5400	7718	4574	6522	4259	4414	1933	3325	2249	1920	989	1655	853	236	120	1055	484	1	45	11	0	0
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	42	128	612	1059	562	658	33	283	345	112	433	742	1020	646	0
NETHERLAND.	0	0	0	0	0	0	0	151	151	151	151	151	151	151	151	173	173	173	173	173	173	173	150	150	160	170	170	170	150	160	170	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	721	102	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	48	48	48	51	51	54	69	67	67	28	27	25	26	23	56	79	125	76	97	70	58	49	58	92	130	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	0	0	1	40	48	39	65	16	43
TRINIDAD & T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	232	31	0	0	0	1	11	304	543	4	219	0	0
U.S.A	8	0	0	0	0	0	0	0	0	0	0	0	0	73	1	10	15	31	72	165	114	172	1872	5127	8977	10226	8315	5139	5857	6782	4991	8068	8131
URUGUAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	214	357	368	354	270	109	177	64	18	62	74	20	59	53
VENEZUELA	0	0	0	0	0	0	0	1624	1508	1856	1921	1210	563	626	827	1306	1000	5397	3500	12514	24751	19479	17233	10085	7229	6723	12109	6791	12305	10143	13351	20403	7002

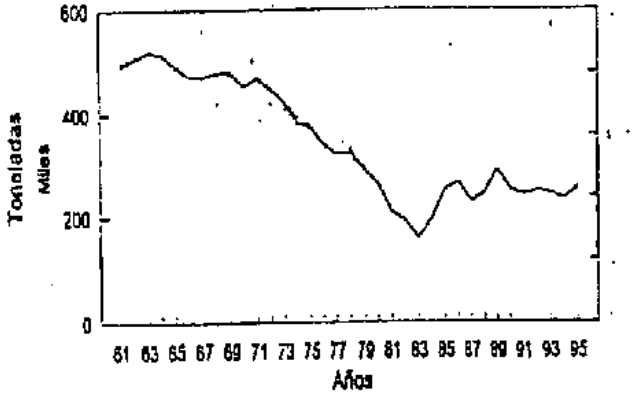
* Brazilian catch in 1995 for BB was later corrected as 2613 MT.



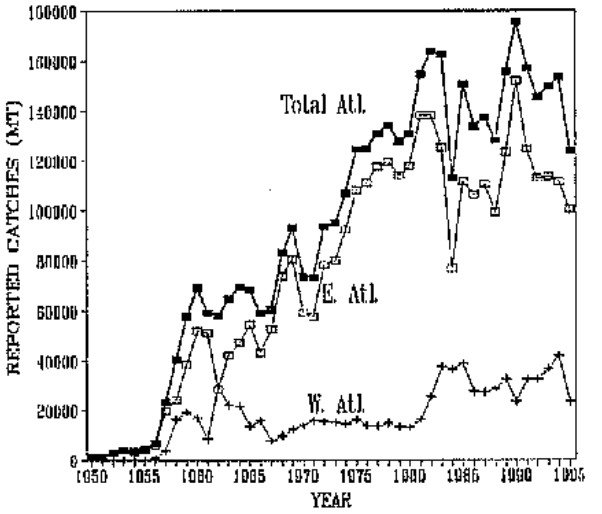
YFT-Fig. 1. Distribution of reported yellowfin catches by gear and 5x5 area, for 1990-1994.



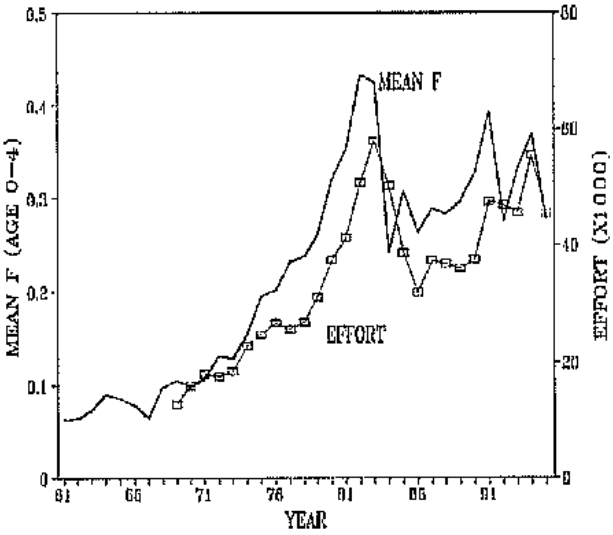
YFT-Fig. 3. Equilibrium production curve (m=1, k=4) for Atlantic yellowfin. Adjusted to catch and effort data estimated from catch rates of French and Spanish purse seine fleets, with effort in fishing days standardized to French purse seiners, category 5, and including an annual increase of 3% in purse seine fishing poser since 1981.



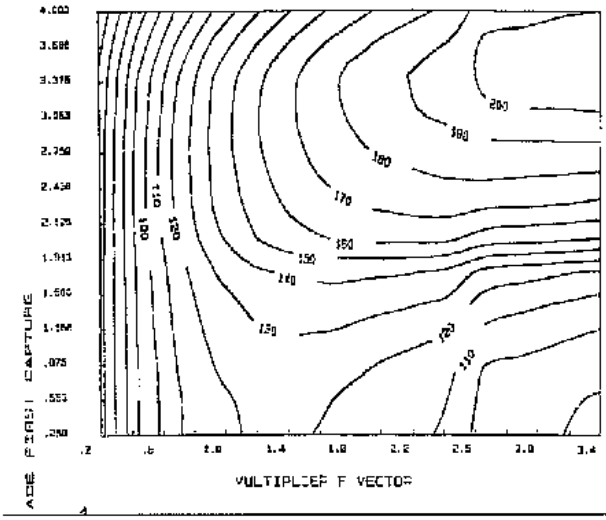
YFT-Fig. 5. Recruitment an dreproductory biomass by VPA applied in forward form, under the same suppostions considered in the previous assessment, from recruitment estimated during said assessment and supposing an average recruitement for the last two years.



YFT-Fig. 2. Reported catches (in MT) of yellowfin tuna by regions in the Atlantic, 1950-1995.



YFT-Fig. 4. Mean fishing mortality rate (ages 0-4) estimated by VPA and fishng effort in fishing days standardized to French category 5 purse seiners, assuming an annual increase of 3% in purse seine fishing posers since 1981.



YFT-Fig. 6. Yield per recruit curves obtained from fishing mortality vectors estimated by VPA, for a recruitment of 68 million, using recruitment figures estimated for the peiod of 1975-1993.

BET - BIGEYE TUNA

BET-1. Biology

Unlike the other tuna species, knowledge of the biology of bigeye is very limited despite 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 lead to unrealistic results. Given the recent situation of the stock, more intense research should be devoted to this species.

The geographical distribution of bigeye tuna is very wide and covers almost the entire Atlantic Ocean between 50°N and 45°S. The vertical distribution also appears to be wide as this species tends to swim in deeper water than the other tuna species. Spawning takes place in inter-tropical waters when the environment is favorable. Fish tend to undertake migration into temperate waters as they grow larger. Catch information of surface gears indicated 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 its stomach contents. Bigeye exhibits relatively fast growth. They reach about 100 cm in fork length at the beginning of their fourth year, and this is when they become mature. Young fish form schools near the sea surface mostly mixed with other tunas such as yellowfin and skipjack tunas. These schools are often associated with drifting objects, whale shark, and sea mounts. This association appears to decrease greatly when they become larger.

Circumstantial evidence, such as time-area distribution of fish and movements of tagged young fish, suggests a single total Atlantic wide 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 (see Detailed Report of Bigeye Tuna).

BET-2. Description of 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**). Longline and baitboat fisheries have a long history which dates back before 1960. Major baitboat fisheries exist in Ghana, Senegal, Canary Islands, Madeira and Azores. Unlike other Oceans, baitboat fisheries catch significant amounts of medium to large size bigeye tuna except in Ghana. Japan and Taiwan are the two major longline countries. Korea has reduced its activity in the Atlantic considerably since 1990. Tropical purse seine fleets operate in the Gulf of Guinea and off Senegal in the eastern Atlantic and off Venezuela in the western Atlantic. French and Spanish fleets are the major component in the east and Venezuelan fleet operates in the west. Since 1990, changing to flags of convenience became common for the French and Spanish purse seiners. Bigeye tuna is a primary target species for longline and baitboat fisheries except Ghanaian baitboat fishery whose target species is skipjack, but for purse seine fishery this species has been a species of secondary importance. A new fishing technique has been introduced for baitboat fleets in Senegal, Mauritania and the Canary Islands. This technique utilizes a baitboat as a floating object, and apparently improved fishing efficiency and made the fishing season longer. The size of fish caught varies among fisheries; medium to large, small to medium and small fish are caught by longline fishery, directed baitboat fishery and purse seine fishery, respectively. Corresponding average weights are 45-50 kg, 20-30 kg and 5 kg for those three types of fisheries. The economic value of fish is also different. Roughly speaking, the price of longline-caught fish at the unloading site is six times higher than those caught by other fisheries.

The total catch (**BET-Figure 2**) exhibited a continuous increase up until the early 1970's reaching around 60,000 MT, and it fluctuated around this level thereafter. In 1991 it reached the highest record and this kept increasing from 1992 to 1994. The 1994 catch was a new record of 108,000 MT for this species. 1995 catch was slightly lower but at the similar level (105,000 MT). This increase in catch is attributable to the purse seine and longline fisheries. The average catch between two periods (1986-1990 and 1991-1995) indicated an increase of 15,000 MT and 13,000 MT for purse seine and longline fisheries, respectively. It was reported that the intensified use of drifting artificial fish aggregating devices (FADs) in purse seine operations was a primary cause of increased purse seine catch, although other technological advances may have contributed as well. The increase in longline catches is primarily due to a rapid shift of target species from albacore to bigeye by the Taiwanese longline fleet, and increased fishing operations both by the Japanese and Taiwanese fleets.

As the use of FADs in the purse seine operations has increased, the information of school type has become more important for the precise estimation of species composition caught by this fishery. As this fishing method has been

recently introduced, this factor has not been taken into account in the procedures for estimating species composition of catches. At the same time, some under-sized fish, which are not recorded in the statistics, have reportedly been sold at several local markets.

BET-3. State of stocks

A standardized index of abundance was used for stock assessment purposes from the Japanese longline catch and effort data which targets on this species and represents roughly 40 % of the total catch. Although other CPUE data were also available, they were not used because they were not considered representative of the stock abundance for this species. With this index, several different types of production models were applied this year. In applying some of the models, it was found that estimated parameters were not in a realistic range. To solve this problem, either the value of certain parameters were fixed or data points during the most recent years were excluded, in order to identify the possible range of MSY. The estimated MSYs were from 44,000 to 78,000 MT for non-equilibrium production models and 66,000 MT for equilibrium production models (**BET-Figures 3**). An age structured production model was also attempted, and the results were generally similar to other models.

Total catches after 1992 were apparently larger than the upper boundary of the estimated MSY range. Current biomass is close to or below the MSY level (70-120 %) depending on the model, but current F estimates all surpass all F_{MSY} estimates by 20 to 190 %. In cases where confidence limits were estimated for parameters, they were all very wide. These results suggest that no model can fully track the recent trajectory of the stock, probably because a sudden increase in catch occurred during the last few years accompanied by a change in selectivity. Also, observed data points prior to 1990 were restricted to the ascending side of a relationship between catch and effort. Nevertheless, the Committee considered, based on the best knowledge of fisheries and stock, that MSY between 60,000 MT and 70,000 MT were most plausible and the current level of catch probably cannot be sustained in the long term, as it is considered that the stock was in a condition of near equilibrium before the recent increase in catch occurred.

Stock status was also analyzed by tuned and un-tuned Virtual Population Analyses (VPA), although there were only one index of abundance available to the Committee. Trends in population size were more or less consistent with production model analysis, indicating gradual declining trends for biomass over time (**BET-Figure 4**). The fishing mortality rate went up quickly, especially after 1991, both for juvenile and adult fish (**BET-Figure 5**). Since there is only one index used to tune the VPA and whose age components are limited to medium to large-size fish, the results of VPA should be cautiously interpreted. The results of yield-per-recruit analysis and future projection, which are given below, were conditional on VPA results, as some of the input data for those analyses were directly taken from VPA.

Yield-per-recruit and spawning stock biomass-per-recruit analyses (**BET-Figure 6**) show that current F is much higher than F_{max}, indicating that the bigeye stock is already overexploited, and current spawning stock biomass-per-recruit is lower than 20 % of its maximum, which corresponds to a threshold at which recruitment over-fishing may occur for other fish species. Multi-gear yield-per-recruit analysis suggests that a reduction of F in the small-fish fishery will result in an increase of yield-per-recruit. On the other hand, intensifying F in the large-fish fishery will bring very little gain or even a slight decline at the very high F for that fishery (**BET-Figure 7**).

In VPA and yield-per-recruit analyses, the role of natural mortality (M), particularly for small fish, is very important; i.e., the impact of small-fish catch over large-fish fishery is large if M is relatively low, but it will be small if M is high. Without the precise information on M, the result could be misleading. Therefore, high priority should be given to a research design to estimate M.

BET-4. Outlook

The outlook for bigeye was examined by yield per recruit analysis, as well as preliminary projections. Under the current exploitation pattern and assuming recruitment at recent average levels, the equilibrium yield would be expected to decline in the future to levels below MSY.

Having obtained the above results, however, the outlook for this species is fairly uncertain. If M is high enough, the stock may enter into new equilibrium with the current catch level, although this probability seems very low. On the other hand, bearing in mind the characteristics of this species, such as its wide distribution, high fecundity, fast growth, etc, the probability of recruitment collapse is also low, at least in the immediate future. The most plausible

scenario would be that the future catch level would be reduced to well below the MSY level, unless reductions in fishing effort are made.

BET-5. Effects of current regulations

The bigeye minimum size regulation of 3.2 kg has been in effect since 1980, which was adopted to reinforce the same regulation for yellowfin. It is clear that the equatorial surface fleets (baitboat and purse seine) continue to land a large quantity of juvenile bigeye tuna smaller than 3.2 kg. About 70 % of the total fish caught in number was smaller than the minimum size in 1995. According to yield-per-recruit analysis (**BET-Figure 6**), perfect implementation of this regulation could result in an increase in yield-per-recruit of almost 30 % at F_{max}.

BET-6. Management recommendations

Since 1993, total bigeye catch was near or greater than 100,000 MT and this represents a substantial increase from the 1989-1990 level by more than 30,000 MT due to the increased catch by purse seine and longline fisheries. The MSYs estimated by the various models were much smaller than the current catch. Although MSY levels were not well determined, as stated above, it is highly likely that the current catch level cannot be sustained in the long term and may lead to large catch reduction.

Further increases in the catch of small fish, which are currently being made by the intensive operations on small fish associated with floating objects by the purse seine fishery, will result in an additional reduction in the adult stock size which may cause recruitment failure.

Taking all these reasons into consideration, the Committee strongly recommends the reduction of total catch to at least below the level of the most likely MSY level (60,000 MT - 70,000 MT), as has already recommended in previous years. Given the condition that the minimum size regulation has never been met in practice, and that considerable catches have been made and are still increasing, this minimum size regulation should be implemented so as to reduce catch for that size. Detrimental effects of taking juvenile bigeye tuna are evident in terms of yield-per-recruit and spawning biomass-per-recruit. Such a reduction can be undertaken by the limitation on fishing for schools associated with floating objects by the tropical surface fisheries. At the same time, catches for other sizes of fish should also be reduced in order to attain the above-mentioned catch reduction.

ATLANTIC BIGEYE TUNA SUMMARY

Maximum Sustainable Yield (most likely range)	60,000 - 70,000 MT*
Current (1995) Yield	105,275 MT
Current (1995) Replacement Yield (Non-equilibrium model)	51,000-74,000 MT
Relative Biomass (B_{1995}/B_{MSY}) (Non-equilibrium model)	0.7 - 1.2
Relative Fishing Mortality (F_{1995}/F_{MSY}) (Non-equilibrium model)	1.2 - 2.9
Management Measures in Effect	3.2 kg minimum size

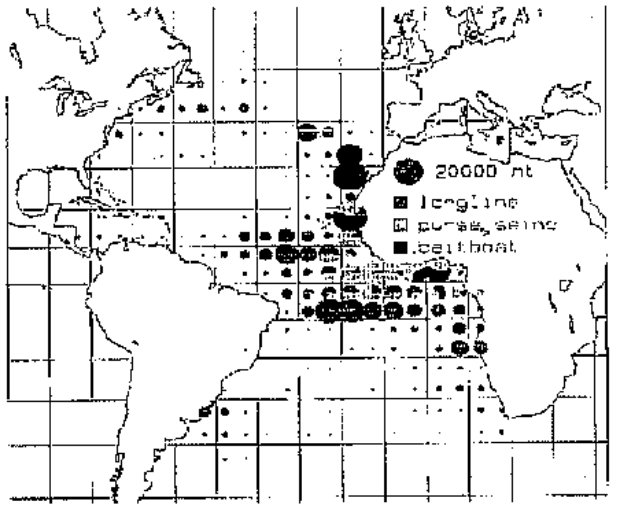
* Since MSY could not be precisely estimated by the production model, a most likely range of MSY is given instead of the actual estimates by the model.

In this table, ranges of point estimates were given for replacement yields and relative ratios.

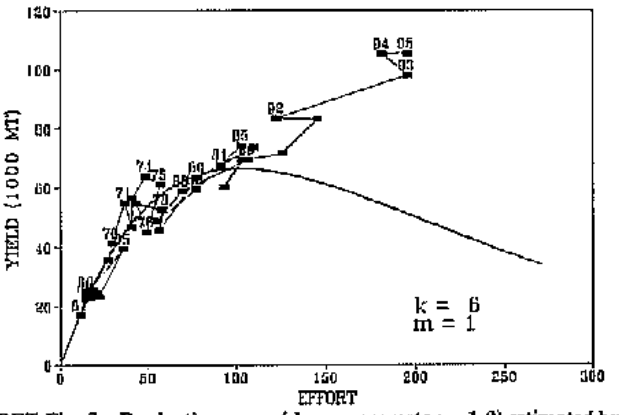
BET-Table 1. Reported catch of bigeye tuna (in MT) by gear, country and year.

(EXECUTIVE SUMMARY)

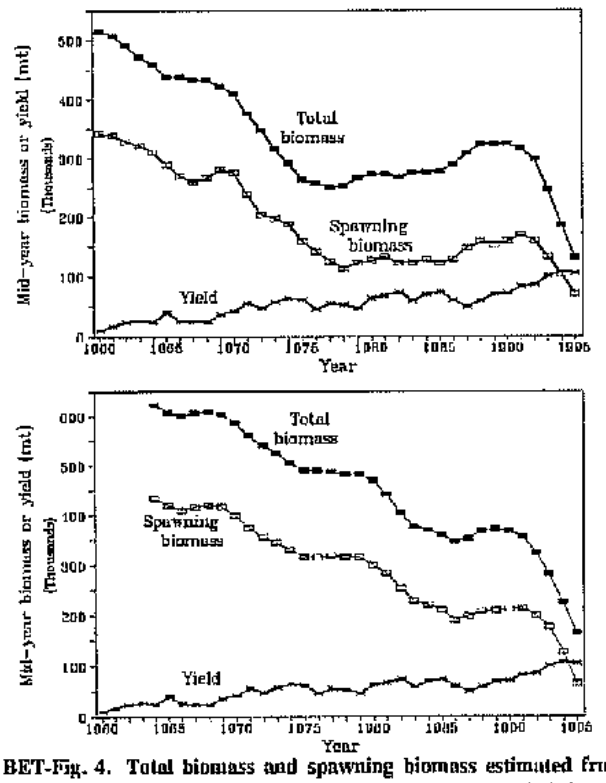
COUNTRY	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	39234	24979	24738	23017	35532	41237	55057	46521	56460	63667	60787	44875	54494	52351	45591	63301	67438	73379	58987	68777	73990	58764	49132	58753	69360	71481	83062	83343	97744	111104	105275
ARGENTINA	400	200	75	347	200	100	44	0	25	18	95	176	84	23	0	0	0	0	0	0	100	41	72	50	17	78	22	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	0	0	0	0	0	0	0	0	0	0	0	11
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	45	0	0	0	15	6	7	8	10	10	9	10	0	0
BRASIL	0	0	0	0	0	0	37	28	70	197	181	678	1183	812	782	698	505	776	535	656	419	873	756	946	512	591	350	790	1256	596	1931
CANADA	0	0	0	0	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	11	144	95	31	10	26	67	124	111	148
CAP-VERT	0	0	0	0	0	111	95	146	142	131	115	50	47	464	45	27	72	280	293	167	112	86	60	117	100	52	151	105	85	209	358
CHINA.TAIWAN	0	595	2231	5344	7483	7555	5479	4990	3818	3097	3950	3274	2978	2628	2200	2266	1670	1900	3436	818	1079	995	1317	1300	717	4910	12083	10218	1188	17416	15950
CONGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	8	19	10	10	14	15	12	12	14	0	0
CUBA	89	300	217	886	1027	4100	3200	2000	2600	2400	1900	1300	1800	2300	2300	1385	712	521	421	447	239	171	190	151	67	62	34	56	36	0	0
ESPANA	1017	1145	1272	1399	1810	4072	7418	4015	5681	4515	8882	7436	9736	6849	5419	8430	9918	9247	8691	13613	10304	10194	8875	7984	7660	10355	18537	17601	19618	21822	19097
FRANCE	10	60	1740	155	3645	3885	3972	3954	4442	5201	4901	6485	8970	8985	7308	6283	8020	7074	8124	4254	4615	4266	3985	4161	3261	5023	6270	7219	14051	14711	10300
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	0	0	0	0	1	57	10
GHANA	0	0	0	0	0	0	0	0	30	73	84	170	237	124	238	332	780	791	491	2162	1887	1720	1178	1214	2158	4160	3656	2804	4273	3959	2549
GRANADA	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	0	65	25	20	10	10
HONDURAS-OB.S	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	0	0	0	0	0	69
JAPAN	28663	17578	9012	11332	11543	9428	31299	19665	22014	22946	17548	8170	10144	9863	12150	20922	22091	33513	15212	24870	32103	23081	18961	32064	39540	35231	30356	34723	35053	38502	39170
KOREA	0	289	320	263	1857	4079	7353	5730	6018	7821	10493	6923	8090	9716	8022	10235	12274	10809	9383	8989	10704	6084	4439	4919	7896	2690	802	866	377	386	423
LIBERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	205	16	13	42	65	53	0
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	0	0	0	508	1085	500	400
MAROC	0	0	0	0	0	0	0	0	0	0	15	170	324	394	414	387	622	625	552	120	30	0	8	0	0	0	0	0	0	0	0
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0
NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	29
NEI-3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	338	1141	157	0	0	85	20	93	785	3158	1384	1700	7488	3583
NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	182	2710	2051	3091	2135	1493	2127	513	4518	2500	3107	2732	1952	1104	631	375	0	0	0	0	0	71	143	0
POLAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	8670	4132	8051	1596	5619	5132	2587	3962	5855	10945	6813	2929	4522	5350	3385	3706	3086	1861	4075	3927	6390	7289	5036	2818	5295	6218	5698	5769	5616	3099	9652
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	0	3	5	0	11	0
SOUTH AFRICA	0	0	0	0	0	0	0	0	1	0	0	0	0	0	19	422	381	137	187	36	118	133	241	381	378	259	85	51	215	77	19
ST. HELENA	0	0	0	0	0	0	0	0	0	0	0	0	5	22	8	9	14	23	14	19	0	0	5	1	1	3	3	10	6	6	10
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	0	0	1	3	0	0
TOGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	52	18	24	22	7	12	12	6	2	86	23	0
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	191	41	22	0	0	1	19	57	263	0	258	0	0
U.S.A.	0	0	0	18	148	195	544	213	113	865	67	28	331	246	212	202	152	377	254	408	353	747	1008	918	761	650	962	751	952	1328	1209
U.S.S.R	385	680	1820	1677	2200	2580	2729	1637	2961	3367	3652	4907	4086	2202	2229	2813	2832	635	352	1233	870	1071	1887	1077	424	95	0	0	0	0	0
URUGUAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	397	605	714	597	177	284	120	55	38	20	56	46	37	80
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	21	464	244	347	661	1684	999	4284	4142	2918	1136	349	332	115	161	476	270	809	457	457



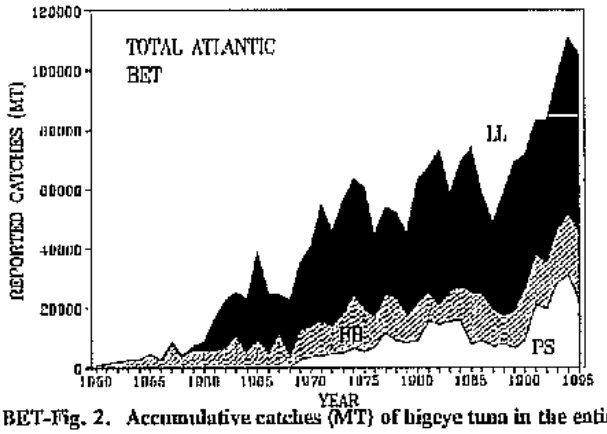
BET-Fig. 1. Distribution of reported bigeye catches by 5x5 area and by gear, 1990-1994 combined.



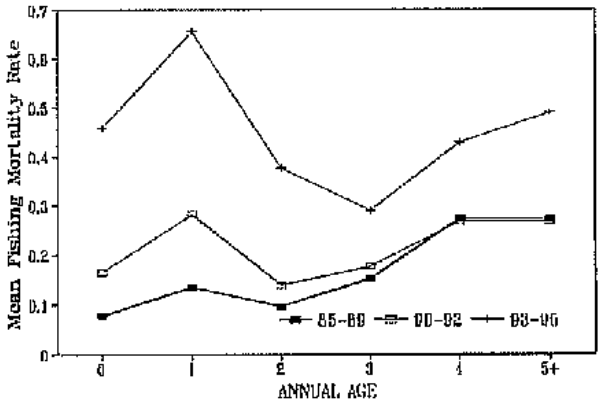
BET-Fig. 3. Production curve (shape parameter = 1.0) estimated by an equilibrium production model plotted with catch and effort series. Base case with abundance index estimated for central area with GM model. Years 93, 94 and 95 are not used for fitting the curve.



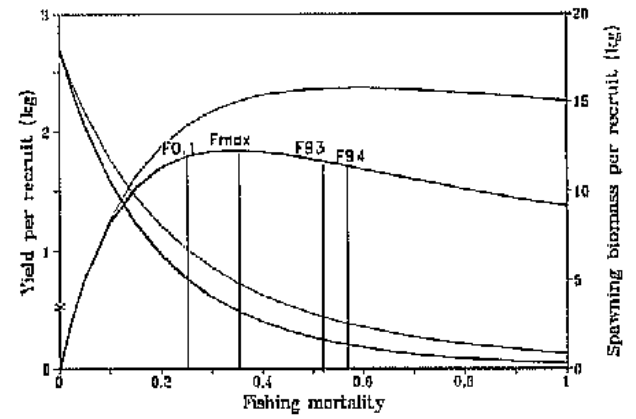
BET-Fig. 4. Total biomass and spawning biomass estimated from tuned VPA (upper panel) and un-tuned VPA (lower panel.



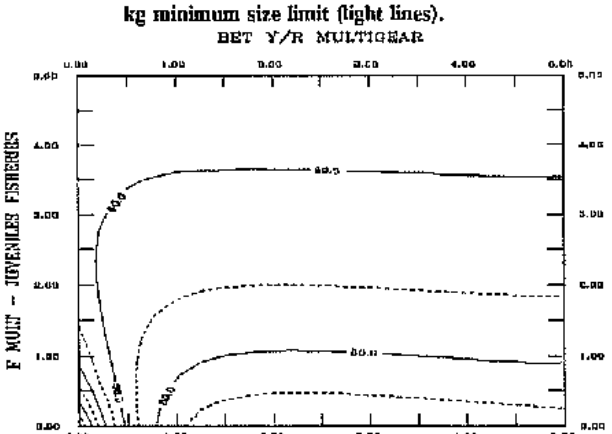
BET-Fig. 2. Accumulative catches (MT) of bigeye tuna in the entire Atlantic by gear, 1950-1995.



BET-Fig. 5. Fishing mortality rates at age for bigeye estimated by VPA.



BET-Fig. 6. Yield-per-rercruit (YPR) and spawning biomass-per-recruit (SPR) for bigeye tunaq assuming current selectivity (heavy lines) and selectivity reflective of a 3.2 kg minimum size limit (light lines).



BET-Fig. 7. Result of multi-gear yield-per-recruit analysis. Large fish fishery and small fish fishery correspond to longline plus islands baitboat fisheries and the other fisheries, respectively. F vectors used in this study were obtained from VPA.

SKJ - SKIPJACK TUNA

SKJ-1. Biology

Skipjack tuna is a cosmopolitan species distributed in the tropical and subtropical waters of the three oceans forming schools. 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. Skipjack growth is variable and seasonal, and is more rapid for fish from the tropical zone than for fish from the equatorial area. That is, considerable variability is observed in the average sizes of annual growth. Skipjack are active predators that feed on numerous prey, which conditions the opportunistic character of this species.

As the stock structure of skipjack in the Atlantic Ocean is not known, two management units (east and west) have been established, due to the development of fisheries on both sides of the Atlantic Ocean and to the lack of transatlantic recoveries of tagged skipjack (**SKJ-Figure 1**).

SKJ-2. Description of 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 (**SKJ-Figure 2a and 2b**). Reported catches are considered to be underestimated, due to the discards of small-sized tunas, which include skipjack, by the purse seine fleets. Catches in the Atlantic Ocean in 1995 amounted to 150,008 MT (**SKJ-Table 1**).

In the east Atlantic, the most important fisheries are the purse seine fisheries, particularly those of the Spanish, FIS (France, Senegal, Côte d'Ivoire, Vanuatu and Malta), and the NEI fleets, followed by the baitboat fisheries of Ghana, Portugal, Spain and the FIS fleets. Skipjack fisheries underwent important changes in 1991, with the introduction of fishing with floating objects and the expansion of the baitboat fishery towards the west, at latitudes close to the Equator, following the drift of floating objects and the development of a new live bait fishing method, directed mainly at bigeye tuna, in which the pole and line acts as an object, fixing and fishing a school during the entire fishing season, in waters off Senegal, Mauritania, and the Canary Islands. In 1995, skipjack catches in the eastern Atlantic amounted to 130,858 MT, which represents a slight decline with respect to the 135,025 MT taken in 1994 (**SKJ-Figure 2a**).

In early 1995 in the eastern Atlantic equatorial area, higher temperatures than normal for this period were detected, as well as an unusual system of currents which affected fishing with artificial floating objects, that moved in different directions from their normal routes.

In the western Atlantic, the most important fishery is the Brazilian baitboat fishery, whose only target species is skipjack. In 1995, Venezuela vessels also participated in the fishery. As regards the purse seine fisheries, whose catches are much lower than those of the baitboat fisheries, catches were only made by the Venezuelan fleet. The 1995 reported catches of 19,150 MT are lower than those of 1994 (29,402 MT). This decline is shown in the purse seine as well as the baitboat catches (**SKJ-Figure 2b**).

There is no information available on effective fishing effort exerted on skipjack tuna, particularly since the introduction of fishing with artificial floating objects. Considering vessel carrying capacity as a measure of nominal effort in the eastern Atlantic Ocean, a continuous decline in effort since 1991 can be observed, and 1995 effort was 14% less than that of 1994 (**SKJ-Figure 2a**). In any case, the variations in vessel carrying capacity are not equivalent to the same variations in fishing mortality.

The development of nominal effort, from the different Brazilian baitboat fleets, expressed in fishing days, shows a declining trend since 1985, and is currently 30% below that of the aforementioned year, when the highest catches for this fishery were taken in the western Atlantic (**SKJ-Figure 2**).

SKJ-3. State of the stocks

The last detailed skipjack stock assessment for the eastern Atlantic stock was carried out in 1984 by the Working Group on Juvenile Tropical Tunas. The results of that assessment showed under-exploitation of the stock. Observing the development of the vessel carrying capacity (**SKJ-Figure 2a**) it can be noted that when the assessment was carried

out (1984), the highest level of this parameter was reached. Vessel carrying capacity in 1983 was 81,800 MT, while it is currently at 44,300 MT, which represents a 54% decline. However, it is not known whether this decline has been accompanied by a similar decline in effective effort, or if on the other hand effective effort has increased, taking into account that the individual fishing power of the purse seiners has increased with the continuous introduction of technological improvements and, since 1991, the massive introduction of floating objects to aggregate tunas. This new fishing strategy has not changed the size distribution of the catches, while it has changed the fishing area, which has been extended towards the southwest, following the drift of the floating objects, and it has possibly changed catchability. Consequently, the current state of the eastern stock is not known, considering that this species, because of its biological characteristics (short life span, rapid growth, few ages present in the fishery, high natural mortality, etc.) is subjected to moderate rates of exploitation, although locally there are high fishing mortality rates in specific areas.

No stock assessment has been carried out on western Atlantic skipjack **(SKJ-Figure 2b)**.

The eastern Atlantic CPUE has undergone a continuous increase, while that of the western Atlantic has remained the same without trend **(SKJ-Figures 2a and 2b)**.

SKJ-4. Outlook

No definitive conclusion can be reached on the state of the eastern and western Atlantic stock. However, the Committee considered that, given the characteristics of this species*, the current level of exploitation can be maintained, but given the important changes that have occurred in the eastern Atlantic purse seine fisheries, the fishery should be carefully monitored and an assessment should be carried out, using adequate, specific methods for this species.

SKJ-5. Effects of current regulations

There are currently no regulations in effect for skipjack.

SKJ-6. Management recommendations

No management recommendations were proposed.

*ATLANTIC SKIPJACK SUMMARY **

	East	*West*
Maximum Sustainable Yield (MSY)	Not estimated	not estimated
Current (1995) Yield	130,858 MT	19,150 MT
Current (1995) Replacement Yield	Not estimated	not estimated
Relative Biomass (B_{1995}/B_{MSY})	Not estimated	not estimated
Relative Fishing Mortality: F_{1995}/F_{MSY}	Not estimated	not estimated
Management Measures in Effect	None	None

* The conclusions of the assessments carried out during the International Skipjack Year Program pointed out some considerations on the problems of assessing this species, which impede the application of production and analytical models:

- Since skipjack is not the main target species of the purse seine fleets, there are no good indices of skipjack abundance.
- Skipjack is a short-lived species which stays in the fishery for a short time and is subjected to high natural mortality.

SKJ-Table 1. Reported catches (in MT) of skipjack by area, gear and country.

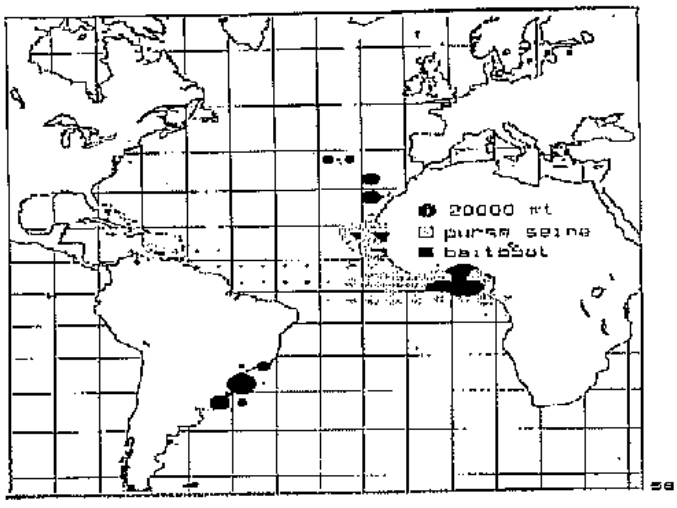
EXECUTIVE SUMMARY

COUNTRY	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	24136	22833	24349	48367	29305	50242	78380	77278	78285	117109	55807	69297	110567	110471	89673	111347	130833	155507	134398	126776	118662	122074	114747	140623	116107	141009	199301	148856	181315	164427	150008
EAST ATLANTI	22591	21042	21562	45725	27448	47771	76409	74349	75451	113686	52343	65548	107217	103295	83108	98774	107941	122368	102667	91216	78418	90034	90756	116908	89742	114963	165978	118739	147536	135025	130858
ANGOLA	1402	2764	1979	4165	1887	955	1996	1677	1434	3474	653	1514	4036	5911	3628	3482	2532	2257	318	46	131	56	80	30	85	69	66	41	13	2	3
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	30	60	68	38	10	20	11	5	3	7	2	2	2	2	0	0
BULGARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
CANADA	14	0	644	923	146	585	1230	7	1189	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	0	0	0	1124	962	1477	1446	1332	1170	825	748	1284	998	2094	1588	1636	1400	1391	2030	877	2076	1456	971	806	1333	864	860	1007	832
CAYMAN ILS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	289	1800	30	0	0	0	0	0	0	0	0	0	0	0	0	0
CHI-TAIWAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	7	4	0	0	1	3	0	5	3	2	10	3
CONGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1250	200	0	5	10	8	8	8	8	11	12	9	9	10	0	0
CUBA	0	0	0	0	0	0	200	100	0	100	300	200	100	200	100	196	198	189	135	310	246	569	81	206	331	86	0	0	7	0	0
ESPANA	4052	3121	3790	9459	7018	7986	14569	23616	20398	35941	17727	16255	22347	25066	18748	26384	35458	38016	28933	46649	35100	41992	33076	47643	35300	47834	71050	49963	57523	49951	51235
FIS	2700	3300	3730	7320	3569	4219	5592	3699	3227	4425	1783	2136	2642	3313	3282	3179	2608	4378	2655	3805	3293	1894	1957	2800	4176	3455	1474	1347	3377	3540	3776
FRANCE	900	2200	1550	5100	2587	7833	13103	13596	7954	22641	10540	14903	28496	22590	15320	22588	24318	26754	27072	9189	10352	11151	15157	13704	11035	13644	28714	18787	36522	31970	24736
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	0	0	0	0	1	11	51
GHANA	0	0	0	0	0	0	0	0	288	701	1426	2199	3492	2866	4299	5812	7858	18272	24376	20697	19082	22268	24347	26597	22751	27188	30915	23756	26132	23531	25377
JAPAN	8142	5834	5913	13591	5611	11005	17954	13538	14524	19582	3807	15042	16845	14614	14686	12304	12935	9930	6002	1504	2098	2031	1982	3200	2243	2566	4792	2378	0	0	0
KOREA	0	0	0	0	0	0	0	0	922	2123	4469	1948	3600	8132	12017	6718	7538	2827	1553	699	153	5	6	3	6	0	0	0	0	0	0
MAROC	3153	1475	933	850	145	1115	118	1	72	28	264	538	3850	1891	1852	5001	3017	3956	2531	885	1002	1220	1028	428	295	837	178	391	217	173	3483
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	0	0	0	0	2	15
NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1560	3383	927	590	540	1372	3732	2263	10516	17504	12148	16259	15583	14784
NORWAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	581	738	0	0	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	676	159	979	1854	2467	3970	2980	1750	1735	144	2541	1611	0	0	0	0	0	0	0	0	0	88	129	0
PORTUGAL	2228	2348	2547	1138	1738	959	4200	3710	2206	1904	569	2068	4388	4584	3074	1954	2825	5530	1113	3974	2409	5446	8172	14203	7725	3954	8059	7477	5635	7528	4996
RUMANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	3	0	0	59	142	349	73	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	0	0	0	0	0	0	1175	1110	540	1471	1450
SAO TOME & PRINC	0	0	0	0	0	0	0	0	0	0	30	35	118	100	34	33	90	78	103	18	20	20	20	21	22	25	24	25	15	0	0
SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	5	287	343	263	58	0
SOUTH AFRICA	0	0	0	0	0	0	0	0	0	67	1	0	40	90	2	48	110	37	104	10	56	116	122	155	100	16	18	6	5	4	2
ST. HELENA	0	0	0	0	0	100	100	100	100	9	22	19	12	21	76	70	112	271	103	85	62	139	139	158	397	171	24	16	65	55	115
U.S.A	0	0	476	3179	4747	11752	16224	12152	21246	19973	7369	1766	5859	6797	2073	2608	2800	79	0	0	0	0	0	0	0	0	0	0	0	0	0
U.S.S.R	0	0	0	0	0	138	161	0	286	407	359	3633	6674	2856	1161	2991	1750	3957	1223	1000	1404	1688	547	1822	1915	3635	0	0	0	0	0
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	358	0	0	0	0	0	0	0	0	0	0

SKJ-Table 1. Reported catches (in MT) of skipjack by area, gear and country.

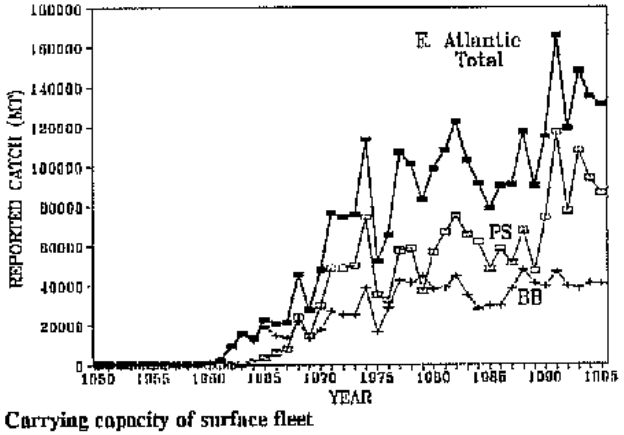
EXECUTIVE SUMMARY

COUNTRY	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
WEST ATLANTIC	1545	1791	2787	2642	1857	2471	1971	2929	2834	3423	3464	3749	3350	7176	6565	12573	22892	33139	31731	35560	40244	32040	23991	23715	26365	26046	33323	30117	33779	29402	19150
ARGENTINA	0	0	0	0	0	0	0	100	16	28	0	0	33	4	0	17	1	137	243	505	101	138	0	7	111	106	272	123	50	1	0
BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	72	39	48	36	33	21	3	9	11	14	5	6	6	10
BRASIL	500	700	1500	800	400	400	100	0	0	0	0	83	190	635	2065	6071	13913	18322	15945	13567	25101	23155	16286	17316	20750	20130	20548	18535	17771	20588	16560
CANADA	0	0	0	0	0	0	0	0	13	0	0	181	0	86	0	0	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHINA.TAIWAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	18	6	6	3	1	2	7	19	0	32	26	9	7	2
COLOMBIA	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	0	0	0	2074	0	0
CUBA	981	951	1155	1607	1255	1800	1600	1400	1500	1800	2300	2800	2400	1800	2000	2255	1086	1134	1700	1248	1632	1277	1101	1631	1449	1443	1596	1638	1600	1600	0
DOMINICAN REP.	0	100	100	100	100	200	200	200	200	234	171	78	41	64	87	59	71	80	106	68	204	600	62	63	117	170	194	176	167	300	33
ESPANA	0	0	0	0	0	0	0	120	0	0	103	0	266	2031	1052	0	0	0	209	2610	500	0	0	0	0	0	1592	1120	397	0	0
FRANCE	0	0	0	0	0	0	0	900	332	72	75	0	0	0	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GHANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	8	1	1	15	12	7	9	5	22	11	23	25	30	25	11	12
JAPAN	0	0	0	0	0	0	0	0	421	1126	438	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	17	20	6	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	1	3	0	25	30	48	11	13	10	14	4	9	8	1	1	0
NETHERLAND.ANT	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	45	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	720	161	1026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ST.LUCIA	0	0	0	0	0	71	71	71	76	76	81	88	100	100	41	40	37	38	35	64	53	76	60	53	38	37	51	39	53	86	72
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	17	28	29	27	20	66	56	53
TRINIDAD & TOBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	1	0	0	0	0	2	0	0
U.S.A	64	40	32	135	102	0	0	138	0	0	198	519	320	1695	1029	981	2573	652	589	817	1786	1004	651	36	56	240	785	523	341	49	21
VENEZUELA	0	0	0	0	0	0	0	0	276	87	98	0	0	0	0	1890	4900	12645	12778	16526	10712	5690	5750	4509	3723	3813	8138	7834	11172	6697	2387

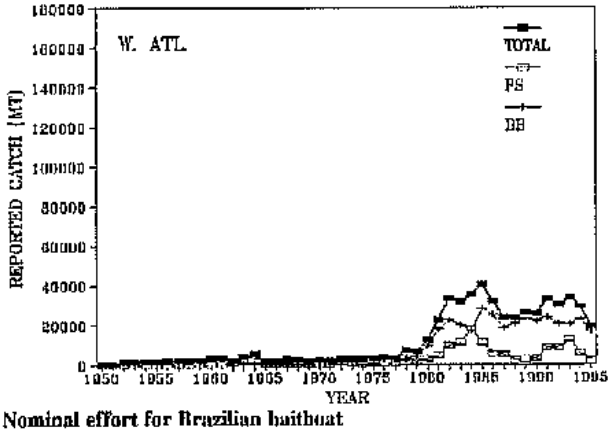


SKJ-Fig. 1. Distribution of reported surface skipjack catches by 5x5 area and by gear.

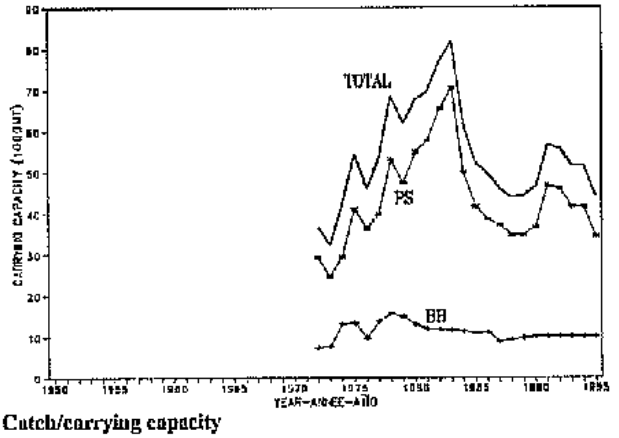
A) East Atlantic
Catch (MT) by gear



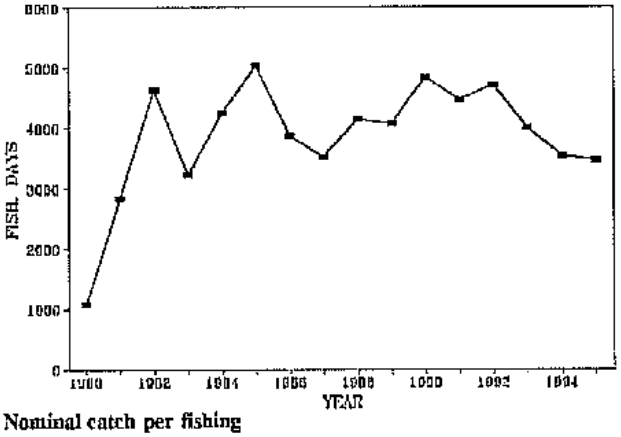
B) West Atlantic
Catch (MT) by gear



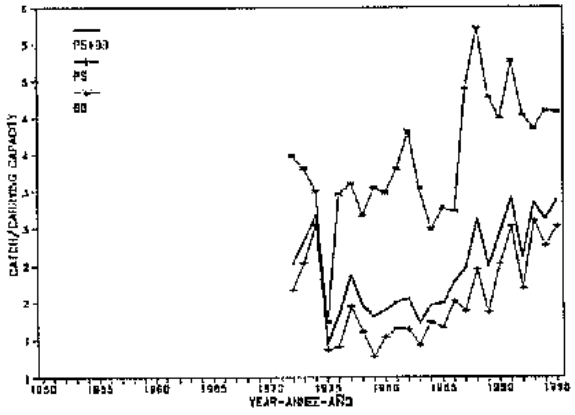
Carrying capacity of surface fleet



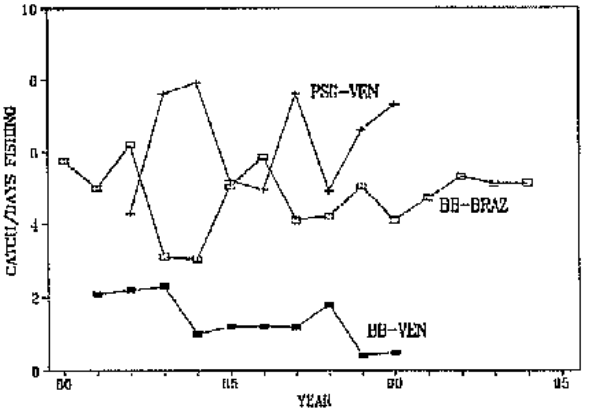
Nominal effort for Brazilian baitboat



Catch/carrying capacity



Nominal catch per fishing



SKJ-Fig. 2. A) Landings, carrying capacity and catch per carrying capacity for the east Atlantic skipjack: B) Landings and some nominal CPUE series for the west Atlantic skipjack.

ALB - A L B A C O R E

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 5°N) and a Mediterranean stock (**ALB-Figure 1**).

Albacore spawning areas in the Atlantic are found in tropical western areas of both hemispheres and throughout the Mediterranean Sea. Spawning takes places during spring and summer in both hemispheres. Albacore are considered to reach maturity at about 90 cm 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.

ALB-2. Description of fisheries (Figure 2)

The northern stock is exploited by surface and longline fisheries. Traditional surface fisheries include Spanish trolling, used mainly in the Bay of Biscay and adjacent waters, Spanish and Portuguese baitboats used in the same area and near the Azores. New surface fishing gears, drift-nets and pelagic paired trawls, were introduced in 1987 in the Bay of Biscay and adjacent waters by France. Ireland and the United Kingdom joined the driftnet fishery at the beginning of the 1990's. These surface fisheries mainly target juveniles (50 cm to 90 cm FL). A Taiwanese longline fishery targets sub-adult and adult albacore (60-120 cm) in the central and western north Atlantic. Other fleets make minor catches and in most fisheries albacore constitute a component of the by-catch.

The total catch in the north Atlantic has shown a downward trend since 1970, largely due to a reduction in fishing effort by the traditional surface and longline fisheries. In contrast, effort and catch in the new surface fisheries have increased markedly since 1987. In 1995 the important increase of troll catches in the Bay of Biscay area compared to the four previous years is notable, as is the increase in catches of the baitboat fishery in the Azores.

The southern stock is exploited by a South African surface baitboat fishery off the west coast of South Africa. The effort in this fishery has remained relatively stable in recent years. Taiwanese longliners target albacore at a fairly high level of effort. Both countries have made efforts to implement management regulations in response to the 1994 ICCAT resolution. Japanese and Brazilian longliners make a minor contribution to the total southern albacore catch.

Reported albacore catches in the Mediterranean, mainly by Italy and Greece, are still minor.

ALB-3. State of the stocks

Assessments of north and south Atlantic albacore were conducted after a serious review of the Task I and Task II data available. The Committee recognized that there are still many uncertainties in the data base for the South Atlantic that need to be urgently clarified. No attempt was made to analyze the status of the Mediterranean stock, due to insufficient information.

– North Atlantic

The Committee noted that age-aggregated, non-equilibrium production models (e.g., AAPM, ASPIC) cannot fully capture the dynamics of the northern stock because the abundance indices available represent two separate fisheries acting mainly on two different age groups and because some of the trends in the individual indices conflict. An application of the standard age structured production model (ASPM) gave a reasonably precise point estimate of *MSY*. However results were very sensitive to the specifications of the analysis probably related to the assumption of time-invariant selectivity inherent in the ASPM approach.

The state of the northern stock was also analyzed using ADAPT tuned VPA's. The relative abundance indices and other assumptions made for the base case were the same as those used in the previous assessment, based on the recommendations made during the Final Meeting of the Albacore Research Program. However, modifications were made, specifically to include determination of gear-specific selectivities using partial catches by gear.

Analyses were conducted to determine the sensitivity of the ADAPT VPA to excluding various indices of abundance, using iterative reweighting instead of all indices equally weighted, and estimating the 1993-95 F ratio between F 8+ and F 7, instead of assuming it was equal to 1.0. The results of the sensitivity runs were similar to the base case.

It was noted that the catch of ages 8+ in 1993-95 were very high relative to previous years. This may be attributed to a large fishing mortality rate on ages 8+ and/or to an increase in cohort strength, which may cause retrospective patterns in the results of sequential analysis. This pattern was observed with a retrospective analysis and therefore an adjustment was made to the fishing mortality rates of ages 7 and 8+ in 1995.

According to the results obtained (**ALB-Figure 3**), the abundance and biomass of adult fish (ages 5+) appear to have declined from the early to late 1980's, followed by an increase in 1988-1990. The abundance and biomass of ages 5+ do not show any trend since 1990. Abundance of recruits (age 1) and juveniles (ages 2-3) varied from year to year with, perhaps, some declining trend from 1975-1984. The levels since then have been variable. The VPA analyses show an increase in recruitment in the last two or three years; however, as indicated in the figure, the estimates are quite variable and the differences between one year and the next are not statistically significant.

The Committee speculated about possible effects of long-term environmental changes on the decreasing trend of spawning stock biomass and the apparent reduction in the recruitment level.

The fishing mortality rate of juveniles was high in 1990, but has been reduced to a lower level since then. Fishing mortality rates on adults (ages 5+) increased to a peak in 1986 and then declined. Recent rates appear to be relatively high, but not as high as the peak year. The fishing mortality rate on ages 8+ also appears to be increasing, however, the estimation of this is quite variable.

Equilibrium yield per recruit and spawning potential ratio analysis made by the Committee indicated that the northern stock is at or near full exploitation (**ALB-Figure 4**). Assuming the fishing mortality rate as estimated by the VPA for 1995, the analysis reflects the current F_{95} (0.702) close to F_{max} (0.880) and greater than $F_{0.1}$ (0.375); correcting F for older ages at the level estimated for 1990-1992, the result is F (0.533) compared to F_{max} (0.878), and is greater than $F_{0.1}$ (0.494). The current level of spawning biomass for these analyses is estimated as 16.5% and 20.7% of the unexploited level respectively.

– South Atlantic

An ASPM was used to produce base-case assessments of albacore abundance, using CPUE indices for the main fleets exploiting this stock. Sensitivity analyses were conducted to investigate the effect of production model selection, standardization and choice of abundance indices and several input parameters (eg. growth model, mortality estimates and stock-recruit function).

Qualitatively, the results of the various analyses are very similar. The base-case ASPM indicates that *MSY* is 26,600 MT and the current (1995) replacement yield is 26,500 MT. The estimate of the ratio of current biomass to that at which *MSY* is achieved is 0.82 (**ALB-Figure 5**). The 1995 fishing mortality rate is 119% of that needed to achieve *MSY*. The results of the ASPM assessment are consistent with those presented to the Committee in earlier years although the estimate of *MSY* is somewhat more optimistic.

ALB-4. Outlook

– North Atlantic

The northern albacore stock has mainly been exploited by surface fisheries since the longline fleets shifted their targeting to bigeye tuna. A recent development in this fishery has been the introduction of drift nets and pelagic trawls, which achieve higher catch rates than trolling gear. Furthermore, the baitboat fishery targeting adult albacore has been intensified. Recent VPA assessments indicate that the northern stock is at, or near, full exploitation. Attention therefore needs to be given to implementing effective controls to limit fishing effort to current levels.

– South Atlantic

Projections under various levels of catch from 1997 onward were conducted in order to evaluate the effect of alternative future management options: constant catches of 22,000, 24,000 and 26,000 MT and a replacement yield

option (**ALB-Figure 6**).The 1996 catch in all the projections was set to 26,000 MT (i.e. the 1995 catch).

The biomass trajectory under a constant annual catch of 26,000 MT declines continuously throughout the projection period. In contrast, the replacement yield and 24,000 MT constant catch options lead to relatively stable population size trajectories. The 22,000 MT constant catch option leads to recovery beyond B_{MSY}, by 2005.

ALB-5. Effects of current regulations

– North Atlantic and Mediterranean

No ICCAT regulations are currently in effect for the north Atlantic or Mediterranean stocks. It was noted that a European Union regulation restricting the length of driftnets used by EU members to 2.5 km was introduced in 1992.

– South Atlantic

During the 1994 meeting, in response to continued indications of over-exploitation, ICCAT accepted a recommendation that catches of southern albacore by nations targeting this species be limited to not more than 90% of the average catches from 1989 to 1993. This recommendation became effective in October 1995.

Taiwan has implemented management regulations reducing the albacore directed fishing effort in response to the 1994 ICCAT resolution. The implementation by South Africa of ICCAT recommended regulatory measures for southern albacore has been hampered by poor reporting of past catches by her fleet. As a first step towards implementing the recommended catch limit, South Africa has restricted the off-loading of albacore to certain ports, has increased the inspection of these off-loadings and has improved logbook reporting systems for albacore landed by the South African baitboat fleet.

ALB-6. Management recommendations

– North stock

The 1994 Committee concluded that the northern albacore stock is probably not over-exploited, but that the stock appears to be at or near full exploitation. The Committee reiterated the previous recommendation that fishing mortality should not be increased above its current level.

– South stock

In 1994 ICCAT accepted a recommendation which came into effect in October 1995, that catches of southern albacore should be limited to not more than 90% of the average catches from 1989 to 1993. The current studies indicated that 90% of the average catch over the 1989-1993 period is higher than the sustainable yield calculated this time. Recognizing that there are many uncertainties in the data base for the south Atlantic albacore and that various recommendations have been made to rectify these problems, it was recommended that the SCRS conduct a stock assessment for the south stock, using the rectified data base in 1997. Meanwhile, it is reiterated that those countries involved in the southern albacore fishery make a concerted effort to implement this recommended catch limit.

– Mediterranean

There were no management recommendations for the Mediterranean stock.

ATLANTIC AND MEDITERRANEAN SUMMARY

	North Atlantic	South Atlantic	Mediterranean
Maximum Sustainable Yield	poorly estimated[1]	26,600 (19,700-28,100)[2]	–
Current (1995) Yield	38,825	26,018	unknown

Current (1995) Replacement Yield	poorly estimated[1]	26,500 (18,600-27,900)	–
Relative Biomass:			
B_{1995}/B_{MSY}	poorly estimated[1]	0.82 (0.42-1.19)	–
SPR[3]	0.165	–	–
R_{80-93}/R_{75-80}[4]	0.782	–	–
Relative Fishing Mortality:			
F_{1995}/F_{MSY}	poorly estimated[1]	1.19 (0.78-2.86)	–
F_{1995}/F_{MAX}	0.798	–	
Management measures in effect	none	Limit catches to 90% of the average of 1989-1993 levels	none

1 Results of the ASPM were very sensitive for the north. Therefore, estimates are not included in the table.
2 95% confidence limits are shown in brackets.
3 Spawning Potential Ratio.
4 Recruitment level during 1989-1993 compared to 1975-1980.

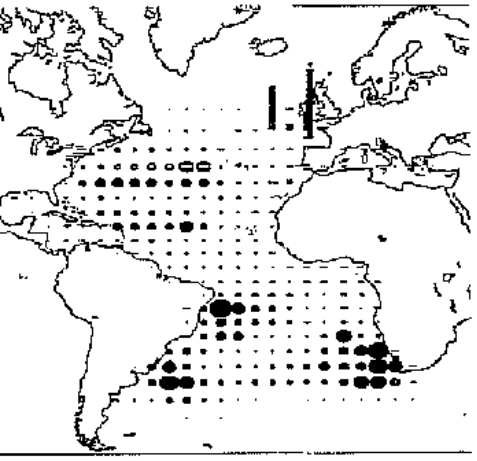
– = not estimated.

ALB-Table 1. Reported catches (MT) of Atlantic albacore by regions and by countries.

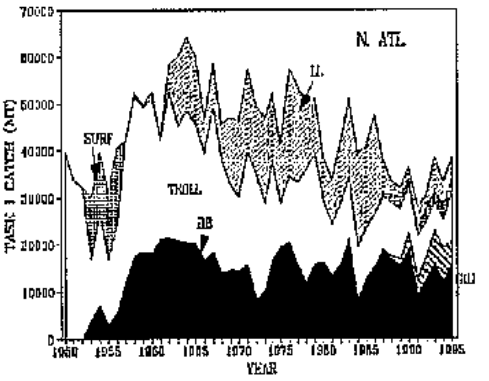
As of July 5, 1996

COUNTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL ATLANTIC	62967	53272	77226	77460	90353	90732	75030	74950	71863	76479	70308	82941	83330	75686	72489	59555	77346	76099	73806	74826	62134	59651	72942	67320	56924	75119	88065	82364	66943	63010	67113	56026	68363	72738	67344	65312
MEDITERRANEAN S	0	0	0	0	0	500	500	500	500	700	500	500	701	500	500	500	561	613	590	833	500	1500	1272	1235	3414	4129	3712	3993	4063	4060	1896	2378	2202	856	242	469
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	200	0	0	0	0	0	0	0	0	900	572	535	1331	531	0	0	3	0	84	547	227	290	218	469
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	141	250	20	60	31	31	121	140	11	64	23	0
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	0	0	484	500	500	500	500	500	500	1	1	0
ITALY	0	0	0	0	0	500	500	500	500	500	500	500	500	500	500	500	560	613	590	833	500	600	700	700	1942	3348	3208	3433	3529	3529	1191	1191	1464	1	0	0
JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	500	0	0
YUGOSLAVIA	0	0	0	0	0	0	0	0	0	200	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	0
NORTH ATLANTIC	52492	42507	58255	60075	64354	60387	47234	58567	45675	47286	46155	57556	49450	46973	52286	41448	57326	53821	50047	51365	38704	34111	41998	51161	39648	40745	47465	38081	33693	32080	36579	27930	30733	38621	33548	38825
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	0	1	21	47	22	6	5	1	9	32	12
CAP-VERT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0
CHINA-TAIWAN	0	0	17	16	103	114	204	761	1907	2352	4675	2871	4410	9501	9538	8130	14837	13723	9324	6973	7090	6584	10500	14254	14923	14899	19646	6636	2117	1294	3005	4318	2209	6300	4967	3977
CUBA	0	0	0	0	0	118	151	91	345	81	0	0	36	0	0	87	85	83	89	0	31	48	82	38	69	20	31	15	4	0	2	0	0	0	0	0
ESPANA	31014	24335	31499	28155	28500	29278	25795	32745	24580	22607	23731	30196	25121	21099	27982	22161	26910	25155	25404	29630	25202	20819	25478	29557	15685	20672	24387	28206	27547	25424	25792	17230	18171	18371	16993	19521
FRANCE	19597	17092	20293	16239	19486	15548	13413	15533	13239	9385	6163	9210	9158	6859	8425	5666	6800	7733	10400	9320	3955	2929	2855	2391	2797	1860	1200	1921	2805	4050	3300	4123	6924	6293	5934	5304
IRELAND	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	60	451	1946	2489	2489
JAPAN	1131	380	5716	14633	15713	14325	5860	4771	3306	4717	5875	6472	1319	1467	2059	1331	1345	825	531	1219	1036	1740	781	1156	576	844	470	494	723	764	737	691	466	485	457	222
KOREA	0	0	0	0	52	174	1471	3926	1588	6844	5011	7707	7922	4794	2823	2843	5379	5579	3048	2997	797	938	1326	478	967	390	373	18	16	53	34	1	0	8	0	0
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0
NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	240	2366	217	226	1227	557	768	425	193	177	494	357	2351	601	525	44	0	0	0	0	0	0	0	0
PORTUGAL	600	600	620	970	500	830	340	740	110	500	200	300	434	887	1229	911	610	62	85	149	79	442	321	1778	775	657	498	433	184	169	3185	709	1638	3385	974	6303
SIERRA LEONE	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	0	0	0	0	10	0	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	0	0	0	0	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	2	0	0
TRINIDAD & TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	268	194	318	0	0	0	0	4	0	247	639	0	0
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	10	0	13	0	0	2	1	0	19	52	24	18	25	17	162	267	113	253	379	479	368	438	651	545
U.S.S.R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITED KINGDOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	499	613	173
VENEZUELA	150	100	110	60	0	0	0	0	600	800	500	800	800	0	0	93	133	102	397	593	300	331	137	823	1076	467	172	26	137	41	95	314	199	246	278	278
SOUTH ATLANTIC	10475	10765	18971	17385	25999	29845	27296	15883	25688	28493	23653	24885	33179	28213	19703	17607	19459	21665	23169	22628	22930	24040	29672	14924	13862	30245	36888	40290	29187	26870	28638	25718	35428	33261	33554	26018
ARGENTINA	1802	1472	749	1547	1493	1100	800	710	1229	400	500	281	100	44	13	97	48	80	8	0	4	2	7	55	209	153	356	469	344	354	151	60	306	306	2	0
BRASIL	0	0	0	0	0	0	0	0	0	0	0	63	16	60	169	170	296	688	494	515	476	276	800	737	732	386	524	399	423	443	514	1109	2282	3983	835	907
CHINA-TAIWAN	0	0	0	0	0	0	0	1059	6792	12546	12225	17491	24985	22157	16686	13384	14600	16092	20467	20340	18710	18187	22800	9502	7889	19643	27592	28790	20746	18386	21369	19883	23063	19400	23921	18351
CUBA	0	0	0	0	0	81	106	42	75	30	0	0	64	0	0	13	15	17	11	0	27	53	29	36	67	27	24	10	2	1	2	17	5	3	0	0
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	889	106	295	307	155	200	807	185	0	0	389	1691	849	725	725
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	112	40	172	457	912	947	372	7	18	35	100	0	0	0	0	0	0	0	0
JAPAN	8673	8893	16422	15104	23760	28309	21023	7719	11895	6331	5898	3218	2087	280	109	306	73	107	135	105	333	558	569	188	224	623	739	357	405	450	587	654	583	467	660	612
KOREA	0	0	0	0	115	346	5275	6353	5697	9186	5030	3832	5655	3731	2393	3230	3376	3829	1413	878	803	682	563	599	348	511	321	383	180	54	19	31	5	20	0	0
MAROC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	113	0	0	0	0	41	0	0	0	0	0	0	0	0
NAMIBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	950
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	0	0	0	0	0	0	4	40	1048	1000	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	172	1841	183	256	770	377	354	125	167	129	210	0	0	0	280	924	0	0	0	0	0	0	0	0
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	741	1357	1029	899	1153	557	732	81	184	483	1185	655
SOUTH AFRICA	0	400	1800	734	631	9	92	0	0	0	0	0	100	100	150	150	150	150	150	480	1850	2320	3180	2760	2803	5841	5526	6927	5647	6535	5194	3410	6193	6708	5270	3650
ST. HELENA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	2	4	7	11	7	9	0	0	2	1	1	1	5	29	0	5	0
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9	11	0	2	102	0	0	0	0	4	1	6	10	5	9	14	20	119
U.S.S.R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	212	74	0	99	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	0	23	235	373	526	1531	262	178	100	83	55	34	31	28	16	49

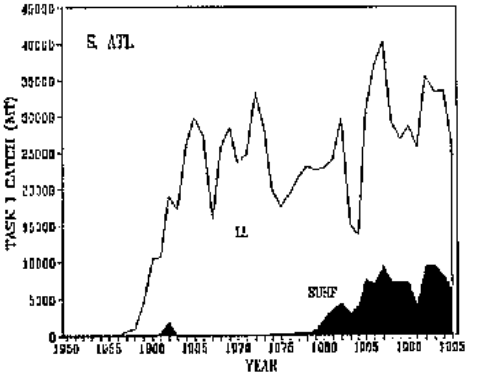
The table shows the catch data as used for 1996 stock assessments. Many countries updated the catch since then (e.g. Spanish 1995 catch is now 22,112 MT)



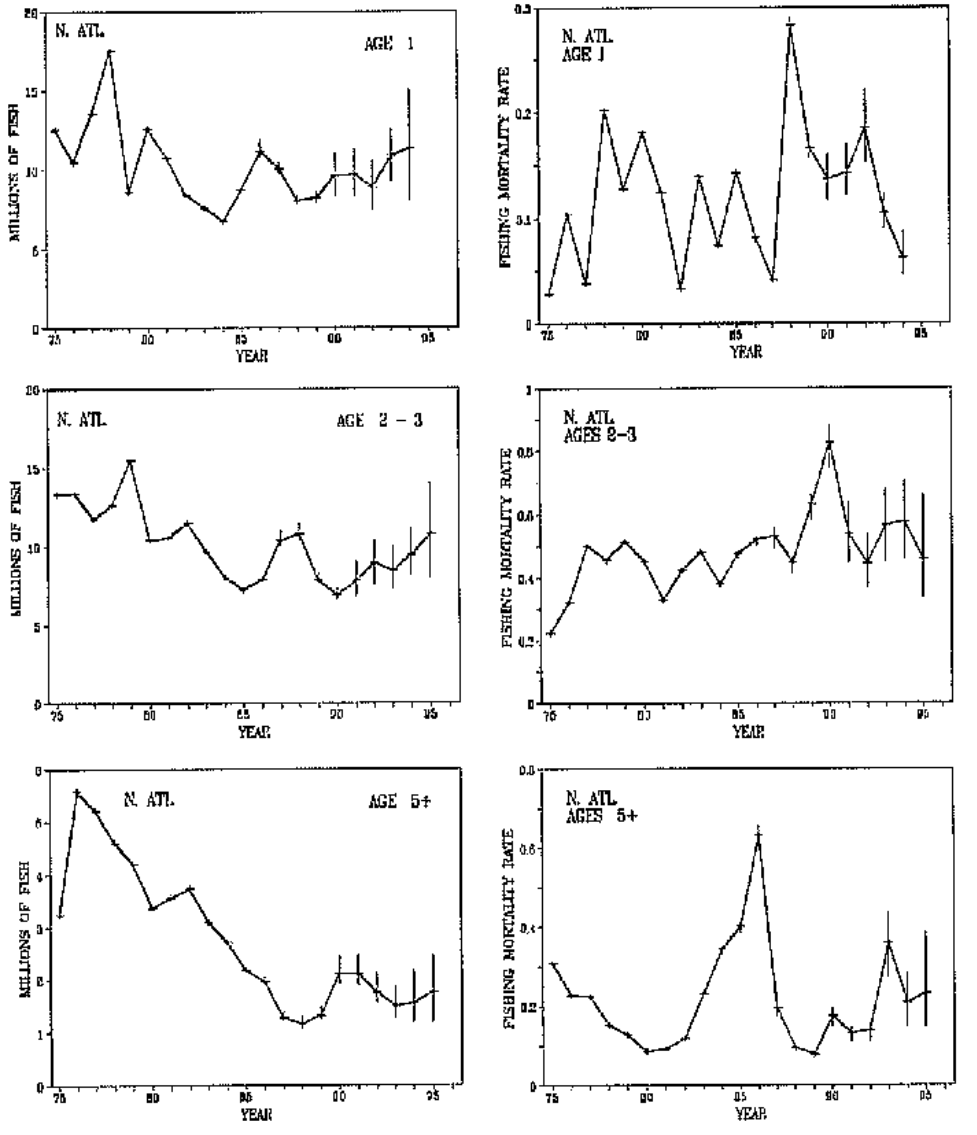
ALB-Fig. 1 Geographical distribution of annual albacore catches throughout 1975-94. (Circles represent catches by longline and histograms represent catches by surface gears.)



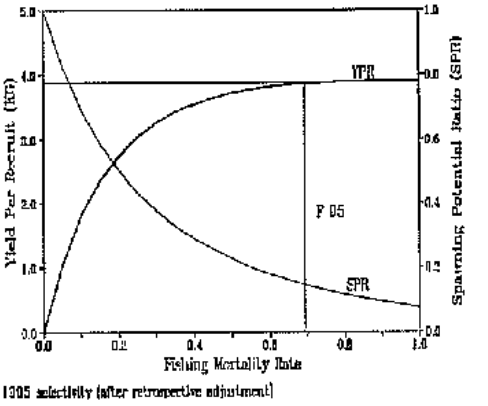
ALB-Fig. 2A Albacore catches (mt) in the north Atlantic, 1950-1995. Mediterranean catches are not shown due to the incompleteness of data for recent years.



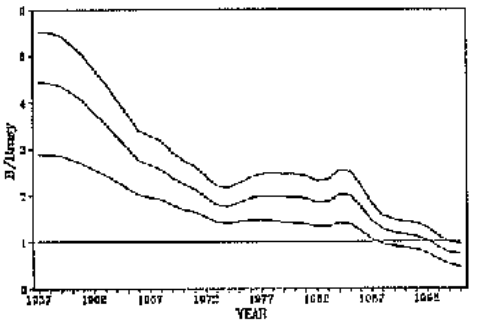
ALB-Fig. 2B Albacore catches (mt) in the south Atlantic, 1950-1995.



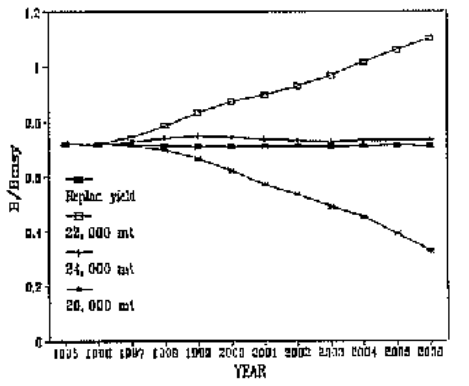
ALB-Fig. 3. Stock abundance (in number of fish) and fishing mortality rate estimated by VPA bootstraping analysis with 80 % confidence intervals, north Atlantic albacore.



ALB-Fig. 4. Yield per recruit (YPR) and spawning potential ratio (SPR), north Atlantic albacore.



ALB-Fig. 5 Ratio of biomass to the biomass at MSY, estimated for south Atlantic albacore, by ASPM (base case) with 95% confidence intervals.



ALB-Fig. 6 Trajectories for rate of biomass to biomass at MSY, fishing mortality to F_{MSY} and catch levels for each options for south Atlantic albacore.

BFT - BLUEFIN TUNA

The SCRS conducts Atlantic bluefin tuna stock assessments based on the assumption of two distinct stocks, west and east Atlantic (including the Mediterranean Sea), although some mixing occurs between the two stocks (**BFT-Figure 1**). Since even minor mixing could, in principle, have a marked effect on stock assessments based on two distinct stock assumptions, due to the difference in population size between the two stocks, the SCRS also conducts sensitivity analyses based on the mixing models. However, mixing models and the available data are not yet considered sufficient to be reliable. Nevertheless, the Committee believes that assessments assuming no mixing should be reasonably robust, if adequate management approaches are applied to both the eastern and western Atlantic management units.

The reported total landings of Atlantic bluefin in 1994 reached an historical high (40,697 MT) which exceeded the previous maximum historical catch of 37,047 MT in 1955 **BFT-Table 1, BFT-Figure 2)**. The 1995 catch (41,757 MT) was higher than the 1994 catch, and is therefore the highest on record. The dramatic increase in total Atlantic bluefin catches in 1994 and 1995 was due to increases in the catch from the east Atlantic stock, as the west Atlantic catch has been limited, by quota, to a low level (2,000-2,700 MT) since 1982.

BFT-1. Biology

Present fisheries for Atlantic bluefin tuna are distributed from the Gulf of Mexico to Newfoundland in the west Atlantic, from roughly the Canary Islands to south of Iceland in the east Atlantic, and throughout the Mediterranean Sea (**BFT-Figure 1b**). In 1982, the Commission established a line for separating the east and west Atlantic management units (**BFT-Figure 1**). A recent review of ICCAT tagging data, conducted in 1994, showed that a small number of fished tagged in the east have been recaptured in the west and *vice versa*.

Atlantic bluefin tuna can grow to over 300 cm and reach 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 in the western Atlantic grow more slowly, generally reach a larger maximum size, and mature at an older age compared to bluefin caught in the eastern Atlantic. Bluefin in the west are assumed to first successfully spawn at age 8 compared to age 5 in the east.

In the west Atlantic, bluefin tuna spawn from mid-April through mid-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 34°N to 41°W and offshore of that area in the winter. In the east Atlantic, bluefin tuna spawn in June and July, primarily in the Mediterranean, mainly around the Balearic Islands, Tyrrhenian Sea, and Ionian Sea, with some occurrences of larvae from southern parts of the central and eastern Mediterranean, where the sea-surface temperature of the water is about 24°C. Distribution expands with age; large bluefin are adapted for migration to colder waters. Bluefin tuna are opportunistic feeders, with fish and squid common in their diet.

BLUEFIN TUNA - WEST

BFTW-2. Description of fisheries

In recent years, the Japanese longline fishery catches in the west Atlantic have declined mainly due to a decrease in fishing effort. The Canadian fisheries showed an increase in 1995, especially for the trap, harpoon, and rod and reel fisheries, as compared to earlier years. Most U.S. fisheries catches in 1995 were similar to previous years. The new winter-spring fishery that developed off Cape Hatteras, North Carolina, in 1994 was continued in 1995. Most fish caught in this new fishery were tagged and released. Catch rates were quite high relative to the summer-autumn catch rates in the northeastern U.S. rod and reel fishery.

From 1992 through 1995, west Atlantic catches (including discards) were 2114, 2309, 2105 and 2426 MT, respectively, compared to about 2,500 to 3,000 in the previous five years (1987-1991) (**BFT-Table 1; BFT-Figure 2**).

BFTW-3. State of stocks

The assessment of western Atlantic bluefin tuna was carried out based on methodology agreed in the Bluefin Methodology Session held in April 1996 (SCRS/96/14) prior to the assessment session. In the 1996 assessment, in

addition to virtual population analyses (VPA), an age-specific production model (ASPM) was also used, in particular, to estimate MSY and the associated spawning stock biomass level by incorporating historical catch and CPUE data before 1970.

Two VPA cases were considered. Also, two production model runs were set up with selectivities corresponding to those for the two VPA runs, and gave similar relative abundance trends to those obtained from the VPA (see **BFT-Figure 3**). The production model estimates of MSY for the current selectivity pattern in the fishery were in the 5,000-6,000 MT range. For reasons given in the Detailed Report, the VPA runs were considered to give the more reliable estimates of current resource status, and the first of these runs was adopted as the base case. Based on considerations of the production model results, the spawning biomass in 1975 in the VPA base case run was taken to be representative of the MSY level.

The results of this 1996 base case assessment generally show similar trends to previous assessments (**BFT-Figure 4**). Recruitment was generally higher from 1970 to 1976 than it has been since. It was essentially stable over the 1980s, until there was a stronger 1989 year-class. Recent estimates of recruitment are lower, but are estimated less precisely for the last few years of the analysis. Related to the strong 1989 year-class, the abundance of ages 6-7 shows a corresponding increase in recent years. The abundance of ages 8+ declined steadily until 1992, the lowest level observed, with a subsequent slight increase . The assessment shows the spawning biomass (age 8+) estimated for 1995 to be 13% of that which produces MSY, while the 1996 value is expected to be slightly larger.

The fishing mortality rate on large fish increased steadily in the 1970s until the implementation of regulations in 1982 (**BFT-Figure 5**), at which time the fishing mortality rate was reduced considerably. However, fishing mortality began increasing again in the 1980s until it peaked in 1991 at a level higher than occurred in the 1970s. The fishing mortality rate since 1993 has been somewhat lower. Fishing mortality rates for age 1 remained at a low level from the mid-1980s. Estimated rates in recent years should be judged with caution since such VPA estimates are generally imprecise.

BFTW-4. Outlook

Base case projections[1] for the west Atlantic (**BFT-Figures 6,7**) indicate that a catch of 2500 MT is sustainable, and that the spawning stock will show a net increase over a period of about 20 years to twice the size in 1995. Transient effects, as a consequence, in particular, of the strong 1989 year-class, are evident (**BFT-Figures 6,7**). The projections indicate that a catch of 3000 MT cannot be sustained. Furthermore, in order for the spawning stock to recover to the MSY biomass level of 1975 within about 20 years, the catch must be reduced to less than 500 MT.

When making decisions on these projections, the Commission should be aware that assessments (including those reported here) are inherently uncertain. Many sources of uncertainty are considered in the Detailed Report. The fact that the VPA projections are based on a stock-recruitment function which reflect recent low levels of recruitment is particularly important when considering long term (10-20 years) projections relative to the MSY biomass level. One of the reasons to rebuild the spawning stock is to increase the likelihood of better recruitment in the future. If this occurs, rebuilding will be more rapid and could occur at a higher catch level than indicated in the base case projections. On the other hand, low levels of recruitment in recent years may reflect factors other than spawning stock size (such as unfavorable environmental conditions). This hypothesis was not investigated, so the Committee has no basis for concluding that it applies to west Atlantic BFT. However, unless recruitment in the future increases above the levels assumed in the projections, rebuilding to the 1975 level of biomass will be difficult and the 1975 biomass level may not be appropriate to produce MSY.

BFTW-5. Effects of current regulations

The Committee noted that, in 1974, the Commission recommended that fishing mortality on bluefin tuna in the entire Atlantic and Mediterranean be limited to recent levels (**BFT-Figure 5**). This recommendation entered into effect in 1975, but has had no effect since it was not adhered to.

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1 All projection results discussed in the Executive Summary correspond roughly to median values (with about a 50:50 probability of better or worse outcomes) and they assume that the constant annual catch level associated with the projections is maintained, unless otherwise stated in the text.

The total 1995 catch in the west Atlantic was 2,426 MT, of which 2,285 MT were landed (141 MT discarded dead), which was 4% above the recommended catch of 2,200 MT. The recommended quotas were 2,660 MT for 1983-1992, a total of 4,788 MT for 1992-1993 combined (average of 2,394 MT per year), 1,995 MT for 1994, and 2,200 MT for 1995. The total landings, not including dead discards, was 2,278 MT in 1993 and 2,029 MT in 1994. Therefore, the catch limits have been followed fairly well.

A regulation prohibiting the catching and landing of bluefin tuna less than 6.4 kg in all areas went into effect in 1975, with a tolerance of 15% (by number) for incidental catches. The catch of fish less than 6.4 kg has been well below the level of 15% of the total bluefin catches in the west Atlantic. The modified regulation limiting catches of fish less than 30 kg or 115 cm to no more than 8% (by weight) of the catch went into effect in 1992. From 1992-1995 three to six percent of the total catch by weight has been below that size.

BFTW-6. Management recommendations

The most recent assessment of western bluefin showed that the 1995 age 8 and older mid-year biomass was about 13% of the 8+ biomass estimated for 1975. In 1995, the Commission requested development of recovery options aimed at achieving a 50% probability of reaching levels which would support MSY in 10, 15 and 20 years. Projections indicate that a catch of 2,500 MT is sustainable, and that the spawning stock will show a net increase over a period of about 20 years to twice the size in 1995. However, the projections indicate than an annual catch of 3000 MT cannot be sustained and that there is a 10% probability of radical reduction by 2004 (assuming it is possible to exert a high enough fishing mortality rate to maintain a constant catch of 3,000 MT as the stock declines). In order for the spawning stock to recover to the MSY biomass level of 1975 within about 20 years, the projections indicate that the catch must be reduced to about 500 MT.

When making decisions based on these projections, the Commission should be aware that there are many sources of uncertainty (which are discussed in the Detailed Report). In particular, assumptions that have to be made about the relationship between stock and recruitment make long-term projections relative to MSY particularly uncertain. In this case, for those projections that show an increase in spawning stock biomass towards the MSY level, the rate of recovery will probably be more rapid than indicated.

On the basis of the projection analyses, the Committee recommended that approximately the current catch level be maintained if the Commission is satisfied with a 50% probability of having slowly increasing 20-year trends in spawning stock size. If the Commission wants to be reasonably sure (i.e., have 90% probability) of at least maintaining the status quo, the catch should be reduced to approximately 2,000 MT. But if the goal is to move more rapidly (i.e., within 20 years) to levels that historically could have produced the MSY, the current catches should be reduced substantially.

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. Certain fisheries, such as the trap fishery, go back to ancient times (with large catches over a long time period). Others, such as the Mediterranean purse seine fishery, were fully developed in the mid-1970s. The main fishing gears in 1995, by region, in order of magnitude of catches are: longline, baitboat and trap in the east Atlantic; purse seine and longline in the Mediterranean.

The reported landings of east Atlantic bluefin in 1994 reached an historical high (38,592 MT), which exceeded the previous maximum historical catch in 1955 **(BFT-Figure 2)**. The 1995 catch (39,331 MT) was even higher than the 1994 catch and is therefore the highest on record **(BFT-Table 1 and BFT-Figure 2).**

The French purse seine catch in the Mediterranean increased substantially to 11,800 MT in 1994, but reported catches declined to 6,247 MT in 1995. However, the export statistics of large fish through Spain to Japan indicate substantial additional catches in 1995 (COM-SCRS/96/169). These recent high catches are believed to be due to favorable climatic conditions, increased effective effort (aided by spotter planes) and new fishing strategies (transshipment vessels), which contributed to higher catches of large fish. It should be noted that there is a new domestic longline fleet developing off Sicily. Such development is thought to be influenced by strong market demands.

East Atlantic catches, excluding the Mediterranean, show an increasing trend since 1987 (4432 MT) to 1995 (9749 MT), with the exception of 1994. Spanish baitboat landings in 1994, after a good season in 1993, returned to the level of previous years (1,943 MT) and increased again in 1995 to 2874 MT. Since 1994, Japanese longliners have been fishing in a new area in the north Atlantic around 60°N by 20°W, as well as in the traditional areas **BFT-Figure 1b)**.

BFTE-3. State of the stocks

The status of the east Atlantic bluefin stock is based on the assumption of an eastern stock with no mixing (see 1995 SCRS Report, section BFTW-3). The VPA base case assessment adopted was developed similarly to the base case for the west Atlantic assessment. The age-specific production model application to the east could not be sufficiently refined to provide reliable results, so that an estimate of the spawning stock level associated with MSY had to be evaluated based upon the fishing mortality level (F_{max}) which provides a maximum yield per recruit under the recent pattern of selectivity in the fishery. This estimated MSY level should accordingly be considered less reliable than that for the west Atlantic.

The estimate of MSY associated with spawning stock biomass at MSY is about 40,000 MT. It may seem surprising that the stock is estimated to be below the associated MSY spawning biomass level in circumstances where catches from 1950 to 1995 have all been below this estimate of MSY. The reasons for this are two-fold: (1) The MSY estimate of about 40,000 MT is based on the average recruitment to the fishery from 1981 to 1992; earlier recruitments to the fishery over the 1970s were about 50% lower on average (and hence suggest an effective MSY over that period, given the current selectivity pattern, of only about 20,000 MT); and (2) past high catches of small fish have prevented the stock from achieving its optimum potential for productivity. Since the current spawning stock biomass is estimated to be only 19% of the MSY level, the MSY of 40,000 MT would not be currently sustainable.

The assessment portrays a declining number of 8+ fish, but also indicated generally increasing numbers of younger fish since 1985 except for the most recent years (**BFT-Figure 8**). Fishing mortality rates are estimated to have increased considerably during the 1970-1995 period. Fishing mortality on the youngest ages (2-4) shows a lesser increase than do the mortalities for older age groups, especially in the most recent years (**BFT-Figure 9**). Estimates in recent years should be judged with caution since such VPA estimates are generally imprecise.

BFTE-4. Outlook

The base case projections (**BFT-Figure 10**) for the east Atlantic indicate that a catch of 25,000 MT is sustainable, and that the spawning stock will show a gradually increasing trend over a period of 20 years to about three times the size in 1995. However, the projections indicate that an annual catch of 30,000 MT is not sustainable, and that the current catch level has a high probability (90%) of resulting in a radical reduction of the spawning stock in 10 years. In order to rebuild to the biomass level believed to be associated with MSY in about 20 years, the annual catch should be reduced to about 20,000 MT.

It should be noted that the projection results in this Report are based on recruitment levels since 1981 which, on average, are higher than in earlier years. The reason for this difference in recruitment levels is unknown, but unless these higher levels of recruitment continue, sustainable yield levels, MSY estimates, and the level of biomass that produces MSY will be lower. If future recruitment is lower than the average level since 1981, a catch of 20,000 MT may be too high to allow rebuilding of the MSY biomass level, even though the level of biomass that produces MSY will be lower.

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 even if spawning biomass is increased to the MSY level.

BFTE-5. Effects of current regulations on east Atlantic and Mediterranean bluefin

The Committee noted that in 1974, it was recommended that fishing mortality on bluefin tuna in the entire Atlantic and Mediterranean be limited to recent levels. This recommendation entered into effect in 1975, but has had no effect since it was not adhered to.

There is also a regulation that prohibits the catching and landing of bluefin tuna weighing less than 6.4 kg in the entire Atlantic, with a tolerance level of 15% (in number) for by-catches. The percentage of fish less that 6.4 kg in

the catch is still high in the east Atlantic and in the Mediterranean. On average, over the 1986-1995 period, these percentages were about 40% and 35%, respectively. While the percentage is variable, there was a notable decline in the east Atlantic until 1993 (15%) but it increased again to 50 % in 1995. The percentage shows strong variations in the Mediterranean, but seems to stabilize at about 30% for the last five years. Catches of age 0 fish are still very high and considerably under-estimated, with no adherence to the regulation regarding no landing of fish <1.8 kg. The percentage of these under-sized fish could be even more substantial than indicated in the official statistics. The market for these small fish is flourishing, as is the case for the large fish, which does not induce the fishermen to limit their catches of this size.

A recommendation entered into force on June 1, 1994, prohibiting fishing by large pelagic longliners greater than 24 m in length in the Mediterranean during the months of June and July. This regulation is aimed at limiting fishing mortality. Some large longliners have been seen fishing during June-July of 1994, 1995 and 1996.

Another recommendation entered into force on June 1, 1995, concerning a 25% reduction of catches by the end of 1998, based on 1993 or 1994 catch levels.

BFTE-6. Management recommendations

The Committee expressed grave concern about the status of east Atlantic bluefin tuna resources in the light of assessment results and the historically highest catches made in 1994 and 1995 (nearly 40,000 MT). Future catch levels of 30,000 MT, or more, are not sustainable. The projections indicate that catches of 25,000 MT or less could result in stock growth. However, **BFT-Figure 10** indicates that the range of possible outcomes is quite large. If the Commission wishes to rebuild the spawning stock to the level of the MSY biomass within about 20 years, the projections indicate that the catches must be reduced to about 20,000 MT. If the time period is to be shorter, the catches must be reduced further **(BFT-Figure 10)**. It should be noted that even these results may be optimistic since they assume that future recruitment continues at the average level observed since 1981. This average level is higher than the average level of recruitment before 1981.

Given the unexpectedly large increase in catches in 1994 and 1995, combined with the results of the present analyses, the Committee considers that a 35% reduction in catches from the 1994 to 1995 levels (i.e., to about 25,000 MT) is necessary to maintain the stock at the status quo or to allow slow increases in stock size with a 50% probability. If the Commissioners want to be reasonably sure (i.e., have 90% probability), of at least maintaining the status quo, the catch should be reduced to about 15,000 MT.

The Committee is concerned about the high catch of small individuals and recommended that every effort be made so that the current measures on the size limit of 6.4 kg be adhered to. The Committee reiterated that effective measures be taken to avoid catches of age 0 fish (<1.8 kg), and not allow any tolerance with respect to the percentage (in number) of age 0 fish in the landings.

It should also be noted that the grave condition of the east Atlantic stock and fishery could adversely affect recovery in the west Atlantic. Mixing models indicate that even a relatively low rate of mixing could be important, although these models are not yet reliable enough to quantify the effect.

Finally, the Committee is gravely concerned about the lack of basic catch and effort statistics for the Mediterranean Sea. In addition, the increase in NEI in 1995 is mainly due to the fact that some fleets land their catches at foreign ports (including ICCAT member country ports). This is the case for major purse seine and longline fisheries. Because, in addition, bluefin tuna catches in the east Atlantic are predominantly from the Mediterranean, it is difficult to conduct stock assessment for the east Atlantic management unit and to give clear advice to the Commission. Countries engaging in purse seine and longline fishing in the Mediterranean Sea must take immediate and effective action, including at least implementing a proper logbook system and size sampling.

ATLANTIC BLUEFIN TUNA SUMMARY

	West Atlantic	*East Atlantic*
Current (1995) Catch	2,426 MT (discards included)	39,331 MT
Current (1995) Sustainable Yield	about 2,500 MT	about 25,000 MT
Maximum Sustainable Yield (MSY)[1]	5,000-6,000 MT	40,000 MT (not well estimated)
Relative Spawning Stock Biomass (B_{1995}/B_{MSY})[2]	0.13 (ages 8+)	0.19 (ages 5+)
Relative Number (N_{1995}/N_{1975})	0.17 (ages 8+)	0.95 (ages 5+)
Management Measures in Effect	--No landing of fish <6.4 kg, with a 15% tolerance. --Fishing mortality not to exceed *circa* 1975 level. --Limit catches <115 cm (30 kg) to no more than 8% by weight. --Total catch limit of 1,995 MT in 1994 and 2,200 MT in 1995 and 1996.	--No landing of fish <6.4 kg, with a 15% tolerance. --Fishing mortality not to exceed *circa* 1975 level. --No longlining in Med. in June-July by vessels >24 m. --1995 catches <1993 or 1994. --A progressive 25% reduction over 3 years starting in 1996 on 1993 or 1994 catches. --No landing of fish <1.8 kg, with no tolerance, commencing 1995.

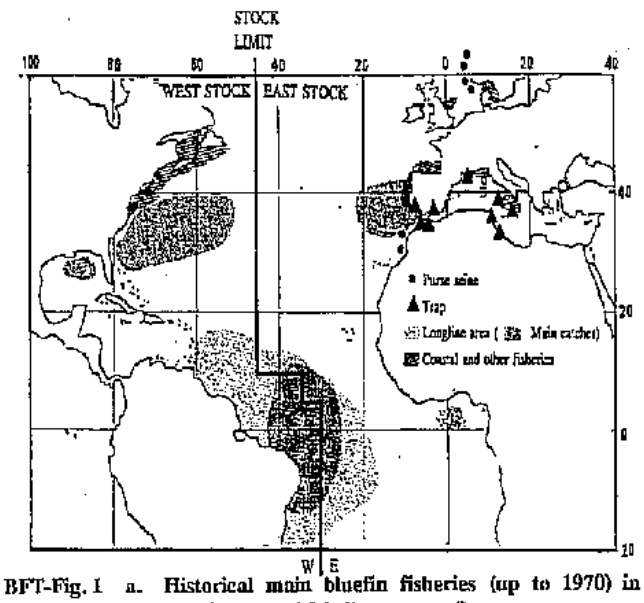
1 For the most recent age-specific selectivity pattern in the fishery.
2 For west $B_{MSY} = B_{1975}$; for east B_{MSY} based on F_{max}.

BFT-Table 1. Atlantic bluefin tuna landings (and discards) in metric tons, by region, country and gear, 1965-1995.

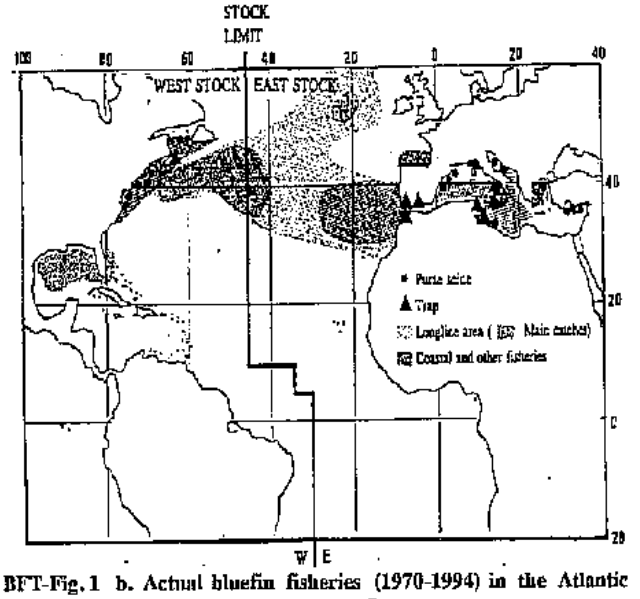
COUNTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL LANDING	24701	27984	33823	29318	35213	31002	22706	25207	15738	17385	15924	17461	14634	14607	24516	26249	28168	25468	20409	18478	19904	19617	23820	24202	26716	26836	22314	20476	27065	24612	24817	26857	27243	29951	40621	41616
TOTAL DISCARDS	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	0	514	192	215	262	133	199	44	31	76	141
EAST ATL + MEDITE	23669	26364	28024	15480	16525	16831	14616	19267	12562	14373	10458	10870	10686	10736	19123	21217	22285	18774	14646	12223	14103	13846	22375	21660	24424	24151	20506	18077	24269	22007	22152	24064	25173	27673	38592	39331
EAST ATLANTIC	18854	20750	23230	9020	10230	10834	9290	10523	4629	5683	5764	4675	4732	4685	6067	9976	5212	6977	5800	4767	4064	3331	6669	8010	7392	4759	4491	4432	6950	5323	5935	6735	7373	9076	7216	9749
CAP-VERT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0
CHINA.TAIWAN	0	0	0	0	0	0	0	0	138	114	46	12	2	1	12	5	3	2	0	3	5	6	16	2	0	0	0	0	0	0	0	0	0	6	11	8
DENMARK	47	192	202	4	61	30	2	15	8	1	0	1	0	2	1	0	3	1	3	1	0	4	0	0	0	2	1	0	0	0	0	0	0	0	0	0
ESPANA	6345	5246	5272	2608	3176	4399	3123	3945	2184	3192	3785	2975	2542	3106	1648	2447	2002	2914	4025	3541	2335	2247	2824	4445	4804	3630	2876	2476	4567	3565	3557	2272	2367	5078	3137	3819
FRANCE	553	907	965	543	400	621	1624	860	390	534	732	680	740	551	522	692	267	592	723	275	260	153	150	400	602	490	348	533	724	460	510	565	894	1099	336	725
GERMANY F.R	434	331	212	0	0	0	0	0	0	0	14	1	6	2	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GUINEA																																				189
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	4	0	0
HONDURAS	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	0	0	0	0	0	0	0	0	104	0	0
JAPAN	481	204	2484	1618	585	404	50	100	13	2	21	157	240	44	2195	2900	1973	1594	577	630	880	515	2573	2609	1514	420	739	900	1169	838	1464	2981	3350	2484	2075	3971
KOREA	0	0	0	0	0	0	0	0	0	0	0	0	19	43	36	15	3	2	0	1	0	0	0	3	0	77	0	0	0	0	0	0	0	0	4	205
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	0	0	0	0	0	0	0	0	0	312	0	0
MOROCCO	6000	4371	5276	3737	4315	2788	3379	3379	1088	737	692	93	653	513	597	2624	331	884	36	206	161	177	993	365	171	86	288	356	437	451	303	795	412	276	502	641
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	6	3	4	0	5	6	74	4	0	0	0	0
NEI-21	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	0	0	0	0	0	0	0	0	911	159
NORWAY	3936	7987	8153	156	1390	2502	990	2015	753	842	470	653	430	420	865	988	529	764	221	60	282	161	50	1	243	0	31	0	0	0	0	0	0	0	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	69	208	156	14	117	48	12	0	17	22	11	4	0	0	0	0	0	0	0	19
POLAND	0	0	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	1016	1499	666	354	303	90	122	209	55	261	0	0	0	0	191	303	24	14	56	35	24	17	41	174	34	29	193	163	48	3	27	117	38	25	240	12
SWEDEN	42	13	0	0	0	0	0	0	0	0	4	3	0	0	0	2	8	2	2	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
UNITED KINGDOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
WEST ATLANTIC	1032	1620	5799	13838	18688	14171	8090	5940	3176	3012	5466	6591	3948	3871	5393	5032	5883	6694	5763	6255	5801	5771	1445	2542	2292	2685	1808	2399	2796	2605	2665	2793	2070	2278	2029	2285
ARGENTINA	0	0	106	271	204	100	100	60	21	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	6	0	2	0	1	2	0	0	0	0	0
BRASIL-JPN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	10	2	3	1	1	0	1	0	2	0	2	1	0	0	0	0	0
CANADA	37	120	177	642	996	636	198	230	281	363	1442	1082	477	1018	768	641	846	972	670	245	324	425	291	433	264	142	73	83	393	619	438	485	443	459	392	576
CHINA.TAIWAN	0	0	0	0	0	0	0	0	12	7	2	13	7	2	20	1	0	1	1	49	15	7	11	2	3	3	3	0	0	0	0	0	0	0	0	0
CUBA	0	0	0	0	0	139	465	2352	1351	468	200	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	339	373	1219	6191	12044	9147	2471	694	272	116	66	1375	321	1097	905	1513	2902	3658	3144	3621	3936	3771	292	711	696	1092	584	960	1109	468	550	688	512	581	427	387
KOREA	0	0	0	0	0	0	0	0	0	0	0	0	11	23	20	8	7	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	23	29	39	24	37	14	28	22	10	20	14	0	0	0	0	0	0	0	0	0	0	0	4	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	14	1	0	0	0	0	0	30	24	23	17	0	0	0
NORWAY	0	0	0	0	71	4	10	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	0	0	0	0
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	157	92	58	10	9	14	12	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	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOUTH AFRICA	0	0	0	0	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	0	0	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	0	0	0	0	0	3	2	14	14	14	0	43	9
TRINIDAD & TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
U.S.A	656	1127	4297	6734	5364	4145	4846	2604	1239	2058	3756	4119	3109	1698	3638	2845	1931	1956	1848	2297	1505	1530	807	1394	1320	1424	1142	1352	1289	1483	1636	1582	1084	1237	1163	1311
URUGUAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	9	16	6	0	2	0	0	1	0	1	0	2
WEST ATLANTIC DISCARDS											0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	514	192	215	262	133	199	44	31	76	141
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	0	0	0	0	14	0	0	0	0	0	0
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	514	192	215	248	133	199	44	31	76	141

BFT-Table 1. Atlantic bluefin tuna landings (and discards) in metric tons, by region, country and gear, 1965-1995. **REV 6. Sept 16 - 12:OO**

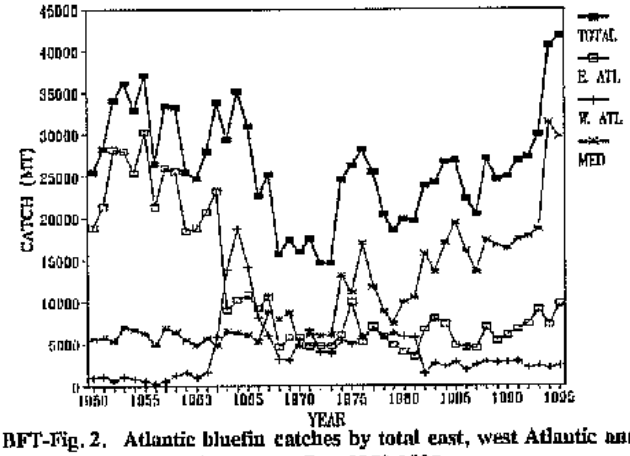
COUNTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEDITERRANEAN	4815	5614	4794	6460	6295	5997	5326	8744	7933	8690	4694	6195	5954	6051	13056	11241	17073	11797	8846	7456	10039	10515	15706	13650	17032	19392	16015	13645	17319	16684	16217	17329	17800	18597	31376	29582
ALGERIE	0	0	0	0	0	0	150	150	150	150	100	100	1	0	33	66	49	40	20	150	190	220	250	252	254	260	566	420	677	820	782	800	304	304	304	304
BELIZE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	398
CHINA.TAIWAN	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	0	0	0	0	0	0	0	0	328	713	494
CROATIA	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	0	0	0	0	0	0	538	347	176	389	408
CYPRUS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	10	10	10	10	10	10	10	10	10	14	0	0
ESPANA	561	620	377	1272	953	1635	651	404	604	617	349	182	212	420	203	120	253	158	165	115	133	354	989	812	2743	1460	701	1178	1428	1645	1822	1392	2165	2018	2711	4400
FRANCE	400	599	214	668	953	390	1000	1500	2500	1500	1100	2200	1100	1400	1800	1600	3800	3182	1597	1578	1701	2350	4878	3660	3600	5430	3490	4330	5780	4434	4713	4620	6000	4760	11843	6357
GREECE	900	1100	1000	1200	600	700	500	600	500	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	131	99	102	131	155	123	92	92	362	612
GUINEA-ECUATORIAL	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	0	0	0	0	0	0	0	0	0	0	111
GUINEE REP.	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	0	0	0	0	0	0	0	0	0	282	240
ITALY	1345	1772	1612	2483	2642	1565	1575	3037	2430	3152	2264	2480	3718	3167	6839	7083	10369	6263	4983	4020	6272	6017	6658	5865	7140	7199	7576	4607	4201	4317	3734	3500	4651	4802	5526	5531
JAPAN	0	0	0	0	0	0	0	0	0	0	0	0	112	246	2195	1260	968	520	61	99	119	100	961	677	1036	1006	341	280	258	127	172	85	123	793	536	813
KOREA	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	0	0	0	0	0	0	0	0	0	684	458
LIBYA	1100	1000	800	100	400	600	700	800	1000	2000	500	600	449	475	1469	780	799	336	677	424	398	271	310	270	274	300	300	300	300	84	258	290	338	546	1332	1332
MALTA	100	100	100	100	100	100	100	100	100	0	0	0	0	0	21	37	25	47	26	23	24	32	40	31	21	21	41	36	26	34	66	63	94	151	344	293
MAROC	0	0	0	0	0	172	11	27	5	0	0	79	37	1	9	40	1	7	0	2	0	2	0	1	4	12	56	116	140	295	588	29	84	6	338	22
NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	19	0	168	255	700	757	415	1750	1349	1624	0	0
NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	49	49	0	0	0
NEI-8																																				2836
NEI-21	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	0	0	0	0	0	0	0	0	892	1183
NEI-11	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	0	0	0	0	0	0	0	0	38	220
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	513	1129	1274
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	278	320	183	428	446
TUNISIE	0	0	404	260	376	601	293	307	184	77	153	206	57	52	136	83	66	131	141	262	228	218	298	293	307	369	315	456	624	661	406	1366	1195	1132	2382	851
TURKEY	300	300	200	100	0	100	100	1488	310	393	138	22	68	66	34	17	181	177	127	27	391	565	825	557	869	2230	1524	910	1550	2809	2137	2436	679	1155	998	999
YUGOSLAVIA	109	123	87	277	271	134	246	331	150	301	90	326	200	224	317	155	562	932	1049	756	573	376	486	1222	755	1084	796	648	1523	560	940	0	0	0	0	0



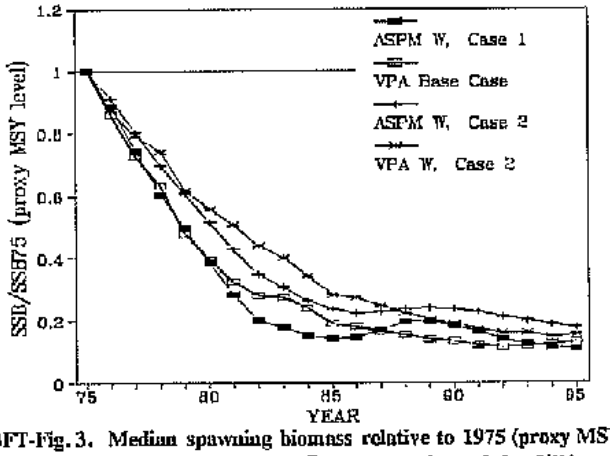
BFT-Fig. 1 a. Historical main bluefin fisheries (up to 1970) in Atlantic Ocean and Mediterranean Sea.



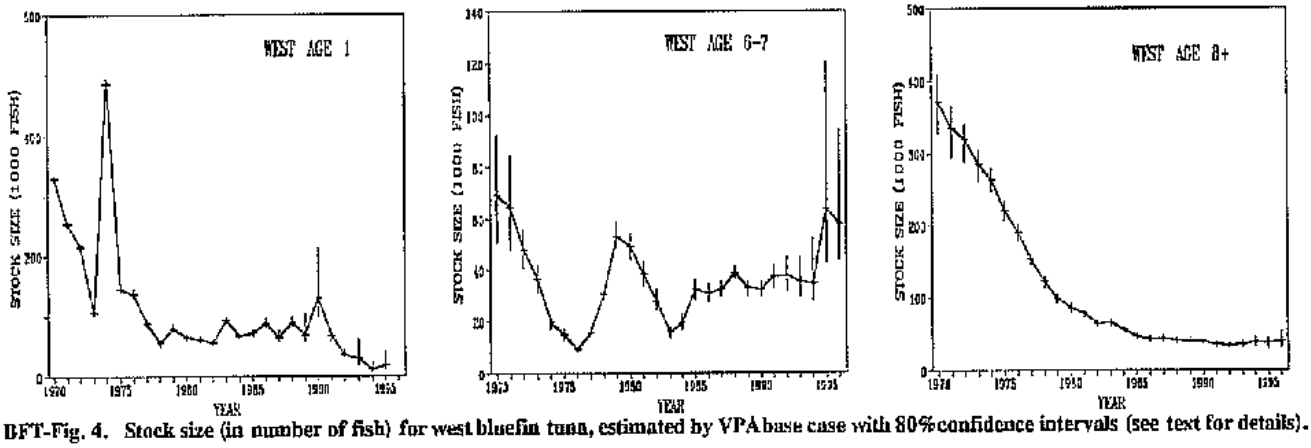
BFT-Fig. 1 b. Actual bluefin fisheries (1970-1994) in the Atlantic Ocean and Mediterranean Sea.



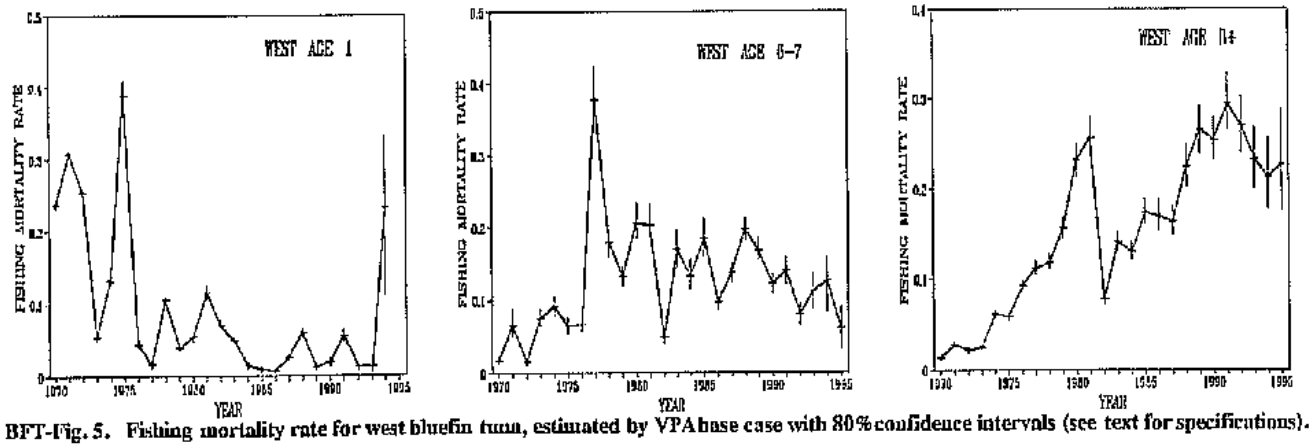
BFT-Fig. 2. Atlantic bluefin catches by total east, west Atlantic and the Mediterranean Sea, 1950-1995.



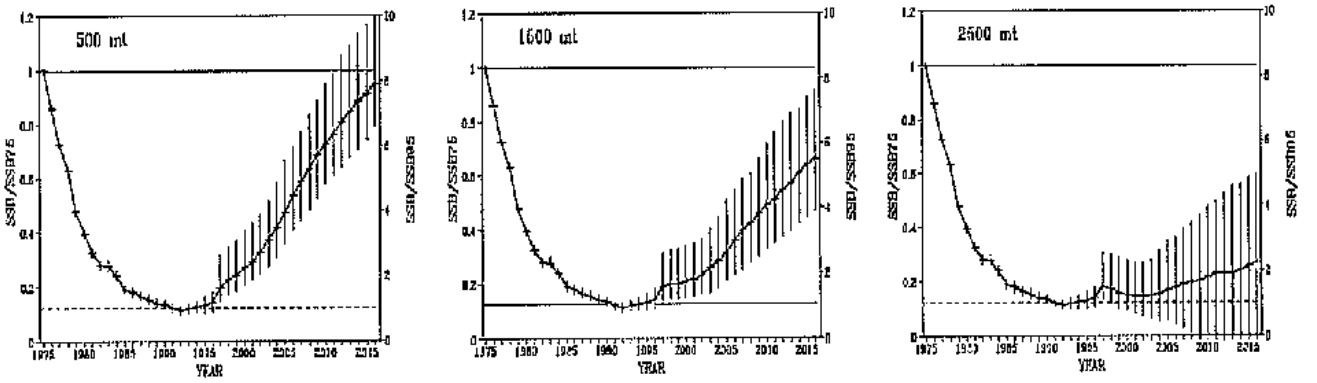
BFT-Fig. 3. Median spawning biomass relative to 1975 (proxy MSY level), for west bluefin tuna, estimated by VPA and production model runs.



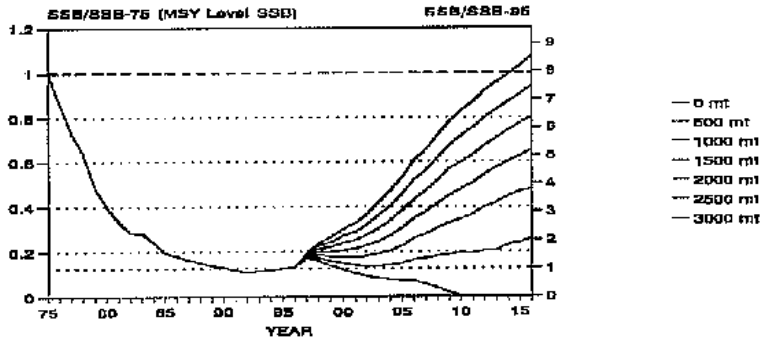
BFT-Fig. 4. Stock size (in number of fish) for west bluefin tuna, estimated by VPA base case with 80% confidence intervals (see text for details).



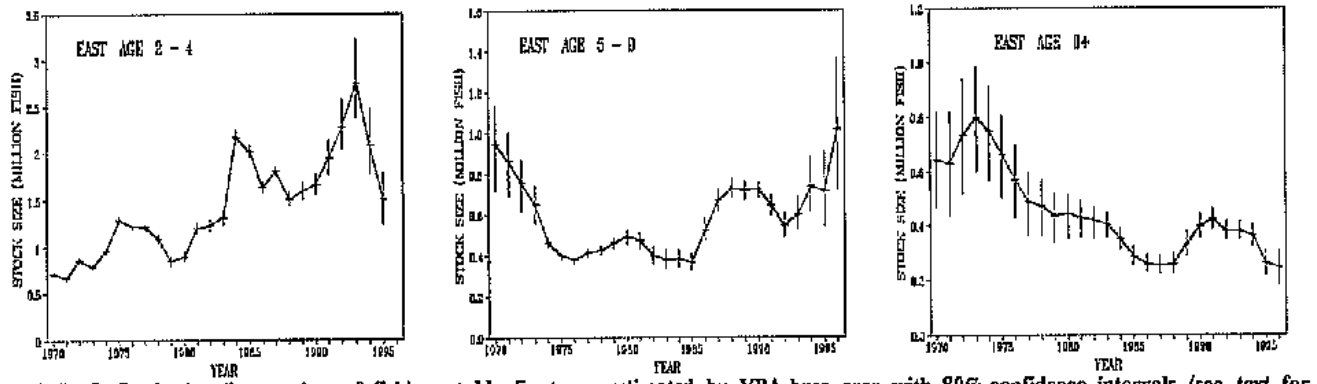
BFT-Fig. 5. Fishing mortality rate for west bluefin tuna, estimated by VPA base case with 80% confidence intervals (see text for specifications).



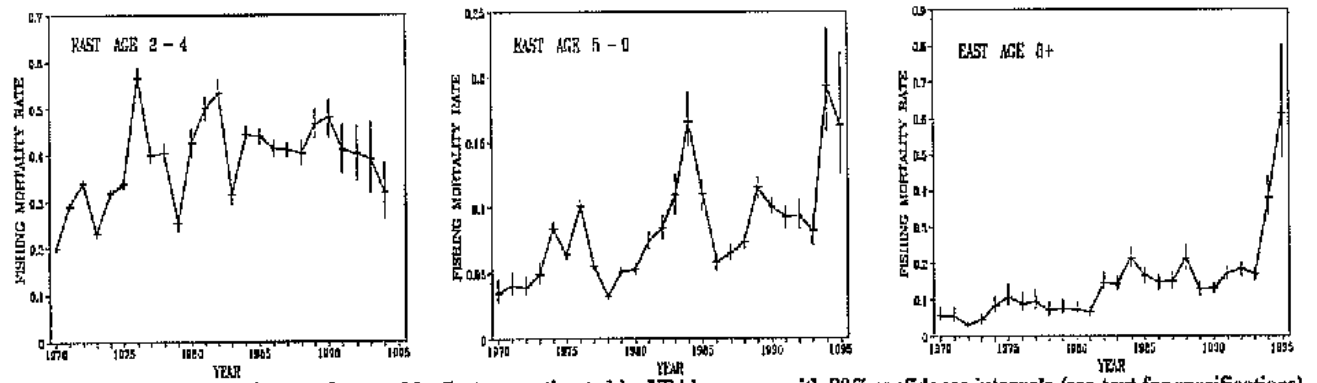
BFT-Fig. 6. Projections made for west bluefin tuna from VPA base case, under the constant catch of 500, 1500 and 2500 mt, 1997 to 2016. Lines represent median trajectories: error bars are approximate 80% confidence ranges relative to 1975.



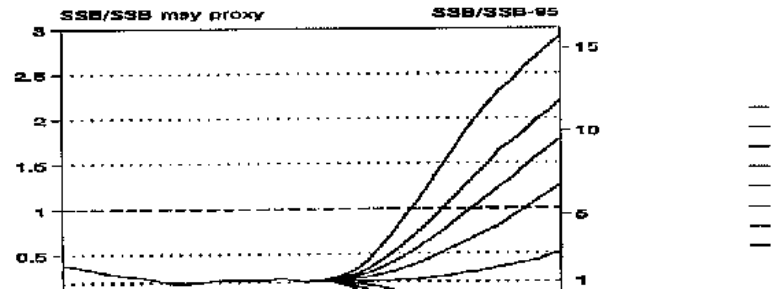
BFT-Fig. 7. Median projections made for west bluefin tuna in VPA base case, under the constant catch of 0 to 3000 mt for 1997 to 2016.



BFT-Fig. 8. Stock size (in number of fish) east bluefin tuna, estimated by VPA base case with 80% confidence intervals (see text for specifications).



BFT-Fig. 9. Fishing mortality rate for east bluefin tuna, estimated by VPA base case with 80% confidence intervals (see text for specifications).



BFT-Fig. 10. Median projections made for east bluefin tuna in VPA base case, under the constant catch of 0 to 40000 mt for 1997 to 2016.

BUM - BLUE MARLIN

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 kgs. Blue marlin have an extensive geographical range, often have migratory patterns that include trans-Atlantic 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 kgs 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 upper reaches of the water column and are typically caught most frequently as a by-catch by the offshore longline fisheries which target tropical or temperate tunas using shallow deployment of gear. However, significant by-catch landings are also made by offshore longline fisheries which target swordfish, particularly in the west Atlantic Ocean.

The stock hypotheses 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 total Atlantic hypothesis for blue marlin. More recently, the Committee reviewed and discussed new data on genetic mitochondrial DNA analysis, as well as tag release-recapture data, and concluded that these data were most consistent with a total Atlantic hypothesis. Additionally, the Committee concluded that the north/south separation is arbitrary for this tropical species (as with white marlin). The Committee did recommend that, if possible, it would be prudent to also assess the status of the stock under a separate north and south Atlantic hypothesis.[2]

BUM-2. Description of 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 of various countries which target tuna and swordfish, including Brazil, Cuba, Japan, Korea, Taiwan, and others. Other major fisheries are the directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, and many other countries 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 which take blue marlin in the western Atlantic, Caribbean Sea, and east and south Atlantic by various countries have been reported (mainly Spain and the U.S. for eastern and western Atlantic, respectively). Purse seine fisheries also have an incidental catch of blue marlin.

Landings for the total Atlantic first developed in the early 1960's, reached a peak of over 9,000 MT in 1963, declined to the range of about 2,000 - 3,000 MT during the period 1967-1977, and have fluctuated with an increasing trend over the period 1978-1995 (**BUM-Table 1 and Figure 2**). Landings for the north Atlantic generally show trends similar to those for the total Atlantic. The general trend in catches have followed the intensity of the offshore longline fisheries.

BUM-3. State of stocks

The most current assessments for blue marlin were conducted during the Third ICCAT Billfish Workshop held in Miami, Florida, during July, 1996. These assessments included data through 1995, which represented revisions and updating from the previous assessment presented at the 1992 SCRS. The general results from these analyses using a non-equilibrium production model (ASPIC) indicated that biomass had been below B_{MSY} for about three decades for both the total and north Atlantic hypotheses (**BUM-Figures 3 and 4**). The Committee considered these stocks to be over-exploited. The assessment results for the south Atlantic were judged to be unreliable and results are not presented

2 The production model analysis of the south Atlantic database could not be made to converge to a solution without fixing several parameters, thus making the assessment results unreliable. Because of the poor model fit, benchmark values are not provided in the summary table.

for this hypothesis. However, it should be noted that the Committee indicated that the total Atlantic assessment results were the most appropriate for this species. Bias-corrected point estimates of maximum sustainable yield were estimated from production model analyses for the total Atlantic and north Atlantic to be about 4,461 and 1,963 MT, respectively. Current landings in 1995 for the total and north Atlantic were estimated at 3,926 and 1,430 MT, respectively. Biomass for the total and north Atlantic in 1996 was estimated to be about 24 and 61%, respectively, of the biomass needed to produce MSY; i.e., B_{1996}/B_{MSY} .

BUM-4. Outlook

For the total Atlantic hypothesis, reported landings from 1995 (3,926 MT) were larger than the estimated equilibrium replacement yield of about 1,920 MT. Landings greater than the replacement yield are expected to result in continued decline in stock status. The reported landings for 1995 (1,430 MT) from the north Atlantic are lower than the estimated equilibrium replacement yield of about 1,694 MT. Landings less than the replacement yield are expected to result in some improvement in stock status. Although the 1995 SCRS previously recognized the increase in stock biomass from north Atlantic production model results (presented at the 1992 SCRS) as a sign of recovery, the slight upturn in the biomass trajectory of the current north Atlantic assessment was not characterized as a recovery by the Committee. It should be reiterated that the Committee recognized that the biology of Atlantic blue marlin was most consistent with the total Atlantic hypothesis. Although the outlook for the north Atlantic hypothesis is more optimistic relative to the total Atlantic assessment results, the Committee has concerns about the status of blue marlin stocks for both stock hypotheses when considered separately. In addition, even though assessment results for the south Atlantic are considered unreliable, similar concerns of the resource status for this hypothesis also exist. Therefore, the Committee continues to regard the persistent high level of fishing mortality, which has depressed stock biomass to levels below that which could produce MSY in stock hypotheses examined here, as inconsistent with the management objective of MSY.

BUM-5. Effect of current regulations

No ICCAT regulations are currently in effect for Atlantic blue marlin.

Two ICCAT contracting parties (the U.S. and Venezuela) and two non-contracting parties (Mexico and St. Lucia) have established domestic regulations for commercial and recreational fisheries involving blue marlin to reduce mortality. In addition, many other countries participating in the recreational fisheries for Atlantic blue marlin have had volunteer release or tag and release policies which also have the effect of reducing mortality.

BUM-6. Management recommendations

The 1996 stock assessments for Atlantic blue marlin indicate that this species is overexploited and warrants consideration for development of methods to reduce fishing mortality rates. The Committee believes that one approach to reducing mortality would be to release or tag and release those blue marlin that are caught by longline vessels which appear to be alive when brought alongside the boat. Such an approach would first have to be implemented on an experimental and selective basis while additional research is conducted to determine the rate of survival of billfish caught and released off longline vessels.

The Committee acknowledges that progress has been made on many aspects of the resolution on billfish, approved at the 1995 Commission meeting, including convening the Third Billfish Workshop, revising the billfish databases, and updating billfish assessments. However, this resolution also proposed development of a five-year research plan and the Committee recognized that this can be implemented **ONLY** if Commission funding becomes available to the Billfish Program. This recommendation represents a change in the financial structure of the Billfish Program, which was initially set up in 1986 to be supported only by outside funding (SCRS 1986). This change clearly reflects the fact that since billfish were initially among the species groups under ICCAT jurisdiction included in the original ICCAT charter, that they should be treated like other species within ICCAT with regards to Commission support. However, it is anticipated that outside funding will continue to support this program but at a lower level than in previous years. Also, see **Appendix 5**, the Billfish Program Plan for 1997.

ATLANTIC BLUE MARLIN SUMMARY
(Bias corrected point estimates)

	Total Atlantic	*North Atlantic*	*South Atlantic*
Maximum Sustainable Yield, (MSY):	4,461 MT	1,963 MT	—
approximate 80% CI	4,096-4,787 MT	1,742-2,133 MT	—
Current (1995) Yield (observed)	3,926 MT	1,430 MT	—
Current (1996) Replacement Yield	1,920 MT	1,694 MT	—
Relative Biomass (B_{1996}/B_{MSY})	0.236	0.608	—
Relative Fishing Mortality:			—
F_{1995}/F_{MSY} (approx. 80% CI)	2.87 (1.45-3.41)	1.21 (0.96-1.56)	
Management Measures in Effect	none	none	none

BUM-Table 1. TASK I catch (MT) reported for blue marlin.

COUNTRY	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	653	3452	9037	8010	6155	3859	2240	2515	3091	2864	3367	2366	3177	3016	3185	2310	2047	1506	1384	1574	1707	2468	1722	2371	2918	1818	1740	2453	3957	4301	4006	2741	2978	3468	3611
AREA UNKNOW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	213	281	145	200	200	200	200	200	200	200	200	200	200	200	200
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	101	45	100	100	100	100	100	100	100	100	100	100	100	100
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	180	100	100	100	100	100	100	100	100	100	100	100	100	100
NORTH ATLAN	653	3452	5141	4809	3682	2040	1173	1381	1601	1845	2150	1315	1616	1916	2076	1366	1255	976	880	1067	1249	1616	1186	1285	1438	1045	660	812	1452	1939	1451	1091	1240	1229	1315
BARBADOS	0	0	0	0	0	0	0	0	0	0	0	0	0	183	150	120	81	72	51	73	117	99	126	126	10	14	13	46	3	18	12	21	21	23	23
BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	5	2	4	1	2	7	8	9	11	6	8	15	17	18	19	11	15	15
CANADA-JPN	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	0	1	0	0	0	0	0	0	0	0
CHINA.TAIWAN	0	9	27	8	2	34	131	374	348	369	193	300	155	183	105	169	64	81	51	160	98	100	125	102	148	117	52	26	11	937	716	336	281	182	206
CUBA	0	0	123	128	144	91	223	167	122	108	149	67	223	516	594	250	220	97	156	162	178	318	273	214	246	103	68	94	74	112	127	135	38	50	50
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	1	0	2	23	2	4	8	0	0	0
GABON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
GRANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	12	6	8	11	36	33	34	40	52	64	52	58	52	52
JAPAN	379	3223	4759	4434	3330	1677	485	474	658	758	1223	335	229	267	551	260	118	54	68	193	332	637	192	351	409	174	78	206	593	250	145	193	207	337	479
KOREA	0	0	0	1	4	46	66	93	214	368	221	215	457	385	304	174	307	185	67	48	71	19	43	110	154	36	13	14	252	240	34	11	2	16	16
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	0	0	0	0	0	0	0	3	13	13
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	0	0	0	0	0	0	0	0	57	100	100
NETHERLAND.AN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50	50	50	50	50	50	50	50	50	50	50	50	40	40	40	40	40
PANAMA	0	0	0	0	0	0	0	0	0	0	0	10	208	62	44	47	87	42	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	8	12	8	2	1	1	4	2	15	6	5
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	0	0	0	1	1	5	0	0	5	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	0	0	0	0	1	0	0	1	2	2	2
TRINIDAD & TOB	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	3	17	2	0	28	4	6	4	226	150	150
U.S.A	116	115	128	161	163	149	197	168	207	204	179	191	209	234	241	265	295	295	295	295	295	295	187	187	167	249	253	313	335	230	217	176	221	110	72
U.S.S.R	0	0	0	0	1	1	3	3	3	2	3	7	10	1	3	0	1	1	0	0	0	0	0	0	0	7	23	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	0	0	0	0	0	0	0	0	15	0	0	0	0
VENEZUELA	158	105	104	77	38	42	68	102	49	36	182	190	125	85	83	79	80	94	134	81	106	83	172	117	219	218	60	17	25	25	44	93	57	128	92

BUM-Table 1. TASK I catch (MT) reported for blue marlin.

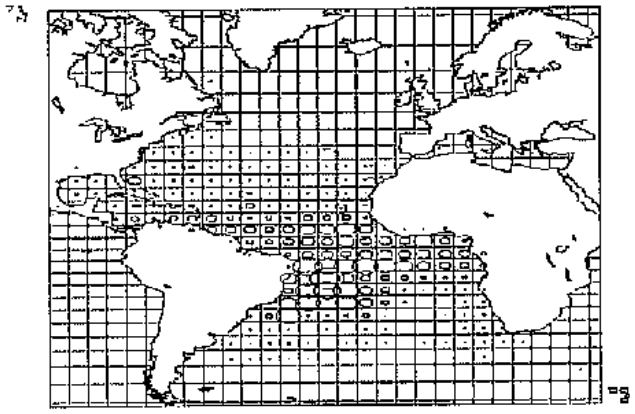
As of July 13, 1996

COUNTRY	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SOUTH ATLANTIC			3896	3201	2473	1819	1067	1134	1490	1019	1217	1051	1561	1100	1109	944	792	530	504	507	458	852	536	1086	1480	773	1080	1641	2505	2362	2555	1650	1738	2239	2296
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	0	9	10	7	4	12	0	6	6	6	6	0	0
BRASIL	41	24	12	12	12	12	6	15	18	39	14	17	4	15	15	41	100	49	34	30	48	50	30	32	40	46	51	74	67	52	69	69	135	78	* 172 *
CHINA.TAIWAN	0	11	21	5	2	35	160	429	1016	560	742	628	537	369	422	240	107	177	139	129	104	150	47	70	165	98	265	266	462	767	956	488	404	262	297
COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100	100	100	88	65	72	78	58	110	153	144
CUBA	0	0	22	26	32	27	221	113	43	41	17	22	75	170	195	159	100	113	180	187	108	118	123	159	205	111	137	191	77	90	62	69	0	0	0
GHANA	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	0	0	0	430	324	126	123	236	441	471
JAPAN	3389	3821	3841	3156	2421	1693	588	472	302	247	172	85	117	17	57	4	17	15	66	115	136	495	248	482	691	335	362	617	962	967	755	824	719	1165	1072
KOREA	0	0	0	1	3	47	79	93	98	120	258	251	532	449	354	392	356	140	78	46	55	31	88	234	262	60	139	361	437	84	503	13	11	40	40
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	0	0	0	0	0	0	0	0	117	100	100
PANAMA	0	0	0	0	0	0	0	0	0	0	0	12	244	72	51	107	103	32	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U.S.S.R	0	0	0	1	3	5	13	12	13	12	14	36	52	8	15	1	9	4	0	0	1	0	0	0	7	16	22	32	5	0	0	0	0	0	0

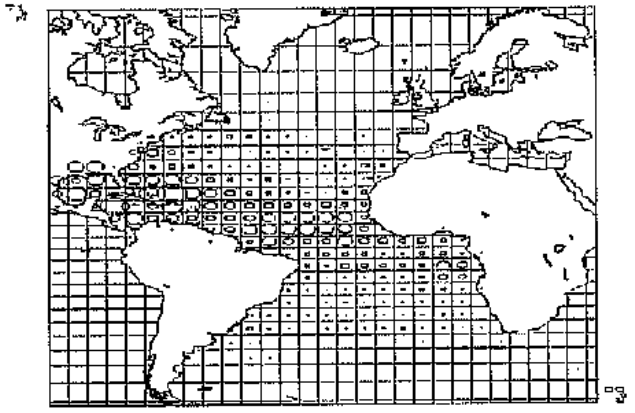
* Include near-surface LL catches of 5 mt for 1994 and 36 mt for 1995

** Unknown quantities of catches.

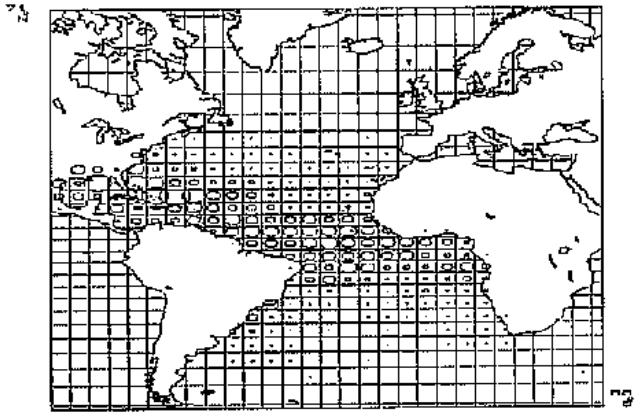
NOTE: Reprted catches for U.S. RR are minimum estimates for ICCAT Areas 92 and 93.



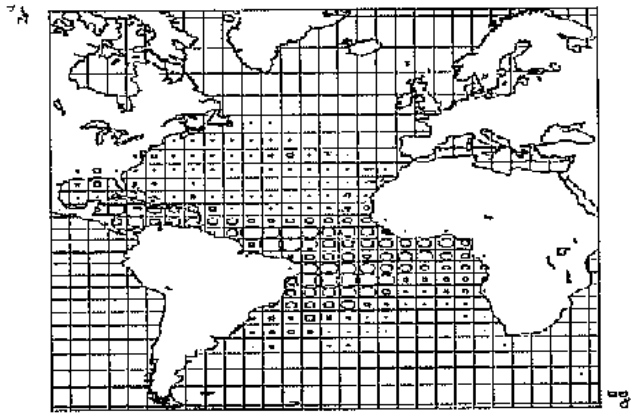
1st Quarter



3rd Quarter

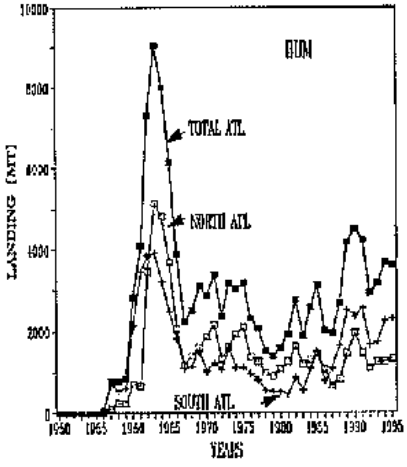


2nd Quarter

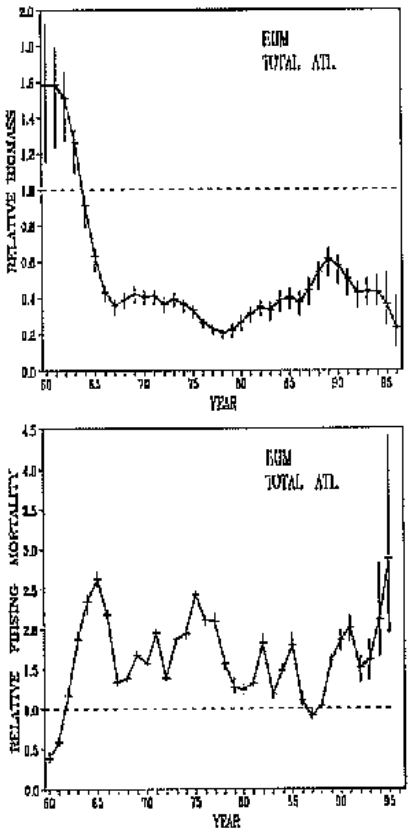


4th Quarter

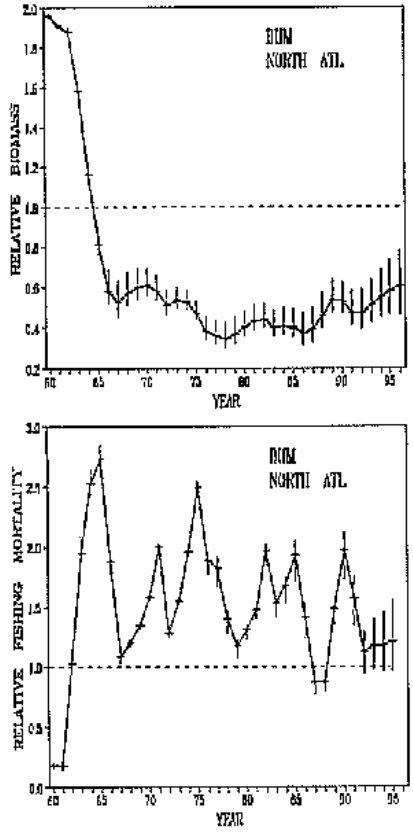
BUM-Fig. 1. Distribution of blue marlin catches throughout 1950-1994



BUM-Fig. 2. Task I catches (MT) of blue marlin by regions, 1950-1995.



BUM-Fig. 3. Bootstapped (2000 trials) median relative biomass and relative fishing mortality for blue marlin fisheries from the total Atlantic with approximate nonparametric 80% confidence intervals.



BUM-Fig. 4. Bootstapped (2000 trials) median relative biomass and relative fishing mortality for blue marlin fisheries from the north Atlantic with approximate nonparametric 80% confidence intervals.

WHM - WHITE MARLIN

WHM-1. Biology

White marlin are found throughout tropical and temperate waters of the Atlantic Ocean and adjacent seas. Their range is almost identical to that of blue marlin (**WHM-Figure** 1), although they seem to be less abundant in the east Atlantic. Their average size is about 20-30 kg. White marlin occur only in the Atlantic Ocean, which is not the case for blue marlin and sailfish. Although white marlin 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. They spawn in tropical and subtropical waters in mid- to late spring, and are found in the colder temperate waters during the summer. Very little is known about the age and growth of white marlin, although they are considered to be very fast growing, as are all the istiophoridae. Female white marlin growth faster and reach a larger maximum size than males.

White marlin are generally considered piscivorous, but also have been know to consume squid. They are found predominately in the upper reaches of the water column and are typically caught most frequently as a by-catch by the offshore longline fisheries which target tropical or temperate tunas using shallow deployment of gear. However, significant by-catch landings are also made by offshore longline fisheries which target swordfish, particularly in the west Atlantic Ocean.

As with blue marlin, the SCRS stock hypotheses for white marlin assessments historically has been a north and south Atlantic stock (divided at 5°N), as well as a total Atlantic stock. However, the SCRS initially recognized the increased importance of the total Atlantic hypothesis for white marlin in 1995. More recently, the Committee reviewed and discussed new data on genetic mitochondrial DNA analysis, as well as tag release-recapture data, and concluded that these data were most consistent with a total Atlantic hypothesis. In addition, the Committee concluded that the north/south separation is arbitrary for this tropical species (as with blue marlin). The Committee did recommend that, if possible, it would be prudent to also assess the status of the stock under a separate north and south Atlantic hypothesis.[3]

WHM-2. Description of fisheries

See section on "Description of Fisheries" in Blue Marlin Executive Summary report.

Landings for the total Atlantic first developed in the early 1960's, reached a peak of almost 5,000 MT in 1965, declined to about 1,000 MT per year during the period 1977-1982, and have fluctuated between about 940 and 1,700 MT thereafter (**WHM-Table 1 and Figure 2**). Landings for the north Atlantic generally show a trend similar to that of the total Atlantic. The general trend in catches have followed the intensity of the offshore longline fisheries.

WHM-3. State of stocks

The most current assessments for white marlin were conducted during the Third ICCAT Billfish Workshop held in Miami, Florida, during July, 1996. These assessments included data through 1995, which represented revisions and updating from the previous assessment presented at the 1992 SCRS. The general results from these analyses using a non-equilibrium production model (ASPIC) indicated that biomass had been below B_{MSY} for three decades for the total Atlantic hypothesis (**WHM-Figure 3**) and two decades under a north Atlantic hypothesis (**WHM-Figure 4**). The Committee considered these stocks to be over-exploited. The assessment results for the south Atlantic were judged to be unreliable and results are not presented for this stock hypothesis. However, it should be noted that the Committee indicated that the total Atlantic assessment results were the most appropriate for this species. Bias-corrected point estimates of maximum sustainable yield were estimated from production model analyses for the total Atlantic and north Atlantic to be about 2,177 and 536 MT, respectively. Current landings in 1995 for the total and north Atlantic were estimated at 1,046 and 437 MT, respectively. Biomass for the total and north Atlantic in 1996 was estimated to be about 23 and 32%, respectively, of the biomass needed to produce MSY; i.e., B_{1996}/B_{MSY} .

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[3] The production model analysis of the south Atlantic database could not be made to converge to a solution without fixing several parameters, thus making the assessment results unreliable. Because of the poor model fit, benchmark values are not provided in the summary table.

WHM-4. Outlook

For the total Atlantic hypothesis, reported landings from 1995 (1,046 MT) were larger than the estimated equilibrium replacement yield of about 921 MT. Landings greater than the replacement yield are expected to result in continued decline in stock status. Similarly, in the north Atlantic, the reported landings from 1995 were larger than the estimated equilibrium replacement yield of about 300 MT. Landings in excess of this level are expected to result in further stock decline. The Committee has concerns about the status of white marlin stocks in both the total Atlantic and north Atlantic, when considered separately. In addition, even though assessments results for the south Atlantic are considered unreliable, similar concerns of the resource status for this hypothesis also exist. Therefore, the Committee regards the continuing high level of fishing mortality, which has depressed stock biomass to levels considerably below that which could produce MSY, as inconsistent with the management objective of MSY. The improving situation in the total Atlantic over the period 1977-1985 (**WHM-Figure 3**) appears to have reversed itself with a steady decline in biomass indicated over the period 1989-1996. When considering the north Atlantic separately, the relative biomass trajectory has been decreasing steadily over the entire time-series (**WHM-Figure 4**).

WHM-5. Effect of current regulations

No ICCAT regulations are currently in effect for Atlantic white marlin. See Blue Marlin Executive Summary Report.

WHM-6. Management recommendations

The 1996 stock assessments for Atlantic white marlin indicate that this species is overexploited and warrants consideration for development of methods to reduce fishing mortality rates. See Blue Marlin Executive Summary Report.

ATLANTIC WHITE MARLIN SUMMARY

	Total Atlantic	*North Atlantic*	*South Atlantic*
Maximum Sustainable Yield(MSY)	2,177 MT	536 MT	—
Approximate 80% Confidence Interval	2,102-2,228 MT	85-771 MT	—
Current (1995) Yield (observed)	1,046 MT	437 MT	—
Current (1996) Replacement Yield	921 MT	301 MT	—
Relative Biomass (B_{1996}/B_{MSY})	0.226	0.321	—
Relative Fishing Mortality: F_{1995}/F_{MSY} (approx. 80% CI)	1.96 (1.33-2.91)	2.37 (1.60-8.41)	—
Management Measures in Effect	none	none	none

WHM-Table 1. TASK I catch (MT) reported for white marlin.

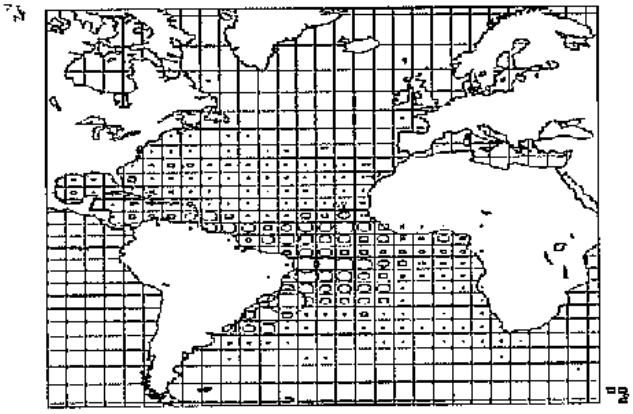
COUNTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL				2614	3735	4906	3512	1426	2047	2269	2143	2260	2280	1859	1760	1745	1819	1125	950	1015	936	112	1100	1668	1227	1769	1603	1461	1299	171	1504	1505	1241	1269	1308	944
NORTH ATLA	85	108	381	914	1694	2127	1798	588	692	1215	1055	1547	1208	1010	1222	1129	1052	501	428	481	514	781	658	1360	756	938	923	582	379	300	316	186	443	380	409	335
BARBADOS	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	0	0	0	117	11	39	17	28	17	21	21
BERMUDA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1
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	0	0	1	0	0	0	0	0	0	2	2
CHINA.TAIWAN	0	0	1	4	3	2	32	47	58	135	104	178	244	135	252	125	142	44	79	62	105	174	135	203	96	128	319	153	0	4	85	13	92	123	172	99
CUBA	0	0	0	35	45	69	118	127	103	58	61	45	34	112	256	294	68	67	43	68	70	189	205	728	241	296	225	30	13	21	14	20	20	0	0	0
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	9	14	0	0	24	13	4	2	10	0	19	0
JAPAN	25	30	271	754	1493	1913	1417	174	273	451	419	915	339	328	381	404	540	80	27	42	99	118	84	27	52	45	56	60	68	73	34	45	180	33	34	31
KOREA	0	0	0	0	1	1	51	44	52	204	340	219	213	106	90	71	64	71	33	16	18	49	12	6	18	147	37	2	2	82	39	1	9	4	23	3
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	0	0	0	0	0	0	0	0	2	8	8
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	0	0	0	0	0	0	0	0	0	46	50	50
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	10	48	14	10	17	20	8	1	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	0	0	0	0	0	0	0	0	0	1	0	0
U.S.A	60	60	74	64	70	76	76	81	87	76	104	95	99	104	108	107	109	109	109	109	109	109	109	161	184	153	134	181	113	52	57	44	30	36	19	20
U.S.S.R	0	0	0	0	0	0	0	1	1	1	0	1	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VENEZUELA	0	18	35	57	82	66	104	114	118	290	27	94	268	175	121	117	112	110	129	183	113	142	113	234	155	155	151	154	41	43	43	43	73	117	60	100
SOUTH ATLANTIC				1700	2041	2779	1714	838	1355	1054	1088	713	1072	849	538	616	767	624	522	534	422	340	442	308	471	831	680	879	920	141	1188	1319	798	889	899	609
ARGENTINA	0	0	0	0	0	0	0	3	14	0	0	20	100	57	0	2	2	2	0	0	0	0	0	0	0	4	4	0	0	8	9	6	0	0	0	0
BRASIL	0	60	34	17	17	17	17	9	21	24	54	17	33	18	32	32	68	275	175	133	58	25	76	70	61	89	143	93	149	207	197	362	196	253	91	* 100 *
CHINA.TAIWAN	0	0	5	10	3	2	29	134	327	448	508	260	469	464	285	382	377	119	198	155	145	136	227	87	124	172	196	613	565	979	810	790	506	493	680	397
CUBA	0	0	0	9	17	33	23	67	15	7	8	4	6	21	48	55	38	57	127	205	212	116	45	112	153	216	192	62	24	22	6	10	10	0	0	0
GHANA	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	0	22	6	88	68	31	17	14	22	1	2
JAPAN	228	662	1644	1664	2002	2718	1585	494	815	392	284	65	101	27	9	14	3	26	14	15	7	25	27	17	24	81	73	74	76	73	92	77	68	49	57	40
KOREA	0	0	0	0	2	7	58	125	157	177	230	341	332	165	139	109	220	111	5	24	0	36	57	9	44	225	34	25	17	53	42	56	1	4	20	20
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	0	0	0	0	0	0	0	0	0	68	50	50
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	16	75	22	16	59	31	1	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	2	2	6	6	6	4	6	15	22	3	6	0	3	2	0	0	1	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	0	1	10	13	65	44	16	6	1	1	1	1	3	0	0	0

* Including near-surface longline catches of 16 mt for 1994 and 22 mt for 1995

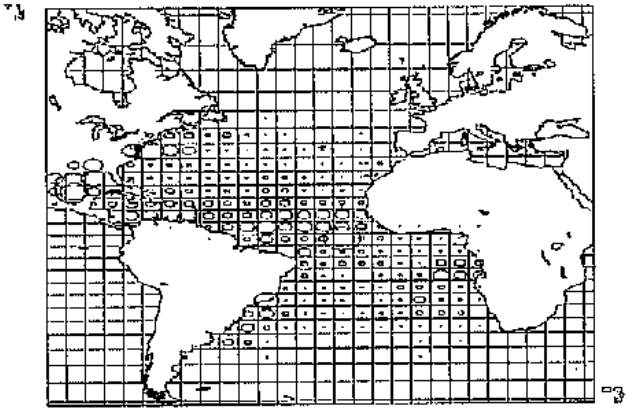
** Unknown quantity of catches

*** Catches include other billfishes.

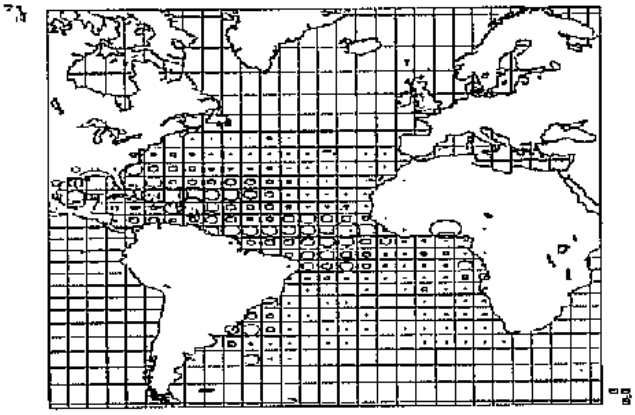
NOTE: REPORTED U.S. R.R. CATCHES ARE MINIMUM ESTIMATES FOR ICCAT ARFEAS 92 AND 93



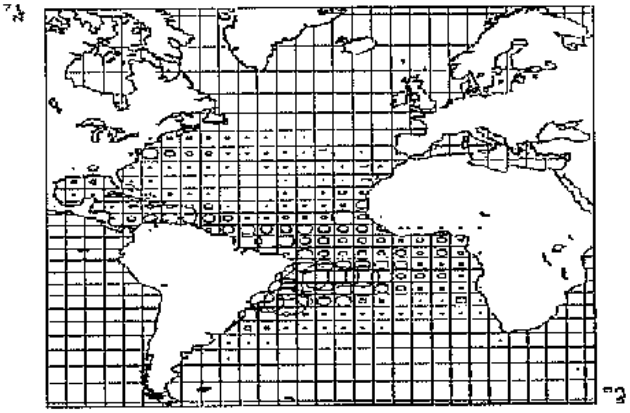
1st Quarter



3rd Quarter

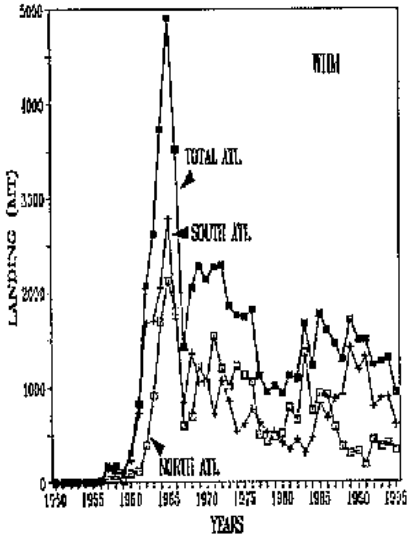


2nd Quarter

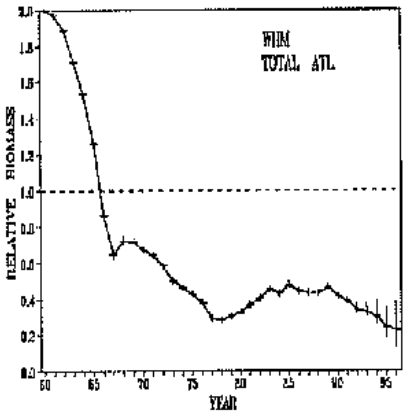


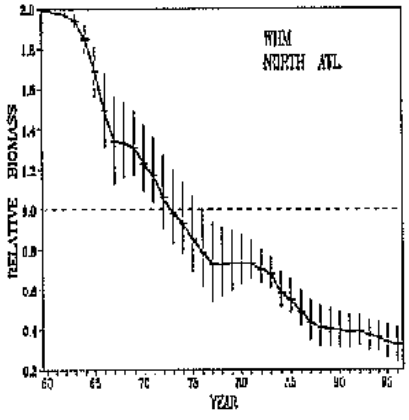
4th Quarter

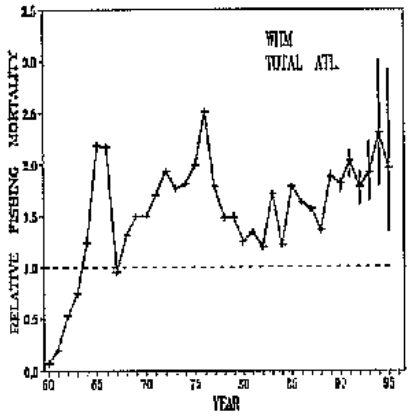
WHM-Fig. 1. Distribution of white marlin catches throughout 1950-1994

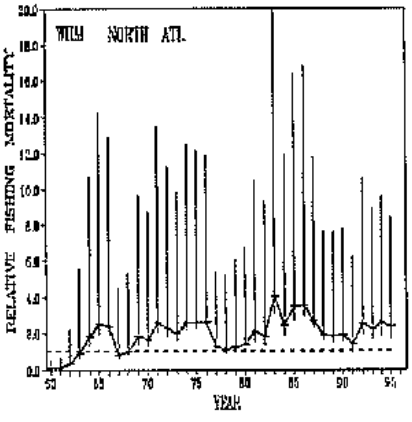


WHM-Fig. 2. Task I catches (MT) of white marlin by regions, 1950-1995.









WHM-Fig. 4. Bootstapped (1000 trials) median relative biomass and relative fishing mortality for white marlin fisheries from the north Atlantic with approximate nonparametric 80% confidence intervals.

WHM-Fig. 4. Bootstapped (1000 trials) median relative biomass and relative fishing mortality for white marlin fisheries from the north Atlantic with approximate nonparametric 80% confidence intervals.

SAI - SAILFISH / SPEARFISH

SAI-1. Biology

Since longline catches of sailfish and spearfish have been reported together in ICCAT landing statistics (except for Japan in 1994), these species will be summarized together for the purposes of this report. Sailfish and spearfish have a circumtropical distribution (**SAI-Figure 1**). Although sailfish have high concentrations in coastal waters (more than any other istiophorid), they are still found in oceanic waters. Spearfish are most abundant in offshore waters. Tag returns for sailfish/spearfish have not demonstrated trans-Atlantic or trans-Equatorial movements. 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, even in the offshore catches. The stock hypotheses for sailfish/spearfish assessment purposes are a western Atlantic and eastern Atlantic stock (divided at 30° W).

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

Sailfish spawn in tropical and subtropical waters in the spring through summer. Due to their relative rare abundance in offshore waters, virtually nothing is known about spearfish reproduction. Both sailfish and spearfish are considered to be very fast growing, although sailfish and spearfish are probably the slowest growing Atlantic istiophorids. Female sailfish grow faster and reach a larger maximum size than males.

SAI-2. Description of fisheries

The fisheries in the west and east Atlantic for sailfish/spearfish are both characterized by participants from many different countries but are quite different from one another. For example, the major catches of sailfish/spearfish in the western Atlantic are incidental to the large longline fisheries of various countries which target tuna and swordfish (Brazil, Cuba, Japan, Korea, and Taiwan). Other major fisheries in the western Atlantic are the directed recreational fisheries of the United States, Venezuela, Bahamas, Brazil, Dominican Republic, and many other countries in the Caribbean Sea. Directed fisheries in the west also include the many artisanal fisheries in the Caribbean Sea. In the eastern Atlantic, the major catches of sailfish are from the artisanal fisheries off west Africa (Ghana, Senegal, Cote d'Ivoire, and others). Directed recreational fisheries for sailfish also exist in Senegal. Catches of sailfish/spearfish in the east Atlantic occur in the offshore longline fisheries of Japan, Korea, Cuba, and Taiwan. Development and geographical expansion of other longline fisheries in the west (by the U.S.) and east (by Spain) also include a by-catch of sailfish/spearfish.

Catch and effort for the total Atlantic first developed in the early 1960's, reached a peak of almost 3,000 MT in 1965, declined to about 1,600 MT by 1973, reach an historical peak of 6,100 MT in 1976, then fluctuated between 2,000 to 4,000 MT through remainder of the time series. Landings for the east Atlantic generally paralleled the total Atlantic increasing trend whereas the landings in the west were steady over the last decade. It should be noted that a significant segment of the landings between 1965 and 1983 were listed as unclassified region until the data preparatory meeting at the recent workshop (Miami, FL, July 1996) which partitioned these data to either the west or east Atlantic. However, the Committee continues to recognize that uncertainties of the landings data, particularly in the east Atlantic, still persist. The overall trend in Atlantic landings are very much governed by the large landings from artisanal fisheries off of west Africa.

SAI-3. State of stocks

The most current assessments for west Atlantic sailfish/spearfish were submitted to the SCRS in 1993 and these analyses included data through 1991. The general results from these exploratory analyses using a non-equilibrium production model (ASPIC) indicated that biomass trends had declined to fully exploited or over exploited levels, particularly near the end of the time series (**SAI-Figures 3 and 4**). Maximum sustainable yield was estimated from production model analyses for the west Atlantic to be about 700 MT, whereas current landings for 1995 are about 761 MT, respectively. Biomass in 1992 was estimated to be 62% of the biomass needed to produce MSY.

The most current assessment for east Atlantic sailfish/spearfish was submitted to the SCRS in 1995 and this analysis, using a non-equilibrium production model, included data through 1992. Due to major uncertainties of meeting model assumptions and specifically the lack of standardized CPUE indices from the major inshore artisanal fisheries, the results of this exploratory assessment were considered to preliminary to present here. However, this exploratory assessment did provide an opportunity to analyze the available database and clarified the short-comings in these data so a more definitive assessment could be done in the future.

SAI-4. Outlook

The Committee remains concerned about the downward trend in the indices of abundance and the biomass trajectories for western Atlantic sailfish which indicate the stock has declined to fully exploited or over-exploited levels. The reported landings for west Atlantic sailfish since 1992 were higher than replacement yield and therefore the stock biomass are expected to have continued to decline. Given the inconclusive results of the non-equilibrium production model submitted to the 1995 SCRS for eastern Atlantic sailfish, insight into east Atlantic sailfish stock status is uncertain. The past equilibrium production model submitted to the 1988 SCRS for eastern Atlantic sailfish indicated that this stock had not yet been fully exploited. The Committee is encouraged by the increase in information on eastern Atlantic sailfish, even though current assessment results were not considered creditable at this time.

SAI-5. Effect of current regulations

No ICCAT regulations are currently in effect for Atlantic sailfish/spearfish. See section in the Blue Marlin Executive Summary Report.

SAI-6. Management recommendations

Recent stock assessments for western Atlantic sailfish indicate that this species is at least fully exploited or possibly over-exploited and warrants consideration for development of methods to reduce fishing mortality rates. See Blue Marlin Executive Summary Report.

ATLANTIC SAILFISH SUMMARY

	West Atlantic	*East Atlantic*
Maximum Sustainable Yield (MSY)	~ 700 MT	—
Current (1994) Yield	~ 761 MT	—
Current (1992) Replacement Yield	~ 600 MT	—
Relative Biomass (B_{1992}/B_{MSY})	~ 0.62	—
Relative Fishing Mortality: F_{1991}/F_{MSY}	~ 1.4	—
Management Measures in Effect	none	none

SAI-Table 1. TASK I catch (MT) reported for sailfish (including spearfish).

COUNTRY	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994		1995	
TOTAL	326	690	901	994	1500	2919	2421	1894	2568	2361	2857	2898	2420	1638	4401	5968	6183	2076	2984	3784	2564	2513	3249	3966	3172	2971	2719	3120	2448	1973	2492	2082	2494	3269	2598		2452	
EAST ATLAN	136	304	457	505	536	1383	1350	1167	1299	1195	857	111	1375	859	3437	5081	5319	1144	2142	2881	1667	1627	2294	3188	2138	1964	1702	2172	1629	1229	1722	1300	1551	2183	1752		1691	
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	48	0	53	50	25	32	40	8	20	21	20	21	20		20	
CAP-VERT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0		0	
CHINA.TAIWAN	0	0	0	0	0	1	15	71	557	423	296	526	785	491	99	25	217	59	7	19	5	12	6	20	8	9	1	0	0	7	13	0	0	420	100		31	
COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	40	40	67	55	62	40	71	44	60		71	
CUBA	0	0	0	10	20	43	31	371	56	52	42	21	13	42	96	110	185	65	69	40	79	79	158	200	115	19	55	50	22	53	61	184	200	0	0		0	
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	4	7	9	**	**	14	**	**	**	**	**		**	
GHANA	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3040	4726	4517	764	1885	2691	119	891	1426	2408	1658	1485	925	1392	837	462	395	463	297	693	700		700	
JAPAN	136	304	457	495	515	1331	1237	404	548	230	95	125	89	66	19	38	4	24	11	19	33	50	38	47	63	84	71	37	57	57	63	16	42	58	50	*	47	
KOREA	0	0	0	0	1	5	62	231	49	395	326	321	312	69	58	46	165	46	18	5	34	24	33	3	34	29	2	20	15	17	16	30	3	3	6		6	
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	0	0	0	0	0	0	0	0	0	11	15		15	
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	15	31	9	7	41	13	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1		1	
SENEGAL	0	0	0	0	0	0	0	76	76	81	87	112	122	144	107	122	189	160	143	107	325	498	572	510	163	241	572	596	587	552	1092	546	917	931	800		800	
U.S.S.R	0	0	0	0	0	3	5	14	13	14	11	14	39	14	9	7	1	13	5	0	0	37	0	0	0	0	2	5	4	4	0	0	0	0	0		0	
WEST ATLAN	190	386	444	489	964	1536	1071	727	1269	1166	2000	1779	1045	779	964	887	864	932	842	903	897	886	955	778	1034	1007	1017	948	819	744	770	782	943	1086	846		761	
ARUBA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	20	20	30	30	30	30	30	30	30	30	30	23	20	16	13	9	5	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	0	0	0	0	0	0	69	45	29	40	61	68		68	
BRASIL	0	159	91	46	46	46	46	23	57	27	21	43	64	37	78	76	186	287	246	201	221	119	133	68	121	188	292	174	137	140	128	90	280	308	127	***	137	***
CHINA.TAIWAN	0	0	0	0	0	1	20	106	75	251	281	346	17	107	171	123	177	5	57	18	36	81	22	31	45	39	64	31	300	171	83	73	33	223	95		29	
CUBA	0	0	0	13	29	59	44	0	258	19	58	30	17	58	133	152	0	91	51	151	119	134	181	28	169	130	50	171	78	55	126	83	70	0	0		0	
DOMINICAN RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	50	49	46	18	40	44	44	40	31	98	50	90		90	
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	0	0	0	**	**	33	**	**	**	**	**		**	
GRANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	37	40	31	36	27	37	66	164	211	104	114	98	218	316	310	246	151		151	
JAPAN	79	57	143	240	655	1140	608	274	422	228	499	321	132	78	118	112	133	23	9	20	22	44	135	22	34	38	28	6	22	22	25	73	1	2	2		3	
KOREA	0	0	0	0	21	6	87	0	160	316	453	446	433	96	81	63	0	65	14	19	51	41	19	0	52	72	14	1	0	17	25	0	3	0	8		8	
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	0	0	0	0	0	0	0	0	2	19		19	
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	0	0	0	0	0	0	0	0	0	31	30		30	
NETHERLAND.	0	0	0	0	0	0	0	0	0	0	28	28	28	28	28	28	28	28	21	21	21	21	21	21	21	10	10	10	10	10	10	10	10	15	15		15	
PANAMA	0	0	0	0	0	0	0	0	0	0	0	0	20	44	13	9	0	18	3	2	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	0	0	0	0	0	0	2	1	4	4	4		4	
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	58	14	25	35	24	11	9	4	4	55	100		100	
U.S.A	111	126	142	157	173	188	194	201	207	214	220	227	233	240	248	254	261	308	308	308	308	308	308	308	308	195	198	273	48	34	22	39	39	25	37	+	14	
VENEZUELA	0	44	68	33	40	96	72	123	90	111	440	338	101	91	84	60	59	56	66	93	58	72	57	119	81	81	77	80	22	24	24	24	46	64	100		93	

* Not including catches of spearfish.

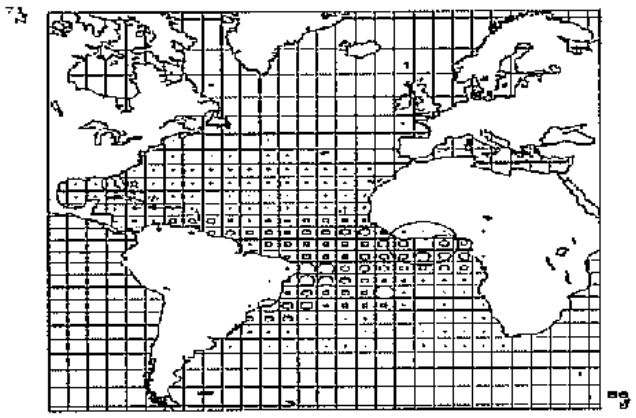
** Unknown quantity of catches.

*** Including 9 MT of surface longline catches for 1994 and 1995.

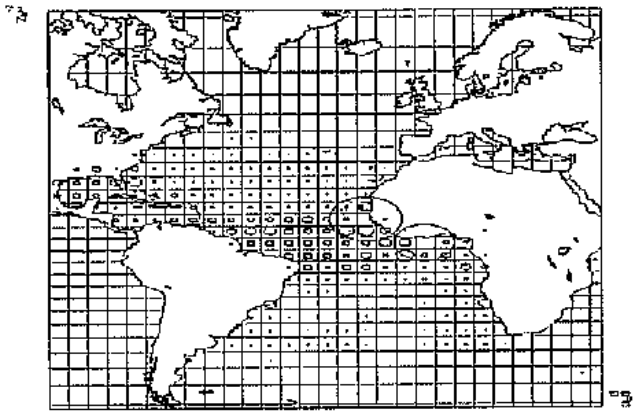
\+ A part of data revised using taxidermist survey, only for 1994. Attempts will be made to revise earlier years and 1995.

++ All by near-surface longlines

NOTE: REPORTED U.S. R.R. CATCH ARE MINIMUM ESTIMATES FOR ICCAT AREAS 92 AND 93

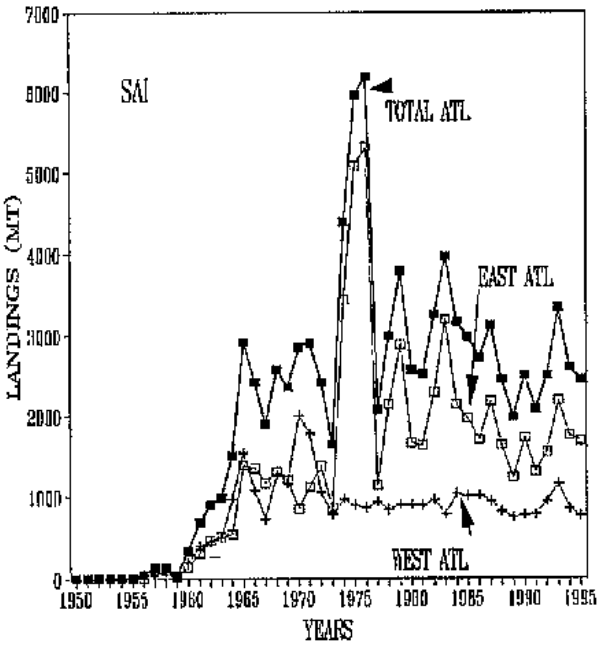


1st Quarter

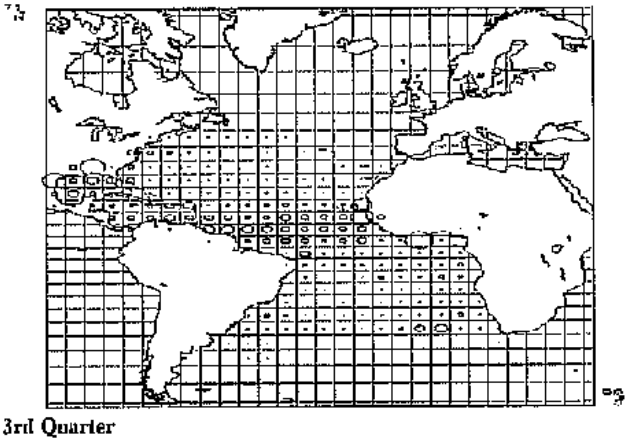


3rd Quarter

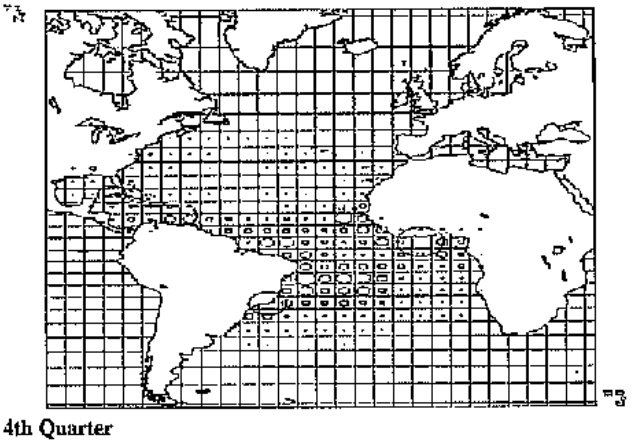
SAI-Fig. 1. Distribution of sailfish catches throughout 1950-1994



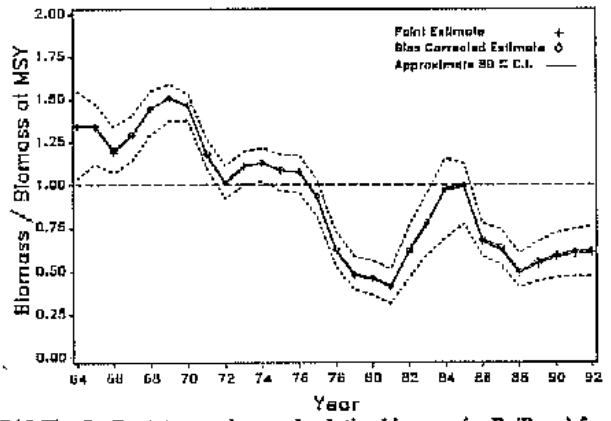
SAI-Fig. 2. Task I catches (MT) of sailfish by regions, 1950-1995.



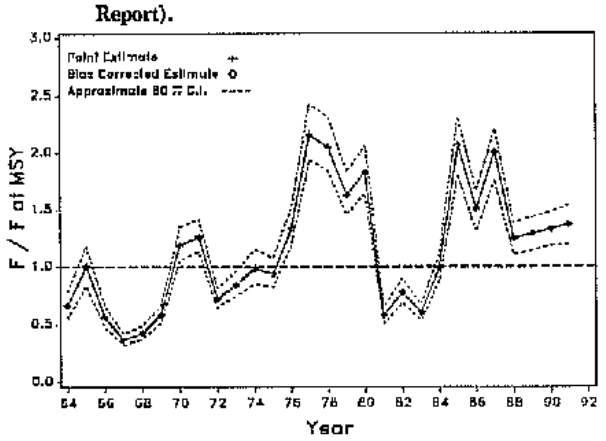
3rd Quarter



4th Quarter



SAI-Fig. 3. Bootstrapped annual relative biomass (= B_t / B_{MSY}) from the ASPIC models fitted to west Atlantic sailfish catch and effort information. Confidence intervals are based on 1000 trials. Annual values for the first two years are omitted due to extreme imprecision. (1993 SCRS Report).



SAI-Fig. 4. Bootstrapped annual relative fishing mortality (= F_t / F_{MSY}) from the ASPIC models fitted to west Atlantic sailfish catch and effort information. Confidence intervals are based on 1000 trials. Annual values for the first two years are omitted due to extreme imprecision. (1993 SCRS Report).

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 separated at 5°N. There is uncertainty as to whether the management boundaries used correspond to the biological stock boundaries.

Swordfish feed on a wide variety of prey including groundfish, pelagics, deep-water fish and invertebrates. They are believed to feed throughout the water column, following the diel migration of the deep-scattering layer by maintaining their position within a preferred level of illumination (isolume). They are typically caught on pelagic longlines at night when they feed in surface waters.

Swordfish spawn in the warm tropical and subtropical waters throughout the year. They are found in the colder northern waters during summer months. Young swordfish grow very rapidly, reaching about 140 cm LJFL (lower jaw-fork length) by age 3, but grow slowly thereafter. Females grow faster than males and reach a larger maximum size. Swordfish are difficult to age, but are considered mature by age 5.

SWO-ATL-2. Description of fisheries

Directed longline fisheries in Spain, the United States and Canada have operated since the late 1950s or early 1960s, and harpoon fisheries have existed since the late 1800s. The Japanese tuna longline fishery started in 1956 and has operated throughout the Atlantic since then, with significant catches of swordfish that are produced as a by-catch in their tuna fisheries. There are other directed swordfish fisheries (i.e., Portugal, Venezuela, Morocco and Uruguay) and by-catch or opportunistic fisheries which take swordfish (i.e. Taiwan, Korea, France and Brazil). The SCRS scientists believe that ICCAT Task I landings data provide minimum estimates because of unreported landings from vessels flying flags of convenience and from other sources including member and non-member nations.

The total Atlantic reported catch of swordfish (north and south, including discards) reached an historical high of 36,834 MT in 1995, 8% higher than the previous peak catch of 34,032 MT in 1989 (**SWO-Table 1 and SWO-Figure 2**). The 1995 reported catch is 13% greater than that reported for 1993 (32,585 MT), which was the final year used in the last complete SCRS swordfish stock assessment analysis.

Since 1989, the North Atlantic reported catch has averaged about 15,800 MT (**SWO-Table 1 and SWO-Figure 2**). In 1995, Spain and the U.S. have decreased their peak north Atlantic landings, by 38% since 1987 and by 37% since 1989, respectively, in response to ICCAT recommendations. If the U.S. discards are counted, the total U.S. landings and discards have declined by 29%. Reduced landings have also been attributed to shifts in fleet distributions, including movement of some vessels out of the Atlantic. In addition, some fleets, including the United States, Spain and Brazil, have changed operating procedures to opportunistically target tuna and sharks, taking advantage of market conditions and higher relative catch rates.

The South Atlantic reported catch was relatively low (generally less than 5,000 MT) until the early 1980s. Since then, landings have increased continuously through the 1980s and 1990s to 17,308 MT in 1994 and 19,900 MT in 1995, levels that match peak north Atlantic harvests. Since 1988, reported landings have exceeded 12,000 MT. The historic peak in reported landings for 1995 (19,900 MT) is 15% higher than reported landings in 1994 (17,308 MT) and 17% higher than reported landings in 1990 (17,008 MT).

SWO-ATL-3. State of stocks

North: In 1996, the status of the North Atlantic swordfish resource was assessed using both non-equilibrium stock production models and virtual population analyses (VPA) based on catch (**SWO-Table 1**) and CPUE data through 1995. The relationship between catches and standardized fishing effort is shown in **SWO-Figure 3**. The current base case assessments indicate that the North Atlantic swordfish resource has continued to decline despite reductions in total reported landings from peak values in 1987 (**SWO-Figure 4**). Although some fleets have reduced their catch levels

and partial fishing mortality by a substantial amount, it is apparent that these have not resulted in reductions in the overall fishing mortality rate because recent landings have exceeded surplus production. The decline in stock size is reflected in declining CPUE's for several fisheries. An updated estimate of maximum sustainable yield from production model analyses is 13,000 MT (with estimates ranging from 5,300 to 16,500 MT). Since 1982, only in one year (1984) have north Atlantic swordfish catches been less than 13,000 MT; preliminary estimates of catches in 1995 were about 16,900 MT.

The biomass at the beginning of 1996 was estimated to be 58% (range: 41 to 104%) of the biomass needed to produce MSY. The 1995 fishing mortality rate was estimated to be 2.05 times the fishing mortality rate at MSY (range: 1.07 to 3.82). The replacement yield for 1996 was estimated to be about 11,300 MT. Preliminary landings in 1995 and anticipated landings in 1996 are expected to exceed this level substantially; thus, it is likely that the stock will decline further.

Overall, the virtual population analyses conducted for North Atlantic swordfish in 1996 were consistent with the non-equilibrium stock production model results, particularly in terms of the trends in population trajectories. The Base Case VPA point estimates for age 1 gradually increased in the early 1980s, shifting to a higher level in 1985 to 1989. Subsequently, recruitment (age 1) shifted to a lower level between 1990 and 1993, before increasing in the last two years (1994 and 1995). However, estimates of recent recruitment are less precise. The age 2 abundance trend mimics the age 1 trend with the appropriate one year lag, but the pattern is less pronounced. Ages 3 and 4 estimated abundance trends from the VPA were variable during the initial years of the time series with a decline in the most recent years (although again these most recent estimates are less precise). Estimated abundance of older fish (ages 5+) declined to about one third from 1985 to 1995. While there has been a general decrease in fishing mortality rates for age 1 swordfish since 1988, all other fishing mortality rates (for ages 2, 3, 4, and 5+) have increased to peak levels, equal to or exceeding levels estimated for 1988. Estimated fishing mortality rates declined slightly from 1988 to 1991 for ages 2, 3, and 4, but have since continually increased. A preliminary virtual population analysis of catch from 1985-1995 aged by one set of sex-specific growth models (using an alternate growth curve from the Base Case), resulted in lower estimates of fishing mortality rates. While the assumption of sex-specific growth is, in principle, more biologically realistic than the 1:1 sex ratio assumed in the Base Case VPA, the Committee is uncertain that the present sex-specific results will prove to be robust to factors the Committee has not had time to adequately investigate (including the effects of growth curve assumptions and sex-ratio estimates). Current fishing mortality rate estimates from the base case are well above common biological reference points obtained from yield per recruit analyses. Additionally, the long-term adult biomass per recruit corresponding to the current fishing mortality rate is very low. Given the fishing mortality pattern from the Base Case VPA in the north, the adult biomass per recruit would result in a level of about 2 percent of the maximum in equilibrium. This is well below the level which is commonly considered to result in risks of recruitment over-fishing in other stocks.

South and total: Previous Committees expressed serious concern about the stock status in the south Atlantic and total Atlantic based on the pattern of high and apparently increasing catches and declining CPUE trends in both the north and in several south Atlantic CPUE indices. The Committee is less certain if the CPUE series used are the most accurate indicators of resource abundance in the south due to factors that have not yet been investigated. However, for the first time, a quantitative assessment for the south Atlantic swordfish stock assumption was conducted, yielding preliminary results (**SWO-Figure 5**). These assessment results quantify the reason for concern. Although biomass at the beginning of 1996 was estimated to be 99% (range: 82 to 118%) of the biomass needed to produce MSY, the 1995 fishing mortality rate was estimated to be 1.24 times the fishing mortality rate at MSY (range: 0.94 to 1.93), and the surplus production for 1996 was estimated to be about 14,600 MT (based on preliminary analyses). Reported landings in 1995 (about 19,900 MT) have exceeded and estimated landings in 1996 could exceed this level; thus, it is likely that the stock will decline further. If a total Atlantic stock was assumed, it is unlikely that the view of the status of the stock would be improved from that of the north Atlantic status. The Committee expressed concern about the uncertainty of the stock structure of Atlantic swordfish and the possibility that the assumed north Atlantic stock does not include the entire catch from the biological stock. When boundaries are uncertain, in this case because of limited or imprecise data, it is important to implement appropriate measures which encompass several possible stock assumptions.

SWO-ATL-4. Outlook

Projections of north Atlantic swordfish based upon VPA's and age-structured and age-lumped non-equilibrium production models were conducted in order to evaluate the effects of possible management scenarios. These indicate that large reductions in yield and fishing mortality rate would be required to rebuild the stock in the short and medium

term. Projections also indicate that the 1995 catch (estimated at approximately 17,000 MT) and anticipated 1996 catch levels are not sustainable and there is a 90% probability of radical reduction by the year 2000 (assuming it is possible to exert a high enough fishing mortality rate to maintain a constant catch at current levels as the stock declines). Even if future catches were maintained at the MSY level, the stock would be expected to exhibit further decline, since the stock is below that which would sustain MSY. Fishing at quota levels agreed to at the 1995 Commission meeting is projected to result in further stock declines since these levels are considerably above projected replacement yield levels. If catches in 1996 have been about 17,000 MT, the replacement yield for 1997 is likely to be about 8,000-12,000 MT.

The Committee noted that total swordfish biomass corresponding to MSY levels in the North Atlantic may not be achieved in 5 or 10 years without substantial reductions in catch from current levels. Further, unless recruitment increases substantially, a constant quota for a declining stock implies ever-increasing levels of fishing mortality and, therefore, over-exploitation. A large increase in recruitment is unlikely if the spawning stock size continues to decline and is unlikely on a sustained basis from any level of spawning biomass. The Committee noted that target fishing mortality rates are less risky than constant catches for rebuilding over-fished stocks. The target F's are usually translated into corresponding quotas which require adjustment after each assessment, depending on the status of the stock.

Results of the preliminary analyses of the South Atlantic indicate that current levels of harvest are not sustainable. Preliminary analyses indicate that fishing at F_{MSY} would maintain the stock at MSY levels and that this would require substantial reductions to around 13,000 MT, or less, in 1997 and thereafter.

SWO-ATL-5. Current regulations

In general, the 1994 regulatory recommendations were neither adhered to, nor effective in conserving Atlantic swordfish. Even if the 1994 regulations had been perfectly implemented, the level of catch would still have substantially exceeded replacement yield and resulted in the continued decline of the north Atlantic swordfish stock. Given that the 1994 regulations were not adhered to, the situation in both the north and south Atlantic is cause for concern, particularly in the north Atlantic because of the status of that stock. The Committee emphasized the need for *effective* management measures throughout the Atlantic, to ensure conservation of Atlantic swordfish and to account for the uncertainty associated with the swordfish stock structure assumptions. The increasing unreported catches of non-member countries and flags of convenience fleets are of considerable concern to the Committee, as these may undermine attempts at effective regulations for conservation.

SWO-ATL-6. Management recommendations

North: The Committee recommends that the Commission, if it desires to rebuild the North Atlantic swordfish stock, must immediately reduce both fishing mortality rates and catch dramatically. The recommendations for regulatory measures adopted in 1990 and 1994 were introduced to reduce both catch and effort, but these reductions, although different among countries involved, have not arrested the decline in the stock. It is important to recognize that the failure to achieve sufficient overall reductions in fishing mortality since 1991 has resulted in the need for more severe reductions now and in the future to achieve recovery. The current catch levels are not sustainable. However, the state of the north Atlantic stock is not in such a depressed state that recovery cannot be realized in a reasonable time period. Immediate and appropriate actions can improve the status, given that estimated stock sizes are below biomass at MSY and given the resilient nature of swordfish. In order to arrest the declining trend, the analyses generally suggest that catches should not exceed about 10,000 MT. A preliminary sex-specific VPA indicated that a catch of about 12,000 MT might allow an increase to MSY levels; however the Committee reiterated the preliminary nature of this analysis. In order to allow for increase in stock biomass, the level of harvest needs to be immediately reduced below the level of replacement yield.

South: The SCRS is seriously concerned about the stock status in the south Atlantic based on the results of the preliminary south Atlantic production model and on the pattern of high catches and declining CPUE trends in some fisheries. The 1996 catches in the south are the highest on record, and at the level of peak catches previously observed in the north. The results of the analysis indicate that current levels of harvest are not sustainable. If the Commission intends to keep the stock in a healthy condition, it should not delay actions and harvest levels must be reduced, otherwise even more restrictive measures will be needed in the future. Preliminary analyses indicate that fishing at F_{MSY} would quickly restore the stock to MSY levels, and that this would require substantial reductions to around 13,000 MT or less in 1997 and thereafter.

Total: If a total Atlantic stock was assumed, it is unlikely that the view of the status of the stock would be improved from that of the north or south Atlantic status. Current catches are not sustainable and substantial reductions in harvest are required.

ATLANTIC SWORDFISH SUMMARY

	North Atlantic	*South Atlantic*
Maximum Sustainable Yield[1]	13,000 MT (5,300-16,500 MT)[3]	14,200 MT (5,200-16,900 MT)
Current (1995) Yield (preliminary)	16,934 MT	19,900 MT
Current (1996) Replacement Yield[1]	11,360 MT (7,120-16,710 MT)	14,620 MT (8,400-17,140 MT)
Relative Biomass (B_{1996}/B_{MSY})[1]	0.58 (0.41-1.04)	0.99 (0.82-1.18)
Relative Fishing Mortality:		
F_{1995}/F_{MSY}[1]	2.05 (1.07-3.82)	1.24 (0.94-1.93)
F_{1995}/F_{max}[2]	2.4	not estimated[4]
$F_{1995}/F_{0.1}$[1]	3.5	not estimated[4]
Management Measures in Effect	25 kg minimum size; country- specific quotas	Limit catch to 1993 or 1994 levels

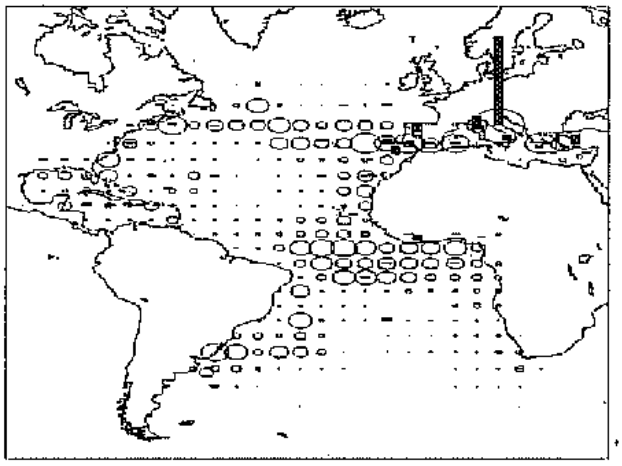
1 Base Case production model results based on catch data 1950-1995 (SWO-Table 1)
2 Base Case VPA results based on catch data through 1995 (SWO-Table 1)
3 80% confidence intervals are shown.
4 Production model results do not provide basis for these estimates

SWO-Table 1. Reported Atlantic swordfish landings and discards by regions, country, and gears for 1965-1995

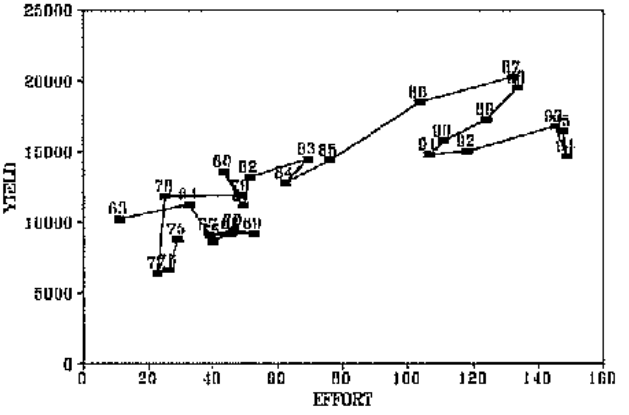
COUNTRY	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL (LAND+DISC)	12990	13020	11940	14912	17151	17896	12159	13079	13631	13903	15923	13864	14331	20377	20402	25267	21804	25825	26702	35540	39097	41012	44464	52619	51793	44198	39052	40758	43553	46456	38473
ATLANTIC TOTAL (INCLUDING DISCARDS)	11230	11268	10623	11472	13428	14555	7184	7121	8824	8869	11622	9227	9051	14419	14855	18688	14991	19482	19806	21874	23869	24294	26176	32280	34032	32730	28293	28055	32585	32702	36834
North Atl. Landing	8652	9338	9084	9137	9138	9425	5198	4727	6001	6301	8776	6587	6352	11797	11859	13527	11138	13155	14464	12753	14348	18450	20224	19508	17246	15722	14709	14985	16756	14686	16408
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	0	0	0	0	0	1
CANADA	4674	4433	4794	4393	4257	4800	0	0	0	2	21	15	113	2314	2970	1885	561	554	1088	499	585	1059	954	898	1247	911	1026	1547	2234	1676	1610
CHINA.TAIWAN	1	37	76	115	218	234	226	129	243	204	209	362	189	126	260	103	140	200	209	126	117	121	40	18	13	208	574	132	98	372	429
CUBA	171	175	336	224	97	134	160	75	248	572	280	283	398	281	128	278	227	254	410	206	162	636	910	832	87	47	23	27	16	0	0
ESPANA	1433	2999	2690	3551	3502	3160	3384	3210	3833	2893	3747	2816	3309	3622	2582	3810	4014	4554	7100	6315	7441	9719	11135	9799	6648	6386	6633	6672	6598	6185	6952
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	4	0	0	1	4	4	0	0	0	75	75	75	95	46	46
GRANADA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56	5	1	2	3	13	0	1
IRELAND	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ITALY	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JAPAN	1025	658	280	262	130	298	914	784	518	1178	2462	1149	793	946	542	1167	1315	1755	537	665	921	807	413	621	1572	1051	992	1064	1126	978	1203
KOREA	2	27	46	24	22	40	159	155	374	152	172	335	541	634	303	284	136	198	53	32	160	68	60	30	320	51	3	3	19	16	16
LIBERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	38	34	53	0	24	16	30	19	35	3	0	7	14	26	0
MAROC	100	61	34	43	20	17	33	43	18	15	15	12	7	11	208	136	124	91	129	81	137	181	197	196	222	203	192	352	460	335	336
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	0	0	0	0	0	0	0
MEXICO	0	0	0	0	0	0	0	2	4	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	14	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	76	112	529	0	0	0	0	0
NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	14	3	131	190	185	43	35	111	0	0
NORWAY	0	300	300	200	600	400	200	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	7	171	24	25	91	22	76	26	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	100	0	0	0	0	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	6	15	11	12	11	8	11	21	37	92	58	32	38	17	29	15	13	11	9	14	22	468	994	617	300	475	773	542	1961	1599	1733
RUMANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	6	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	0	0	0	0	0	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	0	3	0	3	23	0	0
TRINIDAD & TOBAGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	26	6	45	151	42	79	66	71	562	125	0	0
U.S.A.	1227	614	474	274	170	287	35	246	406	1125	1700	1429	912	3684	4619	5625	4530	5410	4820	4749	4705	5210	5247	6171	6411	5519	4278	3852	3782	3366	4026
U.S.S.R	5	8	22	21	11	24	24	28	26	17	32	19	15	23	10	21	0	69	0	16	13	18	4	0	0	0	0	0	0	0	0
UNITED KINGDOM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1
VENEZUELA	8	11	21	18	100	23	52	27	23	24	52	43	15	46	182	192	24	25	35	23	51	84	86	2	4	9	18	103	73	69	54
North Atl. Discards	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	0	247	383	408	708	526
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	0	247	383	408	708	526

SWO-Table 1. Reported Atlantic swordfish landings and discards by regions, country, and gears for 1965-1995

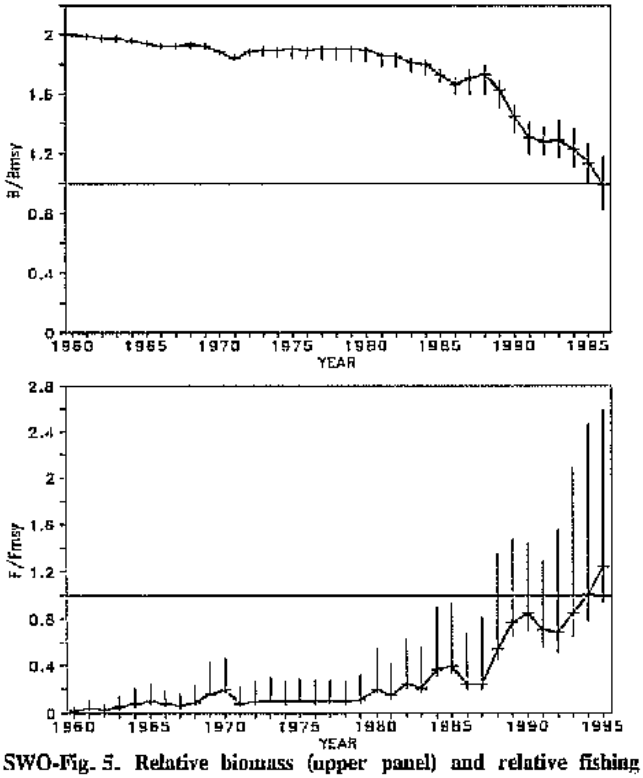
COUNTRY	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SOUTH ATLANTIC	2578	1930	1539	2335	4290	5130	1986	2394	2823	2568	2846	2640	2699	2622	2996	5161	3853	6327	5342	9121	9521	5844	5952	12772	16786	17008	13337	12687	15421	17308	19900
ANGOLA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	228	815	84	84	84	0	0	0	0	0	0
ARGENTINA	400	200	79	259	500	400	63	100	48	10	10	111	132	4	0	0	0	20	0	0	361	31	351	198	175	230	88	88	14	24	24
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	0	0	0	0	0	0	1
BENIN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	24	0	86	90	39	13	19	26	28	28	26	28	0	0
BRASIL	125	125	62	100	181	162	154	121	161	465	514	365	396	372	521	1582	655	1019	781	468	562	753	947	1162	1168	1696	1387	1910	1850	1571	1501
BULGARIA	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHINA.TAIWAN	1	73	128	375	637	985	599	621	849	617	719	573	519	481	994	540	406	400	201	153	215	166	260	614	469	693	837	1271	651	2210	2151
COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	12	7	10	21	15	19	24	24
CUBA	164	122	559	410	170	148	74	66	221	509	248	317	302	319	272	316	147	432	818	1161	1301	95	173	159	830	448	209	246	159	0	0
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	0	4393	7725	6166	5760	5651	6974	7937	11290
GHANA	0	0	0	100	200	0	0	0	0	0	0	0	0	0	0	110	5	55	5	15	25	13	123	235	235	235	235	235	0	0	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	0	0	0	0	0	0	6
JAPAN	1845	1300	474	859	2143	2877	664	1023	480	191	805	105	514	503	782	2029	2170	3287	1908	4395	4613	2913	2620	4453	4019	6708	4459	2870	5256	5198	4084
KOREA	4	54	79	77	370	382	256	249	602	563	279	812	699	699	303	399	311	486	409	625	917	369	666	1012	776	50	147	147	198	164	164
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	856	439	0	0	0	0	0
NIGERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	69	0	0	0	0	0	0	0	3	0	0	0
PANAMA	0	0	0	0	0	0	0	12	274	90	40	219	28	83	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	227
SOUTH AFRICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	31	9	3	7	28	8	5	5	4	0	0	5	9	4	1	0
TOGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	32	1	0	2	3	5	5	8	14	0
U.S.S.R	39	56	158	155	89	176	176	202	188	123	231	138	106	161	70	154	40	26	46	158	60	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	92	575	1084	1927	1125	537	699	427	414	302	156	210	260	165	428
MEDITERRANEAN	1760	1752	1317	3440	3723	3341	4975	5958	4807	5034	4301	4637	5280	5958	5547	6579	6813	6343	6896	13666	15228	16718	18288	20339	17761	11468	10759	12703	10968	13754	1639
ALGERIE	0	0	0	0	0	0	0	0	100	196	500	368	370	320	521	650	760	870	877	884	890	847	1820	2621	590	712	562	395	562	600	0
CYPRUS	0	0	0	0	0	0	0	0	0	0	5	59	95	82	98	72	78	103	28	63	71	154	84	121	139	173	162	73	116	159	0
ESPANA	1200	1000	700	1000	1100	900	1100	1300	1105	700	89	89	667	720	800	750	1120	900	1322	1245	1227	1337	1134	1762	1337	1523	1171	822	1358	1503	1350
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	773	772	1081	1036	1714	1303	1008	1120	1344	1904	1456	1568	2250	0
ITALY	0	0	0	1568	2240	2016	3248	4144	3136	3730	3362	3747	3747	4506	3930	4143	3823	2939	3026	9360	10863	11413	12325	13010	13009	5524	4789	7595	6330	7765	0
JAPAN	0	0	0	0	0	0	0	0	0	0	0	1	0	2	3	1	0	5	6	19	14	7	3	4	1	2	1	2	4	3	0
LIBYA	224	224	336	560	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	0	0
MALTA	0	0	0	0	0	112	224	224	224	192	214	175	223	136	151	222	192	177	59	94	108	97	131	207	121	122	119	71	76	42	0
MAROC	224	192	170	197	250	214	327	230	183	196	118	186	144	172	0	0	0	43	39	38	92	40	62	97	289	478	683	436	733	289
NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	728	672	517	532	771	730	767	828	875	979	1360	1292	1292	0	0	0
TUNISIE	0	0	0	0	0	0	0	0	0	5	3	5	0	0	0	0	7	19	15	15	61	64	63	80	159	176	181	178	226	166	0
TURKEY	112	336	111	115	133	99	76	60	59	15	10	7	34	20	44	13	70	40	216	95	190	226	557	589	209	243	100	136	292	533	0



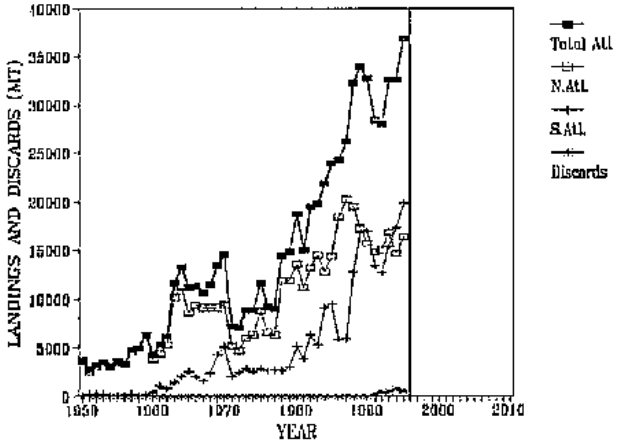
SWO-Fig. 1. Relative geographical distribution of reported landings of swordfish by longline (circle) and surface (histogram) gears, accumulated for 1980-1994



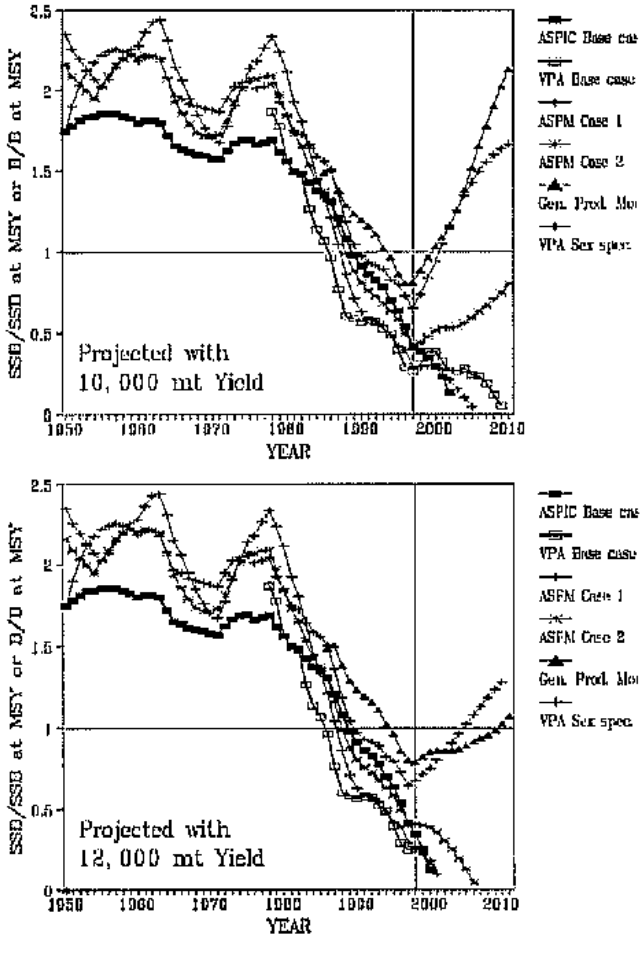
SWO-Fig. 3. Relationship between nominal catch and standardized effort for north swordfish.



SWO-Fig. 5. Relative biomass (upper panel) and relative fishing mortality rate (lower panel) estimated by the ASPIC production model for the South Atlantic. Bars indicate approximate 80% confidence intervals.



SWO-Fig. 2. Reported total landings and discards (in MT) of Atlantic swordfish, by area, 1950-1995. (Mediterranean catches are reported in Table 1 but not included in this figure.)



SWO-Fig. 4. Stochastic stock trajectories and projections (spawning stock biomass or total biomass relative to that at MSY) from the Base Case lumped biomass production model (ASPIC), and the Base Case virtual population analysis (VPA) [dark lines]. Deterministic stock trajectories and projections from sensitivity trials and preliminary analyses [light lines]: two age-structured production model runs (ASPM Case 1--selectivities based on SCRS/94/116 and ASPM Case 2--selectivities based on Base Case VPA); generalized production model (using alternate skew parameter); and preliminary sex-specific VPA. Projections are based on 10,000 MT yield (upper figure) and 12,000 MT yield (lower figure), for 1997 and thereafter

SBF-SOUTHERN BLUEFIN TUNA

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 of south of Java, Indonesia, and off northwest Australia. Juveniles migrate southward along the Australian west coast and stay in the coastal waters in the southwest, south, and southeast of Australia. As fish grow, they extend their distribution to cover a circumpolar area throughout the Pacific, Indian and Atlantic Oceans.

Southern bluefin tuna are considered to 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 otoliths was age 45. Age-specific natural mortality, high for young fish and low for old fish, is supported by tagging experiments and applied for stock assessment. The possible existence of a stock not available to the fisheries was suggested as one of the other explanations for the occurrence of a large number of old fish.

The preliminary results from recovered archival tags suggest that fish move in a much wider range than previously considered. 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 the course of this period, the Japanese longline fishery taking older aged fish, recorded its peak catch of 77,927 MT in 1961, and the Australian catches of young fish by the surface fishery peaked at 21,500 MT in 1982. New Zealand, Taiwan and Indonesia have also exploited southern bluefin tuna and Korea has operated in the fishery since 1991.

The catches of Australia, Japan and New Zealand have been controlled by quota since 1986. The current catch limits are 5,265 MT for Australia, 6,065 MT for Japan, and 420 MT for New Zealand, which have remained at the same level since 1989. However, the catches by nations other than the aforementioned three have increased steadily and stayed at a level of around 2,200-2,600 MT since 1991. The catches by these nations are neither regulated nor monitored adequately.

The Atlantic catch has varied widely between 400 and 6,200 MT since 1978 (**SBF-Table 1 and SBF-Figure 1**), reflecting the shift of longline effort between the Atlantic and Indian Oceans. The fishing grounds in the Atlantic are located off the southern tip of South Africa.

Japanese longline vessels changed their catch retention practice in 1995 and released fish less than 25 kg and part of these catches were incorporated into the estimate of total catch.

SBF-3. State of stocks

The Second Scientific Committee of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) was held in Hobart, Australia, from August 26 through September 5, 1996, to examine the current stock status of southern bluefin tuna.

The CPUE for the parental stock continued to decline through to recent years and then stayed at about the same level. The CPUE for juveniles exhibits a decline through the 1970s to the mid- to late 1980s, depending on age classes, followed by an increase after that (**SBF-Figure 2**). 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.

Virtual Population Analysis (VPA) was conducted to examine the sensitivity to different data inputs and assumptions on stock dynamics. The parental biomass continued to decline through 1994 and showed a slight increase in 1995-1996 in most cases. Sequential rebuilding of especially young age classes was clearly noted, but the extent of recovery varied among VPAs. A significant discrepancy in estimates of recent recruitment trends (1988-1991) was noted according to the VPAs conducted.

In summary, the current parental biomass of southern bluefin tuna remains at a historical low level and is estimated to be 25-39% of the 1980 level, which is used as the reference level for stock rebuilding.

SBF-4. Outlook

Future projections were performed to examine the medium- to long-term consequences of current global catch on the parental biomass as well as the probability to recover to the 1980 level before the year 2020, based on various VPAs incorporating the agreed range of uncertainties. The mean probability of recovery was calculated separately for the weight given to the options within each type of uncertainty by each group of scientists. Results showed a range of the mean probability of recovery from 15% to 79%, reflecting different interpretations of plausibility of each uncertainty. The discrepancy in interpretations could not be solved and no single view of the outlook of the stock could be proposed.

SBF-5. Effects of current regulations

Southern bluefin tuna have been managed by quota among Australia, Japan and New Zealand since 1985. The global quota was reduced several times, from 38,650 MT in the 1984-1985 season and the current quota has been maintained at 11,450 MT since the 1989-1990 season.

The sequential rebuilding observed in young age classes is considered to be the combined result of benefit of substantial reduction of fishing mortality particularly for small fish since 1988 and relatively good recruitment in the latter half of the 1980s. This sequential rebuilding could reach to age 9 in 1994 and start contributing to recovery of the parental biomass.

The catch quota and the high catch rate realized in recent years cause a substantial contraction of the fishing season and area of the Japanese longline operation. This results in an increase in the uncertainties in relation to CPUE interpretations.

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 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 (MSY)	not estimated
Current (1995) Yield	13,125 MT (preliminary)
Relative Biomass	
SSB_{1995}/SSB_{1980}	0.25-0.39
Management Measures in Effect	global quota at 11,450 MT

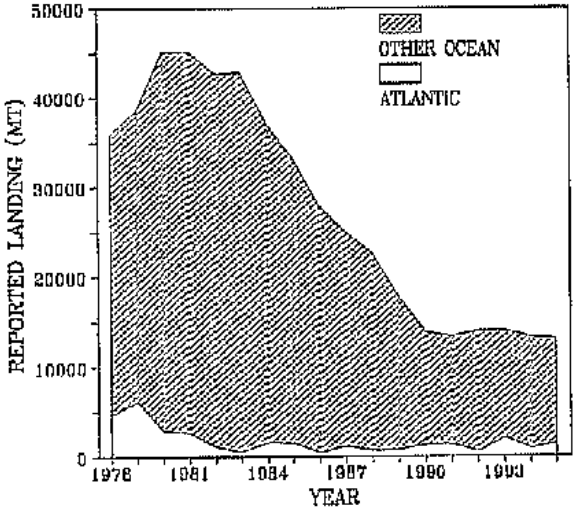
SBF-Table 1. Atlantic and world southern bluefin catch (MT) by gear, area and country.

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995*
ATLANTIC TOTAL	4677	6203	2823	2569	1138	522	1636	1493	426	1193	612	700	1257	1344	525	2095	833	1448
CATCH BY GEAR																		
Longline	4677	6203	2810	2563	1138	522	1636	1493	426	1189	610	694	1257	1344	525	2095	833	1448
Baitboat	0	0	13	6	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Sport	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
CATCH BY COUNTRY																		
China-Taiwan	26	11	22	57	3	17	0	25	37	69	62	69	55	13	++	407	238	
Japan	4651	6192	2788	2506	1135	505	1636	1468	389	1120	548	625	1202	1331	525	1688	595	1448
South Africa	0	0	13	6	++	0	0	0	0	0	0	1	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
World Catches (all oceans)	35848	38673	45054	45191	42764	42838	37089	33199	27875	25033	22568	17789	13819	13401	13975	14048	13299	13125
Japan (LL)	23632	27828	33653	27981	20789	24881	23328	20396	15182	13964	11422	9222	7056	6774	6937	6970	6334	6338
Australia (SURF, LL)	12190	10783	1119	16843	21501	17695	1341	12589	12531	10821	10591	6118	4586	4189	4448	4723	4454	3763
New Zealand (LL, etc.)			130	173	305	132	93	94	82	59	94	437	529	165	60	217	277	436
Other (LL, etc.)	26	62	76	194	169	130	257	120	80	189	461	2012	1648	2273	2530	2138	2234	2588

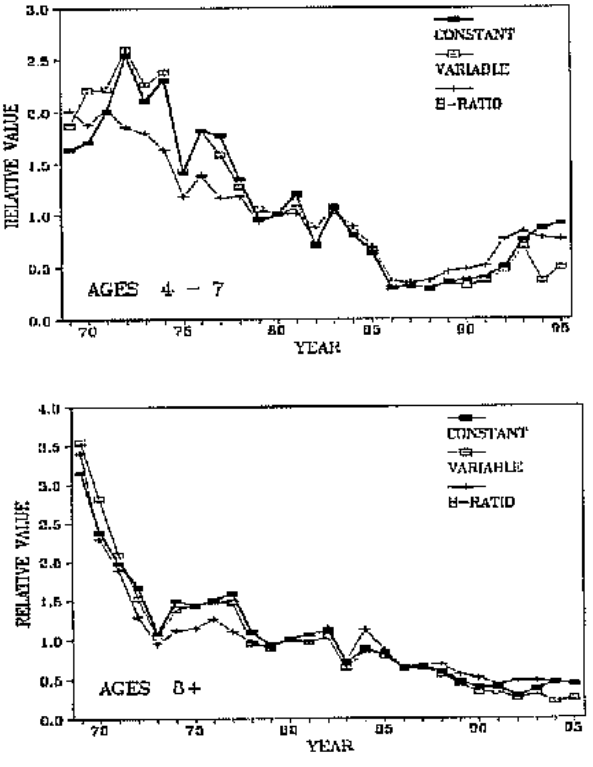
* Preliminary

++ Catch < 0.5 MT.

Source for "World" section: Report of the Thirteenth Meeting of Australian, Japanese and New Zealand Scientists on Southern Bluefin Tuna (Wellington, N on Southern Bluefin Tuna (Wellington, New Zealand - April, 1994).



SBF-Fig. 1. **Global and Atlantic reported landings of southern bluefin tuna, 1978-1995. (Data for 1995 are provisional)**



SBF-Fig. 2 **Standardized CPUE of Japanese longline relative to 1980 for juvenile (ages 4-7) and parental (ages 8+) southern bluefin tuna using three different assumptions of fish distribution (constant squares, variable squares, and B-ratio).**

SMT - SMALL TUNAS

SMT-1 Biology

Very little information is currently known about the biology of small tunas. In fact, scientific studies are rarely undertaken. This is due to many of these species generally being considered as having little economic importance, and the difficulties linked to sampling landings of artisanal fisheries, which are the main fisheries exploiting small tuna resources. The exceptions comprise some stocks of spanish and king mackerel, such as those found in U.S. and Brazilian waters. The important industrial fleets often discard these catches at sea and rarely report the amount caught in their 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 forming 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 (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.

In the eastern tropical Atlantic, the size-at-first-maturity is about 42 cm for *Euthynnus alletteratus*, 30 cm for *Auxis spp.*, 38 cm for *Sarda sarda*, and 45 cm for *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.

SMT-2. Description of 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 and mid-water trawlers (i.e. pelagic fisheries of West Africa-Mauritania). Some U.S. sports fisheries target spanish and king mackerels on a seasonal basis (SCRS/96/156). Tropical purse seiners operating around artificial flotsam (fish aggregating devices) since 1991 may have led to an increase in fishing mortality of small tropical tuna species.

There are over ten species in this category, but only five of these account for 85% of the total catch by weight each year. These five species are: Atlantic bonito *(Sarda sarda)*, frigate tuna *(Auxis thazard)*, spotted Spanish mackerel *(Scomberomorus maculatus)*, king mackerel *(Scomberomorus cavalla)*, and Atlantic black skipjack *(Euthynnus alletteratus)* (**SMT-Figure 2**).

SMT-Figures 1 and 2 show the historical landings of small tunas for the period 1956 to 1995. The total reported landings of all species combined increased from about 71,000 MT in 1965 to more than 115,000 MT in 1969 (**SMT-Figure 1**). Reported landings remained stable between 1970 and 1979 at about 85,999 MT, increasing to about 146,000 MT in 1982, followed by a steady decline to about 99,000 MT in 1986, and a subsequent increase to about 141,000 MT in 1988. Landings reported for the period 1989-1991 remained relatively stable at an average of 138,000 MT (**SMT-Figure 1**). The catch decreased to about 100,000 MT in 1993. A preliminary estimate for the total nominal landings of small tunas in 1994 amounts to 91,000 MT (**SMT-Table 1**). Landing statistics for 1994 currently available to the Committee are very incomplete, making it impossible to draw conclusions regarding the evolution of the fishery in 1995.

The Committee noted the relative importance of small tuna fisheries in the Mediterranean Sea, which at present account for 30% of the total reported catch of tunas and related species. The Committee also noted, however, that uncertainties remain regarding the accuracy of reported landings in all areas, including the Mediterranean, and that there is a general lack of information on the mortality of these species as by-catch.

SMT-3 State of the stocks

There is little information available to determine the stock structure of many small tunas species. Current information does not generally allow for an evaluation of stock status which is assumed 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. The information submitted in 1994 was reviewed by the Committee and is summarized below.

Annual 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 at present indicate that the stocks of Atlantic spanish mackerel and king mackerel in the Gulf of Mexico are overexploited. Reductions in fishing mortality are considered necessary in order to allow the stocks to recover to levels that can provide high average long-term yields and to provide adequate safeguards against recruitment failure.

SMT-4. Perspectives

Catch and effort statistics for small tunas are incomplete for many of the coastal and industrial fishing countries. There is also a general lack of 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. Studies should therefore be conducted to determine the state of these stocks and the best way to manage them, which is probably best carried out at the local or sub-regional level.

The Committee further suggested that ICCAT consider circulating a questionnaire to all small tuna fishing countries with a view to learn more about these fisheries. This questionnaire should aim at collecting all information relative to the exploitation of these species, e.g., species caught, fishing gears, areas and seasons of the fishery, etc.

SMT-5. Effects of current regulations

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

A "U.S: Fishery Management Plan (FMP) for coastal pelagic species in the Gulf of Mexico and Atlantic Ocean Region" has been in effect since 1983. Under the FMP, fisheries management procedures were established for king and spanish mackerels through the implementation of catch quotas. It is believed that vessel landing limits, geographical quotas, and minimum size restrictions have helped to stabilize and improve overall stock conditions.

SMT-6. Management recommendations

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

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
COMBINED SPECIES	88779	97429	87733	66941	91084	79200	74022	91373	84355	88304	124895	126787	145958	138979	119039	100711	99020	123803	151710	132736	142587	138919	124171	112308	90707	81852	
MEDITERRANEAN	25562	33660	21116	11315	13777	10848	12326	15201	16041	20354	27879	35901	41827	44798	25070	27901	25483	31275	36417	23028	36760	35948	22842	29646	20638	19808	
ATLANTIC	63217	63769	66617	55626	77307	68352	61696	76172	68314	67950	97016	90886	104131	94181	93969	72810	73537	92528	115293	109708	105827	102971	101329	82662	70069	62044	
BON:Sarda sarda	28683	43922	24979	12323	21374	15609	15989	20676	17273	19971	31733	40053	43687	42837	22505	25433	21990	30229	42404	26212	28176	34104	21959	28668	19020	18572	
MEDITERRANEAN	20681	28230	16225	6254	7695	6038	6499	8699	9419	13486	19165	29293	31518	35997	15656	18487	16098	22857	24548	12296	22059	26047	15377	25474	15361	14911	
ALGERIE	0	31	222	343	183	140	143	206	196	515	640	740	860	867	874	880	459	203	625	1528	1307	600	600	570	570	570	*
BULGARIA	0	100	0	0	0	0	40	44	11	1	13	191	4	24	1	1	0	13	0	0	17	17	20	8	0	0	
CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	128	6	70	0	
EGYPT	0	0	0	0	10	3	0	1	17	10	3	2	23	14	48	62	68	35	17	358	598	574	518	640	648	648	*
ESPANA	658	888	266	280	290	329	397	610	711	713	480	710	990	1225	984	1045	729	51	962	609	712	686	228	200	344	0	
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	33	16	0	0	0	10	0	1	10	5	6	0	0	
GREECE	900	600	600	500	487	658	511	550	610	712	809	1251	1405	1367	1732	1321	1027	1848	1254	2534	2534	2690	2690	2690	1581	1581	*
ITALY	914	1064	965	715	760	959	955	1533	1378	1403	1180	1096	1102	1806	2777	1437	1437	2148	2242	1369	1244	1087	1288	1238	1828	1828	*
LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	71	70	0	0	
MALTA	0	0	0	0	2	5	1	2	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
MAROC	25	54	54	308	130	135	630	456	128	155	62	309	71	92	75	57	51	127	108	28	31	28	12	17	55	21	
NEI-2	0	0	0	0	0	0	0	0	0	0	295	274	276	452	694	359	359	537	561	342	311	311	311	300	0	0	
RUMANIA	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TUNISIE	117	251	200	203	499	429	619	768	791	865	700	381	748	600	600	482	504	500	600	422	488	305	643	178	170	170	*
TURKEY	18057	25229	13905	3901	5324	3371	3178	4503	5536	9082	14910	24300	25978	29485	7818	12809	11426	17333	18133	5008	14737	19645	8863	19548	10093	10093	*
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	0	
YUGOSLAVIA	10	13	13	4	10	9	23	26	39	29	72	39	61	31	37	34	38	62	36	98	79	45	0	3	2	0	
ATLANTIC	8002	15692	8754	6069	13679	9571	9490	11977	7854	6485	12568	10760	12169	6840	6849	6946	5892	7372	17856	13916	6117	8057	6582	3194	3659	3661	
ANGOLA	870	849	548	499	351	38	831	938	531	251	377	196	253	124	225	120	101	144	180	168	128	102	4	49	20	9	
ARGENTINA	4200	3248	2900	1166	2293	200	283	2026	1746	1288	2600	846	1775	310	2058	1399	699	1607	2794	1327	1207	1794	1559	434	4	0	
BENIN	0	0	0	0	0	0	0	0	0	13	19	32	36	16	25	30	6	3	4	7	0	0	0	0	0	0	
BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	187	179	523	345	214	273	226	71	86	142	142	142	*
BULGARIA	0	0	100	0	100	191	32	37	22	0	75	8	23	46	0	0	2	0	0	3	0	0	0	0	0	0	
ESPANA	1615	10028	3525	2050	6975	4819	4379	1978	1919	717	220	589	434	414	173	398	145	41	91	57	18	8	39	5	3	2	
FRANCE	0	0	0	0	0	0	0	0	0	0	8	0	0	2	17	1	0	0	0	0	0	0	0	52	0	0	
GERMANY D.R	0	0	0	0	0	0	0	0	0	0	288	440	146	274	26	40	23	1	0	0	53	0	0	0	0	0	
GHANA	0	0	0	0	33	20	0	9	9	0	77	5	71	13	8	10	0	943	0	0	0	0	0	0	0	0	
GRANADA	200	200	200	200	183	200	200	136	157	53	52	61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GREECE	0	0	0	0	0	0	0	0	30	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GUADELOUPE	0	0	0	400	390	360	340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAROC	234	277	223	160	229	322	303	131	171	196	312	477	535	561	310	268	251	241	589	566	364	576	762	879	415	492	
MARTINIQUE	100	200	300	400	476	384	549	510	400	500	500	502	587	545	552	491	431	331	395	427	430	820	770	770	770	770	*
MEXICO	100	200	279	198	437	446	237	81	59	174	271	408	396	567	744	212	241	391	356	338	215	200	657	0	0	0	
POLAND	0	0	0	0	5	30	30	177	44	32	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	
PORTUGAL	0	0	0	0	0	0	0	0	0	6	13	31	55	86	56	50	168	371	377	80	202	315	133	145	50	13	**
RUMANIA	0	0	0	0	189	291	79	139	19	0	64	81	249	192	8	32	71	3	255	111	8	212	84	0	0	0	

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	948	29	6	0	0	
SENEGAL	0	0	0	0	4	40	164	614	523	159	140	1327	202	497	200	495	510	463	2066	869	558	824	378	227	227	227	*
SIERRA LEONE	0	0	0	0	0	0	0	0	0	0	57	30	5	5	5	10	10	10	10	10	10	4	6	0	0	0	
SOUTH AFRICA	0	0	0	11	0	5	0	2	16	6	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	0	0	0	0	0	0	1	0	3	3	3	4	1	0	
TOGO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	254	138	245	400	256	177	172	107	311	254	254	*
U.S.A	83	90	24	261	92	117	23	268	224	502	198	333	209	253	217	110	84	130	89	278	298	468	497	170	127	106	
U.S.S.R	300	100	155	24	1400	1542	1281	4164	1602	2125	6433	4559	6329	2375	1290	2073	1085	1083	8882	7363	706	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	25	0	0	0	
URUGUAY	0	0	0	0	0	4	3	0	0	16	3	1	0	1	0	0	3	0	0	0	0	26	0	0	0	0	
VENEZUELA	300	500	500	700	522	562	756	767	382	443	861	833	864	554	748	774	1401	1020	1153	1783	1514	1514	1443	0	1646	1646	
LTA:Euthynnus alletera	8636	5704	3141	2603	5500	9043	10401	8344	17633	14673	19214	13847	15839	22214	20625	12895	8789	14439	25097	24955	25907	21398	20730	11239	10566	10146	
MEDITERRANEAN	960	866	904	1061	1304	1386	2028	2499	2495	2870	2774	1446	2480	1561	1650	2040	2166	2424	2405	2035	2606	1808	1135	699	592	600	
CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	15	15	
CYPRUS	14	17	6	6	5	7	7	18	11	17	17	22	33	17	31	32	13	25	41	20	23	25	21	11	23	23	
ESPANA	590	372	566	716	688	732	1134	1059	1192	993	800	6	705	0	32	12	5	0	5	0	0	0	0	0	0	15	
ISRAEL	100	100	100	100	242	200	300	300	200	170	105	35	110	35	60	259	284	273	135	124	129	108	126	119	119	119	*
MALTA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	1	8	8	0	
MAROC	2	37	3	16	5	63	4	4	0	6	0	61	12	0	1	0	0	0	12	0	5	0	0	0	0	1	
NEI-2	0	0	0	0	0	0	0	0	0	0	0	0	200	200	200	200	200	200	200	200	200	200	200	200	200	200	*
SYRIA	0	0	0	0	0	0	102	105	109	89	80	73	90	80	96	95	73	121	99	121	127	117	120	130	130	130	*
TUNISIE	249	336	217	214	360	364	479	1009	983	1595	1772	1249	1330	1228	1224	1441	1590	1803	1908	1566	2113	1343	664	201	76	76	*
YUGOSLAVIA	5	4	12	9	4	20	2	4	0	0	0	0	0	1	6	1	1	2	5	4	9	5	0	28	21	21	*
ATLANTIC	7676	4838	2237	1542	4196	7657	8373	5845	15138	11803	16440	12401	13359	20653	18975	10855	6623	12015	22692	22920	23301	19590	19595	10540	9974	9546	
ANGOLA	6094	2408	1234	970	1287	449	10	1326	826	646	1328	1171	1734	1632	1632	1433	1167	1345	1148	1225	285	306	14	175	105	117	
ARGENTINA	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	11	2	0	0	1	0	9	0	0	0	0	
BENIN	0	0	0	0	0	0	0	0	0	16	24	40	45	20	31	30	90	14	7	43	66	67	63	67	0	0	
BERMUDA	0	0	0	0	0	7	16	9	7	7	11	11	4	5	5	7	13	13	17	14	8	10	11	5	6	6	
BRASIL	0	0	0	0	0	0	0	0	0	0	0	45	10	0	765	785	479	187	108	74	685	779	935	985	1226	1059	
BULGARIA	0	0	0	0	0	8	0	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CANADA	0	0	0	24	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	0	0	0	0	0	0	0	0	128	236	258	34	16	160	29	14	1	18	65	74	148	17	23	23	
COLOMBIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	228	0	0	
COTE D'IVOIRE	0	0	0	0	1583	860	400	431	38	57	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CUBA	0	400	0	0	0	0	0	0	0	0	131	53	77	6	15	16	24	55	53	113	88	63	33	21	0	0	
ESPANA	848	1079	329	45	0	5	6	33	56	4	485	7	3	2	27	34	12	11	7	11	55	55	1	296	0	0	
FRANCE	0	0	0	0	0	0	0	0	0	0	0	1098	1120	0	0	0	0	0	0	195	0	0	0	0	0	0	
GERMANY D.R	0	0	0	0	0	0	0	0	0	0	0	0	397	543	99	40	10	2	0	2	38	0	0	0	0	0	
GHANA	0	0	0	26	66	4656	6044	1185	6049	5547	4134	3287	2141	5009	5966	901	649	5551	11588	12511	14795	11500	11608	359	994	513	
ISRAEL	0	0	0	0	0	0	0	0	0	0	227	203	640	282	271	76	0	0	0	0	0	0	0	0	0	0	
ITALY	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAROC	326	596	112	7	46	58	31	15	21	289	16	19	26	19	15	447	47	108	49	14	255	41	259	18	30	161	

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
MAURITANIE	50	50	50	50	50	50	50	50	50	50	31	86	77	54	60	60	50	50	50	50	50	50	50	0	0	0	
PANAMA	0	0	0	0	0	0	125	0	3	2	58	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
POLAND	0	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	
PORTUGAL	0	0	0	0	0	0	0	0	0	5	121	8	0	0	0	0	80	21	86	91	2	61	73	45	72	72	*
RUMANIA	0	0	100	100	297	46	10	86	2	17	9	12	291	216	266	126	81	7	88	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	0	0	0	617	306	265	189	96	
SAO TOME & PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	101	0	0	0	0	0	0	0	0	0	0	0	
SENEGAL	0	0	0	0	437	1092	705	1540	1446	1697	2444	1586	5017	5623	8408	4566	2392	2985	6343	6512	4775	3767	4088	4883	4072	4072	*
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	1	0	0	
U.S.A	158	5	212	20	51	67	5	53	113	12	88	97	87	107	41	73	104	118	204	129	173	228	597	1286	1142	1312	
U.S.S.R	0	0	0	0	0	0	470	690	6127	2184	6307	3615	1085	6528	613	1040	271	61	1707	543	667	0	0	0	0	0	
VENEZUELA	200	300	200	300	373	357	501	426	390	1270	721	791	311	573	644	1050	1123	1467	1236	1374	1294	1963	1409	1889	2115	2115	*
FRI:Auxis thazard	11551	10304	13625	10190	13937	10530	9747	20020	8343	12575	20912	15913	25240	21690	25903	22876	20796	24223	25591	22015	23244	20540	13806	14067	15627	14646	
MEDITERRANEAN	3366	4095	3445	3549	4355	2644	3290	3409	3567	3707	3952	3678	6043	5820	6337	5240	5057	3740	6126	6387	7514	5823	4042	2595	4251	3859	
CROATIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	21	52	22	22	*
ESPANA	1972	2074	1344	1706	2335	1389	1635	1184	1676	1771	2120	1700	1935	2135	2301	2047	1555	631	2669	2581	2985	2226	1210	648	1124	1472	
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	4	0	0	1	
GREECE	0	0	0	0	0	0	0	0	0	0	0	516	2192	1887	2060	1419	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	*
ITALY	1100	1600	1700	1200	1300	939	912	1147	1177	1342	1376	1193	1299	1494	1610	1344	1344	906	609	509	494	432	305	379	531	531	*
MALTA	0	0	0	0	7	18	15	9	33	11	18	4	9	11	4	1	13	5	8	18	21	20	11	10	10	10	*
MAROC	107	172	195	446	408	0	357	234	69	73	10	14	77	57	52	48	175	178	811	1177	1606	715	1056	92	1160	419	
TUNISIE	163	220	185	185	283	282	353	811	589	493	409	237	517	218	294	367	538	606	588	660	985	985	35	14	4	4	*
YUGOSLAVIA	24	29	21	12	22	16	18	24	23	17	19	14	14	18	16	14	32	14	41	42	23	13	0	0	0	0	
ATLANTIC	8185	6209	10180	6641	9582	7886	6457	16611	4776	8868	16960	12235	19197	15870	19566	17636	15739	20483	19465	15628	15730	14717	9764	11472	11376	10787	
ANGOLA	521	1171	2286	1119	1536	535	27	197	357	357	256	351	515	212	256	90	21	115	20	70	28	1	0	4	6	21	
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	0	
BENIN	0	0	0	0	0	0	0	0	0	25	37	64	72	32	49	50	1	3	6	3	0	0	0	0	0	0	
BRASIL-POR	0	0	0	0	0	0	0	0	0	0	0	0	72	11	634	623	941	1260	1904	700	592	746	291	608	906	560	
BULGARIA	0	0	0	0	0	0	0	0	0	0	3	3	0	7	0	0	0	0	0	0	0	0	0	0	0	0	
CAP-VERT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	86	105	75	135	82	115	86	67	
ESPANA	264	2019	494	607	246	289	418	574	1249	1211	6260	5295	3128	2691	5746	3702	3164	4538	3938	1877	2240	642	354	122	752	450	
F.I.S	0	0	0	0	0	0	0	0	0	0	0	1856	1984	2800	0	0	0	0	0	0	0	0	0	0	0	0	
FRANCE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	640	416	1904	3392	3392	3008	3872	6656	7136	8000	5520	5520	*
GERMANY D.R	0	0	0	0	0	0	0	0	0	0	0	0	106	55	40	0	3	0	0	0	0	0	0	0	0	0	
GHANA	2000	1800	5287	1589	6295	6001	4311	13914	1047	4286	7566	2048	6062	5632	4530	4500	3256	4689	0	0	0	0	0	0	0	0	
JAPAN	3804	635	1214	1453	486	20	14	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAROC	896	84	299	1173	116	48	272	688	770	694	968	1267	1126	1271	198	424	302	465	194	599	735	863	242	185	96	437	
NEI-1	0	0	0	0	0	0	0	0	0	0	0	0	0	333	46	0	0	17	381	155	237	862	182	200	699	422	
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	30	32	1	2	4	26	3	0	0	0	0	
RUMANIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	15	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	0	0	0	1078	627	150	405	404	
SAO TOME & PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
SENEGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	810	784	1082	311	201	309	309	309	*
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	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	0	
U.S.S.R	0	0	0	0	0	0	162	242	803	450	694	407	5623	1655	5903	6055	3465	2905	5638	5054	2739	0	0	0	0	0	
VENEZUELA	700	500	600	700	903	993	1253	907	550	1845	1176	944	509	1171	1478	1746	2599	3081	3094	3269	4104	3420	649	1762	2597	2597	*
BLT:Auxis rochei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	357	723	3634	2171	814	70	100	100	
ATLANTIC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	357	723	3634	2171	814	70	100	100	
RUSSIA FED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2171	814	70	100	100	*
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	
U.S.S.R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	357	723	3634	0	0	0	0	0	
SSM:Scomberomorus m	13984	12713	13956	15593	14685	15433	14296	14420	13490	13430	16736	13539	15310	11695	13232	13589	15655	16002	14455	15933	16960	18006	18576	21389	11145	8032	
ATLANTIC	13984	12713	13956	15593	14685	15433	14296	14420	13490	13430	16736	13539	15310	11695	13232	13589	15655	16002	14455	15933	16960	18006	18576	21389	11145	8032	
BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	
COLOMBIA	300	600	100	200	310	393	245	283	228	199	213	408	8	10	77	101	81	72	151	112	76	37	95	58	69	69	*
CUBA	900	500	500	700	600	600	500	400	600	400	578	657	476	689	544	443	621	1606	803	746	665	538	611	391	0	0	
DOMINICAN RE	200	200	200	300	324	292	253	174	317	415	479	503	384	168	1058	1267	1271	1321	1415	1401	1290	728	735	739	1330	1330	*
GRANADA	0	0	0	0	0	0	0	10	2	0	1	1	1	1	1	4	17	0	0	1	3	0	0	1	2	2	
MEXICO	4778	3500	5293	6656	5236	4794	3380	4414	5138	5751	5908	5908	7799	5922	5777	5789	6170	6461	5246	7242	8194	8360	9181	10066	0	0	
TRINIDAD & TO	800	1200	1000	800	766	1691	1544	1484	1933	1208	1337	939	1218	0	0	0	0	0	0	0	0	0	0	0	0	0	
U.S.A	5506	4713	4863	4437	4990	5288	6385	5453	3310	2926	5429	2748	3747	2784	3905	3986	5957	5071	5097	4444	4272	5883	5724	5057	4667	1554	
VENEZUELA	1500	2000	2000	2500	2459	2375	1989	2202	1962	2531	2791	2375	1677	2121	1870	1997	1538	1471	1743	1987	2460	2460	2230	5077	5077	5077	*
BRS:Scomberomorus bra	1868	1154	2810	4446	6291	2664	283	986	1522	1191	2826	3466	4342	4511	6259	1502	5011	4741	7767	8791	5238	4186	3279	2972	7161	7320	
ATLANTIC	1868	1154	2810	4446	6291	2664	283	986	1522	1191	2826	3466	4342	4511	6259	1502	5011	4741	7767	8791	5238	4186	3279	2972	7161	7320	
BRASIL	1868	1154	2810	4446	6291	2664	283	986	1522	1191	2826	3466	4342	4511	6259	1502	5011	4741	5063	5927	2767	1437	1149	842	1149	1308	
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2704	2864	2471	2749	2130	2130	2130	2130	*
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3882	3882	*
KGM:Scomberomorus c	7989	7620	8265	11217	15168	11562	9799	10145	8041	12041	16298	19530	18998	14667	14637	10030	12220	12196	13515	10946	12472	12070	13353	15256	16410	12054	
ATLANTIC	6489	6420	7365	9717	13644	9048	8293	8732	6769	11450	15656	18513	18149	14607	13182	9964	12187	11890	13038	10835	12232	11530	12438	14461	15252	10935	
ANTIGUA	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	0	
ARGENTINA	0	3	0	0	0	0	466	988	379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BRASIL	1532	946	2532	3318	5162	2185	546	790	845	848	1598	1612	1929	2695	2588	806	2890	2173	2029	2102	2070	962	979	1380	1365	0	
CHINA.TAIWAN	0	0	0	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DOMINICAN RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	29	33	34	47	52	0	0	
GRANADA	0	0	0	0	0	0	0	162	175	73	25	30	43	40	19	0	0	0	0	0	0	0	0	0	0	0	
MEXICO	907	1300	1520	2189	1531	1354	1497	1331	1535	2249	1946	2740	4409	2874	2164	2303	2643	3067	3100	2300	2689	2147	3014	3289	3289	3289	*

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	20	43	11	38	82	752	541	432	657	0	1192	1192	1192	*
U.S.A	3050	2571	2213	2710	4747	3095	4053	3837	2507	6292	10726	12565	9863	7068	7444	6011	5683	5628	5807	4363	5939	6502	7091	7747	6922	3970	
VENEZUELA	1000	1600	1100	1500	2204	2388	1731	1624	1328	1988	1361	1566	1905	1910	924	833	933	940	1330	1500	1069	1228	1307	800	2484	2484	*
KGX:Scomberomorus sp	500	400	300	500	508	838	502	471	424	197	214	339	283	20	485	22	11	102	159	37	80	180	305	265	386	373	
ATLANTIC	500	400	300	500	508	838	502	471	424	197	214	339	283	20	485	22	11	102	159	37	80	180	305	265	386	373	
BARBADOS	100	100	100	100	112	184	220	135	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
BRASIL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
COLOMBIA	300	200	100	200	251	412	133	108	92	54	73	160	80	20	485	22	11	102	159	37	25	7	12	21	148	148	*
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	140	145	
GRANADA	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	0	
GUADELOUPE	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	0	
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	0	0	
MEXICO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PUERTO RICO-T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	84	0	0	
RUSSIA FED.	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	0	
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	79	150	141	98	80	
TRINIDAD & TO	100	100	100	200	145	242	149	228	175	143	141	179	203	0	0	0	0	0	0	0	0	0	0	0	0	0	
UKRAINE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	90	0	0	0	
MAW:Scomberomorus t	200	1300	2100	1600	4713	1140	1901	2572	6716	4167	4921	3156	5312	4716	4498	3989	3292	1799	3772	2739	4370	3648	1433	1775	1756	1756	
ATLANTIC	200	1300	2100	1600	4713	1140	1901	2572	6716	4167	4921	3156	5312	4716	4498	3989	3292	1799	3772	2739	4370	3648	1433	1775	1756	1756	
ANGOLA	0	0	0	0	348	0	0	20	81	24	70	68	138	0	0	0	0	0	0	0	0	0	0	0	0	0	
BENIN	0	0	0	0	0	0	0	0	0	23	35	60	68	30	46	50	104	17	13	334	211	214	202	214	214	214	*
GERMANY D.R	0	0	0	0	0	0	0	0	0	0	0	0	851	537	33	1	0	0	0	0	0	0	0	0	0	0	
GHANA	0	700	1500	1000	3513	598	555	720	771	1569	4412	1983	2982	2225	3022	3000	1453	0	1457	1457	1500	2778	899	466	466	466	*
RUSSIA FED.	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	0	
SENEGAL	0	0	0	0	52	314	1270	1188	1054	1112	404	1045	671	754	1174	732	1516	1754	2159	753	1419	656	332	1076	1076	1076	*
U.S.S.R	200	600	600	600	800	228	76	644	4810	1439	0	0	602	1170	223	206	219	28	143	195	1240	0	0	0	0	0	
BLF:Thunnus atlanticus	1952	1875	1895	936	1062	815	1026	1251	1341	1205	1175	1973	1941	1738	1908	1403	2822	3462	3322	2834	3887	4201	4352	4163	1097	2040	
ATLANTIC	1952	1875	1895	936	1062	815	1026	1251	1341	1205	1175	1973	1941	1738	1908	1403	2822	3462	3322	2834	3887	4201	4352	4163	1097	2040	
BERMUDA	0	0	0	0	0	9	10	9	7	7	6	4	5	6	4	9	17	11	7	14	13	8	6	5	7	4	
BRASIL	52	75	295	296	194	123	56	273	195	173	181	85	89	57	203	133	172	254	229	120	335	130	49	22	37	434	
CUBA	0	0	0	0	0	0	0	0	0	0	0	721	622	558	487	157	486	634	332	318	487	318	196	125	0	0	
DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	19	10	14	15	19	30	
DOMINICAN RE	100	100	100	200	136	86	90	68	78	105	125	124	144	144	106	90	123	199	4	564	520	536	110	133	239	239	*
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	307	46	0	0	
FRANCE	0	0	0	0	21	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GRANADA	100	100	100	100	51	100	100	71	76	95	68	84	143	102	232	193	256	141	220	134	293	195	146	253	189	123	
GUADELOUPE	1100	1100	1100	240	240	220	190	530	530	470	440	460	490	482	490	460	470	470	450	460	470	460	470	1000	0	0	

SMT-Table 1. Detailed reported landing of small tunas by species, area.

COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
LIBERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	229	0	0	0	0	0	0	0	
MARTINIQUE	600	500	300	100	420	270	580	300	400	300	300	301	352	327	331	295	259	199	366	395	395	750	700	700	0	0	
NETHERLAND.	0	0	0	0	0	0	0	0	55	55	55	55	55	55	55	55	60	60	70	70	70	60	60	65	0	0	
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	17	14	13	16	82	47	
ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	15	38	11	7	53	19	20	
U.S.A	0	0	0	0	0	0	0	0	0	0	0	139	41	7	0	11	32	44	154	87	80	111	126	508	492	522	
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	947	1448	1240	652	1150	1598	2148	1222	13	621	
WAH:Acanthocybi solan	378	381	381	280	391	326	379	393	452	760	610	2920	2280	2366	2159	920	1150	1235	1612	1507	1470	1687	1805	2570	1699	1543	
ATLANTIC	378	381	381	280	391	326	379	393	452	760	610	2920	2280	2366	2159	920	1150	1235	1612	1507	1470	1687	1805	2570	1699	1543	
ANTIGUA	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	0	
ARUBA	100	100	100	100	100	100	100	100	115	115	115	115	115	115	115	115	120	90	80	80	70	60	50	50	0	0	
BARBADOS	0	0	0	0	0	0	0	0	0	189	116	144	219	222	219	120	138	159	332	51	51	60	51	91	82	42	
BENIN	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	
BERMUDA	0	0	0	0	0	14	20	35	23	33	46	24	40	49	46	46	65	43	61	63	74	67	80	58	50	85	
BRASIL	0	3	3	2	3	3	9	3	6	69	1	1	0	0	0	21	141	133	58	92	52	64	71	33	26	1	
CAP-VERT	0	0	0	0	0	0	0	0	0	0	24	2307	1464	1588	1365	142	205	306	340	631	458	351	350	326	361	334	
DOMINICA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	43	59	59	59	58	
DOMINICAN RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	6	9	13	7	0	0	
ESPANA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9	9	32	18	23	28	32	22	20	15	
GRANADA	0	0	0	0	0	0	0	0	35	31	25	23	41	94	50	51	82	54	137	57	54	77	104	96	46	49	
NETHERLAND.	178	178	178	178	178	178	178	178	215	215	215	215	215	215	215	245	250	260	280	280	280	250	260	270	0	0	
ST. HELENA	0	0	0	0	6	4	5	6	4	7	10	12	9	16	23	15	15	18	18	17	18	12	17	35	0	0	
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	79	150	141	98	80	
ST.VINCENT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	28	33	33	41	28	16	
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	118	1	0	0	0	
U.S.A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	12	57	128	110	82	134	203	827	391	325	
VENEZUELA	100	100	100	0	104	27	67	71	54	100	57	77	175	66	125	147	113	106	141	101	159	302	331	513	538	538	*
CER:Scomberomorus re	500	800	800	780	619	620	565	629	698	586	604	628	687	677	680	574	500	392	219	234	225	375	390	360	90	90	
ATLANTIC	500	800	800	780	619	620	565	629	698	586	604	628	687	677	680	574	500	392	219	234	225	375	390	360	90	90	
DOMINICAN RE	100	100	100	100	109	110	105	119	98	86	104	106	76	110	106	63	52	48	57	59	50	45	79	50	90	90	*
GUADELOUPE	200	200	200	280	270	250	240	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MARTINIQUE	200	500	500	400	240	260	220	510	600	500	500	522	611	567	574	511	448	344	162	175	175	330	310	310	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	1	0	0	0	
BOP:Oreynopsis unicolo	809	690	316	105	150	84	212	456	970	492	698	1448	584	38	49	133	87	564	1482	1116	335	408	363	344	434	383	
MEDITERRANEAN	3	7	6	3	7	0	0	135	153	28	0	0	0	0	0	9	1	26	8	7	21	9	40	40	0	4	
LIBYA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40	0	0	
MAROC	3	7	6	3	7	0	0	135	153	28	0	0	0	0	0	9	1	26	8	7	21	9	0	0	0	4	

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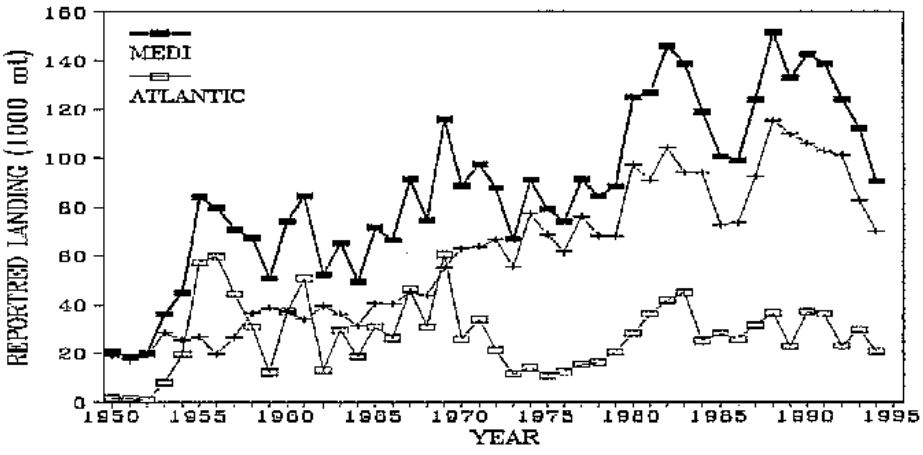
COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
ATLANTIC	806	683	310	102	143	84	212	321	817	464	698	1448	584	38	49	124	86	538	1474	1109	314	399	323	304	434	379	
BENIN	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	3	1	2	1	1	1	1	1	0	0	
MAROC	806	633	210	2	43	4	132	231	727	373	596	968	483	0	0	83	33	487	1422	1058	263	348	272	253	434	379	
MAURITANIE	0	50	100	100	100	80	80	90	90	90	101	478	99	37	40	40	50	50	50	50	50	50	50	50	0	0	
PORTUGAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	
OTH:Others unclassifie	13229	11766	16065	7868	8210	13050	10428	12423	8724	7607	9596	10992	12304	11870	7554	7411	6728	14725	12435	14805	16829	16485	23921	9965	6374	5916	
MEDITERRANEAN	552	462	536	448	416	780	509	459	407	263	1988	1484	1786	1420	1427	2125	2161	2228	3330	2303	4560	2261	2248	838	434	434	
EGYPT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	68	80	80	0	0	0	0	0	0	0	
ESPANA	300	0	0	0	0	337	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GREECE	0	0	0	0	0	0	0	0	0	0	0	0	195	135	40	128	79	129	103	485	485	515	510	510	116	116	*
ISRAEL	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	0	
ITALY	0	0	0	0	0	0	0	0	0	0	18	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	2	0	0	
LEBANON	200	200	200	200	260	200	140	130	140	140	140	130	120	110	100	120	130	150	150	150	130	150	150	0	0	0	
MALTA	0	0	0	100	14	39	9	30	2	11	4	10	21	11	14	54	12	11	6	9	4	8	0	8	0	0	
TUNISIE	52	262	336	148	142	204	360	299	265	112	1826	1344	1450	1164	1273	1791	1872	1858	2991	1659	3941	1588	1588	318	318	318	*
ATLANTIC	12677	11304	15529	7420	7794	12270	9919	11964	8317	7344	7608	9508	10518	10450	6127	5286	4567	12497	9105	12502	12269	14224	21673	9127	5940	5482	
ARGENTINA	0	0	0	0	0	0	0	0	0	0	17	0	0	9	16	0	0	0	0	0	0	0	1	2	0	0	
BARBADOS	0	0	0	0	63	87	78	186	129	123	0	0	0	0	0	0	0	0	0	0	0	71	112	167	162	355	
BRASIL	0	0	0	0	0	0	33	338	679	415	647	48	714	400	31	3	10	338	53	6	11	6	173	287	140	98	
BULGARIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	
CAMEROUN	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	1	0	0	0	3	3	3	6	6	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	3	9	0	5	
CHINA.TAIWAN	844	708	941	1008	932	398	1007	3	489	1272	775	825	1100	770	13	45	127	270	124	1075	223	2023	0	744	0	0	
COLOMBIA	0	0	0	0	28	54	7	15	34	7	21	40	316	16	335	971	677	917	802	1221	341	61	3926	5009	4587	4587	*
COTE D'IVOIRE	0	0	0	0	0	0	0	0	0	0	0	2900	3100	4400	1000	650	20	5300	5300	4700	6050	10100	11150	0	0	0	
CUBA	0	400	600	1100	300	1000	400	100	100	100	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DOMINICAN RE	0	0	0	100	117	46	30	16	61	109	121	141	115	168	207	81	109	199	130	109	100	98	125	86	55	55	*
ESPANA	100	0	6648	0	0	1345	0	0	0	0	0	0	0	0	0	0	0	0	0	50	13	13	13	0	0	0	
GERMANY D.R	0	0	0	0	1	0	13	0	29	74	73	17	0	0	1	0	0	5	0	0	0	0	0	0	0	0	
GERMANY F.R	0	0	0	0	0	0	84	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GHANA	1000	900	0	0	882	451	671	1037	414	70	200	242	616	147	423	0	0	0	0	0	0	0	0	0	0	0	
GUADELOUPE	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	0	
GUINEA-BISSA	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	5	5	0	3	3	3	3	3	5	0	0	
GUINEA-ECUAT	300	300	300	300	300	300	300	300	300	300	200	200	160	190	400	400	500	400	400	400	390	350	360	390	0	0	
ISRAEL	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	0	
JAPAN	1573	1477	980	514	580	398	1048	757	952	1629	1276	814	663	114	342	468	378	341	366	390	539	443	265	815	0	0	
KOREA	6980	5676	3116	2386	3489	5798	2880	4163	2495	1661	2134	2020	1876	1224	960	970	669	357	0	521	170	9	2	5	27	114	
LIBERIA	200	200	200	200	200	200	200	200	218	515	182	441	395	396	284	235	233	265	229	246	237	237	237	0	0	0	
MAROC	0	0	0	0	0	0	0	0	0	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MEXICO	100	100	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	

SMT-Table 1. Detailed reported landing of small tunas by species, area.

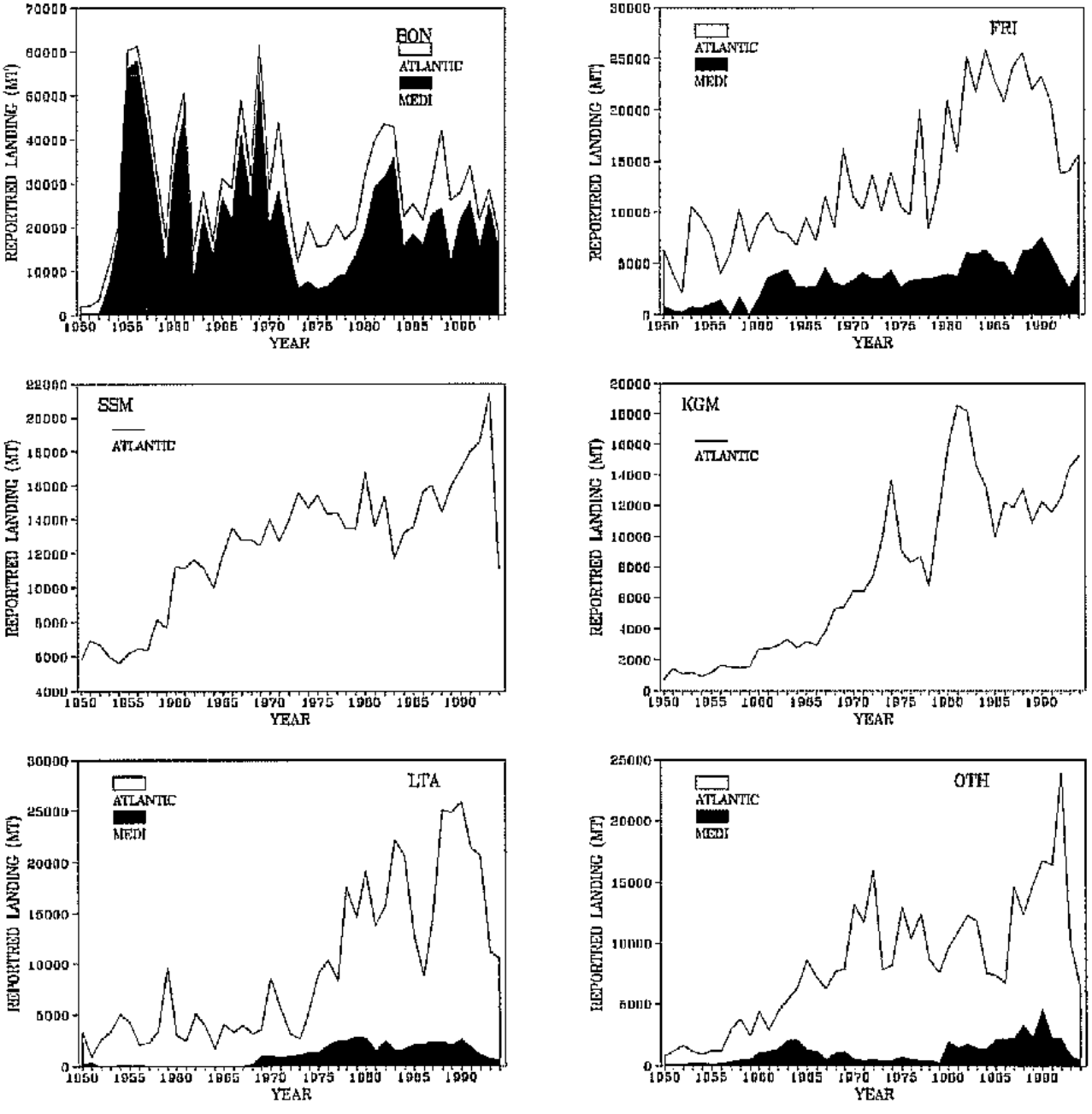
COUNTRY	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
NIGERIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	12	90	157	0	0
PANAMA	0	0	956	994	0	762	1395	2602	757	228	659	1117	648	690	0	415	430	436	0	0	0	0	0	0	0	0
POLAND	0	0	0	0	0	40	39	89	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0
PORTUGAL	327	501	206	21	42	178	262	285	503	199	227	218	68	0	0	17	367	0	14	0	0	0	0	0	25	233
PUERTO RICO-T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	62	0	0
RUMANIA	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SAO TOME & PR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	103	215	236	233	242	260	299	292	300	183	0	0
SIERRA LEONE	0	0	0	0	0	0	16	0	539	492	92	90	79	76	78	80	80	80	80	270	80	35	53	601	0	0
ST.LUCIA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	56	45	71	15	10
TOGO	400	500	500	600	564	792	660	533	533	43	433	332	418	322	128	0	0	0	0	0	0	0	0	0	0	0
TRINIDAD & TO	0	0	0	0	0	0	0	0	0	0	0	0	0	150	21	25	0	3056	1229	3110	3538	102	4428	347	0	0
U.S.A	0	50	0	0	1	19	30	71	31	11	512	61	209	426	883	223	289	287	127	138	229	122	216	181	2	25
U.S.S.R	253	292	181	196	295	380	37	1262	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	0	0	0	0	0	0	0	0	0	1	0	0	0
URUGUAY	400	0	100	0	0	0	0	0	0	0	0	2	16	50	6	78	31	0	0	0	0	0	0	0	0	0
VENEZUELA-F	200	200	800	0	0	22	729	0	54	40	0	0	0	878	891	404	406	13	0	0	0	188	111	0	862	0

* Figure from the last year for which data are available was carried over for more recent year(s).

** Data for Azores is missing and assumed as the same as 1994.



SMT-Fig. 1. Reported total landing (MT) of small tunas, all species combined, in the Atlantic Ocean and Mediterranean Sea, 1950-1994. (Data for 1995 are very incomplete and hence not shown in this figure).



SMT-Fig. 2. Total cummulative catches (MT) of major species of small tunas in the Mediterranean and Atlantic, 1950-1994. (Data for 1995 are very incomplete and hence not shown in these figures).

13. Report of Sub-Committee on Environment

13.1 The Report of the Sub-Committee on Environment was presented by the Convener, Dr. J. Pereira (Portugal). The SCRS reviewed the Report and adopted it together with all the recommendations contained therein. The Report is attached as **Appendix 6.**

14. Report of the Sub-Committee on Statistics

14.1 The Report of the Sub-Committee on Statistics was presented by the Convener, Dr. S. Turner (U.S.A.). He called the SCRS' attention to the recommendations made by the Sub-Committee, particularly those concerning an increase in the Secretariat scientific/statistical staff and improvements to the Secretariat's computer/software facilities, which Commission require funding. After thoroughly reviewing the Report, it was adopted and forwarded to the Commission, together with all the recommendations. The Report is attached as **Appendix 7.**

15. Report of the Sub-Committee on By-catch

15.1 The Report of the Sub-Committee on By-catch, which met during the 1996 SCRS meeting, was presented by Dr. H. Nakano (Japan). The Report was adopted together with all the recommendations, and was forwarded to the Commission (attached as **Appendix 8**).

15.2 The SCRS took due note of an inter-sessional meeting proposed by the Sub-Committee on By-catch for early 1997 and the recommendation to contract an outside expert to monitor activities relative to CITES.

16. Reports of other subsidiary bodies

16.17 The Committee noted that the Tagging Working Group, established at the 1996 ICCAT Tuna Symposium, was formalized under the Bluefin Year Program (BYP) and that this Group requested to start its activities by July, 1997. Drs. E. Prince and J. L. Cort were nominated as West and East Coordinators, respectively (see Item 11).

17. Review of ICCAT scientific publications

17.1 The Committee noted that this subject has been adequately covered by the Sub-Committee on Statistics and in other SCRS Agenda items.

17.2 The Committee noted that the Symposium and Billfish Workshop reports and the contribution papers presented at these two meetings would be reviewed and then published in an enhanced, hard cover form. It was also noted that some funding will be provided by the EU for the Symposium publication and by The Billfish Foundation for the Billfish Workshop Report.

18. Review of future SCRS activities

18.1 Organization of the SCRS sessions

There was general consensus that an inter-sessional meeting schedule, such as that which the SCRS had for 1996, cannot and should not be repeated. The excessive number of inter-sessional meetings resulted in a extraordinary work load for the scientists as well as the Secretariat, which had an effect on the quality of work. Fortunately, due to the extreme efforts by all the scientists concerned, all activities have been successfully completed. The Committee recommended that the Commission keep this in mind when planning the annual schedule. It also recommended that full assessments of bluefin and swordfish should not be scheduled in the same year, since many scientists are involved in the assessments of both species.

Prior to the discussion of the short-term schedule of the Committee, the following clarifications were made:

- A *full assessment* means that the assessment methods and procedures, as well as various input parameters, will be subject to discussion, prior to the carrying out runs. Various sensitivity runs may also conducted.

- An *assessment update* means that the same procedures and methods applied in the previous full assessments will be used, but with new, additional data points.

Bluefin and Swordfish: The Committee considered that full assessments for long-living species, such as bluefin tuna and swordfish, do not need to be carried out at intervals of less than three years, unless there are sudden changes in the populations or management regimes (including fishing patterns). Besides, even if new regulations are recommended in 1996, these will not enter into effect until mid-1997 and hence the effect of such regulations cannot be evaluated in 1997. Therefore, the Committee considered that no full assessments will be needed for either swordfish or bluefin tuna in 1997. In order to avoid assessments of two species in the same year, the Committee considered that one of these species could be the subject of a full assessment in 1998 and the other in 1999, depend on priorities established by the Commission. At present, the Committee considers that swordfish requires more urgent assessment work than bluefin tuna.

Albacore: For the same reason given for the bluefin and swordfish, a full assessment for the north stock is not required in 1997. However, since the data base is improving and an updating of the Taiwanese data base is expected in early 1997 (see **Appendix 7**, the Report of the Sub-Committee on Statistics), the Committee recommended that the catch at age be created for the south stock and that VPA be applied, so that the current production analysis results can be cross checked.

Yellowfin and bigeye tunas: Substantial discussion took place as to the need for full assessments of these species. It was pointed out that the catch data on juvenile bigeye tuna, from the surface fishing gears, were estimated based on sampling, and did not take into account the recent changes in the fishery, and thus could be biased. It is expected that the on-going large-scale research on purse seine catches and sampling from schools associated with flotsam would provide a base to better estimate the catch and size of both species taken by purse seiners in the eastern tropical area. In order to develop abundance indices, a workshop is scheduled in 1998. Most likely, full assessments will not be possible until the aforementioned work is carried out. Notwithstanding, the Committee also considered that the rapid change in fishing on bigeye (and partially on yellowfin) and the increase of catches of this species will require close monitoring of stock conditions. Therefore, the Committee recommended that stock assessments be carried out on both species, and particularly on bigeye tuna, inasmuch as possible, using the current best data available in 1997.

18.2 Inter-sessional scientific meetings in 1997

The Sub-Committee on By-Catch recommended that the Shark Working Group proposed to meet in early 1997, prior to the next Conference of the Parties of CITES scheduled in Zimbabwe in June, 1997. Japan offered to host this meeting at Shimizu in the spring, pending the formal authorization by the Government. The Committee accepted this invitation and requested the Secretariat to finalize the venue and dates through correspondence.

The Swordfish Species Group requested that scientists involved in swordfish research meet for a five-day period prior to the next SCRS session. This Species Group will meet to discuss the methodology for developing sex-specific catch at size and CPUE, to standardize the south Atlantic abundance index and stock structure. a new assessment of this stock cannot be made until the data are improved substantially.

The Committee is proposing a four-year Bigeye Year Program (see Section 18.7). If the Commission approves this Program, a inter-sessional meeting for about five days will be necessary to organize the program plan.

A two-day meeting to coordinate the organization of a workshop on tropical tuna abundance indices might be needed. This meeting can be combined with the program planing meeting of the Bigeye Year Program mentioned above.

As indicated above, the Committee considered that no inter-sessional stock assessments will be needed in 1996. The Tropical Tunas Species Groups and any other Species Groups as needed will meet one week prior to the SCRS Plenary Session.

18.3 Other matters - Bigeye Year Program

The Tropical Species Group submitted a four-year Bigeye Year Program to the Committee for review. It was noted that bigeye tuna is now drawing a lot of attention in the international fisheries community for the following reasons: the high prices being paid on the sashimi market, the strong demand on the Japanese market for this species, the sudden increase in the longline fishery due to the new entry of many fishing nations; the increase in catches of juvenile bigeye by the flotsam purse seine fishery. Also, the assessment shows that the bigeye catch is greatly exceeding MSY levels. On the other hand, while bigeye tuna research has been carried out (at least for the surface fishery), it has been secondary to yellowfin tuna and there is a considerable lack of knowledge on the biology, stock parameters and statistical information for this species.

The Committee therefore drafted an ambitious research plan. The Committee thoroughly reviewed the Plan and recommended that the Commission study it and seriously consider its adoption. The Plan requires substantial funding, yet it is minimal in comparison to the profit this species brings to the tuna industry. The Program Plan, which is attached herewith as **Appendix 9**, also includes the four-year schedule as well as the budget.

19. Recommendations

19.1 Management recommendations

The management recommendations are included at the end of the Executive Summary of each species studied. The Committee requested the Commission to give due attention to these recommendations when considering the management of stocks.

19.2 General recommendations which have financial implications for the Commission

Following herewith is a summary of the SCRS recommendations that have financial implications:

a) The Bigeye Year Program (see **Appendix 9**) to be carried out by Commission funding.

b) An increase in the Secretariat scientific/statistical staff and substantial improvements to be made on the Secretariat's computer/software facilities (see **Appendix 7**).

c) An inter-sessional meeting proposed by the Sub-Committee on By-Catch in early 1997, most likely in Shimizu, Japan.

d) The need for the outside contracting of an expert to monitor the matters relative to CITES (i.e. proposed listing in the CITES Appendices of species under ICCAT mandate, proposed changes to the criteria for such listing, Commission participation in CITES meetings, the preparation of responses to CITES regarding actions taken by the organization and which can have an effect on ICCAT's mandate, etc.)

e) A visit by the Assistant Executive Secretary to Taiwan in the first half of 1997 to assist in updating their statistical collection system which, given the importance of the Taiwanese fisheries for albacore, swordfish and bigeye tuna, is essential to ICCAT's assessment work on these species.

f) Flexibility by the Secretariat in the application of budgetary funds, in particular, as concerns tuna research and statistics, in assuring that the Secretariat be duly represented at all the SCRS stock assessment sessions by the System Analyst in addition to the Assistant Executive Secretary.

g) Adequate funding of the tagging program formed under the BYP. In this respect, the Committee recommended that the extra-budgetary contributions made towards bluefin tuna research in 1996 and the additional contribution to be received in 1997 ($5,000 each) from Taiwan be clearly earmarked for such research, and a special fund be established.

h) The Commission's serious re-consideration of the budget proposed in 1995 by the Bluefin Year Program (BYP) (see Appendix 7 to the 1995 SCRS Report).

i) The Committee recommended that the contribution papers to the Billfish Workshop Report as well as the Symposium Report be peer reviewed and published in enhanced hard cover volumes. However, since some outside funding will be available for both publications, the Commission's funding will be minimal.

j) Participation of the Assistant Executive Secretary and scientist(s) from one or two member countries at the CWP scheduled to be held in Hobart, Tasmania, in March, 1997. Participation of member country scientists should, of course, be funded by the respective national offices.

k) Tagging of billfish caught alive should be accelerated. The Billfish Long-term Tagging Program, as proposed in the 1997 Program Plan for the ICCAT Enhanced Research Program for Billfish (see **Appendix 5** to the this Report), which was developed following the Resolution adopted by the Commission in 1995 concerning billfish tagging, be implemented, with appropriate funding from the Commission.

19.3 Recommendations relative to research of various tuna species

TROPICAL TUNAS: The order in which the recommendations for the tropical species are presented relates to their priority. The Bigeye Program is given first and greatest priority by the Committee.

1) Bigeye Program: (see Section 18.3)

2) Abundance Indices: The assessments of yellowfin and bigeye carried out by the Committee have been attended by uncertainties, due to the lack of availability of standardized catch rates of the surface fisheries, especially the purse seine fishery, which are needed to measure the results of the analyses conducted for the most recent years.

The development of the surface fisheries, baitboat fisheries and particularly the purse seine fishery, with the incorporation of numerous technological improvements and the introduction of new fishing methods, fundamentally fishing by floating objects, has substantially modified the concept of effective effort and, as a result, the interpretation of the catch rates as relative abundance indices.

The method of fishing using floating objects has extended in recent years to the majority of the purse seine tropical tuna fisheries (east and west Pacific Ocean, Indian Ocean and east Atlantic Ocean).

For all these reasons it is recommended that the problems related to the standardization of catch rates of the purse seine fisheries, specifically those related to the interpretation and incorporation of the changes in fishing power derived from fishing using floating objects in the process of obtaining relative abundance indices, be analyzed together, in a workshop on this topic to be organized by ICCAT, in coordination with the international commissions involved in the management of tropical tunas (IATTC, SPC, Indian Ocean Commission, to be created). This Workshop will be open to all experts related to this issue to participate.

Despite the fact that obtaining abundance indices from the catch rates of surface fisheries is a matter of priority, the Committee recommended that the Workshop be held in 1998 once the analysis of a multi-species sampling scheme for tropical tunas (see SCRS/96/86) has been completed.

To organize the workshop, a committee will be created which should, together with the ICCAT Secretariat, carry out the work of coordination with other commissions and define the specific terms of the workshop. This committee will work during 1997 and should consider meeting if the work so requires.

3. Statistics - size frequencies of the catches: The work of the tropical tunas species group has suffered considerable delays which have been caused, for the most part, by the lack of relevant data (suitable raised size frequencies) to be able to begin assessment work.

Similarly, the lack of a data base in the Secretariat, with statistics (total size frequencies, catch at age, abundance indices) used in the last assessments, have made it necessary to repeat certain calculations, which may have caused some differences when compared with previous assessments.

The Committee therefore recommended that the Secretariat supply the group with adequate statistics of size frequencies, appropriately raised by gear, and that a permanent base be created containing all the data used during

the assessments, which would greatly simplify the assessment work and provide a guarantee that the data used in previous assessments are always available to the group.

The Committee insisted on the necessity of the Secretariat having available adequate statistical staff to carry out these tasks.

ALBACORE: The Committee considered it extremely important to review and clarify the Taiwanese historical and current basic albacore statistics, as described in several recommendations in the Report of the Albacore Stock Assessment Session (Albacore Detailed Report). It is strongly recommended that a member of the Secretariat staff visit Taiwan in 1997 and work together with the Taiwanese scientists. This may require a period of three weeks. The Commission is requested to fund this activity, as this affects not only albacore data, but also that of other species, specifically bigeye and swordfish data.

Considering the progress made in the application of length frequency analysis to derive catch-at-age for the southern albacore stock, recognizing that there are many uncertainties in the data base for this stock and that various recommendations have been made to rectify this problem, it is recommended that the SCRS conduct a stock assessment for the southern albacore stock in 1997.

BLUEFIN TUNA: The Committee is gravely concerned about the lack of basic catch and effort statistics for the Mediterranean Sea. In addition, the increase in NEI in 1995 is mainly due to the fact that some fleets land their catches at foreign ports (including ICCAT member country ports). This is the case for major purse seine and longline fisheries. Because, in addition, bluefin tuna catches in the east Atlantic are predominantly from the Mediterranean, it is difficult to conduct stock assessment for the east Atlantic management unit and to give clear advice to the Commission. Countries engaging in purse seine and longline fishing in the Mediterranean Sea must take immediate and effective action, including at least implementing a proper logbook system and size sampling.

The Committee recommended that a direct ageing study on large fish, especially 10+, should be encouraged, as ageing of southern bluefin tuna, a closely related species, using otolith reading, appears promising.

The Committee recommended that every effort be made to collect information on mixing rates of bluefin tuna in the entire Atlantic, including the Mediterranean Sea. Tagging activities using conventional tags as well as archival tags should be increased. The increased tagging experiments could give information on age-specific natural mortality. In addition, the Committee recommended that every effort be made to increase the reporting rate of recoveries of fishermen. It is also recommended that all studies concerning stock structure and mixing rates of bluefin tuna in the Atlantic be encouraged (micro-constituent analyses, genetic studies, parasite occurrence, etc.).

BILLFISH: The Committee recommended that estimates be made of billfish by-catches taken by the swordfish longline fishery and tropical purse seine fisheries of the EU countries (mainly for Spain and France) and additional sampling of these by-catches be carried out.

The Committee also recommended that increased efforts be made to estimate Atlantic recreational billfish catches and CPUE indices. In addition, an estimate should be made of the total number of billfishes released with and without tags, by species, from these fisheries, as well as from other fisheries including longline.

It was further recommended that an assessment of the post-release survival for billfishes caught of commercial and recreational vessels be initiated immediately. In addition, studies to maximize the survival of released billfishes with tags should also be initiated.

SWORDFISH: Mechanisms to improve the reporting system for swordfish catch and effort need to be implemented by ICCAT. Under-reporting undermines the intent of conservation measures and the reliability of assessment advice. Scientists should investigate the sources of possible bias associated with under-reporting.

Following the recommendations in the 1995 report of the SCRS, the 1996 Swordfish Species Group conducted a preliminary sex-specific analysis for the north Atlantic, and a preliminary production model for the south Atlantic. It is recommended that both of these analyses be improved before the next assessment. The mechanism for this improvement follows in the form of the schedule of future meetings and their objectives. Scientists from all countries that fish for swordfish should attend species group meetings.

1) **1997:** A 5-day data preparatory and review meeting prior to the SCRS to (a) review the work of the small group formed to develop the standardized approaches to estimate sex ratio-at-size and catch-at-size-by-sex (which will require a review of methodologies, by correspondence, and considerable preparation before the meeting); (b) review the various growth curves for swordfish and determine the most appropriate to use; (c) conduct a detailed and comprehensive review of new and historical stock structure information and examine the sensitivity of current stock boundaries; and (d) review improvements to the south Atlantic CPUE indices.

2) **1998 or 1999:** An 8-day Swordfish Stock Assessment Inter-sessional Meeting to attempt to conduct a sex-specific VPA for both the north and south (or total) Atlantic. (This will require considerable data preparation.)

In the interim period, scientists are encouraged to collect samples for the analyses of growth by sex, especially from the south and east Atlantic; to continue tagging and genetics studies to document the important changes in the fishing patterns of several fleets in recent years; and to collect fine-scale CPUE data in the south Atlantic.

20. Cooperation with non-contracting parties and other fisheries organizations

20.1 The Committee noted that this item (particularly concerning cooperation with FAO, CCSBT, CITES, CWP, ICES, IPTP, IATTC, etc.) had been well covered under other Agenda items and in reports presented to the Committee from the ICCAT representatives at the meetings of some of the aforementioned organizations.

20.2 The Committee recommended that the Commission be represented by an authorized participant from an ICCAT member country at the newly established Indian Ocean Tuna Commission meetings (at the Commission as well as scientific meetings) and that a report be presented to the Commission and made available to the SCRS as well. This Commission is very similar to ICCAT in its functions, and its future plans could be very interesting to ICCAT.

20.3 The Committee also recommended that ICCAT be represented at the CCSBT meeting by an authorized participant from an ICCAT member country and that a report be made available to the Commission as well as the SCRS.

20.4 Two other meetings were also noted: the Bigeye Tuna Workshop scheduled to be held in mid-November, 1996, in La Jolla, and the Swordfish Symposium being organized in Hawaii, in 1997. Since many ICCAT scientists have been invited to both meetings, it was recommended that reports on both these meetings be presented to the Commission and SCRS by one of the ICCAT participants.

20.5 The Observer from Mexico pointed out that his country intends to collaborate with ICCAT. He noted that Mexico has carried out an extensive observer program on its longline fleet, collection the statistics required by ICCAT. These results will be presented to ICCAT.

21. Date and place of the next meeting of the SCRS

21.1 The Committee recommended that the 1997 SCRS meeting be held for a five-day period, during the week of October 21, 1997, in principle, in Madrid, Spain.

21.2 For reasons of security of the participants, several delegations requested that the Secretariat look into holding next year's meeting in a safer area of Madrid. The Committee reiterated this request to the Secretariat.

22. Other matters

22.1 The Delegate of Uruguay proposed that an item be included on the 1997 SCRS Agenda to consider the scientific recommendations made at the 1996 ICCAT Tuna Symposium and the Committee took due note of this request.

23. Adoption of Report

23.1 The 1996 SCRS Report was adopted.

24. Adjournment

24.1 The 1996 SCRS Meeting was adjourned on Friday, November 1, 1996.

ATTACHMENT A

OPENING ADDRESS TO THE 1996 SCRS
BY DR. ANTONIO FERNANDEZ, ICCAT EXECUTIVE SECRETARY

Mr. Chairman, Ladies and Gentlemen:

I would like to welcome you all to this meeting of the SCRS. Allow me to open this first session by telling you in advance that I do so in a very special way, since it is the last time I shall do so as Executive Secretary of ICCAT. Therefore, before the Assistant Executive Secretary informs you of the details of the Agenda and proposed schedule for this meeting, I would like to address you, before my departure, with some brief but heartfelt words which I should like to be recorded as an Annex of the Report of this Committee.

As you may know, last March I informed the Commission Chairman of my wish to be relieved of my duties, for personal reasons which I did not consider necessary to make public, and the necessary procedures were established for my resignation to become effective after the work relative to the Tenth Special Meeting of the Commission has finished, which will be held next month in San Sebastian. Since then, we have officially received 15 applications for the post of Executive Secretary, and I am sure that the Commission will elect the most appropriate of these in order to fulfill its objectives. In my letter to the Chairman I stated that it had been, and is, an honor for me to defend, serve and forward the interests of ICCAT during the last five years, and I would like to thank the representatives of the Contracting Parties for the respect and appreciation they have shown me, and to assure them that this respect and appreciation is reciprocated.

As I mentioned, the Commission will hold its Tenth Special Meeting at the end of November, and will examine in detail the report drawn up by this Standing Committee. Our Commission is carrying out great work with regard to coordination and collective awareness, the practical effects of which are considerable at the international level, in an ever renewed effort to reach a desirable balance between human activities and the preservation of their ecological environment. In issues such as fisheries which affect, among other concepts, population, resources, food and the environment, it is natural that there is controversy and a need for political consensus. To resolve the numerous issues raised in its Agenda, the Commission certainly needs political and economic impulses, but it also needs impulses of a scientific and technical origin, to be able to adequately evaluate the alternatives before making decisions.

The final objective of this Committee can only be that of presenting the Commission with a reliable and rationally discussed report, which will stand up to the possible criticism, reservations or mistrust of certain sectors that have potential influence on public opinion. I trust, therefore, that the SCRS, following its deliberations, can adequately respond to the difficult questions raised by the Commission. It would be as unjust to present false perspectives for the conservation and management of the stocks as to offer no viable perspective at all. I am convinced that the scientific teams of the ICCAT member countries, despite all the difficulties and uncertainties with which they have to work, are comprised of individuals who very able to assess the most probable status of the stocks under our mandate, bearing in mind the scientific principle that there is always a correlation between the methodology used and the results obtained.

If the results of the assessments carried out by this Committee are not always presented in an univocal and conclusive manner, I believe that this is as much due to a healthy sense of self-criticism inherent in the scientific spirit as to a feeling of responsibility towards the international community. Incidentally, I should like to remind the rapporteurs of the various sections that, when writing their conclusions, they should bear in mind that their readers are not only scientific experts, as those present, but also administrators and others from a wide spectrum.

For our part, the Secretariat has tried to compensate various limitations with a spirit of dedication in order to face the responsibilities entrusted to it by the Commission. The greatest proof of appreciation which the Executive Secretary has been able to give the SCRS scientific teams is to have interfered as little as possible in their work, respecting the freedom and initiative of the researchers in the planning and execution, and facilitating their work as much as possible with the human and material resources that the Commission has decided to supply over the years. Not having interfered with the work does not mean that I have not been interested in the results of the research. Many of you know that, perhaps as a result of my initial scientific education, I have studied the content of the reports with interest, sometimes requesting the clarification I needed, especially during my first years.

Now that my term as Executive Secretary is coming to an end, it is without a doubt the appropriate moment to express to you, Mr. Chairman, and to all the scientists of this Standing Committee, my personal respect and sincere appreciation for the professional dedication that you have shown in your work in attempting to fulfil the objectives of ICCAT during these past five years, and which is gathered for posterity in the Red Books and the Proceedings and Reports of the numerous annual meetings of the Committee, Sub-Committees and Species Groups.

To conclude, I should just like to reiterate that the Secretariat staff is totally at your disposition to ensure that your time in Madrid is as useful and pleasant as possible. Following the practice established last year, at the end of the session this afternoon, a lottery will take place to award the three annual prizes for the recovery of tuna and billfish tags. The Secretariat, from its modest resources, is pleased to invite you all after the lottery to get together for a tasting of Spanish produce. Thank you very much.

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. Admission of observers
5. Admission of scientific documents
6. Review of national fisheries and research programs
7. Reports of 1996 inter-sessional scientific meetings organized by ICCAT
8. Report of the 1996 ICCAT Tuna Symposium *(Ponta Delgada, Azores - June 10 to 18, 1996)*
9. Reports of scientific meetings at which ICCAT was represented
10. Review of the progress made by the Program of Enhanced Research for Billfish
11. Review of the progress made by the Bluefin Year Program (BYP)
12. Executive Summaries on species:
13. Report of Sub-Committee on Environment
14. Report of the Sub-Committee on Statistics
15. Report of the Sub-Committee on By-catch
16. Reports of other subsidiary bodies, if any
17. Review of ICCAT scientific publications
18. Review of future SCRS activities
19. Recommendations
20. Cooperation with non-Contracting Parties and other fisheries organizations
21. Date and place of the next meeting of the SCRS
22. Other matters
23. Adoption of Report
24. Adjournment

APPENDIX 2

LIST OF SCRS PARTICIPANTS

MEMBER COUNTRIES

ANGOLA

N'SINGI, K. K.
Instituto de Invstigaçao Pesqueira
B. P. 2601
Luanda
Tel: 244-2-339061
Fax: 244-2-339061

BRAZIL

MENESES DE LIMA, J. H.
CEPENE/IBAMA
Rua Samuel Hardman s/n
55.578-000 Tamandaré - PE
Tel: 081-675 1109
Fax: 081-527 1090
E-mail: meneses@ibama.gov.br

CANADA

PORTER, J. M.
Department of Fisheries & Oceans
Biological Station
St. Andrews, New Brunswick E0G 2X0
Tel: 506-529 8854
Fax: 506-529 5862
E-mail: porter@sta.dfo.ca

CAPE VERDE

SANTA RITA VIEIRA, M. H.
Directrice de la Délégation de
l'Institut National du Development
de la Pêche à Praia (INDP)
B. P. 545
Praia
Tel: 611 742
Fax: 612 502

CÔTE D'IVOIRE

AMON KOTHIAS, J. B.
Directeur
Centre de Recherches Océanologiques
B. P. 18
Abidjan
Tel: 225-356 448
Fax: 225-351 155

EQUATORIAL GUINEA

OSA ADUGU, S.
Ministerio de Pesca y Forestal
c/Carretera de Luba
Malabo B.N.
Tel: 240 93449
Fax: 240 93408

ECOMO, J. J.
Ministerio de Pesca y Forestal
c/Carretera de Luba
Malabo B.N.
Tel: 240 93449
Fax: 240 93408

FRANCE

FONTENEAU, A.
IATTC
c/o Scripps Institution of Oceanography
8604 La Jolla Shores Drive
La Jolla, California 92037 (USA)
Tel: 619-546 7026
Fax: 619-546 7133
E-mail: fonteneau@ucsd.edu

LIORZOU, B.
IFREMER
1, Rue Jean Vilar
34200 Sète
Tel: 04 67 467834
Fax: 04 67 747090
E-mail: bliorzou@ifremer.fr

STRETTA, J. M.
Centre ORSTOM
Ave. Agropolis, B. P. 5045
34032 Montpellier Cédex 01
Tel: 04 67 617448
Fax: 04 67 547800
E-mail: stretta@orstom.rio.net

JAPAN

HIRAMATSU, K.
National Research Institute of Far Seas Fisheries
5-7-1 Chome Orido
Shimizu 424
Tel: 81-543-36 6014
Fax: 81-543-35 9642
E-mail: hira@enyo.affrc.go.jp

MIYABE, N.
National Research Institute of Far Seas Fisheries
5-7-1 Chome Orido
Shimizu 424
Tel: 81-543-36 6044
Fax: 81-543-35 9642
E-mail: miyabe@enyo.affrc.go.jp

NAKANO, H.
National Research Institute of Far Seas Fisheries
5-7-1 Chome Orido
Shimizu 424
Tel: 81-543-36 6046
Fax: 81-543-35 9642
E-mail: hnakano@enyo.affrc.go.jp

OZAKI, E.
Federation of Japan Tuna Fisheries
Cooperative Associations
2-3-22 Kudankita, Chiyoda-ku
Tokyo 102
Tel: 81-3-3264 6167
Fax: 81-3-3234 7455
E-mail: ldro4602@niftyserve.or.jp

SUZUKI, Z.
National Research Institute
of Far Seas Fisheries
5-7-1 Chome Orido
Shimizu 424
Tel: 81-543-36 6000
Fax: 81-543-35 9642
E-mail: suzuki@enyo.affrc.go.jp

UOZUMI, K.
National Research Institute
of Far Seas Fisheries
5-7-1 Chome Orido
Shimizu 424
Tel: 81-543-36 6046
Fax: 81-543-35 9642
E-mail: uozumi@enyo.affrc.go.jp

KOREA

MOON, D. Y.
National Fisheries Research
& Development Agency (NFRDA)
Distant Water Fisheries Division
Shirang-ri, Kijang-gun
Pusan, 619-900
Tel: 051-720 2320
Fax: 051-720 2337
E-mail: dymoon@haema.nfrda.re.kr

MOROCCO

SROUR, A.
Institut Scientifique des Pêches Maritimes
2, Rue Tiznit
Casablanca
Tel: 212-222 0249
Fax: 212-226 6967

PORTUGAL

FERREIRA DE GOUVEIA, M. L.
Chefe de Divisao de
Tecnicas e Artes de pesca
Direcçao Regional das Pescas
Estrada da Pontinha
9000 Funchal - Madeira
Tel: 351-91 232 141
Fax: 351-91 229 691
E-mail: lgouveia@madinfo.pt

PEREIRA, J.
Universidade dos Açores
Departamento de Oceanografía e Pescas
9900 Horta, Faial - Açores
Tel: 351-92-23460
Fax: 351-92-22659
E-mail:pereira@dop.uac.pt

RUI R. PINHO, M.
Universidade dos Açores
Departamento de Oceanografía e Pescas
9900 Horta, Faial - Açores
Tel: 351-92-22988
Fax: 351-92-22659
E-mail: maiuka@dop.uac.pt

SAO TOME & PRINCIPE

D'ALMEIDA, A. M.
Direççao das Pescas
C. P. 59
Sao Tome
Tel: 00239-12 22091
Fax: 00239-12 21095

FERREIRA, G.
Direççao das Pescas
C. P. 59
Sao Tome
Tel: 00239-12 22091
Fax: 00239-12 21095

SPAIN

ARIZ TELLERIA, J.
Instituto Español de Oceanografía
Centro Costero de Canarias, Apartado 1373
Santa Cruz de Tenerife
Tel: 922-549400
Fax: 922-549554
E-mail: tunidos@rcanaria.ieo.es

CORT, J.L.
Instituto Español de Oceanografía
Apartado 240
39080 Santander
Tel: 942-275033
Fax: 942-275072
E-mail:cendrero@ccaix3.unican.es

DE LA SERNA ERNST, J. M.
Instituto Español de Oceanografía
Apartado 285
29640 Fuengirola, Malaga
Tel: 952-476955
Fax: 952-463808

DELGADO DE MOLINA, A.
Instituto Español de Oceanografía
Centro Costero de Canarias
Apartado 1373
Santa Cruz de Tenerife
Tel: 922-549400
Fax: 922-549554
E-mail: tunidos@.rcanaria.ieo.es

FERNANDEZ, A.
Subdirector General
Instituto Español de Oceanografía
Avda. del Brasil, 31
28020 Madrid
Tel: 91-597 0841
Fax: 91-597 3770

HERRERA ARMAS, M. A.
16-B. P. 1032
Abidjan 16 (Côte d'Ivoire)
Tel: 225-260706
Fax: 225-260706

MEJUTO, J.
Instituto Español de Oceanografía
Apartado 130
15080 La Coruña
Tel: 981-205366
Fax: 981-229077

ORTIZ DE ZÁRATE, V.
Instituto Español de Oceanografía
Apartado 240
39080 Santander
Tel: 942-275033
Fax: 942-275072
E-mail: cendrero@ccaix3.unican.es

PALLARÉS SOUBRIER, P.
Instituto Español de Oceanografía
Corazón de María, 8
28002 Madrid
Tel: 91-3473620
Fax: 91-4135597
E-mail: pilar pallares@md.ieo.es

SANTANA FERNANDEZ, J. C.
Instituto Español de Oceanografía
Centro Costero de Canarias
Apartado 1373
38080 Santa Cruz de Tenerife
Tel: 922-549400
Fax: 922-549554
E-mail: tunidos@.rcanaria.ieo.es

SANTIAGO BURRUTXAGA, J.
AZTI
Txatxarramendi Isla
Sukarrieta (Vizcaya)
Tel: 94-6870700
Fax: 94-6870006
E-mail: josu@rp.azti.es

UNITED KINGDOM

BARNES, J. A.
Director of Department of Agriculture,
Fisheries & Parks
P. O. Box HM 834
Hamilton HM CX
Bermuda
Tel: 441-236-4201
Fax: 441-236-7582
E-mail: agfish@ibl.bm

KELL, L.
Ministry of Agriculture, Fisheries & Food
Directorate of Fisheries Research
Fisheries Laboratory
Pakefield Road
Lowestoft, Suffolk, NR33 OHT
Tel: 44 0 1502-524347
Fax: 44 0 1502-513865
E-mail: l.t.kell@dfr.maff.gov.uk

UNITED STATES

BROWN, C. A.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4590
Fax: 305-361 4499
E-mail: craig.brown@noaa.gov

BUTTERWORTH, D.
Dept. of Mathematics & Applied Mathematics
University of Cape Town
Rondebosch 7700
(South Africa)
Tel: 27-21-650 2343
Fax: 27-21-650 2334
E-mail: dll@maths.uct.ac.za

COOKE, J. G.
Center for Ecosystem Managament Studies
Mooshof, 79297 Winden
(Germany)
Tel: 49-7685 1019
Fax: 49-7685 417
E-mail: jcooke/641-6054@mcimail.com

CRAMER, J.
Southeast Fisheries Science Center
NMFS
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4493
Fax: 305-361 4219
E-mail:jean.cramer@noaa.gov

HESTER, F. J.
LMR Fisheries Research, Inc.
11855 Sorrento Valley Rd., Suite A
San Diego, California 92106
Tel: 619-792 6515
Fax: 619-792 6519
E-mail:fhester52@aol.com

JONES, C. D.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4288
Fax: 305-361 4219
E-mail:chris.d.jones@noaa.gov

LANKESTER, K.
Eerste Hermersstraat 183-III
NL-1054
Amsterdam (The Netherlands)
Tel: 31-20 612 2843
Fax: 31-20 689 5282
E-mail:klankester@mcimail.com

MACE, P.
NMFS-Northeast Fisheries Science Center
Water Street
Woods Hole, Massachussetts 02814
Tel: 508-495 2373
Fax: 508-495 2393
E-mail: pamela.mace@noaa.gov

POWERS, J.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4487
Fax: 305-361 4478
E-mail: joseph.powers@noaa.gov

PRINCE, E.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 1-305-361 4284
Fax: 1-305-361 4219
E-mail:eric.prince@noaa.gov

SCOTT, G. P.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4284
Fax: 305-361 4219
E-mail:gerry_scott@noaa.gov

SISSENWINE, M. P.
NMFS-Northeast Fisheries Science Center
Office of the Science & Research Director
166 Water Street
Woods Hole, Massachussetts 02543
Tel: 508-495 2233
Fax: 508-495 2258
E-mail: michael.sissenwine@noaa.gov

TURNER, S. C.
NMFS-Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149
Tel: 305-361 4482
Fax: 305-361 4562
E-mail: sturner@sturner.sefsc.noaa.gov

URUGUAY

MORA, O.
Jefe Sección de Recursos Pelágicos de Altura INAPE
Constituyente 1497
11200 Montevideo
Tel: 5982-404689
Fax: 5982-413216
E-mail: omora@inape.gov.uy

OBSERVERS

NON-MEMBER COUNTRIES

ITALY

DE METREIO, G.
Assistant Professor
Dipartimento di Produzione Animale
Università di Bari
Via Amendola 165/A
70100 Bari
Tel: 80-558 7823
Fax: 80-558 8020

MEXICO

ULLOA RAMIREZ, P. A.
Instituto Nacional de Pesca
Pitágoras 1320, Col.Sta. Cruz Atoyac
México D. F.
Tel: 604 2352
Fax: 604 4887
E-mail: pabloaf@servidor.unam.mx

TAIWAN

CHANG, S. K.
Overseas Fisheries Department
19 Lane 113, Roosevelt Road, Sec.4
Taipei
Tel: 886-2-738 5486
Fax: 886-2-738 4329
E-mail: skchang@ms1.hinet.net

CHERN, Y. C.
Department of Fisheries, Council of Agriculture
37, Nanhai Road, Taipei
Tel: 886-2-312 5884
Fax: 886-2-331 6408
E-mail: mfda@ms1.hinet.net

HSU, C. C.
Institute of Oceanography
National Taiwan University
P. O. Box 23-13, Taipei
Tel: 886-2-362 2987
Fax: 886-2-366 1198
E-mail: hsucc@ccms.ntu.edu.tw

LIN, D. R.
Taiwan Fisheries Bureau
8, Sec.1, Chung Hsiao E. Rd.
Taipei
Tel: 886-2-321 9511
Fax: 886-2-341 2647

YEH, S. Y.
Institute of Oceanography
National Taiwan University
P. O. Box 23-13, Taipei
Tel: 886-2-363 7753
Fax: 886-2-392 5294
E-mail: sheanya@ccms.ntu.edu.tw

INTERNATIONAL ORGANIZATIONS

CARIBBEAN COMMUNITY (CARICOM)

SINGH-RENTON, S.
CFRAMP, Pelagic and Reef Fishes
Resource Assessment Unit
Tyrell St., Kingstown
St.Vincent & The Grenadines, West Indies
Tel: 809-457 1904
Fax: 809-457 2414
E-mail: cframp@caribsurf.com

FISHERY COMMITTEE FOR THE EASTERN CENTRAL ATLANTIC (CECAF)

WEST, W.
Secretary
FAO Regional Office for Africa
P. O. Box 1628
Accra, Ghana
Tel: 233-21 666851
Fax: 233-21 668427
E-mail: fao.rafr@cgnet.com

COMMISSION OF EUROPEAN COMMUNITIES

PENAS, E.
Commission des Communautés Européennes
Direction Général
200 Rue de la Loi
B-1049 Bruxelles, Belgium
Tel: 322-2963744
Fax: 322-2966046

****

ICCAT SECRETARIAT

A. Fernández
P. M. Miyake
P. Kebe
M. E. Carel
J. Cayol
J. Cheatle
M. A. F. de Bohadilla
J. L. Gallego
C. García Piña

F. García Rodriguez
G. Messeri
A. Moreno Rodriguez
J. A. Moreno Rodriguez
P. M. Seidita
C. Lord
I. Meunier
T. Oyarzun
V. Parra

Interpreters

M. Castel
L. Faillace

Temporary Staff

F. Bellemain
B. F. de Bobadilla

APPENDIX 3

LIST OF 1996 SCRS DOCUMENTS

SCRS/96/1	Tentative SCRS Agenda
SCRS/96/2	Tentative Agenda of the Sub-Committee on Statistics
SCRS/96/3	Tentative Agenda of the Sub-Committee on Environment
SCRS/96/4	Tentative Agenda of the Sub-Committee on By-Catch
SCRS/96/5	Organization of the 1996 Meeting of the SCRS
SCRS/96/6	Guidelines for the presentation of Documents to the 1996 SCRS
SCRS/96/7	Summary of shark by-catch statistics received
SCRS/96/12	Report on Statistics and Coordination of Research in 1996
SCRS/96/13	Report of the First Meeting of the Shark Working Group of the ICCAT Sub-Committee on By-Catches (Miami, Florida, USA, February 26-28, 1996)
SCRS/96/14	Report of the Bluefin Tuna Methodology Session (Madrid, Spain, April 16-19, 1996)
SCRS/96/15	Report of the Meeting on the ICCAT Bluefin Year Program (BYP) Larval Survey (Fano, Italy, April 23-25, 1996)
SCRS/96/16	Report of the ICCAT Tuna Symposium (Ponta Delgada, Azores, June 10-18, 1996)
SCRS/96/17	Report of the Third Meeting of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
SCRS/96/18	Information relating to U.N. Resolutions on straddling fish stocks and highly migratory fish stocks, and large-scale driftnet fishing on the high seas
SCRS/96/19	Report of the Third ICCAT Billfish Workshop (Miami, Florida, USA, July 11-20, 1996)
SCRS/96/20	Development of user-friendly software for Task I
SCRS/95/21	Report of the Contributions-Expenditures of the ICCAT Enhanced Billfish Research Program in 1996
SCRS/96/22	Report of the Third Meeting of the *ad hoc* GFCM/ICCAT joint Working Group on Large Pelagic Fish Stocks in the Mediterranean Sea (Genoa, September 9-11, 1996)
SCRS/96/23	Report on CITES Animals Committee Meeting (Pruhonice, Czech Republic, September 23-27, 1996)
SCRS/96/24	Coordinating Working Party on Fishery Statistics (CWP)
SCRS/96/25	Data preparation carried out by the Secretariat for the 1996 swordfish stock assessments - ICCAT Secretariat

NOTE: The documents shown with an * indicate that these papers were presented to the ICCAT inter-sessional meetings, but not to the SCRS Plenary Sessions.

SCRS/96/26 SCRS Detailed Report on Bluefin Tuna (Report of 1996 SCRS Bluefin Tuna Stock Assessment Session (Genoa, September 12-20, 1996)

SCRS/96/27 Procedures applied to update bluefin tuna catch-at-size data for the 1996 SCRS Bluefin Tuna Stock Assessment Session - ICCAT Secretariat

SCRS/96/28 (Revised) Estimates of unreported Atlantic bluefin tuna catches - ICCAT Secretariat

SCRS/96/29 SCRS Detailed Report on Albacore (Report of 1996 SCRS Albacore Stock Assessment Session, Taipei, Taiwan, August 5-10, 1996)

SCRS/96/30 SCRS Detailed Report on Swordfish (Report of 1996 SCRS Swordfish Stock Assessment Session, Halifax, N.S., Canada, October 2-9, 1996)

SCRS/96/31 Additional responses to ICCAT By-Catch Questionnaire - ICCAT Secretariat

SCRS/96/32* Statistiques d'exploitation des requins dans les côtes du Maroc - Srour, A.

SCRS/96/33* Pelagic sharks associated with swordfish *(Xiphias gladius)* fishing in the eastern north Atlantic Ocean and the Gibraltar strait - Buencuerpo, V., S. Rios, J. Moron

SCRS/96/34* Reproductive parameters of blue shark *(Prionace glauca)* and other sharks in the Gulf of Guinea - Castro, J. A., J. Mejuto

SCRS/96/35* Historical CPUE of pelagic sharks caught by the Japanese longline fishery in the Atlantic Ocean - Nakano, H., M. Honma

SCRS/96/36* The limitations of shark fisheries and the shark fishery of the southeastern United States - Castro, J. I.

SCRS/96/37 (Revised) Large pelagic logbook catch rate indices for sharks - Cramer, J.

SCRS/96/38* Updated landed catch rate information for sharks from US fleet longline trip weighout data records - Scott, G. P.

SCRS/96/39* Recent trends in catch rates of some Atlantic sharks - Scott, G. P.

SCRS/96/40* Resolution Conf. 9.17 of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) on the Status of International Trade in Shark Species. Background and plans for implementation - Daves, N. K., A. L. Oliver.

SCRS/96/41* Standardized catch rates of four shark species in the Virginia-Massachusetts (U.S.) rod and reel fishery - Brown, C. A.

SCRS/96/42 Capturas de tiburones pelágicos desembarcadas por la flota atunera de Uruguay - Domingo, A., O. Mora, A. Milessi

SCRS/96/43* The evolution of tuna fishery in Santos-São Paulo, Southern Brazil (1971-95) - Amorim, A. F., F. M. S. Braga, L. Fagundes, F. E. S. Costa, C. A. Arfelli

SCRS/96/44 National Report of Canada, 1995 - Porter, J. M., C. J. Allen

SCRS/96/46 Observaciones oceanográficas y medioambientales en el Mediterráneo Occidental durante la época de reproducción del atún rojo (*Thunnus thynnus* L. 1758) - Platonenko, S., J. M. de la Serna

SCRS/96/47 Utilisation de modèles linéaires généralisés pour évaluer les stratégies de pêche thonière à la senne en présence d'espèces associées dans l'Atlantique ouest - Gaertner, D., M. Pagavino, J. Marcano

SCRS/96/48 Informe Nacional de Guinea Ecuatorial - Ondoh Fama, L.

SCRS/96/49 National Report of Russia for 1995-1996 - Budylenko, G. A., V. Z. Gaikov

SCRS/96/50 (Revised) United Kingdom National Report / Annex : United Kingdom National Report of Bermuda, 1995

SCRS/96/51* Distribution and abundance of *Thunnus* larvae and their relation to the oceanographic conditions in the Golf of Mexico and the Mediterranean Sea during May through August of 1994 - Tsuji, S. Y. Nishikawa, K. Segawa, Y. Hirce

SCRS/96/52* Sampling characteristics and net behavior of BONGO oblique tows for tuna-type larvae - Tsuji, S.

SCRS/96/53* Identification and occurrence of *Thunnus* larvae collected from the Gulf of Mexico and the Mediterranean Sea by the Shoyo-maru cruise in 1994, with the review of recent identification study of larval *Thunnus* - Ueyanagi, S., Y. Nishikawa, S. Tsuji

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APPENDIX 4

REPORT OF THE 1996 CONTRIBUTIONS/EXPENDITURES OF THE ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH (COM-SCRS/96/21A)

The ICCAT Enhanced Research Program for Billfish, which began in 1987, continued in 1996. The Secretariat served as the coordinator for transferring funds and distributing tags, information, and data. The billfish data base is maintained at the NMFS Southeast Fisheries Science Center (Miami, Florida) and at the ICCAT Secretariat. This report represents a summary of the contributions and expenditures for the ICCAT Enhanced Research Program for Billfish during 1996.

The General Coordinator of the Program is Dr. J. Powers (U.S.A.); the East Atlantic Coordinators are Dr. T. Diouf (Senegal) and Mr. M. Mensah (Ghana), while the West Atlantic Coordinator is Dr. E. Prince (USA).

Table 1 shows the income received at the Secretariat towards the Billfish Program, expenses for 1996, and the balance of Billfish Program funds (as of October 23, 1996). At the start of Fiscal Year 1996, there was a balance of US$ 16,137.47 in the Billfish Program account. Income received in 1996 included a total of $34,000 from The Billfish Foundation, and $500 from the National Coalition for Marine Conservation. It should also be noted that of the $34,000 contributed by The Billfish Foundation, $10,000 was provided for travel assistance for the Third Billfish Workshop (held in Miami, Florida, in July, 1996) and $4,000 was provided towards the enhanced publication of the billfish report resulting from this Workshop. Overall, the Program Plan for 1996 was successfully carried out in a timely manner.

Table 2 shows the Billfish Budget and expenditures as of October 23, 1996. Several additional expenditures are expected to be incurred before the end of 1996. Several budgetary items show a zero expenditure and this is due to the fact that authorization of some budgetary expenditures of the 1996 Budget was dependent on the sufficiency of funds, while in other cases no request for funding was submitted to the Program Coordinator.

Progress of research carried out during 1996 in the west Atlantic is described in SCRS/96/90. Research carried out in the eastern Atlantic mainly involved documentation of landing statistics and tagging and is described in (SCRS/96/170). In addition, progress in data compilation, revisions of the data base, and analysis of fisheries for billfish are included in the Report of the Third ICCAT Billfish Workshop (COM-SCRS/96/19), as well as the Report of the Data Preparatory Session of the Workshop (Appendix 5 of the Billfish Workshop Report). A total of nineteen (19) working documents were submitted to the Third Billfish Workshop (see Appendix 3 of the Billfish Workshop Report).

One of the most important research activities related to the ICCAT Enhanced Research Program for Billfish is at-sea sampling on industrialized longline vessels (summarized in **Table** 3). This activity has been carried out primarily in the western Atlantic on Venezuelan vessels fishing in the Caribbean sea (SCRS/96/98). The historical sampling rate has increased significantly since 1987, with only three trips during the first three years and a steady increase to over 30 trips, or over 200 sets, during the last four years (including 1995). Some observer trips conducted in late 1994 and in 1995 were made off larger vessels which fished for longer periods and accomplished more sets per trip. Therefore, the volume of information is now large. Observations from at-sea sampling on whether billfish are being brought alongside longline vessels as either dead or alive has been extremely valuable in calculations of dead discards resulting from longline activity in the western Atlantic. In addition to data on billfishes, it should be noted that data on the size of many different species are also being collected, particularly for the target species of the longline fleet—yellowfin tuna and swordfish. For example, size data on 9,373 yellowfin tuna, 3,540 swordfish, and 2,717 bigeye tuna have been collected during these at-sea sampling trips from 1987-1995. Although the initial purpose of this research activity was intended to focus on billfishes, it seems obvious that this at-sea sampling program is now a valuable source of information for yellowfin tuna, swordfish, as well as other highly migratory species. The ICCAT Secretariat has been given an updated computerized data base that contains at-sea sampling data through 1995.

Table 1. Funds received in 1996 for Billfish Program (up to October 23, 1996)

SOURCE	*AMOUNT (in US $)*
Starting Balance (1996)	16,137.47
Contributions	34,500.00
TOTAL FUNDS AVAILABLE IN 1996	50,637.47
TOTAL EXPENDITURES IN 1996 (see **Table 2**)	20,518.700
BALANCE IN BILLFISH FUNDS (as of Oct. 23, 1996)	**30,118.77**

Table 2. Budget & Expenditures of the Enhanced Billfish Research Program (as of October 23, 1996) (US$)

	Amount Budgeted	*Expenditures*
AGE AND GROWTH: Purchase of hard parts	500.00	0.00
TAGGING:		
Tag rewards	1,000.00	100.00
Lottery rewards	500.00	0.00
Hard part rewards	500.00	0.00
Printing posters and recapture cards in Japanese/Chinese/Portuguese	3,000.00	0.00
Tags and tagging equipment	2,000.00	0.00
STATISTICS & SAMPLING ENHANCEMENT		
— *West Atlantic shore-based sampling:*		
Barbados *	0.00	840.00
Brazil tournaments	1,500.00	0.00
Cumaná, Venezuela	300.00	300.00
Puerto La Cruz, Venezuela	240.00	0.00
Juangriego, Venezuela	864.00	0.00
Playa Verde, Venezuela	500.00	0.00
Playa Grande Marina, Venezuela	1,680.00	940.00
Venezuela tournaments in Puerto Cabello and Falcon	760.00	660.00
Grenada	1,000.00	0.00
Jamaica	1,000.00	0.00
Martinique	1,500.00	0.00
Trinidad & tobago	1,000.00	0.00
St. Maarten Netherlands Antilles	1,500.00	0.00
U.S. Virgin Islands	1,000.00	0.00
— *West Atlantic at-sea sampling:*		
Venezuela (Cumaná, Puerta La Cruz, Carupano, Juangriego)	22,300.00	7,000.00
Insurance for Venezuelan Observers	1,250.00	1,000.00
St. Vincent and Grenada	2,000.00	0.00
Telemetry/Hook Timer studies (travel)	2,000.00	0.00
Brazil 9,000.00	0.00	
— *East Atlantic shore-based sampling:*		
Dakar, Senegal	1,500.00	0.00
Côte d'Ivoire	1,500.00	0.00
Ghana 1,500.00	1,500.00	
Canary Islands	400.00	0.00
COORDINATION:		
Travel by Coordinators	14,000.00	5,475.64
Mailing & miscellaneous--East Atlantic	100.00	0.00
Secretariat support (data management, mailing, etc.)	2,500.00	2,500.00
Bank charges on Billfish account	500.00	203.06
GRAND TOTAL	**78,894.00**	**20,518.70**

* Expenditure authorized by the Program Coordinator.

Table 3A. Numbers of trips and sets, average number of hooks per set and longline length per set (km), numbers of billfish caught, and estimated mortality of billfish brought alongside the boat for at-sea sampling in Venezuela, 1987-1995.

Year:	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995**	*1987-95*
No. trips	3	3	3	7	16	32	37	34	19	154
No. sets	23	37	34	43	99	265	488	320	201	1510
Avg.hooks/set	1171	1225	2439	1552	1646	1036	1231	1125	1363	1254
Avg. length/set	57	58	42	46	39	47	50	47	67	50
BUM caught (no.)	38	13	11	34	59	87	96	174	139	651
WHM caught (no.)	144	60	47	69	60	92	242	266	334	1314
SAI caught (no.)	30	7	18	19	94	148	250	144	177	887
SPF caught (no.)	0	0	0	8	36	31	66	111	137	389
% BUM mortality	68	40	64	76	67	52	38	44	49	51
% WHM mortality	55	55	65	56	57	65	61	55	59	58
8% SAI mortality	50	67	72	68	78	66	67	75	66	69
% SPF mortality	N/A	N/A	N/A	75	67	61	65	61	72	66

* Through October, 1995.
BUM = Blue marlin; WHM = white marlin; SAI = Sailfish; and SPF = Spearfish.

Table 3B. Summary of industrial longline set data from Venezuela vessels targeting yellowfin tuna and swordfish, 1987-1995.

Season	*Winter*	*Spring*	*Summer*	*Fall*	*Total*
Trips					154.0 .
Sets	238.0	400.0	366.0	506.0	1510.0
Hooks	369,747	355,720	412,570	755,844	1,893,881
Hooks per set	1,553.6	889.3	1,127.2	1,493.8	5,063.9
Line length	13698448	17339263	17792369	27111526	75941606.0
Length per set	57,556.5	43,348.2	48,613.0	53,580.1	203,097.8

APPENDIX 5

1997 PROGRAM PLAN FOR THE ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH (INCLUDING THE PROPOSED LONG-TERM PLAN FOR BILLFISH TAGGING) (COM-SCRS/96/21-B)

The original plan for the Enhanced Research Program for Billfish (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 with the intention of developing the data necessary to assess the status of the billfish stocks. This goal was at least partially fulfilled with the exploratory stock assessments for blue marlin (SCRS/92/69) accomplished at the Second ICCAT Billfish Workshop in July, 1992, and later with refined blue marlin and white marlin assessments submitted to the 1992 SCRS (SCRS/92/128 and SCRS/92/129). In addition, further progress was made at the 1993 SCRS meeting with the submission of the assessment for west Atlantic sailfish (SCRS/93/99) and improvements in the data base for east Atlantic sailfish reported to the 1994 SCRS (SCRS/94/150, SCRS/94/155, and SCRS/94/156). An exploratory stock assessment for east Atlantic sailfish was submitted to the 1995 SCRS (SCRS/95/105). Most recently, updated assessments for blue marlin and white marlin were accomplished at the Third ICCAT Billfish Workshop (COM-SCRS/96/19, SCRS/96/159). However, many of the data acquisition problems remain and maintenance of important elements of the billfish data bases, to insure uninterrupted time series, requires the Enhanced Research Program for Billfish to be continued and expanded in critical areas as recommended by the Second and Third ICCAT Billfish Workshops (COM-SCRS/92/16, COM-SCRS/96/19).

It was confirmed that Drs. J. Powers and E. Prince (U.S.A.) will continue to function as the General Coordinator and West Atlantic Coordinator, respectively. Drs. T. Diouf (Senegal) and M. Mensah (Ghana) will continue to be the Co-Coordinators for the east Atlantic Ocean. Research results (SCRS/96/90, SCRS/96/170, COM-SCRS/96/19) as well as a financial summary for 1996 (COM/96/10) were presented to the 1996 SCRS and Commission meetings.

The summary of the 1997 proposed budget for regular Program activities is attached as **Table 1.** The long-term plan for tagging is attached as **Table 2.** Highlight reports of research activities will continue to be provided to interested parties on a bi-annual basis. In addition, names and addresses of individuals receiving the reports and those involved or interested in the research program will continue to be 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. In addition, all funded participating cooperators in this Program will be required to request the release of funds (via fax) from the General Program Coordinator and to submit data collected in previous years either to area Coordinators or directly to the ICCAT Secretariat.

STATISTICS AND SAMPLING

a) Shore-based sampling

West Atlantic

Bermuda. Shore-based sampling of selected billfish tournaments will be conducted in Bermuda in 1997. Dr. Brian Luckhurst of the Ministry of Agriculture and Fisheries of Bermuda will coordinate this activity, and no funds will be required.

Brazil. Shore-based sampling of selected billfish tournaments will be continued in Brazil for 1996. Dr. Alberto Amorin, Instituto de Pesca, will coordinate tournament sampling activities in the general vicinity of Santos, as well as other locations. It is not anticipated that this activity will require funds in 1997.

Cumaná, Playa Verde, Puerto La Cruz, Juangriego, 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 1997.

Funding will be $300 since some of this activity occurs on weekends and after normal working hours. Sampling industrialized longline boats and artisanal fisheries in Puerto La Cruz, Juangriego, and Playa Verde will be conducted in 1997 and the requested funding for these segments is as follows: Puerto La Cruz $240; Juangriego $864; and Playa Verde $500. Several trips by the West Atlantic Coordinator or his designee will be necessary to organize sampling, collect data, and transport biological samples to Miami in 1997. In addition, the amount of $500 will be required for tag rewards in Venezuela for 1997 that are made by FONAIAP 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 1997. This sampling includes coverage of four recreational billfish tournaments held in Puerto Cabello and Falcon. Requested funding for this activity in 1997 is $760 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 central Venezuelan coast, such as the important fishery at Playa Grande Marina, will be accomplished by contracting a technician on a part-time basis for 12 months. Funding for this activity in 1997 is $1,680. Shore-based sampling in all Venezuelan locations, as well as at-sea sampling (see next section) in Venezuela will be coordinated by Mr. L. Marcano of FONAIAP.

Grenada. Shore-based sampling of size frequency 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. C. Isaac and Mr. P. Phillip) in 1997. Shore-based sampling activities will start in early November, 1996, to coincide with the start of the pelagic fishery at this location. This activity will also include sampling of the Spice Island Billfish tournament. At-sea sampling on the new longline vessels are discussed in the next section. Requested funding for 1997 is $1,000.

Jamaica. Shore-based sampling of the size frequency, total landings, and catch and effort statistics from the recreational fishery will continue in 1997. Efforts will also be made to obtain these data from the artisanal canoe fishery as well. Requested funding for 1997 is $1,000.

Martinique, St. Lucia, and Guadeloupe. Shore-based sampling of recreational billfish tournaments (about 8) in the Caribbean Island locations of Martinique, St. Lucia, and Guadeloupe will be conducted in 1997. This work will be coordinated by IFREMER in Martinique. Requested funding for 1997 is $1,500.

St. Maarten, Netherlands Antilles. Shore-based sampling of size frequency data for off-loaded billfish carcasses from longline vessels will be continued in 1997 through the Nichirei Carib Corporation. Requested funding for this in 1997 is $1,500. Shore-based sampling of the annual recreational billfish tournament, initiated in 1992, may be continued in 1997 by the West Atlantic Coordinator or his designee (if time permits). Since this tournament will contribute air fare and hotel accommodations 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.

U.S. Virgin Islands. Shore-based sampling of several recreational billfish tournaments in the U.S. Virgin Islands will be continued and this activity does not require funding. In addition, sampling of catch and effort from non-tournament fishing will be initiated in 1997 for the 3 month fishing season in St.Thomas, as this location is considered one of the best recreational marlin fisheries in the Atlantic. The United States Virgin Islands Gamefish Club in St. Thomas has agreed to administer these funds, assist in hiring a sampler, and provide the western Atlantic coordinator with the data. Requested funding for 1997 is $2,000.

Trinidad and Tobago. Shore-based sampling of size frequency data for off-loaded billfish carcasses from China-Taiwan and longline vessels from Trinidad may be continued in 1997. This work is being 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 will be necessary to review the research plan and organize field research activities. Requested funding for 1997 is $1,000.

East Atlantic

Dakar, Senegal. Shore-based sampling of the Senegalese artisanal, recreational and industrial fisheries for size frequency, sex determination, and catch and effort data will be continued in 1997 by Dr. T. Diouf, the East Atlantic Coordinator. Requested funding for 1997 is $1,500.

Côte d'Ivoire. Abidjan shore-based sampling of the artisanal and recreational fisheries for billfish will be continued and directed by CRO staff in 1997. Funding for 1997 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 1997 by Mr. S. N. K. Quaatey. Standardized CPUE's for sailfish will be developed for this time series, 1974-1996. Funding for 1997 will be $1,500. At least one coordination trip by Dr. T. Diouf will be required to accomplish this task in 1997.

Canary Islands. Shore-based sampling of size frequency of off-loaded billfish carcasses from Taiwanese longline vessels may be continued in 1997. Requested funding for 1997 is $400.

b) At-sea sampling

West Atlantic

Venezuela. At-sea sampling out of the port of Cumaná, Puerto La Cruz, Carúpano, and Juangriego will be continued in 1997. A total of about 15 tuna trips ($9,000), 15 swordfish trips ($9,000), 2 long-range trips on large Korean-type vessels ($2,300), and 8 trips on smaller longline vessels ($2,000) will be made in 1997. Therefore, the total west Atlantic at-sea sampling for 1997 will be $22,500. In addition, insurance for at-sea sampling for 1997 will be $1,250.

Brazil. At-sea sampling on Brazilian, Spanish, and U.S. longliners will be continued in 1997. Dr. A. Amorim from the Instituto de Pesca and Dr. J. H. Meneses de Lima from IBAMA will direct these research activities. Independent funding of this activity from Brazil in the amount of $4,000 is planned to cover 5 trips. Likewise, funding from the ICCAT Billfish Program is intended to match this effort, which will hopefully result in a total of 10 observer trips off Brazil in 1997. The Western Atlantic Coordinator may travel to Brazil in 1997 to train observers and assist in initiating this program. Requested funding for 1997 will be $4,000.

Telemetry and Hook Timing Studies. Proposals for telemetry studies to evaluate the survival of marlin caught and released off longline vessels were not received in 1996. However, a project to evaluate possible avoidance of billfish catches on longline gear, through the use of hook timing devices to document the time and depth of billfish catches, was funded by the U.S Government. This project will be conducted by staff at the Mote Marine Laboratory in Sarasota, Florida, during 1997. Data on the short-term survival of billfish caught on longline gear will also be obtained. To insure that this study will have a sufficient sample size of billfish in the longline catch, the Western Atlantic Coordinator has agreed to arrange for at least one longline trip to be made in 1997 from Cumaná, Venezuela, or in association with CARICOM and the Division of Fisheries in St. Vincent and Grenada. The by-catch rate of billfish in these locations is sufficiently high for sampling. Most of the funding for this project is already covered but travel costs of $2,000 for a Mote Laboratory scientist will be required for 1997 to test the hook timers on a Venezuelan or St. Vincent longline vessel.

TAGGING

In response to the Commission's 1995 Resolution on Billfish, the SCRS directed developed a scientific program under which Contracting Parties to promote voluntary release of blue marlin, white marlin, sailfish, and spearfish taken alive and the tagging of these species; and to develop a plan to establish a reward program for the tag and release of billfishes and for the return of tags recovered from recaptured billfishes. In order to respond to the billfish resolution requirements, the SCRS presents a long-term tagging plan, with a short-term implementation depending on the timing and availability of funding.

At its 1996 meeting, the SCRS formed a Tagging Working Group (see Section 11.2 to 11.8 of the 1996 SCRS Report) in order to develop an Atlantic-wide tag recovery plan. It should be noted that the successful implementation and funding of this recovery plan will go a long way towards implementing some of the tagging segments of the billfish Resolution.

-- Long-term Plan

Four major categories of expenditures will be necessary in order to implement the enhanced tagging and recapture efforts, and these are indicated separately in **Table 2**. The special Billfish account, generally funded by the private

sector, can only cover regular Program activities (not the long-term plan). Therefore, if the Commission wishes to undertake this long-term plan, additional funding by the Commission is necessary.

1) The cost of additional tags and related equipment to fully promote the tagging activity from the off-shore longline fleets is estimated at $20,000 to $40,000 per year. The specific amount of this expenditure will depend on the extent of participation from various longline fleets.

2) The Committee recommends two possible alternative incentive awards in order to promote enhanced tagging and reporting of recaptured billfish, as follows:

a) Provide a lottery reward totalling $10,000 for the winning tag recaptured billfish; $5,000 to the person tagging and releasing the fish and $5,000 to the fishermen reporting the recapture of the fish;

b) Consider funding an incentive system to promote tag releasing of billfish from the offshore commercial fleet only where tagging activities are monitored by observers. In this case, a payment of $10.00 for tagging each billfish can be confirmed by an observer. This program could be funded up to a limited amount each year, on a provisional basis, not to exceed about $20,000 per year. This approach may cause serious problems in tagging of other species.

3) Given that items (1) and (2) above will result in a significant increase in the number of tag released and tag recaptured billfish, the resulting volume of tag release and tag recapture data will be far too large to burden either the ICCAT Secretariat or the National Marine Fisheries Service tagging program, in terms of data base management. Therefore, some accommodation for quality control and data entry will be necessary. One approach to this problem would be to contract out data entry and quality control functions, but supervision of this activity would still be necessary by tagging program staff of either NMFS or the ICCAT Secretariat. Cost of data entry and quality control is estimated at $30,000 to $50,000 per year, depending on the volume of information resulting from the Program.

4) At major Atlantic transhipment ports, e.g., St. Maarten (Netherlands Antilles), Las Palmas and Tenerife (Canary Islands), Port of Spain, Trinidad, and Montevideo), the hiring of local samplers to retrieve billfish tags from boats or on shore facilities and distribute reward posters to boats and landing sites. Budget for this item is $25,000.

-- Short-term Plan

In the case where funds for implementing the long-term plan, as given above, cannot be obtained for 1997, the following regular tagging activities and expenditures are proposed. Tags and tagging equipment for east Atlantic billfish tagging in 1997, distributed to participants by the ICCAT Secretariat, will require $2,000. The total for tag rewards (including the $500 needed in Venezuela) will amount to $1000 for 1997. A lottery reward of $500 will also be necessary for 1997.

AGE AND GROWTH

Requested funding for biological samples from juvenile and very large billfish, as well as tag-recaptured billfish, is $500 for 1997. The Western Atlantic Coordinator may travel to Madeira (Portugal), in order to sample very large blue marlin that are landed in this location or to initiate archival tagging of Atlantic blue marlin. Only travel funds will be required for Madeira research activities.

COORDINATION

a) Coordination (on site training of samplers, collection of statistical and biological samples)

Experience in the west Atlantic (COM-SCRS/90/20, COM-SCRS/91/18, COM-SCRS/92/24, COM-SCRS/93/102, COM-SCRS/94/147, COM-SCRS/95/107, COM-SCRS/96/90) 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), 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 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. Funding for 1997 will be $14,000. 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

East Atlantic

- Dakar, Senegal
- Abidjan, Côte d'Ivoire
- Ghana
- Madeira (Portugal)

- Other west African and Caribbean countries

b) Miscellaneous/mailing

The requested funding for 1997 for east Atlantic miscellaneous and mailing is $100. Similar needs for the West Atlantic Coordinator are covered by the U.S. domestic budget.

c) Secretariat

Funding for mailing, shipment of specialized materials and samples, and for miscellaneous expenses and contingencies for 1997 is $1,000.

d) Bank charges

Bank charges for maintenance of the ICCAT Billfish special account for 1997 are estimated at $250.

Because of unforeseen changes in the fisheries and opportunities for sampling, it may be necessary for the General Coordinator to make adjustments in budgeted program priorities. These changes, if any, will be duly transmitted to the area Coordinators and to the ICCAT Secretariat. Also, the proposed budget for regular Program activities in 1997 (excluding the long-term tagging program) is attached as **(Table 1)**. The expansion or reduction of expenses will depend, to a large degree, on the available funds. It should be noted that the regular Program activities as well as the long-term tagging plan, developed in response to the Resolution regarding billfish research adopted by the Commission in 1995, will be implemented based on receipt of sufficient funds.

Table 1. 1997 Budget for the regular ICCAT Enhanced Research Program for Billfish (US$)

Budget Chapters	*Amounted budgeted*
STATISTICS & SAMPLING	
— *West Atlantic shore-based sampling:*	
Bermuda tournaments	0
Brazil tournaments	0
Venezuela (Cumaná, Puerto La Cruz, Juangriego, Playa Verde, La Guaira, Venezuelan tournaments in Puerto Cabello and Falcon)	4,344
Grenada	1,000*
Jamaica	1,000*
Martinique, St. Lucia, Guadeloupe	1,500*
St. Maarten, Netherlands Antilles	1,500*
U.S. Virgin Islands	2,000*
Trinidad & Tobago	1,000*
— *West Atlantic at-sea sampling:*	
Venezuela (Cumaná, Puerto La Cruz, Carúpano, Juangriego)	22,300
Brazil	4,000*
Telemetry / Hook timer studies (Travel only)	2,000
Insurance for Venezuelan Observers	1,250
— *East Atlantic shore-based sampling:*	
Dakar, Senegal	1,500
Côte d'Ivoire	1,500
Ghana	1,500
Canary Islands	400*
TAGGING:	
— *Short-term plan*	
Tag rewards	1,000
Lottery rewards	500
Hard part rewards	500*
Printing posters and recapture cards in Japanese, Chinese, and Portuguese	0
Tags and tagging equipment	2,000
AGE AND GROWTH:	
Purchase of hard parts	500*
COORDINATION:	
Coordination (on site training of samplers, collection of statistical and biological samples)	14,000*
Mailing & miscellaneous-East Atlantic	100
Secretariat support (mailing, miscellaneous expenses, contingencies etc.)	1,000
Bank charges	250
GRAND TOTAL:	**$ 66,644**

* Authorizing these expenditures depends, in part, on additional funds being available.

Table 2. Estimated first-year long-term budget for enhanced billfish tag release & recovery program (US$)

Budget Chapters	*Amounted budgeted*
Tags and tagging equipment	20,000
Release and recapture lottery	10,000
Observer verified tag release payments	20,000
Contracting data entry and quality control	30,000
Hiring of local samplers to retrieve tags & distribute posters at major Atlantic transatlantic ports	25,000
GRAND TOTAL:	**$105,000**

APPENDIX 6

REPORT OF THE SUB-COMMITTEE ON ENVIRONMENT

1. Opening of the meeting

The meeting of the Sub-Committee on Environment was held on October 30, 1996, at the Hotel Chamartin, in Madrid. Dr. J. Pereira (Portugal), Convener of the Sub-Committee on Environment chaired the session and welcomed the participants.

2. Adoption of the Agenda and arrangements for the meeting

The provisional Agenda was modified and items relative to by-catches or the association of tunas with other marine animals were deleted, as these had been discussed by the Sub-Committee on By-Catches. Dr. J. M. Stretta (France) served as Rapporteur.

3. Review of contribution papers

This year, four documents presented to the SCRS dealt with issues relative to the Sub-Committee on Environment (SCRS/96/46, 161, 162 and 163). Documents SCRS/96/161, 162 and 163 had been reviewed during the species groups.

Document SCRS/96/46 covered a study on bluefin presented to the SCRS last year and the year before, concerning the relationship between area and distribution of catches in the Catalan Sea. This study confirms that bluefin are linked to hydrological structures of a cyclonic nature. In June, 1995, however, tunas were associated with an anticyclonic movement.

Documents SCRS/96/161 and 162 provided additional information on the sustained yields of tuna associated with artificial floating objects by Spanish purse seiners, by time and area strata. Yellowfin are caught mainly during the first four months of the year in free schools. Skipjack are caught both in free schools and in association with floating objects (natural and artificial), without any particular seasonality. Bigeye are caught in free schools early in the year, and in association with floating objects during the last quarter of the year and in January.

Document SCRS/96/163 presented the results of an on-going joint French-Spanish program during which observers on board purse seiners of these two countries confirmed that tuna catches taken using floating objects, especially artificial flotsam, are predominant in the catch per set of small sized tunas of the three species. On the other hand, other size categories are found in free schools and in tuna schools associated with other animals.

4. Anomalies in oceanographic conditions in recent years

Dr. Stretta called Sub-Committee's attention to the existence of several Internet servers from which information relating to the thermal conditions of the world's ocean surface and other oceanographic information is accessible. From reading these, it appears that overall 1995 was a year marked by important positive thermal anomalies throughout the Atlantic Ocean. During the first quarter of 1995, a warming was observed in the 0-400 m stratum in the north Atlantic. During the second quarter, the eastern and northeastern Atlantic was affected by a thermal anomaly +2°C in surface temperature, with the maximum observed in Angola. This thermal anomaly persisted in the third and fourth quarters in the east Atlantic and northern sub-tropical waters. The same anomaly was observed in the west Atlantic (Venezuela).

As in 1994, the Azores-Madeira region, which is particularly sensitive to surface temperature variations, saw a decline in 1995 in the skipjack fisheries around the Azores and an increase in this species around Madeira and Morocco.

From these analyses, it is clear that thermal anomalies have significant effects on the catchability of tunas. Furthermore, these anomalies cause major variations in recruitment, and thus in the variability of the stocks. On tuna

stocks that are fully exploited, the slightest environmental anomaly could have important negative effects and be a potential danger to the conservation of resources.

The tropical species group noted poor yellowfin yields in 1995 compared with the fishing effort exerted. This situation is similar to that of 1984.

It is essential that the tuna assessment groups have knowledge of environmental data. Dr. Stretta proposed that information on environmental conditions be given to each assessment group before their meetings. Uruguay noted that it would be desirable for oceanographers to attend assessment sessions. The SCRS Chairman, Dr. Suzuki, hoped that the assessment groups had more detailed data (which remains to be defined), which would allow *ad hoc* analyses, rather than general information.

5. Ecology of tunas

This Agenda item was dealt with during the presentation of documents SCRS/161, 162 and 163.

6. Review of studies on the effect of the environment on tuna ecology and the conclusions of any international meetings on the environment

This Agenda item was discussed under anomalies and oceanographic conditions.

7. Consideration of the results of the 1996 ICCAT Tuna Symposium

During the ICCAT Tuna Symposium in June, 1996, a day was dedicated to the subject of tunas and the environment. It was highlighted at this session that it was difficult to procure the participation of oceanographic physicists in fishery related meetings. This topic was, nevertheless, discussed in depth during the Symposium at various levels. There is, however, such a large amount of environmental data, there is a problem in selecting and incorporating them into the new analytical methods. During the Symposium, the issue of bio-geography of tunas was examined, from an eco-physiological point of view. The participants in the Symposium stressed that in the future more account must be taken of the environment, as it plays an essential role in the dynamics of tuna resources. In order to make progress, research should be carried out with increasing international cooperation.

8. Working plan for the Sub-Committee

The Convener of the Sub-Committee pointed to the low level of participation of SCRS scientists in the work of the Sub-Committee, while noting that access, through Internet, to environmental data bases opened up new possibilities for analyses.

9. Date and place of the next meeting of the Sub-Committee on Environment

It was agreed that the next meeting of the Sub-Committee on Environment be held at the same time and place as the next SCRS meeting.

10. Other matters

No other matters were discussed.

11. Adoption of the report

The Report was adopted.

12. Adjournment

The 1996 meeting of the Sub-Committee on Environment was adjourned.

Addendum 1 to APPENDIX 6

Agenda
of the Sub-Committee on Environment

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Review of contribution papers
4. Anomalies in oceanic conditions in recent years
5. Ecology of tunas (association with floating objects, with other marine animals, gear selectivity, species interactions, by-catches, etc.)
6. Review of studies on the effect of the environment on tuna ecology and the conclusions of any international meetings on the environment
7. Consideration of the results of the 1996 ICCAT Tuna Symposium
8. Working plan for the Sub-Committee
9. Date and place of the next meeting of the Sub-Committee on Environment
10. Other matters
11. Adoption of Report
12. Adjournment

APPENDIX 7

REPORT OF THE SUB-COMMITTEE ON STATISTICS

1. Opening of the meeting, adoption of Agenda, and arrangements for the meeting

The 1996 meeting of the Sub-Committee on Statistics was held in Madrid, Spain, at the Hotel Chamartin on October 29, 1996. Dr. S. Turner (U.S.A.), Convener of the Sub-Committee, welcomed all the participants. The Agenda was adopted and is attached to this report as **Addendum 1** to this Report. Dr. P. M. Miyake (Secretariat) served as rapporteur.

2. New developments in statistics

2.a Timeliness of reporting

Document COM-SCRS/96/12 was introduced in relation to this matter. The table attached to that document was revised. The Sub-Committee recognized that 1996 had been a particularly difficult year for the Secretariat as well as for national scientists, because of the numerous inter-sessional meetings. The Committee congratulated the efforts of those countries (which were in the majority) that transmitted their statistics on time for the meetings, albeit sometimes at the last minute. However, it was also noted that a few countries, whose catches contribute substantially to the overall catch of certain species, had failed to report their data, which greatly hindered the stock assessments.

The Secretariat repeatedly stressed the need to receive official reports of any changes made to historical data, and urged that any such changes not be inserted in the species tables during the species group meetings. Instead, these changes must be justified, and documentation for the changes should be provided. The Sub-Committee also expressed concern over the lack of documentation for changes to catch figures made in the species groups meetings which are often not reported to the Secretariat. The basis for changes made at past meetings by species groups are, therefore, often forgotten and/or the changes are not incorporated into the ICCAT data base. Therefore, it is important that all scientists, whether at species group meetings or stock assessments abide by this regulation.

The Sub-Committee requested that the rapporteurs of the tropical group provide the Secretariat with documentation of the procedures used and the basis for the changes made to Ghanaian statistics for this year and for previous years inasmuch as possible.

2.b Mis-reporting or non-reporting by ICCAT Contracting Parties

The problems of mis-reporting or non-reporting by ICCAT Contracting Parties have been raised in various species sections of the SCRS report (e.g. bluefin, swordfish, small tunas). Document SCRS/96/28 shows the estimated unreported catches of bluefin tuna (including those of Contracting Parties and non-Contracting Parties). The Sub-Committee considered that this was a very important issue. If the Contracting Parties do not fulfil their obligations, the Commission cannot request the non-Contracting Parties to assume similar obligations. This would greatly jeopardize the credibility of the Commission. The Contracting Parties were urged report all catches under their jurisdiction (i.e. those caught by the vessels flying their flags) to the Commission, regardless of the port at which the catches were unloaded.

A question arose as to who was responsible for reporting the albacore catches made by Spanish vessels operating in the Portuguese Exclusive Economic Zone (EEZ), under contract to Portuguese companies and unloaded in the Azores. These landings have been reported to date as Portuguese catches. A similar situation also affected Sao Tome and Principe where other countries had access agreements to, and were fishing in, the EEZ of Sao Tome and Principe.

The Sub-Committee was informed that based on the international criteria set by the CWP and adopted by FAO, the flag countries are responsible, in principle, for reporting catches. There are, however, some exceptions, the most common being the case of joint ventures, where the catches are landed in and reported by the coastal countries rather than the flag country. Under such joint ventures, the coastal countries generally have reporting responsibility, but each

case should be based on the results of bilateral negotiations between the countries concerned. **Addendum 3** to this Report provides an extract from the "FAO Fisheries Yearbook, on the present policy, as adopted by the CWP and followed by FAO.

In many cases, however, grey areas exist, and this issue is again on the agenda of the next CWP meeting. The Sub-Committee considered it most important that one of the countries (either flag or coastal) be responsible for reporting, and thus avoid double reporting or non-reporting. Hence, it was suggested that Spain and Portugal come to an agreement as to which country will report these catches.

The Sub-Committee reiterated the general policy that when vessels are licensed to fish within another nation's EEZ, these catches are usually assigned to the vessel's flag country and detailed information on the catch and effort should be provided to the licensing country.

2.c Mis-reporting or non-reporting by non-ICCAT countries

The Sub-Committee recognized the increasing amount of unreported catches by non-Contracting Parties, particularly for bluefin tuna and swordfish. The minimum estimates of such non-reported catches are shown in SCRS/96/28. For example, Belize and Panama have not reported any tuna catches to the Commission and yet both countries have exported considerable amounts of bluefin tuna to Japan, taken in Mediterranean waters. Such practices discourage all countries from implementing regulatory measures and negates the effects of any regulations currently in force. The Sub-Committee requested that the SCRS and the Commission take a very strong action against those countries which continue to carry out illegal fishing activities.

2.d Secretariat data management policy

Details on the Secretariat's data management policy are provided in COM-SCRS/96/12. The Sub-Committee commended the work achieved by the Secretariat during 1996, particularly for providing all the necessary data in time for the various inter-sessional stock assessment sessions. It was noted that this work had been particularly difficult as for many meetings the Secretariat could not send either the systems analysis or a secretary to assist the work of the group, when the venue was outside Madrid, due to budgetary constraints. It was strongly recommended that the Commission request the Executive Secretariat to exercise flexibility in the financial application of the Regular Budget as well as extra-budgetary income, and that first priority be given to facilitate the scientists' work at important stock assessments, by sending adequate data processing personnel in addition to the Assistant Executive Secretary. It was unfortunate that the scientists and the Secretariat staff were penalized by the lack of flexibility in financial exercises.

The Tropical Tuna Species Group commented that the scientists had to spend a considerable amount of time updating the catch-at-size base at this year's stock assessments and that this work should have been completed by the Secretariat prior to the meeting. The Sub-Committee noted that the availability of catch-at-size data depended on the availability of data before the meeting. Considerable time has been wasted in the past at stock assessment sessions because of the late arrival of data, with some data often being submitted during the meeting.

The Secretariat also explained that it had not received any request to update the yellowfin-catch-at size was from the group, and because of the heavy meeting schedule in 1996, priority for data preparation had been given to those tasks specifically requested by the scientists or species groups. In 1995, the species group had decided that the creation and updating of bigeye catch-at-size would be carried out by national scientists. The catch-at-size base created by the species group had not been provided to the Secretariat.

The Sub-Committee considered it more appropriate that the data base be updated by the Secretariat and recommended that the scientists of the tropical group provide the catch-at-size data base created so far to the Secretariat, with information on how the base was created and updated.

It was also recommended that the Secretariat maintain the catch-at-size data base updated every year, regardless of whether or not stock assessments are carried out in that particular year, assuming that the necessary catch and size information has been reported to the Secretariat.

2.e Dissemination and publication of data (in statistical publications and by electronic means with software

There were no changes in the data publication policy. The Sub-Committee noted that the electronic mail system was very well utilized for accurate, easy and quick data transmission.

The Secretariat presented SCRS/96/20, which described two data base packages combined with user-friendly software, one containing the Task I data base and the other containing the Task II data base distributed by area and season. These were developed according to the request of the SCRS as well as to respond to the request made by the FAO for data for digital maps. The Sub-Committee considered that these packages had proved to be very useful, and were actually used in most of the species stock assessments. The Sub-Committee considered that each species group should use this base rather than other less complete data bases.

The Sub-Committee considered that the Task I base (TUNASTAT) should be updated as frequently as possible, since the procedures for updating are relatively simple. On the other hand, updating the base for catch distribution (CATDIS) is much more time consuming and so it was recommended that it be updated once a year, as close as possible to the first stock assessment made in the year.

Making these data bases available through the World Wide Web (WWW) was proposed, since the data are very useful and the latest updated version should be accessible to any scientists working on tuna. The Sub-Committee recommended that the Secretariat conduct a feasibility study of this proposal and, if possible, develop a web page for the dissemination of the Task I catch data base (TUNASTAT), as well as of other information. The results should be reported at the next Sub-Committee meeting.

2.f Other matters

The Sub-Committee noted that a considerable number of changes to Task I and II data had been introduced in the Taiwanese statistics for 1991 through 1993. These changes were justified and explained in document SCRS/96/79. These changes have, however, affected the stock assessment results. Noting that the Taiwanese fleet has adopted some new fishing methods using longline gear, and that the target species have been changing with the use of deep longlines, the Albacore Stock Assessment Session which met in Taipei recommended that the ICCAT Assistant Executive Secretary visit Taiwan for a period of about two weeks to assist the Taiwanese scientists in reviewing the data base, finalize the updating of the data, and establish a new data collection system, in order to adjust for all these transitions. The Taiwanese scientists also requested that due consideration be given to this recommendation. Since this also relates to bigeye, swordfish and billfish data, the Sub-Committee supported this recommendation.

The Secretariat presented SCRS/96/24, which requested the approval for membership of the South Pacific Commission and International Whaling Commission to the CWP. The CWP was previously limited to regional organizations of the Atlantic Ocean but has recently changed the Statutes and is now open to all regional fisheries agencies, regardless of ocean. The Sub-Committee recommended that membership of these agencies be approved by the Commission.

The Sub-Committee noted that the next CWP (Coordinating Working Parties) will be held in Hobart, Tasmania, March 3-6, 1997 and the CWP meeting agenda includes an item shark statistics. This is the first time this subject has been raised in an inter-agency meeting of this nature and hence the Sub-Committee recommended that, besides the Assistant Executive Secretary, scientist(s) from one or two ICCAT Contracting Parties attend this meeting (ICCAT may send a delegation of up to four participants). It was understood that the travel expenses for these extra scientists should be assumed by the national office of those scientists.

3. Action taken on SCRS recommendations for statistics (as contained in the 1995 SCRS Report)

3.a Evaluation of data obtained through the Bluefin Tuna Statistical Document Program

As already reported in Section 2.b, the ICCAT Bluefin Tuna Statistical Document Program has served as a good source to cross-check reported catch statistics. The Sub-Committee wished to advise the Commission that there could be some misreporting in the statistical documents concerning the flag of origin of the catches of bluefin (tuna laundering). The document program also raises some technical problems concerning which country should validate the documents for tuna unloaded at foreign ports.

At its 1995 meeting, the Commission requested the SCRS to determine the factor to convert from belly meat products to round weight. Unfortunately the sampling could not be conducted, despite the considerable efforts of the Secretariat and the Spanish and Japanese scientists. According to the information obtained by the Secretariat from companies that handle these products, the Sub-Committee recommended to use of 1:10 as the conversion factor, until actual sampling can be conducted. The Sub-Committee noted that the scientists had done everything possible to

conduct sampling on this matter and had been unable to do so due to the resistance of the fish dealers and factories processing such products. Therefore, it was recommended that the Commission take appropriate action to encourage such companies to collaborate with the scientists.

3.b Updating of computer facilities and software

Updating of computer facilities and software was reported in document SCRS/96/12. It was noted that many of the items which had been recommended at the 1995 meeting had been purchased, but that some purchases were still pending. A small group met to study the need for further facilities and its report is attached as **Addendum 2** to this Report.

The Secretariat reported that the cost of a bibliographic data base (ASFA) on CD ROM would be about 150,000 pesetas for the necessary software and 505,000 pesetas for the base from 1978 to the present date. Yearly updates would cost about 400,000 pesetas thereafter. Considering the cost which would be involved in establishing ICCAT's own bibliographic data base by the Secretariat staff, the Sub-Committee considered that the cost of the software and purchasing one original data base would be well justified, and recommended these purchases, assuming that ICCAT can extract information from its publications for its own use. It was recommended that the Secretariat update the base for ICCAT-related entries in future years, rather than purchasing updated versions. It was further suggested that ICCAT examine the possibility of extending the ICCAT base to the earliest years of the Commission, as the initial data base to be purchased dates back to 1978.

The Sub-Committee recognized that the work load of the Secretariat has been increasing steadily and substantially every year, and considered it essential that the Secretariat be equipped with sufficient staff as well as more efficient software and hardware, and that efforts should be made to modernize equipment in line with progress in computer technology.

3.c Restructuring of the sampling strategy for the tropical surface fisheries

The outside contract which the Secretariat had to carry out this work has expired, and was not renewed. The Sub-Committee was informed that Spain and France had started a joint program to investigate the sampling strategy from the new floating objects fisheries, with partial funding from EU. When the field work has produced some results, the data will be analyzed to correct or adjust the past data of tropical tuna catches.

3.d Collection of shark statistics as recommended by the 1995 Working Group on Sharks

As this subject had already been thoroughly reviewed at the Sub-Committee on By-catches, the Sub-Committee on Statistics briefly reviewed the format and endorsed it. This reporting form will be distributed by the Secretariat together with the usual requests for tuna statistics.

3.e Others

The Small Tuna Species Group drafted a questionnaire to collect information on the catches of small tunas and to obtain further information on the fisheries catching these species. The form was reviewed and the Sub-Committee agreed that the questionnaire would be useful for gaining an understanding of the small tuna fishery and in collecting statistics. It recommended that this project be carried out during 1997 and a summary of the results be reported at the 1997 meeting.

4. Consideration of the results of the 1996 ICCAT Tuna Symposium

The Sub-committee noted that the Symposium had highlighted the benefits of the ICCAT open system of data collection and reporting, which is highly regarded throughout the world.

5. New business

The Sub-Committee requested that the Secretariat assume responsibility for converting catch at size to the catch at age when simple age slicing is used.

The Sub-Committee also discussed the development of a web page for publicizing the Commission's work and for the dissemination of information. It was decided that the first priority for the web site would be the dissemination of statistical data, while various Commission documents could also be made available in the future.

6. Recommendations and future plans

Various recommendations have been made throughout this report. The important ones are listed below. At the same time, it was recognized that the work load of the Secretariat has been increasing every year, as indicated in Section 3.b. This requires an increase not only in computer facilities but also in human resources. It was noted that the Secretariat's statistical department is definitely understaffed. At present, staff members are sacrificing their personal time to complete the tasks required of them, but even so some of the lower priority tasks cannot be completed. As in the past, the Sub-Committee strongly recommended that the Commission make the necessary budgetary provisions to increase the scientific or statistical staff of the Secretariat. This is an essential investment for maintaining or increasing the Commission's scientific credibility.

The Sub-Committee recommended:

a) That the Commission provide adequate budgetary provision to increase the scientific/statistical staff of the Secretariat.

b) That data changes be formally reported and duly justified. The Tropical Tunas Species Group rapporteurs should provide the Secretariat with documentation of the procedures used and the basis for changes to statistics.

c) That all catches be reported, in principle, by the flag countries making the catches, regardless of where they are unloaded. (see **Addendum 3** to this Report).

d) That the SCRS and Commission take appropriate action with regard to those countries which do not comply with the ICCAT regulations and do not report their catches (e.g. Panama, Belize).

e) That the Commission request the Executive Secretary to exercise flexibility in the application of the Regular Budget as well as extra-budgetary income and that first priority be given to facilitating the scientists at important stock assessments, by sending adequate data processing personnel in addition to the Assistant Executive Secretary.

f) That the Tropical Species Group provide the Secretariat with the catch-at-size data base as far as has been created, with information on how the base was created and updated.

g) That the Secretariat maintain the catch-at-size data base updated every year, regardless of whether or not the stock assessments are held during a given year, assuming that a significant proportion of catch and size composition information is available.

h) That the Task I base (TUNASTAT) be updated as frequently as possible, but that updating of the base for catch distribution (CATDIS) be carried out once a year, as close as possible to the date of the first stock assessment made in the year.

i) That the Secretariat study the feasibility of establishing access to an ICCAT home page on the World Wide Web and, if possible, establish a web page for the Task I catch data base (TUNASTAT). The results should be reported at the next Sub-Committee meeting.

j) That the Commission approve the applications received from SPC and IWC for membership in the CWP.

k) That in addition to the Assistant Executive Secretary, scientists from one or two of the member countries represent the Commission at the forthcoming CWP session in Hobart, Tasmania, in 1997.

l) That the Commission take appropriate action to ensure the collaboration of the fish dealers and processing companies of bluefin tuna belly meat with scientists and samplers, in an effort to obtain scientifically reliable conversion factors.

m) That the bibliographical data base (ASFA), dating from 1978, be purchased, together with supporting software, if it is ascertained that ICCAT can extract information from its publications for its own use. This base will be updated in future years by the Secretariat.

7. Date and place of the next meeting of the Sub-Committee on Statistics

The Committee decided to meet at the same time and place as the meeting of the SCRS in 1997.

8. Other matters

No other matters were discussed.

9. Adoption of Report

The Report of the Sub-Committee on Statistics was adopted with minor changes.

10. Adjournment

The meeting was adjourned.

Addendum 1 to APPENDIX 7

Agenda of the Sub-Committee on Statistics

1. Opening of the meeting, adoption of Agenda, and arrangements for the meeting
2. New developments in statistics
    - 2.a Timeliness of reporting (Table 1 to Report on Statistics & Coordination of Research)
    - 2.b Mis-reporting or non-reporting by ICCAT Contracting Parties
    - 2.c Mis-reporting or non-reporting by non-ICCAT countries
    - 2.d Secretariat data management policy
    - 2.e Dissemination and publication of data (in statistical publications and by electronic means with software)
    - 2.f Other matters
3. Action taken on SCRS recommendations for statistics (as contained in the 1995 SCRS Report)
    - 3.a Evaluation of data obtained through the Bluefin Tuna Statistical Document Program
    - 3.b Updating of computer facilities and software
    - 3.c Restructuring of the sampling strategy for the tropical surface fisheries
    - 3.d Collection of shark statistics as recommended by the 1995 Working Group on Sharks
    - 3.e Others
4. Consideration of the results of the 1996 ICCAT Tuna Symposium
5. New business
6. Recommendations and future plans
7. Date and place of the next meeting of the Sub-Committee on Statistics
8. Other matters
9. Adoption of Report
10. Adjournment

Addendum 2 to APPENDIX 7

Report of the Small Group to Review the Secretariat's Computer Facilities

1. Equipment

A small group was formed to review the Secretariat's computer equipment and software. The Group noted that very good progress had been made in the last few years. The majority of the Secretariat's computers have been updated (three old personal computers remain out of a total of eight PCs and one work station). In addition, peripheral equipment (i.e., monitors, printers, a scanner, and portable disk drives) have been updated and/or added, which has greatly facilitated the work of the Secretariat, particularly during meetings.

The group emphasized that the Secretariat should avoid the situation of 2-3 years ago when nearly all equipment was old, much of it on the point of failing, and incompatible with current software. The Secretariat should therefore plan on regularly upgrading its equipment, and the group recommended replacing PCs (including monitors and keyboards) approximately every four years.

The small group recommended replacing three old PCs (two 286 and one 386) with two new PCs. These computers should be pentiums, and one should be equipped with at least a 133 Mhz processor and at least 16 MB RAM and the other should have a processor of at least 166 Mhz (preferably even faster) and a minimum of 32 MB RAM and a hard drive of no less than 2 gigabytes (GB). The third new computer should have a minimum of 24 MB RAM with at least a 1 GB hard drive. All the new PCs should have at least 15" non-interlaced color monitors with high refresh rates (minimum 72 Mhz) with, at maximum, .28 mm dot pitch.

The group recommended that additional RAM be purchased for the System Analyst's printer, to a total of 4 MB, so that large, high quality graphics can be printed.

The group also recommended that, prior to the 1997 meeting, the Secretariat investigate and report on systems for long-term storage of information, such as the annual SCRS and Commission Reports. It was noted that CD ROMs provide one type of such long-term storage system.

2. Data back-up Policy

The group reviewed the current data storage and archival policy of the Secretariat. It commended the Secretariat on the frequency of back-ups. The group strongly recommended, however, that the Secretariat establish alternate data storage locations in Madrid for normal back-ups as well as at one or more locations outside Madrid, at least annual back-ups.

3. Software

The group felt that it was essential that the Secretariat purchase a FORTRAN compiler and sufficient copies of Wordperfect for the entire staff. The other software listed below was also considered very important for the legitimate and smooth functioning of the Secretariat.

Priority	*Product*	*Price (US$)*	*Comments*
1	FORTRAN compiler	400-700	
2	Wordperfect (5 copies)	1,500	Essential, immediately; total cost.
2	Anti-virus (8 copies)	1,600	Norton or McAffe or other high quality product; total cost for all copies.
3	Bibliographic software	1,000	
4	Editor for WWW home page set up	130	
5	Quattro Pro (2 copies)	500	
6	Microsoft Office, with Word and Excel (2 copies)	1,000	Total cost for 2 copies.
7	Visual Basic	400	

Addendum 3 to APPENDIX 7

Criteria Extracted from the "FAO Yearbook on Fishery Statistics" Concerning the Reporting of Catches and Landings

Notes on countries and areas

"6. The flag of the vessel performing the essential part of the operation catching the fish, should be considered the paramount indication of the nationality assigned to the catch data and this indication overridden only when one of the following arrangements between a foreign flag vessel and the host country exists:

a) The vessel is chartered by the host country to augment its fishing fleet; or

b) the vessel fishes for the country by joint venture contract or similar agreements (as opposed to the *ad hoc* practice of a vessel selling catches to a foreign vessel or landing catches at a foreign port) and the operation of such vessel is an integral part of the economy of the host country.

When governments negotiate joint ventures or other contracts in which vessels of one country land their catches at ports of another country or unload their catches to vessels of another country and the one of the above-mentioned criteria is applicable, the assignment of nationality to such catches and landings data should be specified in the agreement.

7. National data cover all quantities caught by fishing craft flying the flag of the reporting country and landed not only in the domestic harbors of the reporting country but also in foreign harbors. National catch excludes quantities caught by foreign fishing craft and landed in domestic ports."

APPENDIX 8

REPORT OF THE SUB-COMMITTEE ON BY-CATCH

1. Opening of the meeting, adoption of Agenda, and arrangements for the meeting

At the request of the Chairman of the SCRS, the Convener of the Sub-Committee on By-Catch, Dr. G. Scott (U.S.A.) opened the meeting. The Agenda, which was circulated before the meeting, was reviewed and adopted and is as **Addendum 1** to this Report.

2. New developments in statistics

At the meeting of the Working Group on Sharks which was held in Miami, Florida, February 26-28, 1996, it was recommended that countries reporting data to ICCAT be asked to report Task I data on sharks. That recommendation was approved by the Commission through correspondence and a reporting form was drafted and circulated. The Sub-Committee reviewed SCRS/96/7 which reported the results of that survey on shark by-catch information submitted by member countries, non-member countries, and one fisheries organization.

The Committee also reviewed additional responses to the ICCAT by-catch questionnaire in which information on general by-catches was reported (SCRS/96/31). It was noted that a report from one country had also included data on catches from other oceans, and hence new data will be submitted by that country.

3. Report of the Working Group on Sharks

The Sub-Committee reviewed the progress made by the Working Group on Sharks *(Miami, Florida, February 26-28, 1996)*, noting that the Group's objectives were: (1) to further identify sharks caught in fisheries targeting tuna and tuna-like species; (2) to finalize a plan for collection of shark statistics; and (3) to prepare a response to a request from CITES for collaboration in the collection of scientific and trade data on sharks.

Those objectives were met and the report was orally presented to the CITES Animals Committee as well as to several other scientific organizations.

The Sub-Committee noted that considerable additional information on shark by-catches was needed and requested that nations which had not done so to submit the completed shark by-catch information forms.

4. Report of the Cites Animals Committee *(Pruhonice, Czech Republic - September 23-27, 1996)*

An ICCAT representative and two scientists from ICCAT member countries attended the CITES Animals Committee Meeting in September, 1996, and the Sub-Committee reviewed the report of that meeting (SCRS/96/23). Relevant discussions during that meeting concerned CITES Resolution Conf. 9.17 concerning international trade in sharks and biological status of sharks. The Resolution specifically directs the CITES Animals Committee to report all available information on shark biological status and trade, and requests FAO and other international fisheries organizations to establish programs to collect and assemble the necessary biological and trade data on shark species and that such additional information be provided no later than six months prior to the Conference of the Parties. A draft of the discussion paper (prepared by the United States for the Animals Committee) on the biological status and trade was transmitted to ICCAT, several other organizations and many fisheries scientists and shark biologists for review.

The Sub-Committee noted that ICCAT had been more responsive than many other international fisheries organizations in developing the data collection plan and sending information on catches to CITES.

The Sub-Committee did not recommended at this time that ICCAT prepare a review of the draft of the discussion paper for the Animals Committee.

The Sub-Committee reviewed two reports on related activities by NGOs. Document SCRS/96/166 reported on the Marine Fish Red Listing Workshop of the International Union for Conservation of Nature and Natural Resources (IUCN) held in London, April 29 to May 1, 1996. Document SCRS/96/167 reported on a meeting of the Shark Specialist Group of the IUCN held in Brisbane, Australia, July 31 to August 3, 1996. Many of the tuna, tuna-like species and sharks which are target species or by-catches of the fishing activities of ICCAT member nations were listed on the IUCN red list.

The Sub-Committee noted that a FAO expert consultation on the status of shark resources, to be funded primarily by the Japanese Government, will be held in advance of the Tenth Conference of the Parties to CITES in June, 1997. The Sub-Committee expressed its hope that some ICCAT specialists on shark biology and fisheries might be invited to attend.

5. Follow-up of the Recommendations made by the Shark Working Group

As noted above, the Secretariat had been able to complete most of the recommendations of the Shark Working Group.

The Sub-Committee noted that the Shark Working Group had not been able to fully evaluate many papers submitted to it on shark biology and fisheries information and recommended that an inter-sessional meeting be held during the coming year to do so. That meeting should be held after the report of the CITES Animal Committee is completed (probably by January, 1997) so that this report can be discussed, and before the CITES meeting in June 1997.

6. Review of the forms and procedures for the collection of shark statistics, as recommended by the Shark Working Group

As noted above, such forms and procedures had been developed and were accepted by the Sub-Committee.

7. Consideration of the results of the 1996 ICCAT Tuna Symposium

The Sub-Committee noted that it was recommended at the Tuna Symposium that observers be used to collect information on by-catches. The nations at the meeting were asked whether they had observer programs. Four of the twelve indicated that they had on-going observer programs and two indicated that programs were planned or were under consideration.

The Committee reviewed SCRS/96/163 which reported that, with partial funding by the European Union, French and Spanish scientists had developed a program focused on the fauna associated with purse seine catches by the French and Spanish purse seine fleets. Field sampling was initiated in 1995, and analysis will be completed in 1997.

All of the associated fauna was studied and observed catches included cetaceans, tunas, billfish, swordfish, sharks, rays, turtles, birds, and other fishes. Catches were recorded together with the types of purse seine effort including effort directed at free schools, schools associated with natural or artificial logs, or schools associated with animals, including whales or whale sharks.

The Sub-Committee recommended that these observer programs be continued and expanded. It further recommended that the data from observer programs be summarized and reported to ICCAT.

8. Future plans

The Secretariat reported that the Coordinating Working Party (CWP), which acts to coordinate and standardize data collection activities among international fisheries organizations and to facilitate exchange of information, is expanding from an Atlantic-oriented organization to a world-wide organization. It was also reported that at its next CWP meeting in Hobart, Tasmania, in 1997, the collection of shark statistics was to be discussed. The Secretariat noted that one or two national scientists are permitted to assist the representative from each organization at a meeting. Given that ICCAT has several scientists who are quite knowledgeable on shark biology and fisheries, the Sub-Committee recommended that one or two be asked to assist the Secretariat at that meeting.

9. Other Matters

The Sub-Committee discussed the increasing number of international meetings concerning the fisheries under ICCAT's purview. It noted that Secretariat staff and national scientists are fully occupied, and it is increasingly difficult to keep track of what relevant meetings are to be held and also to attend some of those meetings. The Sub-Committee strongly recommended that a consultant be hired to monitor activities of other international organizations and NGOs and to represent ICCAT at relevant meetings.

10. Date and place of the next Meeting of the Sub-Committee on By-Catch

The Sub-Committee decided to meet at the same time and place as the next SCRS meeting.

11. Adoption of Report

The Report was adopted.

12. Adjournment

The 1996 meeting of the Sub-Committee on By-Catch was adjourned.

Addendum 1 to APPENDIX 8

Agenda
of the Sub-Committee on By-Catch

1. Opening of the meeting, adoption of Agenda, and arrangements for the meeting
2. New developments in statistics
3. Report of the Working Group on Sharks *(Miami, Florida - February 26-28, 1996)*
4. Report of the CITES Animals Committee *(Pruhonice, Czech Republic - September 23-27, 1996)*
5. Follow-up of the recommendations made by the Shark Working Group
6. Review of the forms and procedures for the collection of shark statistics, as recommended by the Shark Working Group
7. Consideration of the results of the 1996 ICCAT Tuna Symposium
8. Future plans
9. Other matters
10. Date and place of the next meeting of the Sub-Committee on By-Catch
11. Adoption of Report
12. Adjournment

APPENDIX 9

A BIGEYE TUNA YEAR PROGRAM (BETYP) RECOMMENDED FRAMEWORK AND BUDGET

1. Global

A spectacular and uncontrolled increase in bigeye tuna catches has been observed during recent years, mainly by the purse seine and longline fisheries, which may introduce significant risk in the management and conservation of bigeye tuna. Scientific research efforts on bigeye have always been at a very low level in ICCAT, resulting in poor knowledge on the basic biology, stock structure, migration, and dynamics of this species.

Given the present high level of catches, an intensive research program, coordinated by ICCAT, is necessary to determine whether the present catches are sustainable or whether they will driving the stock towards dangerous over-fishing.

Considering the present stock situation, the high level of catches, and the value of bigeye tuna, the proposed Bigeye Tuna Year Program (BETYP) is a necessary investment in the context of responsible fishing, and requires a large and intensive research program. The Bigeye Year Program has a high cost which is fully justified by:

1) the very high value of the present bigeye fisheries, especially the longline fisheries (sashimi), with large catches which have a high value/kg;

2) the unknown, but probably very serious conservation danger presently faced by the bigeye stock because of the dramatic increase in catches, both by the purse seiners (juveniles) and by the longliners (spawners); and

3) the more or less complete lack of baseline research on bigeye tuna (growth, stock structure, spawning, etc.).

This research program should be:

Urgently conducted, because of the potentially critical situation of the stock. This action cannot be delayed in the context of responsible fisheries.

Very large and ambitious, because of the multiple and serious fundamental problems pending on most parameters. The requested budget can be justified as a minimum investment by the high value of the bigeye landings (US$ 600 million in 1994).

Primarily conducted by all the countries involved in the bigeye fisheries: Japan, Taiwan, Uruguay, and other longline fishing countries, the EU countries (Spain, France, Portugal) for purse seine and baitboat fisheries, Ghana for the equatorial baitboat fishery, etc. Active research must be conducted simultaneously on both the longline and surface fisheries, and must cover the entire area of distribution of the species.

The ICCAT Secretariat should play an active role in every step of this Program (as during the International Skipjack Year Program), and an *ad hoc* ICCAT Bigeye Program Coordinator should be recruited for the duration of the Program. This expert should manage all the various coordination aspects necessary for such a large Program (data collection, data analysis, working groups, tagging and recoveries, etc.).

An ICCAT Bigeye Year Program Budget should be established and funded by the Commission and other sources, (such as a landing tax on every Atlantic bigeye landed).

The ICCAT Secretariat should also organize, during this Program, various working groups:

1) In early 1997 and 1998 a large preparatory working group for the organization and planning of Bigeye Year Program.

2) In late 1997 and 1998, various small technical working groups on specific bigeye problems, such as: genetics, tagging, ageing, modeling; in the year 2000, a large Bigeye Symposium.

3) The publications from the Bigeye Year Program should also be handled by ICCAT.

2. Necessary research operations and estimated budget

One of the major activities of the Bigeye Year Program is tagging. This activity, both with traditional and archival tags, is the core of the entire Program. This is the most expensive activity, the results of which depends the success of the Program. If this activity is not fully accomplished, the entire Bigeye Program will be wasted.

2.1 ICCAT coordinating actions and budget

A special ICCAT fund of approximately US$ 2.2 million over a period of four years (1997-2000) is also necessary for the Bigeye Year Program:

Annual Budget (in US $)

	1st year	*2nd year*	*3rd year*	*4th year*	*TOTAL*
Coordinator & Secretariat	75,000	75,000	75,000	75,000	300,000
BETYP Coordination	40,000	20,000	20,000	20,000	100,000
Working Groups	30,000	30,000	30,000		90,000
Symposium				110,000	110,000
Coordination & research by ICCAT Secretariat	25,000	25,000	25,000	25,000	100,000
Cost of research activities	90,000			20,000	110,000
Tags	500,000				500,000
Boats for tagging	600,000	200,000			800,000
Publications			20,000	30,000	50,000
Other	12,500	12,500	12,500	12,500	50,000
TOTAL	**1,482,500**	**350,000**	**162,500**	**260,000**	**2,210,000**

2.2 National research

Various coordinated research activities must be conducted at the national level; the corresponding costs (manpower and laboratory costs) to be covered by each country participating in the Program.

1) **Improved bigeye statistics:**

Obtaining improved bigeye statistics for all fleets (PS, BB and LL; particularly intensive size sampling covering a full year and all fisheries), with multiple trips at sea by observers on-board all fleets catching significantly levels of bigeye, and developing an in-depth analysis of bigeye fishery data (to obtain an index of bigeye abundance for juvenile bigeye?).

Planned activities:

- five permanent observers should be placed on-board the longline fleets (12 month*5 observers -- very low coverage in terms of the large number of boats) in order to conduct this intensive sampling.

- temporary technicians should increase the sampling of bigeye taken by the surface fleets at all the landing ports during an entire year, and observers should be placed on a significant portion of the purse seine fleet. The increase of purse seine fishing power on small bigeye is clear but not well explained (the fishery on logs explains part but not all of the increase in bigeye catches). The observer program should then be developed on the purse seine fleet catching bigeye in order to sample those bigeye and to understand the

basic technological or behavioral reasons explaining the increase in purse seine fishing power on bigeye. The goal would be to cover 40 trips by observers on-board purse seiners.

- temporary technicians at the major ports where longline landing or transshipment occurs, should be temporarily contracted to sample those fleets.

2) Tagging:

- Intensive tagging of bigeye, targeting growth, stock structure and stock size, should be developed covering all sizes taken and all major fishing zones. This tagging program should use every model of tags available (regular, archival and possibly pop-up). Significant tagging should be carried out using tetracycline injections in order to validate simultaneous growth studies.

At this stage the following tagging activities should be planned:

- regular tagging in the nursery area: use of a Tema baitboat rented during a four-month period (November to February) to carry out extensive tagging of small bigeye (and yellowfin). (Goal: 20,000 tagged bigeye, 5% with tetracycline injections).

- regular tagging of medium size and large bigeye taken by surface gear in the north temperate area: use of a baitboat rented during a one-month period in the Canary Islands (Goal: 1,000 tagged bigeye), in Madeira and Azores (Goal: 1,000 tagged bigeye). (Estimated cost: US$ 300,000 for the rental of the northern baitboats (3-month period) and US$ 500,000 for the rental of a Tema baitboat).

- opportunistic regular tagging of large bigeye taken by longline, done by trained scientific observers: significant numbers of large bigeye should be tagged in all the major fishing zones (north and south Atlantic feeding zones, and north and south spawning zones. A goal of 500 bigeye in each of the seven longline fishing strata (i.e., a total of 3,500 large bigeye tagged should be a goal for the Bigeye Year Program).

- archival and pop-up tags on medium and large bigeye: a target of 500 tags should be planned, using the best available tags; those tags should be released in diverse well selected areas (feeding and spawning strata), allowing a better understanding of bigeye migrations, e.g., between nurseries, spawning and feeding strata).

For this key operation to be totally successful, all the costs of chartering the baitboats, purchasing the tags, paying the recovery rewards, and the organization of publicity for the recoveries should be allocated to ICCAT and included in the Bigeye Year Program budget.

3) Genetics:

- Full use of the various modern genetic analytical techniques should be developed and applied to bigeye in order to evaluate the heterogeneity of the potential bigeye sub-populations of the Atlantic. Significant sampling should be obtained from all major fishing strata and on all the sizes taken by the various fisheries (see map of the major bigeye fishing strata).

- The genetic samples should be analyzed in an independent but coordinated way, simultaneously, by various laboratories using various analytical methods.

- The costs of analyzing the genetic samples would be covered by each country involved in the Program (the ICCAT covering the sampling and the dissemination of the samples with an *ad hoc* limited budget of US$ 10,000).

4) Growth:

- Bigeye growth will be studied from tagging and recovery results, and from hard part readings. Samples of the hard parts (otoliths and vertebrae) should be collected from various areas and sizes of bigeye. Goal: to collect 500 samples and analyze them independently in two independent laboratories should be the goal of the Program.

- The costs of reading the age samples would be covered by each country involved in the program (the ICCAT covering the sampling and the dissemination of the samples with an *ad hoc* limited budget of US$ 10,000).

5) Natural mortalities and population size of juvenile:

- The natural mortality of bigeye is a fairly unknown parameter which is of key importance in the present stock assessment (basically few negative effects or no effect can be expected from the increased purse seine catches of juveniles if the juvenile M is very high, or a strong impact if juvenile M is low). This research on juvenile M should cover simultaneously various fields:
  - Eco-physiology of juvenile bigeye; and
  - Study of predators of juvenile bigeye.
- The direct (use of modern echo-sounder technique) and indirect (comparative analysis of the population sizes estimated from VPA on various species in relation to the numbers of juvenile tunas caught at sea in the nursery) in order to better measure the population size of juvenile bigeye.
- Analysis of the tagging and recovery of tags in the nursery area.
- Use of data analysis models allowing better evaluation of the M of juvenile (e.g., similar to the methods used by the South Pacific Commission).

6) Reproductive biology:

- Significant sampling should be conducted to obtain significant bigeye gonad sampling from all major bigeye strata, with more intensive sampling of gonads conducted in the spawning areas. Those samples should be processed in order to determine the spawning potential of bigeye as a function of their sizes and ages.
- A limited sample of 1,000 gonads should be sampled in each of the four northern and southern bigeye areas (i.e., 4,000 gonads) in order to calculate the monthly gonad index (GI) by area.
- An extensive sampling of gonads should be obtained by observers in each of the three inter-tropical areas of the central eastern Atlantic (see map): 5,000 gonads in each of these areas (for a total of 15,000 gonads) allowing gonad index calculation, counting and sizing of eggs of the pre-spawning females, physiology of maturation, and genetics of gonad contents (using standard and normalized procedures).

7) Modeling bigeye stock assessment: building an *ad hoc* bigeye model

- Bigeye management should preferably be conducted using an *ad hoc* assessment model, which takes into account the biological peculiarities of bigeye (primarily its complex stock structure and migrations) and the major economic component of the various fisheries (sashimi vs canning fisheries). Such a complex model should be developed by an external specialist of such methods contracted under the Bigeye Year Program, and assisted by various experts in this type of model. A working group should be held to finalize the model. A cost of US$ 20,000 should be assigned in the budget for this highly technical task.

Budget for research activities (in US$)

Improved statistics	50,000
Tagging	1,300,000
Genetics	10,000
Growth	10,000
Natural mortality	10,000
Reproductive biology	10,000
Modeling bigeye stock assessment	20,000
TOTAL	**1,410,000**

2.3 Overall organization of the Bigeye Year Program

A scientist specialized in bigeye should be nominated as the General Coordinator of the Bigeye Year Program. This scientist should work in close collaboration with the ICCAT Secretariat and the fishery biologist recruited to manage the Program at the ICCAT level.

A selected scientist should be nominated to coordinate and stimulate the research activities of each theme (statistics, tagging, genetics, growth, natural mortality, reproductive biology, and modeling).

3. Conclusions

In the context of responsible fisheries, it is now an obligation for ICCAT countries to develop, immediately, intensive research on the Atlantic bigeye, due to the lack of research done in the past on this highly valuable stock and because of the very serious danger of over-fishing presently faced by this stock. The high budget requested for this four-year research program is, in fact, quite low and reasonable, compared to the extremely high value of this fishery (more than US$ 500 million yearly; the US$ 2.2 million requested is only 1% of the landing value of the catches) and the critical lack of research on this stock in the past. This expensive research program is in fact an economic investment which is presently necessary for the rational management and conservation of the bigeye stock. In the absence of this intensive research program, a drastic reduction in fishing effort and catches should be implemented immediately on all fleets catching bigeye. The decision to carry out this Program cannot be delayed because of the present situation of the bigeye stock. ICCAT research should be coordinated with other research programs which are planned world-wide on bigeye tuna because of the increasing risk of exploitation now faced by this species in most oceans.

Considering the critical situation of the bigeye stock and the urgent need for a full research program, any limited research action will not be able to provide the information necessary to manage and conserve the Atlantic bigeye tuna stock.

4. Planned activities of the Bigeye Year Program:

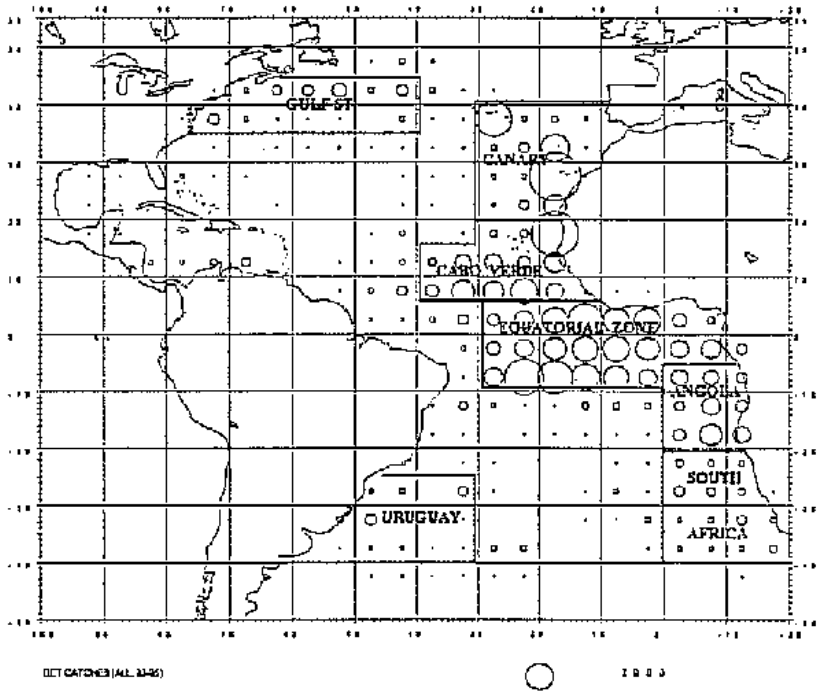
1) November, 1996: approval of the Bigeye Year Program by the Commission.
2) First quarter 1997:

   -- Technical working group to establish the details of the content and organization of the Program;
   -- Recruitment of a Bigeye Year Program scientist at the ICCAT Secretariat;
   -- Nomination of scientists responsible for the research activities.

3) June, 1997 - October, 1998: research activities developed

4) End of 1998 and all 1999: analysis of data and samples; various working groups by theme.

5) Year 2000: celebration of the "Bigeye Year Program 2000 Symposium"



Map of bigeye fisheries (all catches, for the period 1993-1995), and fishing zones used to plan the Bigeye Year Program research plan.

NATIONAL REPORTS

NATIONAL REPORT OF ANGOLA *

by

Kumbi Kilongo and M. Tchikulipiti

1. The fisheries

The total catch of tunas in Angola in 1995 amounted to 910 MT, a 53% increase as compared to 1994. This increase is due to the inclusion of catches of six Japanese longliners that have operated in Angola since a short time ago. These data, which have not yet been submitted to ICCAT, correspond to the July to December, 1995, period. It should be noted that the number of baitboats has remained constant since 1993. It is likely that the catches presented may be less than the actual catches, if the number of licenses (18) issued to Japanese longliners is taken into account.

The total catch data (Table 1) show that yellowfin is the major species in the catches, as it represents 59% of the local catches (baitboats and traps) in 1995, and 45.4% of the catches are from the Japanese longliners, whereas skipjack, Atlantic bonito and other species were caught in minor amounts. The tuna catches by trap declined by about 60%.

2. Research

Up to 1994, the data on catch and effort were compiled from the commercial catch records of only seven longliners and five traps, located around Lobito and Benguela. The situation has changed since the issuance of 18 licenses to Japanese longliners. The Fisheries Research Institute of Lobito (IIP) is in charge of collecting and processing the catch and effort data, and the results are regularly transmitted to the ICCAT Secretariat.

The statistical scheme to collect data is of average quality, due to the limited number of staff and the lack of contact with the different fishing centers. The IIP of Luanda is in the process of restructuring this scheme for the longline catch data, based on reorganizing fishing logbook coverage, and for the artisanal fleet, based on sampling of the main species of the fishery, which will result in improvements in the calculations of the total catch.

3. Application of ICCAT recommendations

Continuous effort has been deployed whose objective is to organize an efficient application of the ICCAT recommendations. Strict monitoring of the licenses issued has been initiated and the sampling scheme for size frequency has been resumed at the start of this year.

* Original report in French.

Table 1. Total catches (in MT) since 1993

Species & fishery	*1993*	*1994*	*1995*
BAITBOAT			
YFT	211	137	215
SKJ	13	7	3
LTA	11	31	58
FRI	–	–	6
BON	2	–	–
TRAP			
YFT	–	–	1
LTA	164	90	59
FRI	4	6	15
BON	47	20	9
LONGLINE			
YFT	–	–	117.4
BET	–	–	427.2
TOTAL			
YFT	211	137	333.4
SKJ	13	7	3
LTA	175	121	117
FRI	4	6	21
BON	49	20	9
BET	–	–	427.2
GENERAL TOTAL	**452**	**291**	**910.6**

NATIONAL REPORT OF BRAZIL *

by

J. H. Meneses de Lima **

1. Fisheries information

1.1 Fleet Development

In 1995, the Brazilian longline fleet consisted of 16 vessels, 13 based at Santos (Sao Paulo) and three at Natal (Rio Grande do Norte), showing no changes in relation to 1994. The number of foreign flagged leased longliners operating in Brazilian waters in 1995 was 21, which is less than the number of boats in operation in recent years (36 in 1993 and 27 in 1994). This fleet was comprised mainly of Taiwanese flagged vessels (14), which were based at the port of Cabedelo (Sate of Paraiba). The other foreign flagged longliners chartered by Brazilian companies were two Barbadian, one Honduran, two Japanese and two Korean vessels.

The Brazilian baitboat fleet in 1995 consisted of 53 vessels, which is slightly less than the number in 1994. As regards foreign fishing activities in 1995, three Portuguese flagged baitboats started operations in Brazilian waters, based at the Port of Itajai (State of Santa Catarina). The annual number of tuna vessels (longliners and baitboats) operating in Brazilian waters for the period 1992-1995 is shown in **Table 1.**

1.2 Catches

Catches of tuna and tuna-like species taken by longliners in Brazilian waters during the years 1992 through 1995 are shown in **Table 2.** The total longline catch in 1995 was 6,153 MT, showing an increase of 41.6% over the previous year's catch.

Species composition of catches of tuna and tuna-like species taken by longliners in 1995 showed major changes in relation to recent years. In 1995, the leased fleet, which in the past has shown a predominance of albacore catches, showed the highest percentage of bigeye catches (40.3%) in relation to the total catch in weight. Yellowfin tuna was the second most important species caught (26.6%). As for the Brazilian longline fleet, species composition of catches remained unchanged in relation to 1994, except for the marked increase in the catch of the dominant species (swordfish), whose percentage composition in relation to the total catch in weight reached 73.4%. As a result of the increase in swordfish catches, there was a marked decrease in shark catches taken by the Brazilian longline fishery. In 1995, shark catches represented only 44% of the total catch in weight, while in previous years these catches reached levels in the range of 50-60%. Annual catches of sharks, by Brazilian and leased longline fleets, are shown in **Table 4.**

Table 3 shows catches by the baitboat fishery for the period 1992-1995. The total catch in 1995 amounted to 19,809 MT, showing decrease of 16.6% over the 1994 catch. Skipjack is the target species of this fishery, representing about 83% of the total catch in weight. While skipjack catches showed a decrease of 19.6% in relation to 1994, yellowfin catches decreased by only 5.9%.

Preliminary landing estimates of the main tuna species taken by the artisanal fishery, in the northeast region of Brazil, are shown in **Table 5** for the period 1992 through 1995.

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* Original report in English.

** Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA)

1.3 New developments in the fishery

A major development which occurred in the Brazilian longline tuna fishery was the introduction of monofilament longline. Since 1994, some vessels based at the port of Santos have changed from the traditional longline to the monofilament longline, initiating a direct fishery for swordfish, using squid as bait, making use of one way light sticks, and setting the longline to operate at depths of about 30 m from the sea surface.

Another change occurred in this fishery in 1996, with the start of fishing activities by two Spanish and one American leased longliners, targeting swordfish.

Regarding the baithoat fishery, except for the introduction of new vessels with freezer facilities, starting in 1992, the only important change occurring in this fishery was the initiation of fishing operations by three Portuguese leased baitboats in 1995.

2. Activities in research and statistics

The "Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA)", through its regional fishery units (CEPENE and CEPSUL) located in the northeast and south regions of Brazil, respectively, has been in charge of the collection and compilation of Brazilian fishery data, with the exception of the State of Sao Paulo, where this activity is carried out by the "Instituto de Pesca".

In addition to activities of collection of tuna statistics and sampling for size frequency, which have regularly been carried out for the main tuna species (skipjack and yellowfin), in 1995, port sampling for size of swordfish landed by the Brazilian longline fleet based at the port of Natal was initiated. In 1996, this sampling activity was extended to cover swordfish landings made by the Spanish leased longliners. All the size and the catch and effort data collection by IBAMA in 1995 have been submitted to the ICCAT Secretariat, except for a minor part of these data, the compilation of which is still in progress.

In response to an SCRS recommendation concerning the development of standardized abundance indices of skipjack in the western Atlantic, all past catch and effort data collected through logbooks from the Brazilian baitboat fishery were used to create a database, making it possible to carry out this analysis.

In 1996, Brazilian scientists participated in the Third Billfish Workshop (Miami, U.S.A. - July 11-20) and in the Swordfish Stock Assessment Session (Halifax, Canada - October 2-9).

2.1 Statistical collection systems

Statistics on catch and effort are collected through logbooks, the submission of which is mandatory by all masters of fishing vessels over 20 GRT licensed to fish in Brazilian waters. Submitted logbooks must be completed in full on a daily basis, at the end of each trip. This requirement also applies to foreign flagged leased vessels authorized to fish in Brazilian waters.

Statistics on landings by the industrial tuna fleet are collected for each fishing trip, directly from the buyers' sales sheet, or are submitted on the appropriate forms by the fishing companies or boat owners. Regarding the statistics on landings made by the artisanal tuna fishery, a data collection system, based on statistical sampling, is now being implemented in the northeast region of Brazil to provide for landing estimates of the main tuna species.

To improve the monitoring of shark catches taken by the longline and the pelagic driftnet fisheries, a new logbook format has been implemented in 1996, requiring the fishermen to provide catch information (in weight and number) for the following shark species: blue shark, hammerhead shark, bigeye thresher, shortfin mako and silky shark.

3. Implementation of ICCAT conservation and management measures

ICCAT recommendations on minimum weight limits for yellowfin and bigeye have been implemented by domestic legislation in 1973 and 1981, respectively. The minimum size and weight limits for swordfish were implemented in 1995.

As the process for the adoption of regulatory measures for shark fisheries is in an advanced stage, it is expected that there will be a rapid implementation of measures prohibiting finning sharks and establishing a scheme of limited entry of vessels into the pelagic driftnet fishery.

Table 1. Distribution of tuna vessels that operated in Brazilian waters, by type of fishery, vessel flag, and base port, 1992-1995

Fleet	*Base port*	*1992*		*1993*		*1994*		*1995*	
		BB	LL	BB	LL	BB	LL	BB	LL
	Rio G. do Norte	--	3	--	5	--	3	--	3
	Rio de Janeiro	25	--	23	--	21	--	21	--
Brazilian	Sao Paulo	--	14	--	14	--	13	--	13
	Santa Catarina	32 (1)	--	30 (2)	--	29 (2)	--	27 (2)	--
	Rio G. do Sul	--	--	4 (3)	--	4 (3)	--	5 (4)	--
Sub-total		57	17	57	19	54	16	53	16
Barbadian *	Sao Paulo	--	--	--	--	--	--	--	2
Honduran *	Sao Paulo	--	1	--	1	--	2	--	1
Japanese *	Rio G. so Sul	--	1	--	2	--	2	--	2
Portuguese *	Sao Paulo	--	2	--	--	--	--	--	--
	Santa Catarina	--	--	--	--	--	--	3	--
Panamanian *	Sao Paulo	--	--	--	1	--	1	--	--
	Paraiba	--	--	--	--	--	--	--	14
Taiwanese *	Para	--	11	--	14	--	10	--	--
	Rio G. do Sul	--	15	--	18	--	10	--	--
Korean *	Rio G. do Sul	--	--	--	--	--	2	--	2
Sub-total		--	*30*	--	*36*	--	*27*	*3*	*21*
TOTAL		**57**	**47**	**57**	**55**	**54**	**43**	**56**	**37**

* Foreign vessels leased by Brazilian Companies and licenses to fish in /Brazilian waters.
1 Includes 6 freezer baitboats (over 151 GRT).
2 Includes 2 freezer baitboats (over 151 GRT) in 1993, and 3 freezer baitboats (over 151 GRT) in 1994 and 1995.
3 Freezer baitboats (over 151 GRT).
4 Includes 4 freezer baitboats (over 151 GRT).

Table 2. Catches (MT) of tuna and tuna-like fishes taken by the Brazilian and foreign leased longline fleets, 1992-1995

Species	*Fleet*	*1992*	*1993*	*1994*	*1995* *
Yellowfin	Brazilian	227	418	165	98
	Leased	970	1100	919	1214
Albacore	Brazilian	95	55	68	91
	Leased	2615	3545	767	633
Bigeye	Brazilian	29	54	39	94
	Leased	760	1202	557	1841
Swordfish	Brazilian	608	674	969	1168
	Leased	1979	1339	602	572
Sailfish	Brazilian	30	51	34	32
	Leased	252	150	26	65
White marlin	Brazilian	117	79	73	60
	Leased	92	224	17	43
Blue marlin	Brazilian	14	19	21	43
	Leased	109	127	49	126
Other**	Brazilian	40	4	5	4
	Leased	227	204	32	69
TOTAL	**Brazilian**	**1160**	**1354**	**1374**	**1590**
	Leased	**7004**	**7891**	**2969**	**4563**

* Preliminary estimates.
** Includes *Acanthocybium solandri*.

Table 3. Catches (MT) of tuna and tuna-like fishes taken by the Brazilian and Portuguese* leased baitboat fleets, 1992-1995

Species	*Fleet*	*1992*	*1993*	*1994*	*1995*
Skipjack	Brazilian	18,273	17,611	20,555	15,675
	Leased	---	---	---	855
	Total	18,273	17,611	20,555	16,530
Yellowfin	Brazilian	2,661	3,088	2,744	2,581
	Leased	---	---	---	32
	Total	2,661	3,088	2,744	2,613
Others	Brazilian	287	414	258	659
	Leased	---	---	---	7
	Total	287	414	258	666
Total	Brazilian	21,221	21,113	23,757	18,915
	Leased	---	---	---	894
	Total	21,221	21,113	23,757	19,809

* Three Portuguese flag baitboats leased by Brazilian companies and licensed to fish in Brazilian waters.

Table 4. Catches of pelagic sharks by the Brazilian and foreign flag leased longline fleets and their percentage composition in relation to total catches, 1988-1995

Year	*Brazilian fleet*		*Leased fleet*	
	Catch	*%*	*Catch*	*%*
1988	1298.4	45.0	481.4	17.7
1989	1962.4	50.0	211.1	10.6
1990	2706.4	55.3	391.4	18.1
1991	2517.9	60.1	403.5	14.2
1992	1999.8	60.0	574.8	7.6
1993	2137.2	60.6	1439.0	12.3
1994	1892.4	53.6	719.9	19.4
1995	1460.7	44.0	692.0	12.6

Table 5. Preliminary landing estimates (MT) of the main tuna species caught by the artisanal fishery in the northeast region of Brazil for the period 1992-1995

		Species				
Year	*Landing site*	*King mackerel (KGM)*	*Serra Spanish mackerel (BRS)*	*Blackfin tuna (BLF)*	*Others (OTH)*	*TOTAL*
1992	Ceara	739.3	981.8	--	767.8	2488.9
	R. Grande do Norte	193.9	131.7	138.8	27.6	492.0
	Total	**933.2**	**1113.5**	**138.8**	**795.4**	**2981.0**
1993	Ceara	1136.1	629.0	--	606.6	2372.0
	R. Grande do Norte	--	--	--	--	--
	Total	**1136.1**	**629.0**	**--**	**606.6**	**2372.0**
1994	Ceara	1138.2	855.1	--	681.7	2675.0
	R. Grande do Norte	189.1	269.1	347.1	34.1	839.4
	Total	**1327.3**	**1124.2**	**341.7**	**715.8**	**3514.4**
1995	Ceara	1003.1	916.4	--	435.6	2355.1
	R. Grande do Norte	193.3	352.9	243.5	--	789.7
	Pernambuco	52.7	41.9	36.3	18.7	149.6
	Total	**1249.1**	**1311.2**	**279.8**	**454.3**	**3294.4**

NATIONAL REPORT OF CANADA, 1995 *

by

J.M. Porter ** and C.J. Allen ***

1. National fisheries information

The Canadian Atlantic statistical systems provide real time monitoring of catch and effort (see section 2 below) for all fishing trips.

1.1 Bluefin tuna

Bluefin occur in Canadian waters from July to October over the Scotian Shelf, in the Gulf of St. Lawrence, in the Bay of Fundy, and off Newfoundland. In adherence to the ICCAT agreement, the Canadian quota for the 1995 calendar year was 654 MT. This Canadian quota is comprised of 535.6 MT allocation from ICCAT for the calendar year 1995 plus a carry-over of 118.4 MT. The carry-over is the difference between what Canada caught in 1994 (391.6 MT) and the level at which Canada could have set her quota (510 MT) in 1994. The Canadian nominal landings of Atlantic bluefin tuna in 1995 were 576.1 MT, leaving 77.9 MT uncaught (**Table 1**).

The major fishery since 1988 has been in the tended line fishery in the Hell Hole between Browns and Georges banks (off southwestern Nova Scotia), though in 1995 its importance had decreased to about 37% of the Canadian landings (from 70% in the early 1990s). Fish captured in this fishery weigh about 200 kg (round) on average. Nominal CPUE has been fairly stable in recent years, though at a lower level than at the inception of this fishery in 1988 (SCRS/96/68). In 1995, 30% of the Canadian catch came from the Gulf of St. Lawrence. This represents a marked increase for this fishing area, approaching levels of harvest not seen since the early 1980s. Though nominal CPUE was slightly higher in 1995 than in 1994, it was much lower than the CPUE observed in the early 1980s (SCRS/96/68). These higher catches in the Gulf of St. Lawrence, where mostly giants are harvested (average size about 400 kg), means that the 1995 Canadian catch at size contained more older fish than in recent years. A substantial catch was also taken from the St. Margaret's Bay traps (72 MT) and from the rod and reel fishery off northeastern Nova Scotia (61 MT). In the Bay of Fundy, 43 MT were taken by electric harpoon. Only 9.6 MT were taken in the tended line fishery off Newfoundland due primarily to decreased effort in the groundfish fishery and less presence in the offshore fishing grounds. The offshore longline vessel, which directs for tuna other than bluefin in the northwest Atlantic, caught only 4 MT of its 25 MT by-catch limit in 1995.

In 1995, 459 licensed fishermen actually participated in the directed bluefin fishery, one offshore longline license was issued with a bluefin by-catch provision, and four fish-trap license holders in St. Margaret's Bay used 24 bluefin tuna trapnet licenses throughout the season (**Table 2**).

1.2 Swordfish

Swordfish occur in Canadian waters from May to November, primarily on the edge of Georges Bank, the Scotian Shelf and the Grand Banks of Newfoundland. The ICCAT recommendation for the Canadian swordfish quota for 1995 was 1,500 MT. The Canadian nominal landings of swordfish in 1995 were 1,609.2 MT (round; **Table 1**). The nine percent overrun is attributed to unexpectedly high catches of unusually large swordfish at the end of the season and an anomaly in monitoring catch at sea. These problems have been rectified for 1996 and all swordfish trips are covered by an improved catch monitoring system.

In 1995, 1,420.7 MT was taken by longline (or 88% of the catch), while the tonnage taken by harpoon was the highest amount since the 1960s (188.5 MT; **Table 3**). The high harpoon catches are thought to be attributed to the late development (August) of a thermocline on the edge of the Scotian Shelf, generally warmer water conditions on the offshore banks, and to fishing earlier in the season by more of the fleet due to restrictions on fishing for groundfish species. The mean weight (round) of longlined and harpooned swordfish was 68 kg and 122 kg,

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* Original report in English.

** Fisheries and Oceans Canada, Biological Station, St. Andrews, New Brunswick E0G 2X0 Canada.

*** Fisheries and Oceans Canada, Resource Management Branch, 200 Kent Street, Ottawa, Ontario K1A 0E6.

respectively (**Table 3**). The higher catches by harpoon, combined with high catches of large fish by longline late in the season (see above), has resulted in proportionately more large fish in the 1995 Canadian swordfish catch-at-size compared to recent years, and hence more females in the 1995 catch-at-size-by-sex. The Canadian longline CPUE for mature fish continues to decline (SCRS/96/140), consistent with the conclusions of the SCRS. Nine percent of the Canadian landings by number in 1994 constituted small fish as defined by the ICCAT swordfish recommendations for regulatory measures (< 25 kg round).

All 77 licensed longline fishermen were active in the 1995 fishery (**Tables 2 and 3**). Although a total of 1,400 fishermen are eligible for harpoon licenses, only about 97 actually landed fish in 1995. For many, harpooning swordfish is an opportunistic activity conducted during other fisheries, though in recent years several fisherman fish early in the season soley by swordfish harpoon. Generally, in recent years, with the decline of groundfish stocks, more fishermen direct for swordfish (**Table 3**). In addition, one offshore longline license was issued for tunas other than bluefin with a swordfish by-catch provision.

1.3 Other tunas

The other tunas (albacore, bigeye and yellowfin) are at the northern edge of their range in Canada, hence catches are small. They are found on Georges Bank, the Scotian Shelf and the Grand Banks during summer months. One Canadian offshore longline vessel, has been designated to direct for other tuna species and the 77-vessel swordfish longline fleet has a dual licence capability enabling them to direct for other tunas during the swordfish fishery. The fishing activity for other tunas was increased in 1995, with swordfish longline vessels directing for yellowfin (174.4 MT) and bigeye (148.6 MT) early in the season.

1.4 Sharks

Historically, blue shark, porbeagle and shortfin mako have been a by-catch of the Canadian swordfish and groundfish longline fisheries although small amounts are also landed from other fisheries. It is believed that the by-catch is larger than reported because of discarding, though regulatory amendments are addressing this problem. A directed longline fishery has been developing in recent years and a Management Plan for these species was implemented in 1994. In 1995, three offshore longline vessels directed for porbeagle and approximately twenty inshore vessels directed for sharks. Total landings in 1995 were 1305 MT of porbeagle, 123 MT of blue shark and 107 MT of shortfin mako (**Table 1**). The recreational fishery has been restricted to hook and release only until criteria are developed to allow the retention of fish.

2. Research and statistics

In 1994 a Dockside Monitoring Program was established in Atlantic Canada for some of the swordfish and bluefin fleets. This statistical system allows a real time monitoring of catch and effort. At the completion of each fishing trip, log record data must be submitted by each fisherman to a monitoring company which inputs the data into a central computer system. Data must be received from fishermen before they can proceed with their next fishing trip. This ensures 100% coverage of properly completed log records and individual fish weights. Log records have information on catch, effort, environmental conditions and by-catch. In 1996, this industry-funded system will apply to all fleets and include monitoring of all trips even when no fish are caught. Prior to the implementation of the Dockside Monitoring Program, even though the submission of logbooks was compulsory, less than 50% of trips were represented by useable log records and information on individual sizes of fish (see **Table 3** for swordfish). Problems such as by-catch and highgrading are assessed through Observer Programs and at-sea surveillance on the domestic fleet. License holders that do not comply to the fisheries regulations and conditions of license are sanctioned under the Fisheries Act, and subject to fines and/or loss of fishing privileges.

2.1 Bluefin research

The scientific research program at the Biological Station St. Andrews is as follows:

1) Data entry of all bluefin CPUE from log records from 1984-94 completed, and preliminary analyses initiated. Consultation with Industry and completion of analyses in 1996.

2) Dockside Monitoring for all bluefin tuna landed in Canada, and data entry by Regional Statistics offices. In 1996 there will be monitoring and data entry for all trips even when no fish are landed.

3) Participated in the Miami Research Workshop for Atlantic Bluefin Tuna Tagging Studies. Initiated cooperative tagging with U.S. and Australian scientists and Canadian bluefin Industry to attach dummy archival tags to giant bluefin in impoundments in order to evaluate attachment methods.

2.2 Swordfish research

The scientific research program at the Biological Station St. Andrews is as follows:

1) Updated 1961-94 biomass index and 1988-94 age-specific index for swordfish caught by longline.

2) Hail and dockside monitoring implemented for all longline swordfish landed in Canada and data entry conducted by regional statistical offices. In 1996, there will be dockside monitoring for all swordfish landings including harpoon, and the system will be improved to monitor late season catches while vessels are still at sea in order to prevent overrun of the quota.

3) Continuation and expansion of the juvenile swordfish cooperative tagging study with the Nova Scotia Swordfishermen's Association. In 1995, 77 fish were tagged and 2 recaptured.

2.3 Other tunas

Biological sampling of other tunas (albacore, bigeye, yellowfin) has been conducted on the Canadian offshore and Japanese fisheries within the 200-mile fisheries zone. There was limited sampling of the domestic fleet (submission of tally sheets, logs, and some observer coverage).

2.4 Sharks

In 1995, the priorities of the scientific research program were to establish data collection from Canadian vessels directing for pelagic sharks (Dockside Monitoring implemented in 1995), and to continue the cooperative tag and release program involving both commercial and recreational fishermen.

3. Implementation of ICCAT conservation and management measures

For bluefin, swordfish, and sharks, Canada issues an annual management plan prior to the opening of the respective fishing seasons. Details of management measures and their enforcement are provided in Appendix A. These plans are compiled in consultation with the fishing industry and incorporate all relevant ICCAT regulatory recommendations. These plans are implemented under the *Fisheries Act of Canada*. In 1995 the Bluefin Tuna Management Plan was announced on July 25, 1995, and the Swordfish Management Plan was anounced on June 1, 1995. The necessary ICCAT regulatory recommendations are either specified in the *Atlantic Fishery Regulations* (1985) (made under the *Fisheries Act*) or are handled as written conditions of license, both of which are legally binding on fishermen.

3.1 Bluefin tuna

Canada has implemented the ICCAT regulatory recommendations that apply to bluefin tuna in the Canadian Atlantic Bluefin Management Plan (Appendix A). The 1995 quota was set at 654 MT, (see section 1.1), and no person shall have in their possession any bluefin weighing less that 30 kg. In addition, Canada has limited entry into the fishery; and restrictions on the amount and type of gear used, vessel replacement, management fishing areas, and license transfer requirements.

In 1995, Canada had a computerized system to record the implementation of the ICCAT Bluefin Tuna Statistical Document Program. Prior to the ICCAT program, Canada already had a system of uniquely numbered tags to be attached to all bluefin tuna landed in Canada. In 1995, 127 documents were returned to Canada because of incorrect data. To rectify this, in 1996 a notice was sent to all Canadian bluefin exporters regarding the proper completion of the ICCAT Bluefin Tuna Statistical Document .

3.2 Swordfish

Canada has implemented the ICCAT regulatory recommendations that apply to swordfish in the Canadian Atlantic Swordfish Management Plan (Appendix A). The 1995 quota was set to 1500 MT, and there is a prohibition on the taking and landing of swordfish less than 25 kg (15% tolerance per trip). As stated in section 2.2, efforts have been taken in 1996 to ensure that the quota is not overrun. In addition to the ICCAT regulatory recommendations, Canada has limited entry into the fishery, strict by-catch provisions, time-area closures to protect small fish and minimize by-catch, and gear restrictions.

3.3 Other tunas

The 3.2 kg minimum size restriction for bigeye and yellowfin is not relevant in Canada as these small fish do not enter the cold waters of Canada. These other tunas are managed under the *Fisheries Act* and the effort is restricted by limiting entry into the fishery to vessels having a swordfish longline license and to one offshore longline license specifically allowed to direct for these other tunas.

3.4 Sharks

ICCAT has no regulatory recommendations for sharks. However, Canada has a domestic management plan which includes provisions for a limited entry exploratory fishery, gear restrictions, time-area closures to minimize by-catch, a prohibition of finning, and the collection of fishing and biological data (Appendix A).

4. Inspection schemes and activities

Canada is not a signatory to the ICCAT Port Sampling Scheme, and uses a combination of the Dockside Monitoring Program, and shore and sea-based patrols of Department of Fisheries and Oceans Fisheries Officers to ensure compliance to domestic regulations (which include ICCAT regulatory recommendations; see section 3). No foreign vessels land tuna in Canadian ports and efforts are concentrated on the Canadian fleet. The Japanese vessels fishing in the Canadian 200-mile fishing zone are required to have 100% observer coverage while in Canadian waters. As well, their activities are also monitored by aerial surveillance and at-sea inspections.

In addition to the Dockside Monitoring Program to ensure complete coverage of the catch and effort of the Canadian fleet (see 2 above), aerial and vessel surveillance is used to monitor the fleets at-sea. Shore-based patrols monitor routine landings, watch for illegal landings and conduct airport and border surveillance. Observer coverage is used periodically to monitor the commercial fishery. Details of enforcement activity are outlined in Appendix B.

NOTE: Appendices A and B are available at the Secretariat for consultation.

Table 1. Summary of 1991-95 Canadian landings (MT round weight) of large pelagic fish species.

Species	Landings				
	1991	1992	1993	1994	1995
Swordfish	1026.5	1546.5	2233.7	1675.7	1609.2
Bluefin tuna	481.7	443.5	458.6	391.6	576.1
Albacore	5.7	1.0	8.7	32.2	11.5
Bigeye tuna	27.1	67.5	124.1	110.5	148.6
Yellowfin tuna	28.0	25.5	71.5	52.3	174.4
Unspecified tuna	2.0	3.2	9.1	0.2	0.0
Blue shark	32.0	101.1	20.8	133.0	123.0
Shortfin mako		119.0	152.2	157.2	107.0
Porbeagle	346.0*	717.0	919.0	1549.0	1305.0
Unspecified sharks	61.4	49.0	22.7	107.1	38.4

* Mackerel sharks.

Table 2. Distribution of bluefin tuna and swordfish fishing licenses by region and species* in 1995.

Region	Number of licenses					
	Bluefin		Swordfish LL		Other tunas****	
	Total	Active	Total	Active	Total	Active
Gulf	606	359	0	0	0	0
Newfoundland	55 ***	20	11	11	11	11
Scotia-fundy	42	42	66	66	66	66
St. Margaret's Bay**	4	4	–	–	–	–
Quebec	54	34	0	0	0	0
Total	761	459	77	77	77	77

* Bluefin tuna, swordfish and other tunas are regulated by limited entry.

** Four fish trap license holders with 6 bluefin trapnet licenses each.

*** 38 of these licenses are subject to a reduced level of fishing activity and restricted to NAFO Divisions 3LNO.

**** Restricted to tunas other than bluefin (albacore, bigeye, yellowfin).

Note: Active fishermen are those that picked up their licenses, license conditions and tags, and may or may not have actually fished.

Table 3. Summary of 1988-94 active licences, swordfish landings (MT round weight), average weight of fish (kg round) and percentage of small fish *

	1988	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*
Number of vessels landing fish								
Longline	39	52	50	53	46	75	74	75
Harpoon	+	+	+	61	72	72	32	97
Catch (MT)								
Longline	887	1097	819	953	1486	2206	1654	1421
Harpoon	24	146	92	73	60	28	22	188
Total	911	1243	911	1026	1546	2234	1676	1609
Ave. wt (kg)								
Longline	50	52	61	61	57	56	63	68
(#sampled)	(1315)	(3902)	(10280)	(8111)	(5904)	(19469)	(26279)	(20247)
Harpoon	–	129	138	78	67	129	120	122
(#sampled)	(0)	(637)	(164)	(146)	(136)	(151)	(83)	(1131)
% of catch small fish* (by #)	16	16	11	11	16	15	11	9
% of catch sampled	7	23	71	49	23	50	99	94

* <25 kg round weight.
\+ undetermined number, but <100.

NATIONAL REPORT OF CAPE VERDE *

by

María Helena Santa Rita Vieira

1. Introduction

The fisheries resources of Cape Verde are comprised of a wide variety of species, of which the most important are those for large pelagic species, specifically the Scombrids (yellowfin, bigeye, skipjack, frigate tuna, Atlantic black skipjack, and wahoo), and small pelagic species.

Since 1992, some experimental fisheries have been conducted which target sharks.

2. Description of the fisheries

The fisheries are characterized by the many types of small boats and gears. There are about 1,400 boats which have more or less standard characteristics (3-4 m in length, 3-4 fishermen; 1000 vessels have outboard motors). The gears used are handline, troll, beach seines and, very rarely purse seines. This is the so-called artisanal fishery. As concerns the commercial fleet, it is comprised of 80 vessels of quite distinct characteristics. Some are very old vessels. The newest vessels tend to be standardized. The gears used are baitboat, handline, trolls and small purse seines (180-200 fathoms x 20-22 fathoms).

The small boats as well as other vessels are polyvalent and carry out seasonal fishing; each fishery is comprised of various species. In addition, the commercial vessels often transport the small boats to the fishing school, where they fish together. Afterwards, the commercial vessels return with all or a major part of the catch, whereas the small boats can return empty.

All these fishing schemes result in difficulties in defining fishing effort, which have worsened since 1992. In fact, up to 1991, tunas were the target species of the commercial vessels, while now due to the interest on the local market for small pelagic species, these have replaced tunas.

Tables 1 and 2 summarize the catches from 1992 to 1995.

As regards the industrial fishery, 1995 catches increased slightly as compared to those of 1994. Catches in 1996, for which data are available up to August, amount to 297 MT.

The catches by small boats for 1995 have not been estimated for all the islands. It seems that these will be similar to 1994 catches, that is, about 2,000 MT.

3. Statistics

The scheme for the collection, processing, and publication of data is described in the report presented in 1995.

4. Research

The tuna research program, as described in 1996, is on-going, and is sustained by internal financing; there is also a Netherlands/FAO project.

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* Original report in French.

This year, the following two papers were presented: "Cape Verde Islands: A stage for yellowfin tuna during their transatlantic migrations?", by J. P. Hallier and M. H. Vieira; and "An estimate of the size-weight relationship of *Acanthocybium solandri* (Cuvier, 1832), caught in the Cape Verde Islands, 1994-1995" by M. H. Vieira and J. P. Hallier.

Table 1. Catches (MT) of the Cape Verde industrial fleet, 1992-1996

	1992	*1993*	*1994*	*1995*	*1996 **
Yellowfin tuna	224	186	167	337	93
Bigeye tuna	3	—	53	2	0
Skipjack tuna	727	632	609	629	127
At. black skipjack + frigate tuna	2	11	50	64	30
Wahoo	12	3	63	36	47
TOTAL	968	832	942	1068	297

Gears: baitboat, handline, troll.
* Up to August.

Table 2. Catches (MT) of the Cape Verde artisanal fishery, 1992-1995

	1992	*1993*	*1994*	*1995 **
Yellowfin tuna	1206	1345	1560	
Bigeye tuna	102	85	156	
Skipjack tuna	137	236	203	
Atl. black skipjack+frigate tuna	80	50	26	
Wahoo	338	316	298	
TOTAL	1863	2032	2243	

* Data are not yet available.

NATIONAL REPORT OF FRANCE *

1. National fisheries

1.1 General overview

French catches of tunas in 1995 reached 78,100 MT, which represents a decline of 20% in relation to 1994 (when catches reached the highest level of the decade). The catches returned to the level of 1991-1993. This decrease affected all species, temperate or tropical (**Table 1**).

1.2 Temperate tunas

1.2.1 Bluefin tuna

Since the 1970's, bluefin tuna are caught mainly by purse seiners in the Mediterranean. In the 1994 fishing year, this fishery was carried out by 32 purse seiners that caught 6,247 MT, as compared to 11,800 MT in 1994, with effort that was comparable in terms of number of vessels. Old vessels were replaced by others with better performance. The 1996 catch estimates are still not known, but very important landings have been reported in the Gulf of Lion in September and October. The development of trade with Japan is the reason for the fishing of these large sized fish, and for increasing fishing effort on this species during its spawning period. Due to this initiation of trade with Japan, professional bluefin tuna fishermen have utilized more means (aerial detection, vessels-pools which transship fish at sea, Spanish fish dealer infrastructures, etc.) to fish and land catches in which the majority of the individuals measure between 190 and 230 cm (140 and 250 kg). This situation is disquieting since fish sold directly to the Spanish fish dealers are only included in the bluefin tuna imports to Japan.

The remainder of the fishing season catches fish whose average weight is 20 kg. The new vessels, for reasons of profitability, search for bluefin tuna very far from their base ports, as far as the central Mediterranean, but, notwithstanding, fishing effort continues to concentrate on the western part of the eastern sector of the Mediterranean basin.

Atlantic catches of bluefin tuna in 1995 were 725 MT, or 389 MT more than in 1994. This is related to much more accessibility of Bay of Biscay fish, which results in a more or less important increase in the catches made by gears that are not directed at this species, such as the pelagic pair trawl vessels (30 pairs in 1995) and driftnets (47 vessels). However, four vessels that carry out this activity continued concentrating their effort on bluefin tuna and each vessel caught 20 MT in 1995. An increase is noted in the landings of the baitboats that operated in the Bay of Biscay, although a declining trend is evident between 1991 and 1994 (448 and 66 MT, respectively), without there having been an important change in the number of vessels (10 to 8).

1.2.2 Albacore

In the summer of 1995, albacore fishing in the Atlantic was carried out by 51 driftnet vessels, and 2,400 MT were landed. Since 1993, fishing effort in number of vessels has been declining, as have the catches. Since 1995, a system of special fishing permits has been implemented on the fleet. The length of the nets used by the French fleet has gone from 5 km per vessel at the start of the season, to 2.5 km per vessel starting from July 27, 1994. Sixty pelagic trawl vessels (30 pairs) caught 2,904 MT, with a reduction of 10 vessels between 1994 and 1995.

In the Mediterranean, albacore are caught very incidentally by purse seiners, and in a active manner by the sport fishermen, from mid-August until the end of October. The sport fishery catch is estimated at 3 MT.

* Original report in French.

The annual fluctuations in the Mediterranean albacore catches clearly show the sporadic character of the abundance of this species along the French coasts of this sea.

It is noted that in 1995, French inter-tropical purse seiners caught 80 MT of albacore.

1.3 Tropical tunas

1.3.1 The purse seine fleet

The catch of tropical tunas by French tuna vessels (18 purse seiners) in 1995 reached 59,800 MT, and was comprised of 28,800 MT yellowfin, 23,900 MT skipjack, and 7,100 MT bigeye. As compared to 1994, a slight decline was observed in the 1995 catches of these three species. Fishing with artificial floating objects, widely developed by the French purse seiners since 1991, was also carried out in 1995 and contributed about 65% of the catches of the French purse seiners in 1995. Given the recent important catch made by this type of fishing with floating objects in the eastern Atlantic purse seine fishery, studies are under way (financed by the European Union, in cooperation with Spain) to estimate and to adequately take into account this fishing type in the statistics and in the assessments of the tuna resources. The objective is to evaluate well the potential effects on the tuna resources (negative or positive) of the recent massive development of the floating objects fishery.

1.3.2 The baitboat fleet

As concerns the baitboat vessels, there were seven French flag vessels in Dakar in 1995, that is, the same number as in the previous year. The French baitboats caught 6,000 MT. The 1995 catch is at quite a low level, and this decline in the catches could be due to abnormal oceanographic conditions and to competition in the fishing grounds with the purse seiners (Spanish and French) in the main fishing area of the baitboats, i.e. the Mauritanian EEZ.

2. Research and statistics

French tuna research is centered on temperate species of the Atlantic and Mediterranean (IFREMER), and on tropical species of the Atlantic (ORSTOM).

From a general standpoint, in 1996 there was active participation of French scientists in the ICCAT Symposium in the Azores, in June: 13 French researchers participated in the Symposium, where 18 conferences were presented, contributing in this way to the full success of this Symposium.

2.1 Temperate tunas

2.1.1 Bluefin tuna

Sampling continued on bluefin tuna landed by the purse seiners that operate in the Mediterranean. In 1995, this sampling was carried out from trade data obtained from fish dealers, with coverage varying according to the month of the year from 30 to 90% of the total catch. The months for which the data are incomplete correspond to the fishing season in the area around the Balearic Islands whose the catches could be directly sold in Spain. A program sponsored by the EU permits a more precise assessment of the French purse seine landings in Spain, which are not included in the French statistics. Another program, initiated in 1992 and involving the four member countries of the European Union that have a Mediterranean coast (Spain, France, Greece and Italy), concluded in 1995. The objective of this program was to improve Mediterranean knowledge on the fishery, statistics, the limits of the stock by genetic study and the biology of bluefin tuna as well as the three other species (albacore, swordfish and Atlantic bonito). The final report has been transmitted to the participants of the GFCM/ICCAT and the Bluefin Tuna Species Group Meetings held in September in Genoa. These two programs have contributed to the objectives of the ICCAT Bluefin Year Program (BYP).

2.1.2 Albacore

For the north Atlantic, research on albacore has centered in recent years on the development of ageing methods on large albacore, with a view towards improving the analytical stock assessments.

The program to monitor the by-catches of the driftnet fishery was finalized in 1993. The 2.5 kg driftnet regulation in force since August 1, 1994, was applied in 1995. Since 1993, no research has been directed at Atlantic albacore, except for the collection of statistical data and size sampling of the trawlers and driftnet vessels.

Recovery data from 3000 albacore tagged in the Mediterranean during five years between 1986 and 1991 continued at the rate of 2 to 3 per year, confirming that Mediterranean albacore do not seem to cross the Strait of Gibraltar. No genetic difference has been found in the overall Mediterranean.

2.2. Tropical tunas

As concerns tropical, tunas, the collection of statistical data and the research programs are carried out in close collaboration with the research institutes of Côte d'Ivoire, Senegal, and Spain.

In the area of fishery statistics, intensive sampling of the French fleet was carried out in 1995, as in previous years, with about 100% logbook coverage and a large number of size samples taken (123,000 tunas measured in 1995 from French tuna vessels). The resulting detailed fishery statistics on the French inter-tropical fleets have been submitted in a timely manner to ICCAT.

Research has been carried out on the following areas:

- MAC Program carried out in Dakar in cooperation with Senegal: analysis of the ethology and dynamics of the association of schools-baitboats used by the Dakar baitboats since the early 1980s. An active research program has been just been initiated with a view towards understanding the dynamics of this association and the potential of these original fishing methods (at the local level and in other geographic sectors).

- Comparative analysis of the yellowfin and bigeye tuna fisheries and environmental conditions at the world level (program carried out in San Diego in collaboration with IATTC).

- A program of scientific observers on-board purse seiners in 1995 to study the tuna fishing carried out by the purse seiners in association with cetaceans, particularly dolphins, in the western Indian and eastern Atlantic Oceans. This activity is part of a three-year program, which started in 1994 and is financed by the European Union, ORSTOM and the Spanish Institute of Oceanography (IEO) and is carried out in cooperation with Côte d'Ivoire and Senegal. The first results of this program were presented to the SCRS in 1996.

- PICOLO Program: Analysis of Legeckis waves in the northern Equatorial area (10 to 20°W, Equator to 5°N) and their effects on the important concentrations of tunas observed seasonally in this area. This multi-discipline program will be conducted for a five-year period by a research team which will carry out several oceanographic cruises in the area.

- A program of statistical analysis, carried out in collaboration with Spain and financed by the European Union, was initiated in 1996 with a view towards a better estimate of the sizes and the species caught by the purse seiners based on the fishing method (free schools or associated schools).

Table 1. French catches (in 1,000 MT) of tunas in 1985-1995

Species	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*
Yellowfin	9.8	16.6	16.6	21.6	30.6	43.8	34.2	31.5	31.1	34.6	30.4
Skipjack	8.5	11.7	15.1	16.3	15.6	16.4	31.4	20.1	32.2	31.2	26.4
Bigeye	4.4	4.6	3.4	3.8	2.8	4.9	6.6	7.2	9.9	12.9	8.9
Albacore	12.2	1.2	2.0	2.8	3.7	3.4	4.2	6.1	7.0	6.0	5.3
Bluefin	5.9	3.8	4.9	6.5	4.9	5.2	5.2	6.9	5.8	12.2	7.1*
TOTAL	**30.8**	**37.9**	**42.0**	**51.0**	**57.6**	**73.7**	**81.6**	**71.8**	**86.0**	**96.9**	**78.1**

* Bluefin tuna: 578 MT Atlantic, 6,247 MT Mediterranean purse seiners (direct sale to Spain, not all included) 50 MT sport fisheries, 60 MT Mediterranean driftnets.

NATIONAL REPORT OF EQUATORIAL GUINEA *

by

L. Ondo Fama

1. The fisheries

The tuna fishery in Equatorial Guinea is carried out by the foreign fleets. During the year under study, 1995, 27 tuna longliners and purse seiners participated in the fishery, of which 18 were French flag vessels and 9 were Spanish flag vessels. The gross registered tonnage (GRT) of these vessels varied from 187 MT to 1284 MT. As regards engine horse power (HP), these were between 480 HP and 4200 HP (**Tables 1 and 2**). The catch obtained in the Equatorial Guinea EEZ during this year amounted to 1,704 MT.

While there is no national, industrial fishing fleet for tunas and tuna-like fishes, Equatorial Guinea attempts to implement the recommendations adopted by ICCAT through bilateral and multilateral agreements dealing with fisheries matters. The use of the ICCAT logbook for the tuna fishery was introduced in the country in 1983 by means of a Equatorial Guinea/European Union agreement. It should also be noted that 89 MT of bluefin tuna were exported during the second half of 1995, after prior utilization of the ICCAT Bluefin Tuna Statistical Document.

Table 1. Distribution of vessels, by class and gross registered tonnage (GRT)

Gross registered tonnage (GRT):	*150 - 500*	*500 - 850*	*850 - 1300*
Number of vessels:	1	10	16

Table 2. Distribution of vessels, by engine horse power category (HP)

Engine horse power (HP)	*Number of vessels*
480 - 830	1
830 - 1180	0
1180 - 1530	0
1530 - 1880	1
1880 - 2230	4
2230 - 2580	3
2580 - 2930	0
2930 - 3280	7
3280 - 3630	1
3630 - 3980	4
3980 - 4330	5

* Original report in Spanish.

NATIONAL REPORT OF JAPAN *

by

Fisheries Agency of Japan
and
National Research Institute of Far Seas Fisheries

1. Fisheries information

1.1 Type of fisheries

Longline was the only fishing gear deployed by Japan in the Atlantic Ocean during 1995. Two other fishery types, baitboat and purse seine, ceased their activities and withdrew from the Atlantic in 1984 and 1992, respectively.

1.2 Trend in fishing effort

The number of Japanese longliners which operated in the Atlantic in 1995 was 252 (**Table** 1). This is an increase of 12 boats as compared to 1994. The number of fishing days also increased by 17%. This increase in fishing effort appears to be attributable to the slow fishing of bigeye tuna in the eastern Pacific Ocean, which is the main fishing ground for the Japanese longline fleet, as well as to the strengthened management measured imposed on southern bluefin tuna fishing during recent years.

1.3 Statistical coverage

The logbook coverage from the Japanese longline fleet in the Atlantic has been very good (90-95%). The coverage for 1995 preliminary data is estimated to be about 70%. All statistics on catch in this report are raised so that they represent total statistics.

1.4 Catch trends

The 1995 provisional Japanese total catch of tunas and tuna-like fishes in the Atlantic, including the Mediterranean Sea, is estimated to be 59,865 MT (**Table** 2). This is a slight increase of 4,300 MT (7.7%) from 1994, and is the highest during the past six years (**Table** 2). The longline catch in 1995, which is equal to the total catch since there is no other type of fishery, was the highest since the mid-1960s. **Table** 3 shows the catches, by species, in the Atlantic. Among the major species, bluefin, southern bluefin and yellowfin catches increased about 2,100 MT (70%), 850 MT (140%), and 1,200 MT (25%), respectively. On the other hand, catches of albacore and white marlin declined 520 MT (45%) and 30 MT (33%), respectively. This large increase in the bluefin catch is primarily due to the development of a new fishing ground off Iceland. More information on this is given later in the report. The catch of bigeye tuna accounted for 65% of the total catch of tuna and tuna-like species (70% in 1993), and this dominance has remained unchanged for more than a decade. Among other species, there were important catches, in terms of weight, of yellowfin, bluefin and swordfish, followed by blue marlin.

Information on catch by area breakdown (north/south or east/west) is provided in **Table** 4.

1.5 New developments or shifts in the fishery

Two major changes have been observed in the most recent years. One is the introduction of new materials for longline gear, nylon monofilament for the main line, branch line and leader, and braided nylon and new synthetic material (known as "thinner liner" among fishermen since it is thinner than the conventional Kuralon line) for the main line. Among these materials, braided nylon has been extensively introduced followed by high tech new materials. In general, 70 to 80% of the total distant water fleet has introduced one of these. Although not enough information was obtained, the efficiency of these new gears seems to be better than that of convention gears, but it tends to fluctuate

* Original report in English.

and is sometimes less effective, depending on the area, time and target species. It is reportedly said that the introduction of these materials was started with an aim towards improving catches, as well as to reduce the work load of crew members, as such materials are lighter than conventional materials. At the same time, since the hauling speed is slower, the number of hooks set per day decreased by about 20%. This means the new materials are cost-effective to some extent. On the other hand, there are some drawbacks. The new materials are not as durable as the conventional ones. Reportedly, it is said that because the catch with these new materials is not as large as expected, there are some vessels that have switched back to the conventional gears.

The collection of information on the material for the main and branch lines started in 1993. Since there were many kinds of materials, it was thought not practical to cover all those materials. Instead, it was decided to classify only nylon, which is the most popular material, from the others. The annual deployment rate by materials is given in **Table 5** for 1994 and 1995. It is clear from the table that this use of nylon became very popular during those two years. The use of nylon was between 30-40% in 1994, but increased to more than 60% in 1995. In 1995, the percentage of nylon use for both lines was over 50%, while the use of conventional plus other materials decline to less than 30%.

Another change that has occurred in recent years in the development of a new fishing ground (**Figure 1**) for bluefin tuna in waters south of Iceland (50°-60°N, 15°-30°W) starting in the autumn of 1994. The geographical bluefin catch distribution in 1995 is given in **Figure 2**. The size of fish in the catch was similar to that of fish caught in the so-called central area (34°-50°N, 30°-45°W). The average weight was also reported at around 100 kg in gilled and gutted condition.

The geographical distribution of longline fishing effort in 1995 is given in **Figure 1**. It shows that much of the fishing effort was exerted in the northeastern Atlantic, tropical eastern Atlantic, as well as waters off South Africa. This inclination well reflects the fishermen's interest in their target species (bigeye, norther bluefin and southern bluefin tunas).

Except for the above two points, the operational pattern of the longline fleet was similar to that of the recent past.

2. Research and statistics

The National Research Institute of Far Seas Fisheries (NRIFSF) has been in charge of the collection and compilation of the Atlantic fishery data necessary for scientific research on Atlantic tuna and billfish stocks. All the statistical data have been routinely reported to the ICCAT Secretariat and results of the scientific research have also been presented at the regular meetings and inter-sessional workshops of the Standing Committee on Research and Statistics (SCRS).

2.1 Fishery data

The NRIFSF submitted final 1994 catch, catch/effort and part of the size frequency data (Task I, II and biological sampling) of the longline fishery to the ICCAT Secretariat. The compilation of the same data for 1995 is in progress. The preliminary 1995 catch estimates are given in this report. The size data for swordfish and bluefin tuna in 1995 were presented at each stock assessment session. The quick reporting system of logbooks and size data by on-board sampling at a port call has been continued since its inception in April, 1984. The implementation of a new logbook format for the longline fishery, which started in early 1993, provided several improvements in data. In the new logbook, sailfish and spearfish are separated; they had been combined in the old format. Other improvements are the inclusion of information on shark catches, gear configuration, sea surface temperature and catch in weight by species.

2.2 Tuna biology and stock assessment

The biological and stock assessment studies carried out by the NRIFSF on Atlantic tunas and billfishes have been continued. Among these, research related to the Bluefin Year Program was one of the major activities. Larval studies and genetic analysis on stock structure have been underway, and will be presented in the near future.

From the end of 1995 to early 1996, observer trips were made on two Japanese longline boats fishing in the Atlantic. The primary fishing areas were the northwest Atlantic between 40°-50°N. Additional observations were also made in the south Atlantic off Angola. The total trip duration (days) and operations observed were 89 and 57, respectively. The collection of information on fishing activities, size measurements and biological sampling on tunas

and other fishes, including sharks, were made during those observer trips.

This year, the NRIFSF participated in ICCAT-related meetings: the By-Catch Meeting (February 26-28, Miami, USA), the Bluefin Tuna Methodology Session (April 16-19, Madrid), the BYP Larval Survey Meeting (April 23-25, Fano, Italy), the ICCAT 25th Anniversary Tuna Symposium (June 10-18, Ponta Delgada, Azores), the Third Billfish Workshop and the Longline Data Preparatory Meeting for the Workshop (Miami, USA, July 11-20), the Albacore Stock Assessment Session (July 5-10, Taipei, Taiwan), the Third Meeting of the Ad Hoc GFCM/ICCAT Joint Working Group on Stocks of Large Pelagic Fishes in the Mediterranean Sea (September 9-11, Genoa, Italy), the Bluefin Tuna Stock Assessment Session (September 12-20, Genoa, Italy), and the Swordfish Stock Assessment Session October 2-9, Halifax, Canada).

3. Implementation of ICCAT conservation and management measures

3.1 Catch quota management system

a) Reporting by radio

The Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries of the Government of Japan (FAJ) orders all tuna vessels operating in the Atlantic Ocean to submit the following information every ten-day period (early-, middle-and late-period of the month) by radio or facsimile to FAJ:

i) The position (longitude and latitude) of each vessel in order for FAJ to grasp the movement of all vessels operating in the Atlantic Ocean

ii) The catch weight of bluefin tuna, swordfish, etc. (Ministerial Order on April 2, 1975, and supplemented on December 13, 1991, for swordfish).

Furthermore, FAJ orders all vessels operating in the Atlantic Ocean to report every day during the critical period when FAJ needs the latest catch data on bluefin and swordfish (Ministerial order on January 22, 1963).

b) Introduction of vessel position and catch data report via satellite

The FAJ is developing a GPS/Inmarsat-A system which enables FAJ to monitor the operation of each fishing vessel on a real time basis. In the system, vessel-specific data on position and catch are transmitted from a data terminal, data processing equipment combined with a GPS receiver and personal computer on board a fishing vessel. The data are compiled and analyzed by the FAJ in Japan.

Development of the system was initiated in 1992, and the operation has been conducted on a trial basis with an increased number of the vessels installed with a data terminal. About 110 Japanese longline vessels fishing for bluefin tuna in the Convention area have been installed with the data terminal. The FAJ is improving the system to conduct real-time monitoring on position and catch data, instead of reporting by facsimile, for all Japanese longline vessels fishing for bluefin tuna and swordfish in the north Atlantic Ocean.

c) Catch quote management

i) Northern bluefin tuna: The FAJ sets a bluefin catch quota every year for the western and eastern Atlantic Ocean in accordance with the ICCAT recommendations.

ii) Swordfish: The FAJ encourages its fishermen not to conduct direct fishing for swordfish in the Atlantic Ocean. Furthermore, as regards south Atlantic swordfish, the FAJ sets a catch quota in accordance with the ICCAT recommendations by a Ministerial order amended in 1995.

As for northern Atlantic swordfish, the FAJ sets the incidental catch limit of 8% by an order amended in 1995. In addition, the FAJ instructs fishermen to avoid operating in a certain sea area in the north Atlantic Ocean if and when the incidental catch rate of swordfish has exceeded 8% in each operation and to move to another sea area which is expected to give a lower incidental catch rate.

iii) Fishing year: The FAJ establishes the "Fishing Year (August to July)" for purposes of proper quota management for bluefin tuna and swordfish. This means, for example, that the 1996 quotas for these tunas are applied to the 1996 Fishing Year which started in August, 1996, and will end in July, 1997. Because ICCAT recommendations come into effect six months after the date of recommendation (generally ICCAT meetings take place in November and the recommendations which were adopted in November, 1995, come into effect in May, 1996), the Government needs a certain period to legislate the ICCAT recommendations domestically.

3.2 Minimum size limits

In accordance with ICCAT recommendations, the FAJ prohibits the catch of undersized fish, with the exemption of a certain percentage of tolerance by Ministerial order. The bluefin and yellowfin undersized catch prohibition was established by a Ministerial order on April 2, 1975. Then, this order was supplemented to cover undersized bigeye and swordfish. It is noted that all Japanese pole and line vessels reluctantly ceased their operations in the Convention area to observe the 1972 recommendation which prohibits any taking and landing of yellowfin tuna weighing less than 3.2 kg because of their high by-catch rate.

3.3 Time are area closure

Since 1975, the FAJ, as a voluntary measure, prohibited Japanese longline vessels from operating in the Mediterranean from May 21 to June 30, by Ministerial order. Then, in 1994, the FAJ recommended this order to alter the closed season, from June 1 to July 31, in accordance with the 1993 ICCAT recommendation.

Also, the FAJ has prohibited Japanese longline vessels from operating in the Gulf of Mexico.

3.4 Result of the implementation of the ICCAT Bluefin Tuna Statistical Document (BTSD) Program

From January 1 to June 30, 1996, Japan collected 4,622 BTSDs (4,600 for fresh/chilled products and 22 for frozen products) and of these 3,763 BTSDs (or 81% of the total) were validated by non-Contracting Parties. By product weight, 1,627 MT of the 2,501 MT (or 65% of the total) were imported from non-Contracting Parties. The converted live weight of tuna products which were imported from non-Contracting Parties is 2,049 MT, which is almost equal to the imports (2,274 MT) during the corresponding period of last year. Tunisia and Italy are the main exporting non-Contracting Parties, and these countries exported 775 MT and 635 MT, respectively, in live weight. There were no imports from Belize and Panama from January 1 to June 30 as was the case last year. Japan has not imported any bluefin tuna products validated by Honduras since 1994.

4. Inspection schemes and activities

4.1 Assignment of patrol vessels

Since 1976, Japan has dispatched patrol vessels to the north Atlantic and the Mediterranean Sea every year for a certain period of time to monitor and inspect Japanese tuna vessels. The FAJ dispatched two patrol vessels to the north Atlantic and the Mediterranean in 1996. These vessels have also collected information on activities on non-Contracting Parties. The collected information has been recorded on the Sighting Information Sheets and submitted to the ICCAT Secretariat in August, 1996, in accordance with the 1994 ICCAT resolution.

4.2 Random inspection of landing at Japanese ports

All Japanese tuna fishing vessels which land their catches at any Japanese port must report this plan of landing. The FAJ randomly inspects landings of those Japanese longline vessels to enforce the minimum size limit and catch quotas of bluefin tuna and swordfish.

4.3 Management of transshipment at foreign ports

A permit issued by the FAJ is required for any Japanese tuna vessel to transship tuna or tuna products to reefers at foreign ports. The FAJ monitors the weight by species, time and place for each transshipment and, if necessary, conducts an inspection of landings at Japanese ports when reefers return to one of the Japanese ports.

4.4 FAJ official resident at Shimizu port

Since February, 1996, a FAJ official has been stationed at Shimizu fishing port, which is one of the largest tuna landing ports in Japan, to collect information on the tuna fishery, and to inspect landings of the Japanese longline vessels at this fishing port.

5. Other activities

5.1 Annual catch statistics

Each longline vessel flying the Japanese flag and licensed to engage in the tuna fisheries by the Minister of Agriculture, Forestry and Fisheries is mandatorily required to submit a catch report to the Minister within 30 days after the end of the cruise or after the vessel has entered a Japanese port. Submission of this report is a requirement established by Ministerial order on January 22, 1963. The above-mentioned catch report includes the daily information of the vessel's noon position, number and weight of the catch by species, quantities of gear used, surface water temperature, etc. The information on the catch report submitted is examined and compiled into a data base by the National Research Institute for Far Seas Fisheries.

5.2 Collection of biological data gathered on board longline vessels

The information necessary for stock analyses such as length, weight and sex of fish caught is collected by fishermen as a voluntary measure.

5.3 Collection of trade data

The Ministry of Finance collects such trade data as quantity, value, export country, etc. of imported products. Japan has improved the HS code in response to the 1992 ICCAT resolution to collect all data of the various types of bluefin tuna products, e.g. fillet, meat (round, dressed) etc., and the status of the products, e.g., frozen, fresh or chilled.

5.4 Effort limitation

The number of longline vessels which can operate in the western Atlantic north of 35°N, and the Mediterranean has been limited. Furthermore, the FAJ requires the longline vessels operating in the eastern Atlantic north of 40°N to submit an advance notice to the FAJ to grasp the fishing activities for bluefin tuna.

5.5 Education of fishing masters

The FAJ has dispatched staff to the foreign ports (Las Palmas, Cape Town, etc.) and Japanese ports and hosted a meeting with the captains of Japanese longline vessels operating in the Atlantic Ocean. The aim is to acquaint the fishing masters concerned with the relevant information to increase their observance of the regulatory measures established by the FAJ based on the ICCAT recommendations.

5.6 Restriction of re-flagging of vessels

No Japanese tuna longline vessel is authorized to operate on the high seas unless a license is issued by the Government of Japan. The license is not given to vessels flying flags of states other than Japan. Japanese vessels cannot escape from the FAJ's control even when such vessels are conducting fishing operations in waters far distant from Japan, since a Japanese port is designated as the base of operation and all the products are brought into Japan. (The export and lease of Japanese fishing vessels are closely controlled by the FAJ to avoid their use for operations which may diminish the effectiveness of international conservation measures.)

5.7 Legislation for enhancement of the conservation and management of tuna stocks

A new law was enacted in June, 1996, with the objective of implementing the measures necessary to enhance the conservation and management of tuna stocks and to develop international cooperation for the conservation and management of tuna stocks. This law establishes that the Government of Japan may restrict the imports of tuna and tuna products from a foreign country that is recognized by the relevant international organization not to rectify its

fishermen's activity, thus diminishing the effectiveness of the measures for conservation and management which have been adopted by the international organization.

The objective of this law is to encourage ICCAT activities, ensuring the strength of tuna resource conservation and the stability of the tuna supply.

Table 1. Annual number of Japanese tuna boats that operated in the Atlantic Ocean and Mediterranean Sea, 1990-1995

	1990	*1991*	*1992*	*1993*	*1994*	*1995**
Longline fishery						
Fishing effort:						
Number of boats	235	242	248	307	240	252
Fishing days (sets in 100)	359	339	292	399	380	444
Purse seine fishery						
Fishing effort:						
Number of boats	1	2	2	0	0	0
Fishing days	243	407	230	0	0	0

*Preliminary.

Table 2. Japanese catches (MT) of tunas and tuna-like fishes, by type of fisheries, in the Atlantic Ocean and Mediterranean Sea, 1990-1995

Type of fishery	*1990*	*1991*	*1992*	*1993*	*1994*	*1995**
Longline (Home-based)	54,930	46,883	48,515	52,917	55,580	59,865
Purse seine	4,361	7,516	2,794	--	--	--
Total	**59,291**	**54,399**	**51,309**	**52,917**	**55,580**	**59,865**

*Preliminary.

Table 3. Catches (MT) of tunas and tuna-like fishes taken by the Japanese longline fishery, 1990-1995

	1990	*1991*	*1992*	*1993*	*1994*	*1995**
Atlantic						
Albacore	1,324	1,346	1,048	951	1,156	635
Bigeye tuna	35,024	29,487	34,128	35,053	38,502	39,170
Bluefin tuna	2,014	3,669	3,862	3,065	2,502	4,358
Southern bluefin	1,202	1,331	525	1,688	595	1,448
Yellowfin tuna	5,919	4,718	3,715	3,096	4,782	6,080
Swordfish	7,305	4,687	3,539	6,382	5,628	4,790
Blue marlin**	1,216	905	1,017	928	1,524	1,570
Black marlin	—	—	—	—	6	1
White marlin	126	121	248	82	92	62
Sailfish***	88	88	43	60	53	42
Spearfish	—	—	—	—	38	36
Others	538	443	265	815	513	953
Atlantic Sub-total	54,756	46,795	48,390	52,120	55,930	59,865
Sharks	—	—	—	—	3,216	2,188
Mediterranean						
Bluefin tuna	172	85	123	793	536	813
Swordfish	2	1	2	4	3	7
Bigeye tuna	—	2	—	—	—	—
Others	—	—	—	—	—	—
Mediterranean Sub-total	174	88	125	797	539	819
Sharks	—	—	—	—	5	11
TOTAL	**54,930**	**46,883**	**48,515**	**52,917**	**59,690**	**62,883**

* Preliminary.
** Includes a minor amount of black marlin up to 1993, but separated since 1994.
*** Includes shortbill spearfish up to 1993, but separated since 1994.

Table 4. **Area breakdown of Task I catches (MT) taken by the Japanese longline fishery. The ICCAT area definition is used for tunas and billfishes. For other species, north and south, east and west, are separated at 5°N and 30°W, respectively.**

Species	*West*	*East*	*North*	*South*	*Medit.*	*Total*
1994						
Bluefin	427	2,075	2,502	0	536	3,037
Southern bluefin	1	594	0	595	0	595
Albacore	460	696	505	651	0	1,156
Bigeye	2,388	36,114	12,296	26,207	0	38,502
Yellowfin	589	4,194	2,284	2,498	0	38,502
Swordfish	—	—	1,072	325	3	4,797
White marlin	12	80	41	51	0	92
Blue marlin	105	1,419	532	991	0	1,524
Black marlin	0	6	0	5	0	6
Sailfish	8	45	26	27	0	53
Spearfish	2	36	3	35	0	38
Skipjack	0	0	0	0	0	0
Blue shark	837	1,754	1,203	1,388	5	2,596
Other sharks	131	493	285	340	0	625
Other fishes	60	453	87	426	0	513
Total 1994	5,020	47,959	20,836	36,939	544	58,316

Species	*West*	*East*	*North*	*South*	*Medit.*	*Total*
1995 *						
Bluefin	387	3,971	4,358	0	813	5,172
Southern bluefin	0	1,448	0	1,448	0	1,448
Albacore	132	503	181	454	0	635
Bigeye	3,367	35,803	14,666	24,504	0	39,170
Yellowfin	526	5,554	2,858	3,222	0	6,080
Swordfish	—	—	1,072	3,725	7	3,921
White marlin	12	50	29	33	0	62
Blue marlin	110	1,460	531	1,039	0	1,570
Black marlin	0	1	0	1	0	1
Sailfish	3	39	17	25	0	42
Spearfish	4	33	10	26	0	36
Skipjack	0	0	0	0	0	0
Blue shark	574	1,214	1,362	427	10	1,798
Other sharks	60	339	223	176	1	401
Other fishes	31	822	57	795	0	753
Total 1995	6,217	55,441	26,893	34,766	950	52,609

* Preliminary.

Table 5. Annual deployment rate of longline materials for the main and branch lines in the Atlantic, 1994-1995

Year	*Main line: Nylon*	*Branch lines: Nylon*	*Main and branch lines:*	
			Nylon	*Other*
1994	34%	41%	29%	54%
1995*	63%	63%	52%	27%

* Preliminary.

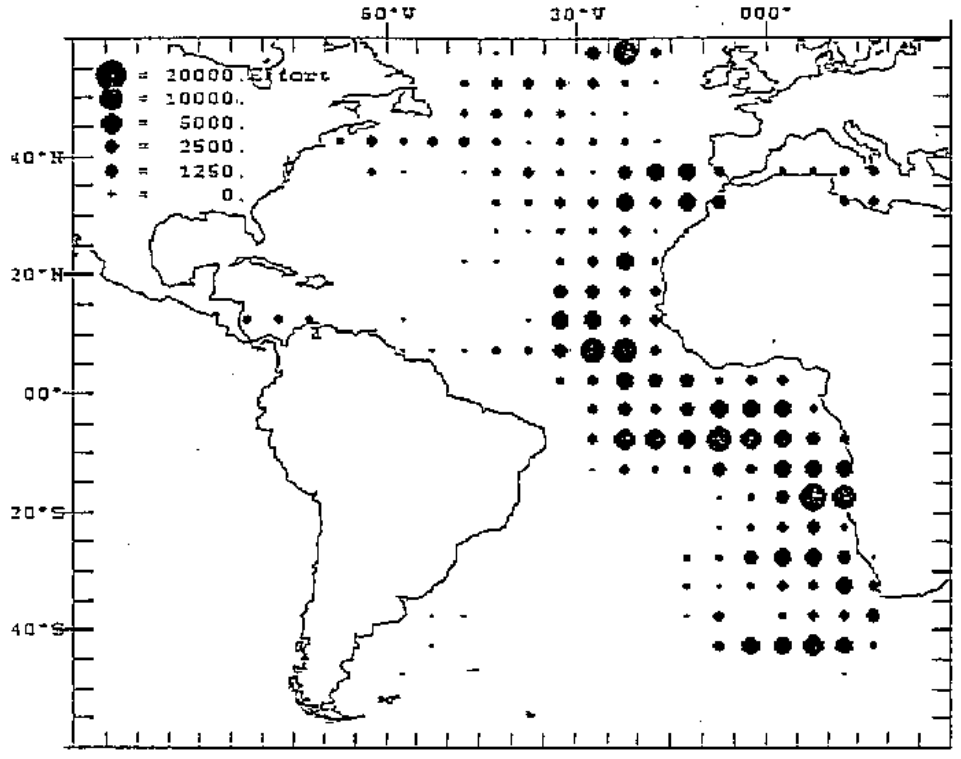

Fig. 1. Geographic distribution of longline effort (number of hooks) in the Atlantic, 1995.

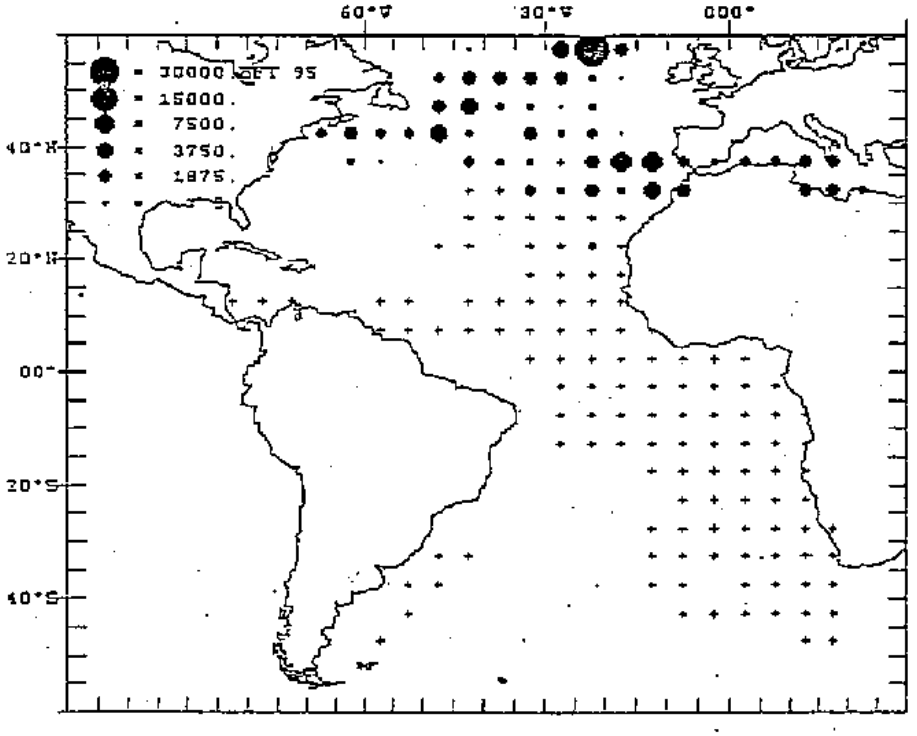

Fig. 2. Geographic distribution of bluefin catch in number in the Atlantic, 1995. Plus sign indicates no catch.

NATIONAL REPORT OF KOREA*

by

National Fisheries Research and Development Agency (NFRDA)

1. The tuna fishery

Korean fisheries for Atlantic tunas and tuna-like species have shown a gradual decline year after year since 1977. From 1991 onwards, the Korean fleet of tuna longliners was comprised of less than 10 vessels each year with an average annual catch of 1,600 MT, which corresponds to about one-tenth of that of the early 1980s (**Table 1**). In 1995, four Korean tuna longliners were engaged in fishing activities and the total catch by these vessels amounted to 1,826 MT, showing a similar level to the previous year's catch. The CPUE of the Korean tuna longline fishery has tended to decrease with fluctuation between 0.7 and 1.8 fish/100 hooks.

1.1 Bluefin tuna

Until recent years, bluefin tuna has not been among the target species of Korean tuna longliners. Thus, a catch of less than 100 MT of bluefin tuna was reported by the vessels fishing thousands of metric tons of bigeye and yellowfin tunas. In 1994 and 1995, however, bluefin tuna was the dominant species among the catches taken by Korean tuna longliners. The catch of bluefin tuna in 1995 amounted to 663 MT, which is about a 3% decrease as compared to 1994.

1.2 Yellowfin tuna

Yellowfin tuna has been one of the target species for the Korean tuna fisheries in the Atlantic Ocean. The 1995 catch of this species from the fishery amounted to 453 MT, an increase of about 4% over the previous year's catch. Yellowfin tuna was the second most important species, contributing 25% of the total catch.

1.3 Bigeye tuna

Bigeye tuna has comprised the major component of the Korean tuna catches since the early 1980s when the deep longline fishing technique was employed. Despite the continuous decline in the catch of bigeye tuna, the proportion of this species remained stable at about 60% of the total catch up to 1990. In recent years, however, the proportion of bigeye tuna has decreased to about 20%. This change is mainly due to the initiation of the bluefin tuna fishery. The catch of bigeye tuna in 1995 amounted to 423 MT, showing an increase of 10% compared to 1994.

1.4 Swordfish, billfishes and other tunas

The remaining 16% of the total catch includes billfishes and other tunas, which have been considered as by-catch species. Among billfish catches, those of blue marlin and white marlin were estimated based on the Task II data. The catch data of other species such as albacore and swordfish in 1995 were only available from Task II statistics.

2. Research activities

The NFRDA has carried out routine scientific monitoring work as in past years. This monitoring covers the collection of catch and fishing effort statistics from the Korean tuna longliners in the Atlantic to meet the data requirements of ICCAT, especially for Task II statistics. Task I statistics have been compiled by the National Fisheries Administration (NFA) from fishing companies for official use. In 1996, the NFRDA started collecting by-catch data from Korean longliners fishing in the Atlantic Ocean.

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* Original report in English.

3. Implementation of ICCAT tuna management measures

To implement the recommendations adopted by ICCAT, Korea has introduced domestic regulations. Those include minimum size limits for yellowfin, bigeye, and bluefin tunas and catch and size limits for swordfish. A new domestic regulation has been in effect since 1995, with a view towards protecting the spawning stock of bluefin tuna from June 1 to July 31 in the Mediterranean.

Table 1. Nominal catches (MT) of tunas and tuna-like fishes taken by Korean fisheries in the Atlantic Ocean, 1980-1995

Year	*No. of vessels*	*BFT*	*YFT*	*ALB*	*BET*	*SKJ*	*SWO*	*BUM*	*WHM*	*SAI*	*Others*	*Total*
1980	54	--	5,869	1,487	8,963	4	683	94	18	85	1,749	18,952
1981	56	--	6,650	1,620	11,682	47	447	126	85	65	1,584	22,306
1982	52	--	5,872	1,889	10,615	21	684	50	69	52	1,781	21,033
1983	53	3	3,405	1,077	9,383	530	462	131	15	3	1,215	16,224
1984	51	--	2,673	1,315	8,943	29	406	344	62	86	927	14,785
1985	45	77	3,239	901	10,691	20	344	416	372	101	1,293	17,454
1986	28	(156)	1,818	694	6,084	11	82	96	71	16	1,093	9,965
1987	29	(1)	1,457	401	4,438	6	75	152	27	21	1,048	7,625
1988	29	(12)	1,368	197	4,919	3	123	375	19	15	782	7,801
1989	33	(45)	2,535	107	7,896	6	162	689	135	33	944	12,507
1990	17	(20)	808	53	2,690	--	101	324	81	41	240	4,338
1991	9	(229)	260	32	801	--	150	537	57	30	267	2,134
1992	8	(101)	219	--	866	--	17	38	1	1	321	1,463
1993	4	(573)	180	--	377	--	--	19	2	1	308	887
1994	4	684	436	--	386	--	--	--	91	1	207	1,805
1995	4	663	453	--	423	--	--	61*	1*	--	225	1,826

* = Based on Task II data.
( ) = ICCAT Report, 1994 (Vol. 2).

NATIONAL REPORT OF MOROCCO*

by

A. Lahlou** and A. Srour***

I. Information on the fishery

Fishing for tunas and tuna-like species is carried out off the Atlantic and Mediterranean coasts of Morocco. The main species caught are bluefin tuna, swordfish and small tunas such as Atlantic bonito and frigate tuna.

– Bluefin tuna fishery

Currently, fishing for this species is carried out mainly by traps and incidentally by the purse seine and driftnet fisheries. There is also an artisanal fishery targeting large-sized bluefin tuna in the area around the Straight of Gibraltar which uses hand line as the fishing gear.

The bluefin catch series for the period 1986 to 1995 **(Table 1)** shows a progressive increase in catches from 1986 to 1991 following a sharp decline in 1992 and 1993 and then a gain in 1994. The increase in catches of this species is due to more activity maintained in the traps, which gained interest during this period. The decline in bluefin tuna catches in 1992 is attributed to the decrease in the trap yields.

In 1995, the trap catches increased to 189 MT, with 99% of these taken by the five Atlantic traps. The only trap set in the Mediterranean had a minor catch (1 MT).

As concerns the coastal fleet involved in bluefin tuna fishing, this fleet produced 391 MT, of which 377 MT (about 96%) were from the Atlantic coast.

The activity of the recent artisanal fishery for bluefin tuna is not yet well defined. However, the provisional estimates indicate a bluefin tuna yield of 300 MT for the period from July to December, 1995.

– Swordfish fishery

This species is exploited by artisanal fishing vessels which operate close to their base ports. These vessels mainly use driftnet, whose characteristics are established by a specific regulation.

A review of the swordfish catch series for the 1986 to 1995 period shows the following:

Atlantic: Catches which did not vary widely between 1986 and 1991 have remained stable at about 200 MT. Since 1992, this yield increased slightly until 1995, with an annual average of 370 MT.

The trap yields are very low. On the other hand, yields of longliners using driftnet are relatively important, surpassing 90% of the total catches.

Mediterranean: Swordfish fishing in the Mediterranean started in 1983. The reported catches since that year have remained low at about 50 MT up to 1988. Since 1989, the catches have increased sharply and reached 683 MT in 1992 and 733 MT in 1994. In 1993 and 1995, a sharp decline in catches was reported.

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* Original report in French.

** Secretary General of the National Office of Fisheries.

*** Research of the Scientific Institute of Marine Fishes, Casablanca.

Small tunas: These species comprise an important part (in weight) of the tuna catches (80% for 1995), their commercial value is thus considerably less important than that for large tunas. The main species caught are Atlantic bonito (BON), frigate tuna (FRI), and skipjack (SKJ).

Catches of these species increased considerably between 1986 and 1990, going from 1,250 MT to 3,828 MT. Catches declined from 1991 to 1994, but in 1995 there was a record catch of 5,042 MT. The increase reported in 1995 is explained by the exceptional catches of skipjack.

II. Research

The Scientific Institute of Maritime Research continues to accord particular interest to the scientific monitoring of the tuna fisheries. Also and in addition to the collection of Task I data, important size data on bluefin tuna and swordfish are collected and transmitted to ICCAT.

Also, within the framework of the Project of farming bluefin tuna, established in the north of Morocco jointly with the Japanese Government, the knowledge acquired has contributed to a better understanding of the biology of bluefin tuna.

Consequently, the program which monitors the tuna fisheries accords special attention to the trap activities and to the breakdown of the mixed tuna catches in the landings of the coastal fishery.

III. Application of the ICCAT management measures

The measures taken for the management of the tuna fisheries in Morocco concern the establishment of minimum commercial sizes of certain species and that relative to the use of driftnets. This regulation takes into account the measures adopted by ICCAT and includes other measures that are taken on the national level.

Among these measures, the establishment of 2.5 km as the maximum length of the nets and the prohibition of mesh less than 400 mm. Therefore, the acquisition of this fishing gear is strictly prohibited by large fishing vessels over 15 GRT.

With reference to the ICCAT measure relative to the cessation of the activities of longliners measuring more than 24 m in length in the Mediterranean during the months of June and July, this measure does not affect Moroccan longliners since their lengths are less than 24 m.

Table 1. Catch series (in MT) for tunas and tuna-like fishes caught along the coasts of Morocco in 1986-95

	Bluefin tuna (BFT)		*Atl. bonito (BON)*		*Frigate tuna (FRI)*		*Swordfish (SWO)*		*Black skipjack (LTA)*		*Skipjack tuna (SKJ)*		*Plain bonito (BOP)*		*TOTAL*	
Year	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*	*Trap*	*Coastal*
I. Atlantic:																
1986	166	122	5	246	10	292	3	178	0	47	0	425	0	33	184	1343
1987	101	255	18	223	11	303	5	192	5	103	0	105	0	487	140	1688
1988	235	202	2	587	3	191	1	195	1	48	0	128	0	1422	242	3073
1989	304	147	3	563	113	486	3	219	3	11	0	295	0	1058	426	2779
1990	228	75	8	356	238	497	26	177	53	202	0	837	0	263	553	2407
1991	759	36	1	575	347	516	10	182	0	41	0	178	0	348	1117	1876
1992	84	328	1	761	91	150	13	339	0	259	0	391	0	272	189	2500
1993	254	22	1	878	76	109	3	454	0	18	0	217	0	253	334	1951
1994	339	163	4	411	58	38	8	327	0	30	0	173	0	434	409	1576
1995	188	377	8	484	92	345	12	324	0	161	0	3483	0	379	300	5553
II. Mediterranean:																
1986	38	18	4	47	25	150	0	92	0	0	0	2	0	1	67	310
1987	110	6	5	122	27	151	0	40	0	0	0	13	0	26	142	358
1988	96	44	1	107	0	811	0	62	0	12	0	0	0	8	97	1044
1989	286	9	0	28	70	1107	0	97	0	0	0	0	0	7	356	1248
1990	580	7	0	27	185	1421	0	289	0	4	0	0	0	21	765	1769
1991	22	7	0	27	118	597	0	478	0	0	0	0	0	9	140	1118
1992	82	2	0	6	250	806	0	683	0	0	0	0	0	0	332	1497
1993	4	2	1	8	60	32	0	436	0	01	0	0	0	0	66	478
1994	332	6	4	51	91	1069	8	725	0	0	0	0	0	0	435	1851
1995	1	14	0	21	27	392	0	289	0	1	0	30	0	4	28	751
III. TOTAL:																
1986	204	140	9	293	35	442	3	270	0	47	0	427	0	34	251	1653
1987	211	261	23	345	38	454	5	232	5	103	0	118	0	513	282	2026
1988	331	246	3	694	3	1002	1	257	1	60	0	428	0	1430	339	4117
1989	590	156	3	591	183	1593	3	316	3	11	0	295	0	1065	782	4027
1990	808	82	8	383	423	1918	26	466	53	206	0	837	0	284	1318	4176
1991	781	43	1	602	465	1113	10	660	0	41	0	178	0	357	1257	2994
1992	166	330	1	767	341	956	13	1022	0	259	0	391	0	272	521	3997
1993	258	24	2	886	136	141	3	890	0	18	1	217	0	253	400	2429
1994	671	169	8	462	149	1107	16	1052	0	30	0	173	0	434	844	3427
1995	189	391	8	505	119	737	12	613	0	162	0	3513	0	383	328	6304

NATIONAL REPORT OF RUSSIA *

by

G. A. Budylenko & V. Z. Gaikov **

1. The fishery

The tuna fishery in 1995 was carried out by seven seiners in traditional fishing grounds and during the same periods as in previous years. The total catch amounted to 4,938 MT, including 2,936 MT (59.4%) of yellowfin tuna *(Thunnus albacares)*, 1,450 MT (29.4%) of skipjack tuna *(Katsuwonus pelamis)*, 96 MT (1.9%) of Atlantic black skipjack *(Euthynnus alletteratus)*, and 456 MT (9.3%) of frigate tuna *(Auxis thazard)*. The catch of yellowfin tuna increased as compared to the previous year; skipjack tuna catches remained at the level of last year.

The tuna catches, distributed by fishing grounds, are as follows: Sierra Leone area: 2,971 MT (74.1% yellowfin tuna, 9.5% skipjack tuna, 2.9% Atlantic black skipjack, and 13.5% frigate tuna); the open area of the central east Atlantic: 1,915 MT (38.3% yellowfin tuna, 60.9% skipjack tuna, and 0.8% other species). In addition, non-specialized vessels caught 52 MT of frigate tuna.

The results of the tuna fishery in 1995 are presented in **Table 1**, and the preliminary results of the fishery in the first half of 1996 are shown in **Table 2**.

2. Research

In 1995, an analysis of the tuna fishery and biological data for 1994-95 was carried out. Work continued on the creation of a fishery and biological data base for the longline and purse seine fisheries with objects (tunas, swordfish, sharks and other associated species). The biological materials, collected on 70 research and commercial cruises, were included in the data base compiled.

In July-December, 1995, material was collected from tuna seiners in the open central east Atlantic Ocean. Species composition was analyzed and 2,070 yellowfin and skipjack individuals were measures, and 140 biological analyses were carried out. Feeding skipjack measuring 36-68 cm in length predominated in the catches during the research. Yellowfin tuna were represented in the catches by three size classes: 45-50 cm, 65-90 cm, and over 100 cm. Immature individuals predominated.

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* Original report in English.

** Atlantic Scientific Research Institute of Marine Fisheries & Oceanography (AtlantNIRO).

Table 1. Species composition of the tuna catches and fishing effort in the Atlantic Ocean in 1995, by fishing grounds and fishing periods

	Sierra Leone Area	*Open central east Atlantic*	
No. of vessels	7	7	
Fishing Period	February-April	August-December	
Effort (days at sea)	469	544	1,013
Catches (MT)			
Yellowfin tuna (YFT)	2,202	734	2,936
Skipjack tuna (SKJ)	284	1,166	1,450
Atlantic black skipjack (LTA)	86	10	96
Frigate tuna (FRJ)	399	5	404
Total	**2,971**	**1,915**	**4,886**

Table 2. Tuna catches (MT) taken by Russian purse seiners during the first half of 1996

Species	*Catch (MT)*
Yellowfin tuna (YFT)	2,696
Skipjack tuna (SKJ)	381
Atlantic black skipjack (LTA)	49
Bigeye tuna (BET)	13
Frigate tuna (FRJ)	46
Total	**3,185**

NATIONAL REPORT OF SOUTH AFRICA *

by

A. J. Penney **

1. National fisheries information

The South African tuna fishery remained essentially unchanged in character in 1995. This fishery remains a surface pole and line (baitboat) fishery, targeting southern albacore *(Thunnus alalunga)* off the west coasts of South Africa and Namibia. Approximately 150 South African ice boats and freezer boats were active in this fishery during 1995, including four vessels issued with permits to fish in Namibian waters. In addition, some hundreds of small (5m - 8m) sport craft fished for albacore and other tunas with rod and reel. There was a 23% decrease in reported catches of albacore in 1995, following the 22% decrease in catches reported in 1994 (see **Table 1**). This decrease resulted from substantially reduced availability or abundance of albacore in the fishing grounds usually exploited by this fleet, and not from exclusion from fishing grounds (as happened in 1991), or switched targeting to other species. The total catch of about 4,300 MT is the second lowest reported in the history of this fishery (after the low 1991 catch), heightening South African concerns for the state of the southern Atlantic albacore resource.

As in previous years, there was no tuna fishing conducted by South African vessels using longlines or purse seine nets, and only a 2 MT by-catch of swordfish was reported from demersal trawl nets. The sport fishing sector also made substantially reduced catches, reporting only 8 MT of albacore caught. There was some further development in fishing for swordfish in South African waters. Recreational fishermen reported only 1 MT of swordfish landed, and a number of swordfish tagged. However, for the first time, 1 MT of swordfish was caught under an experimental longline permit, operated as a joint venture between South African and Japanese companies. This has prompted substantial interest in targeted longlining for swordfish by South African tuna fishermen.

During 1995, South Africa again issued permits to 90 Japanese and 30 Taiwanese longline vessels to fish for tunas in South African waters. South Africa continued to receive six-monthly summarized returns for catches made within the South African EEZ by these vessels, although no validation of these returns, nor independent evaluation of catches, was conducted. As noted during 1994, these catch returns do not indicate catch positions, and it is not known what proportion of these foreign longline catches is made to the east of the ICCAT Convention area. An interesting trend evident in the returns from these fleets is a rapid increase in the catch of swordfish made in South African waters in recent years. Combined with the results of the sport fishery for swordfish and the experimental joint-venture permit issued in 1995, this has escalated interest in longlining for swordfish among South African fishermen, resulting in a number of recent applications for swordfish longline permits. No decision has yet been taken on the possible development of a South African commercial swordfish fishery. Fishing agreements with Japan and Taiwan will also be completely re-negotiated in late 1996.

2. Research and Statistics

The Linefish Section of the Sea Fisheries Research Institute continued to collect monthly catch and effort returns from South African tuna fishermen, as part of the National Marine Linefish System, a catch and effort data base from all linefishing activities. In response to the ICCAT recommendation that catches of southern albacore be limited to not more than 90% of their 1989-1994 annual average, a particular effort was made to improve the submission of catch returns by active commercial tuna fishermen, particularly those belonging to the SA Tuna Association. As in previous years, catch and effort data for South African albacore vessels were used to update the CPUE index for this fishery. In addition to the usual GLM standardization methods used previously, the GenMod GLM approach was also used to produce standardized CPUE indices for the South African fishery (see **Figure 1**).

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* Original report in English.

** Sea Fisheries Institute.

This revised CPUE index was used, in combination with revised standardized indices for the Taiwanese and Japanese longline fisheries in the southern Atlantic, to update the dynamic production model stock assessment for this resource. The results were presented at the 1996 Albacore Stock Assessment meeting in Taipei, in the paper: "Further development of stock assessment and risk analysis methods for the south Atlantic population of albacore *(Thunnus alalunga)*" by A. E. Punt, D. S. Butterworth, A. J. Penney and R. W. Leslie, 1996 (SCRS/96/82).

The updated assessment confirmed previous assessments that southern albacore are biologically over-exploited, and that annual catches in the South Atlantic need to be reduced from their current level of approximately 26,000 MT to approximately 22,000 MT if recovery to more productive levels is to occur. It was also noted that improvements in historic catch data had resulted in the ICCAT recommended catch limit (90% of the average annual catches between 1989 and 1994) exceeding the estimated Replacement Yield of the stock, suggesting that a catch limit in terms of actual tonnage should be adopted, rather than a percentage of historic catches.

Length-frequency sampling of South African catches of southern albacore continued. Despite the reduction in catches in 1995, the number of fish measured from South African waters increased to 3,568 fish as a result of increased sampling effort in response to a request from the 1994 meeting of the Albacore Species Group. In addition, negotiations with Namibian researchers resulted in a further 521 albacore being sampled from fish caught in Namibian waters by South African vessels. The length-frequency distributions of the fish measured (see **Figure 2**) show a higher number of modes than in previous years, with evidence of a mode of small (recruiting) fish in western Cape catches, and a mode of larger adults caught off Namibia. Efforts to improve sampling of these various cohorts will continue with a view to possible MULTIFAN analysis of the growth rates of southern albacore caught in the southern African region.

In response to persistent questions regarding relationships between albacore in the southern Atlantic and Indian Oceans, South Africa initiated a cooperative research project with Taiwan to obtain genetic and morphometric data from albacore from these two regions. Comparative analyses of samples from these regions were presented at the 1996 ICCAT Tuna Symposium in the Azores Islands, in the papers: "Mitochondrial DNA sequence analysis on albacore, *Thunnus alalunga*, meat samples collected from the waters off western South Africa and the eastern Indian Ocean" by S. Y. Yeh, T. D. Treng, C. F. Hui and A. J. Penney (1996); and "Relationships between albacore *(Thunnus alalunga)* stocks in the southern Atlantic and Indian Oceans" (1996) (both from the Proceedings of the ICCAT Tuna Symposium, Ponta Delgada, San Miguel, Azores, 10-18 June 1996.

Results clearly showed that albacore caught in the southern Atlantic Ocean are genetically and morphometrically distinguishable from those caught in the southern Indian Ocean, confirming that the southern Atlantic and Indian Ocean albacore stocks should be managed as separate stocks.

3. Implementation of ICCAT conservation and management measures

At the 1994 ICCAT Commission meeting, ICCAT accepted a recommendation limiting annual catches of southern albacore to no more than 90% of average annual catches between 1989 and 1994. Implementation of this limit on the South African tuna fishery was complicated by non-reporting of catches by over 40% of South African tuna vessels up to 1994, making determination of past performance difficult. As a first step towards implementing the catch reduction, South Africa therefore increased the monitoring and data collection efforts on these vessels, in cooperation with the SA Tuna Association. To facilitate the inspection of albacore landings and the validation of catch returns, tuna permits were also revised to limit the number of harbors at which albacore could be landed.

These monitoring efforts have resulted in a substantial improvement in the submission of catch returns, particularly from those larger vessels most active in the fishery. The improved catch returns now agree closely with total purchase records from tuna dealers, suggesting that they provide reliable estimates of total catch. These data show that the South African tuna fleet has not exceeded the recommended limit, particularly during the poor season in 1995. Recently, however, the recreational sector, many of whom hold commercial permits allowing them unlimited tuna catches on their vessels, have objected to the limitation on landing sites for albacore. It is therefore planned to re-evaluate all options for implementing formal measures to limit albacore catches with representatives of the commercial and recreational sectors in early 1997.

4. Inspection schemes and activities

As a signatory to the ICCAT Port Inspection Scheme, South Africa continued to conduct inspections of tuna vessels operating out of South African harbors. Between December, 1994, and November, 1996, a total of 27 inspections were conducted, 10 in Cape town harbor and 17 in Hout Bay harbor. All vessels inspected were South African poling vessels, offloading predominantly albacore, with a few yellowfin and bigeye tunas. All the yellowfin tuna caught were large adults, and no under-sized fish were encountered.

As part of the effort to improve monitoring of the albacore catches, these inspections were also broadened to include limited length-frequency sampling of albacore catches, in addition to the usual weight measurements. These additional length-frequency data will be used to supplement data collected by research staff, towards obtaining adequate monthly cohort progression information for growth determination.

Table 1. Estimated total South African catches (MT) of tuna species within the ICCAT Convention area (including South African and Namibian waters) during 1994 and 1995

Catch	*Albacore*		*Yellowfin*		*Bigeye*		*Skipjack*		*Swordfish*		*Total*	
Method	*1994*	*1995*	*1994*	*1995*	*1994*	*1995*	*1994*	*1995*	*1994*	*1995*	*1994*	*1995*
Pole	5,220	4,127	257	145	76	27	3	2	-	-	5,556	4,301
Longline	-	-	-	-	-	-	-	-	-	1	-	1
Purse seine	-	-	-	-	-	-	-	-	-	-	-	-
Rod & reel	48	8	7	-	-	-	1	-	1	1	57	9
Trawl	-	-	-	-	-	-	-	-	-	2	-	2
Total	**5,268**	**4,135**	**264**	**145**	**76**	**27**	**4**	**2**	**1**	**4**	**5,163**	**4,313**

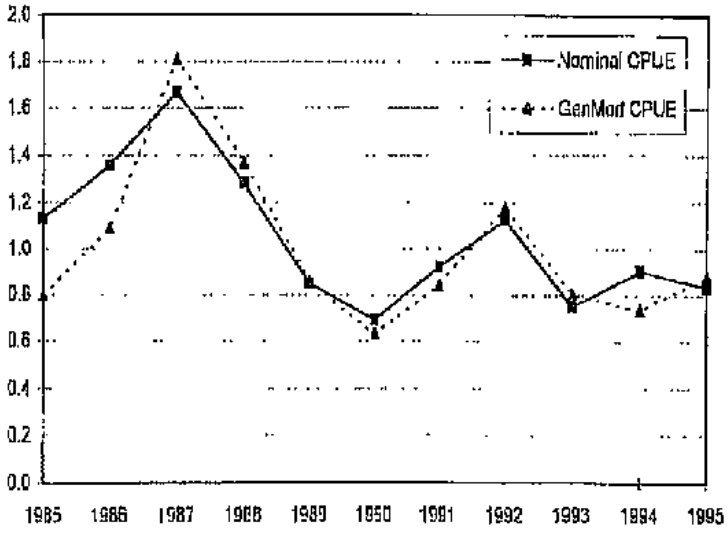

Figure 1. Nominal and GenMod standardized CPUE abundance indices for the South African surface albacore fishery from 1985 to 1995.

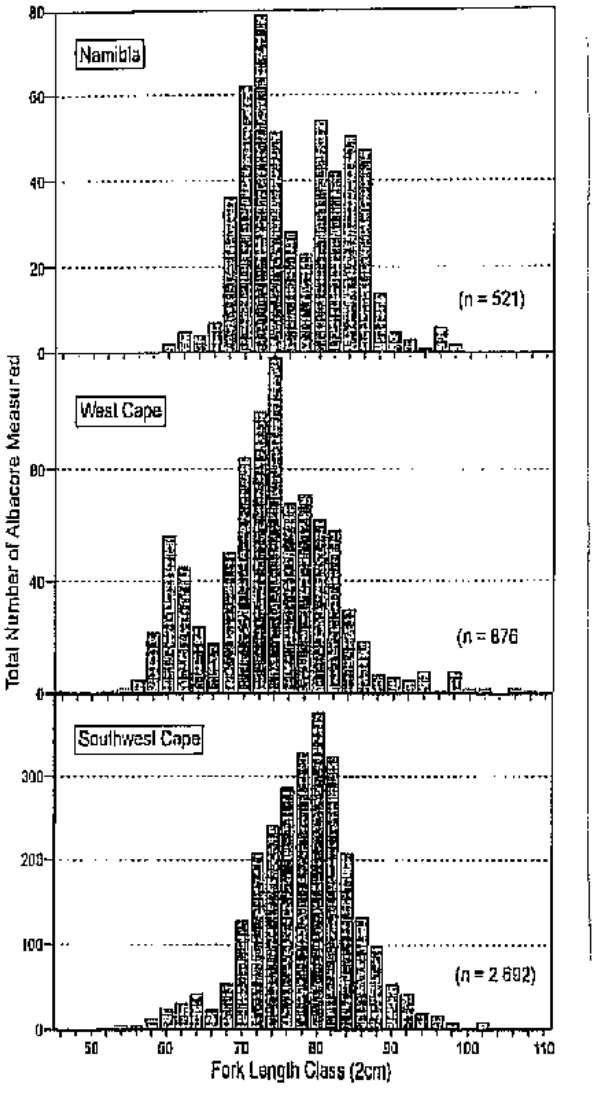

Figure 2. Length-frequency distributions of albacore caught by South African baitboats fishing off the southwest Cape, west Cape and Namibia during 1995.

NATIONAL REPORT OF SPAIN *

1. State of the fisheries

Spanish catches of tunas and tuna-like species amounted to 160,902 MT in 1995, which represents a 4% increase with respect to those of 1994 (Table 1).

Yellowfin tuna catches maintained the continuous decline initiated in the early 1990s. Bigeye tuna catches decreased significantly as compared to 1994 catches and slightly as compared to the average of the last three years. Skipjack catches are at the same level of the last three years.

Catches of albacore increased by 27%, with respect to the previous year, although there has been a declining trend in the traditional fishery since the late 1980s. Bluefin tuna catches continue an increasing trend, and swordfish catches have experienced an important increase with respect to recent years. Small tuna catches maintained the average level of recent years.

2. Tropical tunas

a) The purse seine fishery

Among the tuna fisheries of the inter-tropical, eastern Atlantic, the most important one is that carried by the large purse seiners of diverse nationalities, of which that of Spain is one of the main fleets. This fishery is directed at yellowfin and skipjack tunas, with by-catches of other species, such as bigeye, albacore and small tunas.

The number of vessels in 1995, which declined by six units as compared to 1994, now stands at 24. Thus, the carrying capacity (calculated taking into account the time that each vessel remained at the fishing grounds) has gone from 18,538 MT to 14,487 MT. Fishing effort, expressed in days fishing, was 6,617 days (7,154 days in 1994). Fishing effort, expressed in searching days, went from 6,006 in 1994 to 5,506.

Catches taken by this fleet reached 93,217 MT (97,121 MT in 1994), with the following breakdown by species: yellowfin 36,066 MT (39,032 MT in 1994); skipjack 45,475 MT (44,681 MT in 1994); bigeye 11,024 MT (11,974 MT in 1994); and others 652 MT (1,434 MT in 1994).

The CPUE, in MT/searching day, was as follows: 6.55 for yellowfin (6.50 in 1994); 8.26 for skipjack (7.45 in 1994); and 16.82 for both species combined (15.95 in 1994).

As regards the sizes which comprised the catches, it is noted that 3,007 samples were made in 1995, and 142,646 tunas were measured. Of these, 49,272 yellowfin, 70,847 skipjack, 13,226 bigeye, and 9,301 other species were measured. The average weights of the fish caught were: 19 kg for yellowfin, 3 kg for bigeye and 2 kg for skipjack.

b) The baitboat fishery

This fishery is carried out by three baitboat vessels based at Dakar (Senegal). The target species are yellowfin, bigeye and skipjack tunas. In recent years, the major part of these catches are from fishing with objects.

The number of vessels has remained constant with respect to 1994. The catches were as follows: 300 MT yellowfin (437 MT in 1994); 617 MT skipjack (498 MT in 1994); and 802 MT bigeye (523 MT in 1994), which amount to 1,719 MT (1,458 MT in 1994).

Effort, in days fishing, was 367 days, which is slightly less than that of 1994 (376 days).

* Original report in Spanish.

A total of nine samples were made and 40 yellowfin, 152 bigeye and 268 skipjack tunas were measured. The average weights obtained were 8 kg for bigeye, 4 kg for yellowfin and 4 kg for skipjack.

c) Research and statistics

i) The purse seine fishery

The main source of statistical information are the fishing logbooks which are completed by the vessel captains on a daily basis and/or when a set is made. The coverage rate in 1995 represented 96% of the catches (87% in 1994), thus attaining the levels reached prior to 1993. Sampling of the catches was done at the main landing and/or transshipment ports: Abidjan (Côte d'Ivoire), Dakar (Senegal) and La Puebla del Caramiñal (Spain). In Document SCRS/96/124 the basic data on this fishery are presented.

Since 1990 this fishery has undergone a change in the fishing patterns, with the massive introduction of artificial floating objects. Consequently, research in recent years has centered on the monitoring and analysis of the development of this new fishing method. In the paper presented at the ICCAT Tuna Symposium (SYMP/61), this matter is discussed.

In order to determine the impact which the purse seine fisheries have on other species, a study was carried out and finalized in 1996 (financed by the EU), in which observer data from 22 trips carried out in 1995 and early 1996 by French and Spanish vessels were collected and analyzed. Of this trips, 11 were made in the Atlantic Ocean.

In 1996, another Spanish/French project started, financed by the EU, to analyze the statistical data processing scheme in this fishery in order to obtain more precise data on the species composition of the catches and their size distributions, taking into account distinct time-area strata and the different types of tuna schools (free schools, those associated with objects and organic waste, etc.). The results are presented in SCRS/96/161, 162 and 163.

Document SCRS/96/86 presents an analysis of the multi-species scheme of tropical tunas; document SCRS/96/87 presents information on the analytical assessment of bigeye.

Lastly, a project was presented at the last EU meeting to study the causes of the increase in bigeye catches of this fleet. The study, if approved, will be initiated in 1997.

ii) The baitboat fisbery

The source of information are the fishing logbooks that the vessel captain complete. The coverage rate is estimated at close to 100%. Information on the size distribution of the different species caught is obtained from the reporter-sampler at the port of Dakar. For the past several years, the most important catches in this fishery have been attained by the objects fishery .

d) The Canary Islands tunas

The fishery in Canary Islands waters and off the nearby African coast is carried out by vessels that fish using the live bait method. The number of vessels that operated in 1995 rose to 299 with a total of 8,032 trips lasting an estimated 10,488 fishing days.

Catches reached 13,896 MT (15,667 MT in 1994). The breakdown, by species, is as follows: bluefin tuna 4 MT (56 MT in 1994); yellowfin tuna 801 MT (1,329 MT in 1994); albacore 657 MT (160 MT in 1994); bigeye tuna 7,271 MT (9,325 MT in 1994); skipjack tuna 5,143 MT (4,772 MT in 1994); other species 20 MT (25 MT in 1994).

The number of samples taken was 245, with 23,645 individuals measured (16,292 in 1994). The breakdown by species was: 750 yellowfin tuna, 206 albacore, 14,438 bigeye tuna, and 8,361 skipjack tuna. The average weight of the fish caught was: yellowfin tuna 24 kg, bigeye tuna 21 kg, skipjack tuna 4 kg, and albacore 26 kg.

i) Research and statistics

There is an information and sampling network at the major tuna landing points in the Canary Islands tunas. This network is comprised of 10 reporter-samplers at the following ports: La Restinga (Hierro Island); Playa Santiago and

Valle Gran Rey (La Gomera Island); Santa Cruz de La Palma and Tazacorte (La Palma Island); San Juan Beach and Santa Cruz de Tenerife (Tenerife Island); Arguineguin and Mogan (Gran Canary Island); and Arrecife (Lanzarote Island). The vessels that unload at the port of Algeciras are also monitored by a reporter-sampler. The coverage rate of the catch data is 100%.

Document SCRS/96/125 presents data relative to tuna statistics concerning the Canary Islands.

In 1995, two cruises were conducted to monitor the "objects" fishing method, which has gained in importance in recent years. In addition to monitoring the species composition of the catches, time intervals when the highest catches are taken were established and opportunistic tagging of 89 fish of different tuna species was carried out. In documents SYMP/64 (poster) and SYMP/65 (video) information on this fishery was provided.

Analysis of the stomach contents of skipjack continued, by means of periodic cruises which are carried out in accordance with the availability of this resource and the appropriate vessels.

In document SYMP/62 information is given on bigeye tuna fishing in the Canary Islands area, in relation with environmental parameters. Document SYMP/63 provides an analysis of the abundance indices of the skipjack fishery in the same area.

e) Other activities

i) The purse seine fishery

Catches of the purse seine fleet that operated in the Atlantic Ocean are monitored and the data are presented in ICCAT under the NEI category. This fleet comprises vessels of different countries which usually do not provide official statistics to the Commission. There is an estimated 100% coverage rate of the catches. IN addition, size sampling is carried out periodically to establish the species composition and the size distribution of each of the species caught. In 1995, 33,796 fish were sampled (12,821 in 1994).

3. Albacore

a) Altantic

The total catch taken by the Spanish surface fleets in the fisheries of the Cantabrian Sea (northeast Atlantic) and adjacent waters of the Atlantic, including the Azores, amounted to 21,445 MT (excluding 657 MT from the Canary Islands and 217 MT from the tropical purse seine fleet). This represents an increase of 26% as compared to the 1994 catch.

In the area of the Cantabrian Sea, the baitboat fishery catch was 8,762 MT, with a nominal effort of 6,403 fishing days, thus maintaining stable catches and effort as compared to the values reported in 1994. In the same area, and also in waters of the Atlantic, the troll fishery caught 10,251 MT, exerting a nominal effort of 16,270 fishing days, which represents a 57% and a 50% increase, respectively, as compared to 1994.

The baitboat and troll fleets carry out their activities during the summer months and early autumn (June-October). The major component of the catch is made up of juvenile fish and sub-adults (55-90 cm) from the north Atlantic stock. These fleet are comprised of 220 and 440 vessels, respectively. The number of vessels in this fishery has remained constant since 1994.

In the autumn months of 1995, part of the Cantabrian baitboat fleet moved to the southwest area of the Iberian Peninsula, in the Atlantic Ocean. The catch of the fishery was 534 MT, with a nominal effort of 394 fishing days. Also in 1995, part of the fleet moved to the Azores Islands where 1,898 MT of albacore were caught. These catches were reported by Portugal. This fishery catches sub-adult and adult albacore (80-115 cm) from the north Atlantic stock.

b) Mediterranean

In the autumn months some trollers and baitboats from Cantabrian ports fish in the western Mediterranean. The catches obtained in 1995 amounted to 163 MT by baitboat and 306 MT by troll, with an exerted nominal effort of

313 and 330 fishing days, respectively. These catches were somewhat higher that those of 1994, although they remained at levels similar to previous years. The catch is comprised of albacore measuring 60-80 cm from the Mediterranean stock.

c) Research and statistics

The ICCAT recommendations concerning statistics, relative to ICCAT Task II data, are carried out with the information from the baitboat and troll fisheries, which is collected through the data and sampling network established at the main ports of sales along the Cantabrian coast and the south Atlantic region (a total of 13 ports). The estimates of catch and effort by gear, month and ICCAT statistical area, are obtained from the surveys carried out at those ports, which represent a coverage rate between 80-90% of the total landings.

The size distribution of the catches is obtained by means of sampling, stratified by commercial category, from the landings of the trips made by the baitboat and troll vessels at the ports monitored. In 1995, sampling coverage was an average of 11,308 fish (0.7% of the catch) for the baitboats and an average of 39,935 fish (2% of the catch) for the trollers, with a size range of 40 to 116 cm.

Document SCRS/96/81 provides information on the trend of standardized indices of abundance, by areas (CPUEs) of the Spanish baitboat and troll fleets for the years 1981-1995. The indices of abundance obtained for age groups 2 and 3 of the troll fleet are used in calibrating virtual population analysis of the north stock.

Updating of the ICCAT albacore tagging file continued. In 1995, four albacore were recovered by the baitboat (2) and the pelagic trawl (2) fleets. One of these fish was recovered off the east coast of the United States, after remaining at large for 5 years, and having carried out a transatlantic migration. The information obtained from tag-recapture experiments of this species is used in studies to define stock structure, migrations and validation of the growth of this species. A summary of the migrations established from tag-recapture data of this species in the north Atlantic is included in Document SYMP/84.

d) Other activities

In 1995, fishing logbooks for the Cantabrian baitboat fishery and the southwest area of the Iberian Peninsula were completed. The aim is to have the necessary information available to carry out studies within the CYTMAR/95 Project, coordinated by the AZTI, concerning the "Application of infrared tele-detection to the albacore fishery". In the same way, the information collected from the fishing logbooks is used to create the data base for the study of the different procedures used in estimating abundance indices for this fishery. These activities are carried out within the EEC/DG XIV/CI/95/101 project, financed by the EU and coordinated by AZTI.

4. Bluefin tuna

a) Atlantic

Bluefin tuna catches in the Bay of Biscay fishery in 1995 reached 2,772 MT, which represents an increase of 43% with respect to the previous year and 46% with respect to the average catch of the last five years. Fishing effort also increased by 49% in comparison to 1994 and 15% as compared to that of the last five years. In the autumn, as has occurred in recent years, due to favorable sea conditions bluefin tuna fishing continued until November 20, which is the main reason for the increase in fishing effort. The CPUE of age class 2 (fish from 8-15 kg), used as an index of abundance in the assessments, was 48.6 fish/day at sea. This value is close to the average of the last five years (67 fish/day), after the important decline of 1995 (32 fish/day).

In the area around the Strait of Gibraltar, the traps caught 941 MT, which was a decline of 17% as compared to the previous year (1,135 MT).

In the autumn, part of the baitboat fleet of northern Spain moved to the Gulf of Cadiz zone (ICCAT area 58), where they caught 102 MT of bluefin tuna. The majority of the fish caught were juveniles of ages 1-4 (7-40 kg). Effort was 93 days fishing and the CPUE was 1.1 MT/day at sea.

b) Research and statistics (Atlantic)

Sampling of the catches and effort by time-area strata of the baitboat fleet of northern Spain is carried out by sampler-reporters located at the five ports where landings take place. In some cases the reporters coincide with those that collect data on albacore. In addition, monitoring of fishing effort is done with fishing logbooks that some baitboat vessels complete.

Some 182 samples were taken, stratified by commercial category, in the Bay of Biscay baitboat fishery, with a total of 6,118 fish measured. This represents a 2.2% coverage rate; the fishing effort coverage rate was more than 80%.

In the Gulf of Cadiz area, 21 samples were made, with a total of 5,495 fish sampled; the coverage rate was 21%.

In the traps of the south Atlantic area, size sampling of 3,126 fish was done, which represents 71% of the total fish caught. Sampling is carried out on board Japanese freezer vessels.

Studies were concluded on growth validation through the analysis of hard parts (fin ray spines), in addition to studies on stock structure by means of genetic analysis. These results were included in the study financed by the EU, "Characterization of large pelagics in the Mediterranean".

In recent years, tagging cruises have provided numerous recoveries which show interaction between fisheries, among them, those of the Mediterranean with the eastern Atlantic fisheries.

Document SYMP/96 (video) studies the development of bluefin tuna fishing in the north Atlantic within the context of "responsible fishing".

c) Mediterranean

The Spanish bluefin tuna fishery in the Mediterranean in 1995 was characterized, on the one hand, by an increase in yields and catches (and to a lesser degree, fishing effort) of some fisheries, and by the change in fishing strategy of the artisanal fleet towards hand line, on the other. This resulted in an important decline in juvenile catches.

The total catch of bluefin tuna amounted to 4,607 MT in 1995, as compared to the 2,360 MT reported the year before. This represents an increase of more than 40%. The surface longline fleet caught 368 MT of bluefin tuna, directing 6% of annual effort at the catch of this species by "Japanese type" longline. Purse seine catches increased by 40% (2,895 MT), with a 22% increase in effort (840 days at sea), as compared to the 1,725 MT and 656 days at sea for the previous year. The artisanal fleet, using hand line, caught 726 MT. The increase in fishing effort directed at this fishing type is due to the implementation of the minimum size regulation, which caused numerous vessels to change their fishing strategy towards hand line activities.

There was a 33% reduction in fishing effort of the Mediterranean traps. There is currently only one trap in operation. Trap catches were practically null in 1995 (1.3 MT).

The baitboat fleet that occasionally fishes in the Mediterranean caught 206 MT of bluefin tuna.

d) Research and statistics (Mediterranean)

Data bases were developed on catch, effort and size distributions by fishing gear and by time-area strata (5°x5° and 1°x1°, depending on the cases). Data are obtained by the sampler-reporters located at the most important ports, as well as through collaboration with the fishermen who complete the fishing logbooks and with scientific observers on board the purse seiners. Thus, it is known that there are "pool" vessels on the high seas that pick up the Spanish and French purse seine catches which are then exported to Japan from Spain.

Through scientific monitoring, within the project financed by the EU (Project No. DG XIV-94/050), detailed information (name of the vessels and landing date) has been obtained on the landing of more than 4,000 MT of bluefin tuna caught by French purse seiners that transshipped their catches (directly to trucks) at Spanish ports along the Mediterranean coast in 1995. There was an 80% coverage rate of this sampling.

Bluefin tuna sampling resulted in a total of 37,697 fish measured, which represents a sampling rate of 15% of all fish caught by all fishing types used by Spanish fishermen.

In 1995 the EU Project DG-XIV "Characterization of large pelagics in the Mediterranean", concluded. This project included, among other studies, one on the fecundity of bluefin tuna in the Mediterranean.

5. Application of the ICCAT management measures for tunas

As regards the measures adopted by ICCAT, the Spanish fisheries administration transmits to the Commission in a timely fashion the date of implementation of each of the measures, as well as the corresponding law that is included in the current legislation.

As concerns specific measures on swordfish adopted by ICCAT at its 1994 meeting, a new Ministerial Decree of November 6, 1995, was drafted to regulate the activity of the Spanish fleet directed at swordfish. The provisions of the Decree contemplate more monitoring and control in a closer time frame to the fishery, with will result in a progressive and improved compliance of the measures adopted. The Spanish Administration is making a great effort in human and technical means to apply the aforementioned Ministerial Decree.

With regard to the effects of other measures, the changes in fishing strategy in the Mediterranean bluefin tuna fishery to comply with the minimum size regulation has favored an increase in the average size of fish caught and an important reduction in fish less than 6.4 kg.

6. Application of the ICCAT Bluefin Tuna Statistical Document Program in 1995

Compliance with the ICCAT Bluefin Tuna Statistical Documents has allowed for a more in-depth analysis of the complexity of the application of the Program. The total number of Documents validated by the Chambers of Commerce in 1995 reached 951, which included a total volume of bluefin tuna exports amounting to 4,997,653.50 kg.

Of the Documents validated, 912 corresponded to bluefin tuna exports from the Mediterranean. The total exports from the Mediterranean rose to 4,286,459.50 kg.

Exports of bluefin tuna from the Atlantic are compiled in 39 validated Documents, for a total of 711,194.00 kg.

7. Inspection schemes and activities

The inspection activities relative to ICCAT that were carried by the Monitoring Authorities of the Kingdom of Spain, centered in two areas, the Atlantic and the Mediterranean. These activities are carried out during the entire year on vessels that catch and transport ICCAT-related species.

During the spring and summer seasons which coincide with the albacore *(Thunnus alalunga)* cruises in the northeast Atlantic and those for bluefin tuna *(Thunnus thynnus)* in the Mediterranean, the General Secretariat of Maritime Fishing, through the Under-Directorate General of Fishing Inspection and in collaboration the Navy (General Plan of Fishery Monitoring), there has been an increase in the human and material resources dedicated to inspection and monitoring during these periods.

Table 1. Spanish catches (MT) of tunas and swordfish, 1990-1994

Species	*1991*	*1992*	*1993*	*1994*	*1995*
Yellowfin tuna	59,773	51,704	44,226	40,799	37,167
Skipjack tuna	72,642	51,083	57,920	49,951	51,235
Bigeye tuna	18,537	17,601	19,618	21,822	19,097
Albacore	18,166	20,089	19,510	17,936	22,788
Bluefin tuna	3,664	4,532	7,096	5,813	8,425
Swordfish	13,564	13,145	14,930	15,625	19,621
Small tunas	3,664	2,202	1,339	2,262	2,569
Total	**190,010**	**160,356**	**164,639**	**154,208**	**160,902**

NATIONAL REPORT OF THE UNITED KINGDOM

1. National fisheries information

A seasonal driftnet fishery for albacore has been conducted in the Atlantic to the southwest of the British Isles during July, August and September since 1992. The number of boats reached a peak of 25 in 1995 and total catches have varied from 59 MT in 1992 to 576 MT in 1994. By-catches of swordfish, bluefin, yellowfin, marlins and sharks are also taken. The U.K. catch of albacore in 1996 has been recorded at 49.2 MT.

2. Research and statistics

The Department of Fisheries Research (DFR), part of the U.K. Government's Ministry of Agriculture, Fisheries and Food, is responsible for providing scientific assessments and objective advice in support of marine and freshwater fisheries management. Whilst no research is being conducted primarily into tuna and tuna-like species, there are a variety of research programs which are complementary to the work of ICCAT.

A programming framework has been developed to allow the evaluation of management procedures. This framework contains a set of generic tools including age, length and biomass based assessment models with which it is hoped that management procedures for a wide variety of fish species and fisheries can be investigated.

Work has also been conducted on the modelling of fisheries data sets, in particular, the use of diagnostics for assessing the goodness of fit for generalized linear models of catch and effort data. It is hoped to collaborate with scientists from other nations to develop a set of diagnostics for use when presenting standardized catch-effort series.

The DFR has also been involved with research on fish migration for the whole of its 90 year existence and for the last 25 years has been developing techniques for following individually identified free-ranging fish in the open sea. Originally relying on transponding acoustic tags and sector-scanning sonar, the program is now mainly based on archival tags, which record the depth of the fish and the temperature of the sea at frequent intervals for long periods. These data are used to identify consistent patterns of behavior which can, in turn, be used to reconstruct geographical movements of fish during spawning and other migrations.

At present, archival tags are recovered through the commercial fisheries and are deployed with species (e.g. plaice and cod in European waters) on which there is high fishing effort. Recovery of data via satellite would allow this technique to be extended to those species for which the technique is not cost effective because tag return rates are too low. This is an objective for a future development program. The DFR has an on-going program of electronic tag development and has just finished the development of a versatile archival tag with eight separate data channels and 12 Mbit of non-volatile flash memory, which gives a recording life of 4-5 years. The tag includes a light sensor (for geolocation) as well as temperature and pressure sensors; compass and tilt sensors are at an advanced stage of development. With an air-filled case (56 x 8 mm) the tag weighs 16 g in air.

The DFR is keen to apply its engineering skills to the development of archival tags and sensors for large, far-ranging oceanic fish, such as tuna and billfish. To this end, Dr. Geoff Arnold, who leads DFR's migration program, has been building up contacts with colleagues in institutes in other ICCAT countries and has attended a variety of conferences where the application of archival tags to tuna has been discussed. These have included the 45th Annual tuna Conference at Lake Arrowhead, California, in May, 1994, the TAB Atlantic Bluefin Tuna Tagging Workshop in Miami in August, 1995, and the 15th Semana das Pescas dos Açores in Horta in March, 1996.

3. Implementation of ICCAT conservation and management measures

There are currently no ICCAT regulations in effect for north Atlantic albacore.

4. Inspection schemes and activities

Catches of albacore at present do not have to be entered in EU logbooks but total weight, value and catch composition are recorded at landing. No biological samples are taken from the fish and species composition of sharks are noted although not entered on the official data base. Since the fishery is in operation until the end of September, it has not been possible to complete the shark by-catch forms for submission to ICCAT by the July deadline. They will, however, be completed and returned in future years.

Although there are currently no ICCAT regulations in effect for north Atlantic albacore, there is a European Union regulation restricting the length of driftnets to 2.5 km with which the U.K. fleet complies. Nets are measures and photographed before leaving U.K. ports to ensure compliance with this regulation and they are checked on return. Some nets also include "dolphin doors" in an attempt to reduce catches of marine mammals and so total length might exceed 2.5 km, but the actual fishing length is in accordance with the regulation.

Table 1. U.K. catches (MT) of albacore, including by-catches of tuna-like species, 1992-1995

Year	*Albacore*	*Bluefin*	*Swordfish*
1992	59	0	-0
1993	499	0	2
1994	576	0	3
1995	173	1	1

UNITED KINGDOM NATIONAL REPORT OF BERMUDA

1. National fisheries information

The Bermuda fishery consists of 194 local commercial fishing vessels which fish near the Island on a daily basis, seldom venturing more than 40 km offshore. Only about one-third of this fleet is active on a continual basis and the bulk of the fishing effort occurs during the period April through November. There is also a small but active recreational fleet that also fishes for tuna and tuna-like species.

The Bermuda domestic fleet utilizes rod and reel for the taking of tuna and tuna-like pelagic species. There is also some limited use of longlines, almost exclusively within the Bermuda EEZ.

Although 1995 saw no change in yellowfin landings, there was a marked increase in the amount of wahoo landed. In addition, the use of longlines, on a limited scale, resulted in promising catches of swordfish and other pelagic species.

On June 10, 1996, His Excellency the Governor of Bermuda declared a 200 mile (320 km) Exclusive Economic Zone (EEZ) around the Island.

Bermuda has licensed foreign fishing vessels to fish with the EEZ and, previously, in a declared 200 mile (320 km) Exclusive Fishing Zone. All such vessels have been longline fishing vessels.

In 1995, Bermuda licensed three U.S. flagged longline vessels to fish in the Bermuda Exclusive Fishing Zone although these vessels reportedly failed to exercise their licenses during 1995.

Details of the Bermuda landings of tunas and tuna-like species are summarized in **Table 1.**

2. Research and statistics

Catch and effort data are collected on all pelagic species of commercial importance as part of the Bermuda Fisheries statistical data collection program. Data collection for the principal species has been ongoing since 1975. Bermuda thus has a data base of landings and gross measures of effort for a period spanning 21 years which allows the examination of long-term trends.

Biological sampling for wahoo, yellowfin tuna, swordfish and blackfin tuna is on-going. Whole specimens have been provided to Fisheries staff through a cooperative agreement with several commercial fishermen. Basic biological data have been collected from each specimen: length, weight, sex, gonad stage and stomach contents, when present. The sagittal otoliths have been removed from the majority of the specimens for an age and growth study. Preliminary work on wahoo otoliths has revealed the presence of apparent daily growth rings. In common with other scombrid fishes, this species appears to be very fast-growing. The scope of this study is being expanded to further elucidate age and growth parameters in this important species. Work on yellowfin and blackfin tuna is also developing with respect to age, growth and reproduction.

Bermuda continues to be actively involved in the ICCAT Enhanced Research Program for Billfish and presented current findings at the 1996 Billfish Workshop held in Miami, U.S.A.

3. Implementation of ICCAT conservation and management measures

Bermuda Fisheries Regulations include the following:

i) Minimum weight of 3.2 kg (7 pounds) for all yellowfin (YFT) and bigeye tunas (BET).

ii) Minimum weight of 30 kg (66 pounds) or 115 cm (45 inches) lower jaw fork length for bluefin tuna (BFT).

iii) Minimum weight of 25 kg (55 pounds) or 125 cm (49 inches) lower jaw fork length for swordfish (SWO).

Bermuda Fisheries legislation also has provisions whereby the taking of any species may be prohibited, thus permitting the imposition of quota limitations when agreed allowances have been filled.

The minimum size legislation also pertains to fish taken by foreign fishing vessels and the penalties provided for in law are in accordance with the United Nations Convention on the Law of the Sea.

Foreign vessels licensed to fish in the Bermuda EEZ must comply with a number of terms and conditions, inclusive of a port call for inspection purposes and carriage of a Bermuda observer.

All fishing vessels (local and foreign) licensed by Bermuda are required to submit detailed catch and effort statistics.

Bermuda has transmitted details of the implementation of the ICCAT Bluefin Tuna Statistical Document Program to the ICCAT Secretariat and the Ministry of International Trade and Industry of Japan, in addition to confirming this action with the Ministry of Agriculture, Fisheries and Food, United Kingdom.

4. Inspection schemes and activities

The Bermuda domestic catch is continuously monitored and sampled by Fisheries Authorities for data on catch, effort and size.

Foreign fishing vessels calling at Bermuda are also sampled on an opportunistic basis while foreign vessels licensed to fish the Bermuda EEZ are required to submit to port inspections.

Table 1. Landings (in MT) by Bermuda and Bermuda-licensed foreign flag vessels of tunas and tuna-like species in 1995

Species	*Bermuda vessels*	*U.S.A. vessels**
Albacore	**	–
Atlantic black skipjack	–	–
Billfish (marlins, etc)	16.2	–
Bigeye tuna	–	–
Blackfin tuna	4.3	–
Bluefin tuna	–	–
Swordfish	1.0	–
Wahoo	85.2	–
Yellowfin tuna	43.5	–
Totals	**154.4**	**nil**

* Licensed to fish in the Bermuda EFZ.
** Less than 0.1 MT.

NATIONAL REPORT OF THE UNITED STATES *

by

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service

I. National fisheries information

A. Introduction: 1995 U.S. large pelagic fishery

The total (preliminary) reported U.S. catch of tuna and tuna-like fishes (including swordfish, but excluding other billfishes) in 1995 was 24,289 MT, a 15% decrease from 1994. Estimated swordfish catches (including dead discards) increased 477 MT to 4,551 MT, and provisional landings from the U.S. fishery for yellowfin in the Gulf of Mexico decreased in 1995 to 1,897 MT. U.S. vessels fishing in the northwest Atlantic landed an estimated 1,310 MT of bluefin, an increase of 147 MT compared to 1994. An estimated 142 MT of bluefin were discarded dead by U.S. longline vessels. Provisional skipjack landings increased by 32 MT to 81 MT from 1994 to 1995, estimated bigeye landings decreased by 121 MT in 1995 compared to 1994 to an estimated 1,207 MT, and estimated albacore landings decreased from 1994 to 1995 by 127 MT to 545 MT.

The following sections present background information and 1995 landings statistics for species covered under the International Convention for the Conservation of Atlantic Tunas. Detailed analyses of the 1995 catch and effort levels are reported in **Appendix I.**** Management measures enacted in 1995 were reported to the International Commission for the Conservation of Atlantic Tunas (ICCAT) as required, before ICCAT's 14th Regular Meeting. Modifications to regulations in 1996 are reported in Section III of this report.

B. Atlantic tunas

1. Background

The U.S. Atlantic tuna fisheries are managed under regulations issued under the authority of the Atlantic Tunas Convention Act (ATCA), which authorizes the Secretary of Commerce to implement regulations as may be necessary to carry out the recommendations of ICCAT. The authority to implement ICCAT recommendations has been delegated from the Secretary to the Assistant Administrator for Fisheries of the Department of Commerce.

Atlantic tunas are targeted by both recreational and commercial fishers in the United States. Hand gear includes rod and reel, harpoon (bluefin only), kegline, bandit gear, and handline. Atlantic tunas are also landed by drift gillnet, purse seine, and longline gear (by-catch only in the case of bluefin). All vessels and ex-vessel buyers are subject to permitting and reporting requirements. A total of 29,500 Atlantic tuna vessel permits have been issued. Atlantic tunas are targeted and harvested from Maine to Texas. Employment associated with bluefin tuna alone is estimated to be 1,200 full-time equivalent jobs.

The majority of U.S. commercial landings of Atlantic bluefin tuna are exported to Japan. Ex-vessel revenues from bluefin tuna generally range between US $20-25 million. Higher quality bigeye and yellowfin tuna are also marketed fresh in Japan, with the balance sold on the U.S. domestic market.

The recreational fisheries target primarily bluefin in the 6.4-107 kg category, as well as yellowfin and other tunas. These fisheries are an important source of direct income to charter and headboat vessels, and an indirect source

* Original report in English.
** Appendices I to IV, attached to the 1996 U.S. National Report, are available at the ICCAT Secretariat for consultation.

of income to firms that supply recreational fishery participants. For bluefin tuna alone, charter-headboat fees collected in 1994 are estimated to be $3.19 million, while fishing expenditures by private anglers are estimated at $3.3 million. Angler consumer surplus estimates for bluefin and yellowfin tunas, while dated relative to changes in regulations, indicate nevertheless that net economic benefits from the recreational fishery are significant.

Review of Atlantic tuna statistics: Questions have been raised concerning the accuracy of U.S. landings figures for the recreational sector. Pursuant to this inquiry, the United States will be conducting a review of these statistics to verify the estimates. While this review may result in changes of U.S. statistics reported to SCRS for 1992-95, these changes are not expected to result in landings in excess of ICCAT recommendations. Any modifications will be reported to SCRS along with the full documentation, as required by ICCAT.

2. Fishing monitoring

The NMFS monitors landings and sizes of large pelagic species through port and tournament sampling, recreational fishery surveys, vessel logbook and dealer reporting procedures, and scientific observer sampling of the U.S. fleet. Dealers are required to record and report purchases of ICCAT species to NMFS on a timely basis. Commercial landings are also monitored through vessel logbooks, and verified through the observer program. The United States conducts two statistical surveys of the recreational fishing sector which provide catch-per-unit-effort (CPUE) data as well as catch estimates for the recreational fisheries for large pelagics, including Atlantic tunas, swordfish, billfish and sharks.

2.1 Tropical tunas

-- Yellowfin tuna

Yellowfin is the principal species of tropical tuna landed by U.S. fisheries in the western north Atlantic. Total estimated landings increased to 8,131 MT in 1995, from the 1994 landings of 8,094 MT. The estimated 1995 catch is considered provisional and may change due to late reports of commercial catches and to possible revisions in estimates of rod and reel catches made by recreational anglers. A high proportion of the landings were due to estimated rod and reel catches of recreational anglers in the northwest (NW) Atlantic (4,025 MT). These estimates are based on two statistical sampling surveys of the recreational fishing sector.

-- Skipjack tuna

Skipjack tuna are also caught by U.S. vessels in the western north Atlantic. Total reported skipjack landings (preliminary) increased from 49 MT in 1994 to 81 MT in 1995. Most of the catch is taken off the U.S. east coast (NW Atlantic) between Cape Haterras and Long Island.

-- Bigeye tuna

The other large tropical tuna reported in catches by U.S. vessels in the western north Atlantic is bigeye tuna. U.S. bigeye catches are nearly equal in both quantity and value to U.S. catches of bluefin tuna. The majority of U.S. landings of this species comes from the longline vessels fishing off the east coast of the U.S. in the area from Cape Hatteras, North Carolina, to Massachusetts, averaging 84% of the annual U.S. bigeye catch made between 1992 and 1995. Total reported catches (preliminary) for 1995 decreased by 9% from 1,328 Mt to 1,207 MT.

2.2 Temperate tunas

-- Bluefin tuna

U.S. vessels fishing in the northwest Atlantic in 1995 landed an estimated 1,310 MT of bluefin tuna and discarded dear an estimated 142 MT (total: 1,451 MT). Those estimated landings represented an increase of 147 MT from the revised 1994 level, and the estimated dead discards were 66 MT higher. In addition to landed catch, an estimated 1,349 bluefin (about 142 MT) were discarded dead by U.S. longline vessels (75 MT were discarded dead in 1994); of those discards, an estimated 33 fish (about 7 MT) were caught in the Gulf of Mexico in 1995 (3 MT were discarded dead in 1994).

In 1994, a catch and release fishery for large bluefin developed off the coast of North Carolina during the winter months, and it is thought that the number of vessels participating in the fishery has increased each year since 1994. Catch rates (primarily of medium and/or large bluefin) were extremely high (often in the tens of fish per trip) when compared to catch rates off the New England coast (about one fish per nine trips).

— Albacore

Albacore are landed by U.S. vessels; however, this species contributes significantly less to the total U.S. tuna production than the other tunas. Total reported catches were very low prior to 1985, averaging only 22 MT; however, U.S. catches increased substantially with close to 97% of the production annually coming from the northeastern U.S. coast until 1995 when Caribbean landings increased to make up over 20% of the total. Reported catches of albacore were 545 MT in 1995, a decrease from 1994 of 127 MT. The amount of albacore taken incidentally in the directed tuna fisheries has increased in recent years. Although albacore are not a major target of the U.S. tuna fishery, they are frequently sought by recreational harvesters off the northeastern United States. This seasonal fishery was provisionally estimated to have landed 23 MT (4% of the total annual yield) in 1995. The other fisheries taking albacore are the commercial longline (targeting swordfish, yellowfin, bigeye), the gillnet (targeting swordfish), the handline (targeting bluefin), and beginning in 1993, an experimental pair trawl fishery. The experimental pair trawl fishery ended in 1995.

C. Swordfish

1. Background

The U.S. fishery for Atlantic swordfish is managed under the authority of the Magnuson Fisheries Conservation and Management Act and ATCA. The implementing regulations govern the conservation and management of the north Atlantic swordfish stock that includes swordfish in the north Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea, North of 5° North latitude. The authority to implement ICCAT recommendations has been delegated from the Secretary to the Assistant Administrator for Fisheries of the Department of Commerce.

Swordfish are targeted almost exclusively by commercial fishing vessels in the United States, with the bulk of the landings harvested by longline vessels. There are currently some 1,200 vessels permitted for the commercial Atlantic swordfish fishery, although only some 200 vessels are active in the fishery (see section below on limited entry). The U.S. fishery for north Atlantic swordfish has historically been dominated by the New England fleet, which fishes along the Atlantic coast from New England to Florida and into the Gulf of Mexico. The Florida fleet, which evolved from techniques and gear used by Cuban-American longliners, is a more recent development. Virtually all commercially landed swordfish are caught by longline gear. However, there is a small, traditional harpoon fishery and a drift gillnet fishery in the northeast. Separate quotas have been established for longline/harpoon and drift gillnets since 1991.

Atlantic swordfish are marketed primarily on the domestic market in fresh form. Ex-vessel prices generally vary between $2.50 and $6.00 per pound, depending upon the quality of the product, as well as current market supply and demand conditions. The domestic production of Atlantic swordfish competes not only with domestic Pacific production, but also with considerable imports (nearly equal to domestic production).

2. Fisheries monitoring

For 1995, the U.S. Total Allowable Catch (TAC) was 3,970 MT. The provisional estimate of U.S. landings in 1995 is 4,026 MT, and dead discards for the same period were 526 MT. The TAC for the period 1991-1994 was 4,560 MT. The 1995 swordfish season was closed October 31, 1995, and a 15 fish by-catch per trip was allowed. The by-catch allowance was reduced to six fish per trip as of December 1, 1995.

D. Billfish

1. Background

The U.S. fishery for Atlantic billfish is managed under the authority of the Magnuson Fisheries Conservation and Management Act and ATCA. The implementing regulations govern the conservation and management of Atlantic

billfish in the north Atlantic Ocean, including the Gulf of Mexico and Caribbean Sea. The authority to implement ICCAT recommendations has been delegated from the Secretary to the Assistant Administrator for Fisheries of the Department of Commerce.

Atlantic billfish are restricted exclusively to the recreational fishery in the United States under current regulations. However, by-catch of U.S. pelagic longline vessels is a source of fishing mortality for billfish. The United States will publish proposed rules in the Fall of 1996 to limit entry in the commercial Atlantic swordfish and shark fisheries, which could indirectly affect the billfish longline by-catch rate.

Over the past ten years, a "catch and release" approach has been almost universally adopted in the recreational billfish fishery, resulting in an estimated release rate of over 90%, and relatively low recreational landings. Although there are no permits required for recreational billfish fishers, it is estimated that over 100 thousand anglers participate in this fishery each year for at least one angling day. Prime areas for the billfish fishery include the east coast of Florida, the mid-Atlantic area, the Gulf of Mexico, and the Caribbean, depending on the species or the season.

The recreational billfish fisheries of the United States are an important source of direct income to charter and headboat vessels, and an indirect source of income to firms that supply recreational fishery participants. Angler consumer surplus estimates for billfish vary from $550 to $1,200 per trip, indicating that net economic benefits from the recreational fishery are significant.

2. Fisheries monitoring

Blue marlin, white marlin, and sailfish are landed in the recreational rod and reel fisheries. Recreational landings of each billfish species are estimated using a combination of billfish tournament surveys and the NMFS Large Pelagic Survey. Estimates of by-catch mortality in the commercial U.S. longline fleet are made using the data from mandatory pelagic logbooks. A new procedure was developed to re-estimate this by-catch for blue marlin, white marlin, and sailfish for 1987-1995. This procedure incorporated observer data and is detailed in SCRS/96/97-Revised.

The preliminary estimates of 1995 U.S. recreational catches for these billfish species are: 43.0 MT for blue marlin, 9.0 MT for white marlin, and 10.0 MT for sailfish. The estimates for 1994 were 86.0 MT, 11.0 MT, and a revised 44.8 MT, respectively, for the three species. Preliminary estimates of the billfish by-catch discarded dead in the U.S. commercial longline fishery for 1995 were 142.7 MT for bluefin marlin, 99.8 MT for white marlin, and 28.7 MT for sailfish.

E. Mackerels

1. Background

U.S. catches of king and Spanish mackerel catches are taken primarily by gillnets and handlines. Substantial commercial and recreational fisheries exist throughout the range of both species, the timing of which is seasonal in nature. Very intense commercial gillnet, rod and reel, and recreational rod and reel fisheries have taken place on both mackerel species since the early 1960s throughout their range. Current fisheries in the U.S. for both species are regulated through federal quotas on commercial landings, commercial trip limits, minimum size restrictions, and recreational personal bag limits. Management policies are set for federally designated migratory groups, the Atlantic and Gulf of Mexico resource groups, that have been placed under a rigid re-building plan since 1985 when age-based stock assessments indicated that over-fishing was occurring on three of the four stocks exploited. Because these species occur in both federal and state territorial zones of the U.S., successful management has required participation by both federal and state management agencies. Currently, the Gulf of Mexico Spanish mackerel and the king mackerel stocks are considered over-fished.

2. Fisheries monitoring

Harvest of both Spanish mackerel and king mackerel has stabilized in recent years although large fluctuations in recreational catches have occurred and overages in commercial landings are still common. King mackerel yields have ranged from 4,595 MT to 7,883 MT between 1983 and 1995 with an average production of 6,234 MT since 1988. Removals of Spanish mackerel have ranged from 4,197 MT to 6,277 MT between 1983 and 1992 and since 1989 have averaged 5,015 MT. Landings for 1995 are preliminary and are not included in these averages and ranges.

F. Sharks

1. Background

The shark fishery is regulated by the Fishery Management Plan for Sharks of the Atlantic Ocean which was implemented in April, 1993. The Plan divides shark species into "large coastal species", "small coastal species" and sets TACs for large coastal and pelagic species. The NMFS rejected planned quota increases for 1995, and the semiannual quotas were left at the 1994 levels of 1,285 MT for large coastal species and 290 MT for pelagic species. A Shark Stock Assessment Workshop was held in Miami in June, 1996. This Workshop indicated that recovery of the fishery would be more likely to occur with reductions in effective fishing mortality of 50% or more.

2. Fisheries monitoring

The 1995 total U.S. commercial landings for large coastal sharks decreased to 160,000 fish in 1995 as compared to 190,000 in 1994 due, in part, to restrictions imposed. The U.S. Atlantic shark fishery is primarily a southeastern fishery from Virginia to Texas. Commercial shark landings for that region were 3,521 MT, down from 4,095 MT the previous year. The 1995 recreational catch of large coastal sharks was estimated at 183,000 fish. Landings are monitored by a system of logbooks, dealer reports, and statistical surveys of the recreational catch. Landings data by species are currently being considered by species for some 24 species of sharks. However, the majority of the catch remains unidentified.

II. Research and statistics

1. Introduction

While data collection is carried out primarily by NMFS, research on large pelagics is conducted by a combination of government, academic and, to a lesser extent, private research entities. Research priorities are gleaned from the SCRS annual reports, the annual reports of the Species Groups from the Advisory Committee to the U.S. Section of ICCAT, and from interaction between researchers and fishery participants. The primary objective of the research and statistics program is to improve the knowledge base necessary to design, implement, and monitor domestic and international management measures.

2. Statistics

The NMFS monitors landings and sizes of large pelagic species through port and tournament sampling, recreational fishery surveys, vessel logbook and dealer reporting procedures, and scientific observer sampling of the U.S. fleet.

2.2 Commercial fisheries

For bluefin tuna, dealers are required to record each purchase of Atlantic bluefin tuna on a Dealer Report Form which must be faxed and mailed to NMFS within 24 hours from the purchase or receipt of the fish. The form collects the following information: dealer number, dealer name, date the fish was landed, gear used to harvest the fish, fork length, weight (round or dressed), identification tag number, area where the fish was caught, port where landed, federal fisheries permit number (of fisherman), vessel name, name of vessel's master, signature of vessel's master, date of signature. A bi-weekly dealer report adds socio-economic data to these same data.

Other Atlantic tunas, sharks, and swordfish landings are monitored through a combination of vessel logbooks and dealer reports. Logbook data collect information on fishing vessel activity, including dates of trips, number of sets, area fished, and in some cases, socio-economic data such as volume and cost of fishing inputs.

2.3 Recreational fisheries

The United States conducts two statistical sampling surveys of the recreational fishing sector: the Large Pelagic Survey (LPS) and the Marine Recreational Fishing Statistics Survey (MRFSS). These two surveys provide CPUE data as well as catch data for the recreational fisheries for large pelagics, including Atlantic tunas, swordfish, billfish, and

sharks. The LPS was designed to specifically track fishing effort and catch of large pelagic species, while the MRFSS is a general sampling survey. LPS estimates are used for areas and times where LPS sampling took place and MRFSS estimates for areas and times where no LPS sampling was available.

3. Research

In additional to fishery monitoring, major research activities in 1995 and 1996 focused on several items.

ICCAT research recommendations: The U.S. continued activities responsive to ICCAT recommended research primarily directed at determining the reproductive biology of Atlantic swordfish and bluefin tuna. Research on development of methodologies to determine the genetic discreetness of large pelagic fishes in the Atlantic was continued. Larval surveys for bluefin tuna and other large pelagics in the Gulf of Mexico was continued. Research continued on development of new methods for estimating and indexing abundance of various large pelagic species, including application of fishery independent methods, such as aerial surveys, as well as robust estimation techniques for sequential population analyses. Investigations into the error structures of catch and catch rate data were continued. U.S. scientists coordinated increased efforts for the ICCAT Enhanced Research Program for Billfish.

Detailed information regarding the research activities for Atlantic tunas, swordfish, billfish, sharks, and other ICCAT-related species are provided in **Appendix I.**

III. Implementation of ICCAT conservation and management measures

The U.S. Code of Federal Regulations and 1996 Regulatory Amendments as published in the "Federal Register" are attached in **Appendix II.** These are provided for Atlantic tunas, swordfish, and billfish. A summary of existing regulations is provided in the sections below.

A. Atlantic tunas

1. Bluefin tuna

ICCAT measures: The United States has implemented ICCAT recommendations for bluefin tuna by restricting total annual catches to the U.S. quota as recommended by ICCAT. In addition, the ICCAT-recommended minimum size and 8% limit on the catch of bluefin between 6.4 kg and 30 kg have been implemented. U.S. regulations also prohibit directed fishing in the Gulf of Mexico. Finally, U.S. importers and exporters of bluefin tuna must abide by U.S. as well as Japanese requirements under the ICCAT Bluefin Statistical Document Program (see discussion below).

Domestic measures: U.S. regulations also include measures not imposed by ICCAT but which facilitate management, address social concerns, and improve the economic performance of the fishery. These strictly domestic measures include permitting and reporting requirements, quotas by user group and by geographical area, a minimum size for sale of 107 kg, and measures to slow the commercial fishery (such as monthly quotas and days off). Finally, in an effort to improve the quality of data collected from the bluefin tuna fishery, U.S. vessels are required to accept on-board observers if selected.

Bluefin Statistical Document: The United States has implemented a Bluefin Tuna Statistical Document as a requirement for lawful entry of bluefin tuna into the customs territory of the United States. In addition, bluefin tuna tagging and information retrieval systems are designed to track the import and export of bluefin tuna. Taken together, these data collection and reporting systems comply with ICCAT recommendations regarding the Bluefin Tuna Statistical Document Program (BSDP). Complementary systems are implemented for Atlantic and Pacific bluefin tuna and information on both sub-species is reported to ICCAT on a semi-annual basis. Compiled import-export statistics for the United States collected under the Bluefin Statistical Document Program for the period covering July 1995-June 1996 are provided in **Appendix III.**

2. Other Atlantic tunas

Yellowfin and bigeye tuna catches in the United States are subject to a minimum size of 27 cm, equivalent to that of bluefin tuna, but higher than that required by ICCAT. All U.S. tuna fishing vessels and ex-vessel processors

are subject to permitting and reporting requirements, as well as possible observers. In response to the ICCAT recommendations regarding the level of fishing effort for yellowfin tuna, the United States has implemented limited access in the purse seine fishery, banned the introduction of new gear types such as pair trawls, and has begun workshops with the fishing industry to consider limited access for other gear types.

B. Swordfish

ICCAT measures: The United States has implemented ICCAT recommendations for swordfish by restricting total annual catches to the U.S. quota as recommended by ICCAT. In addition, the ICCAT-recommended alternative minimum size of 119 cm from the tip of the lower jaw to the fork of the tail (with zero tolerance) was implemented in the 1996 swordfish regulations for the United States.

Domestic measures: U.S. regulations also include measures not imposed by ICCAT, but which facilitate management, address social concerns, and improve the economic performance of the fishery. These strictly domestic measures include a split-year fishing season of June 1-May 31, divided into two six-month seasons, permitting and reporting requirements for vessels as well as ex-vessel buyers, sub-quotas for drift gillnet and harpoon fisheries. Finally, in an effort to improve the quality of data collected from the swordfish fishery, U.S. vessels are required to maintain logbooks and to accept on-board observers if selected.

The Secretary of Commerce will publish a proposed rule in the fall of 1996 that would implement limited entry in the U.S. Atlantic swordfish fishery. Depending upon the thresholds for permit eligibility that are adopted in the final rule, the number of permit holders in the directed swordfish fishery could fall from 1,200 to as few as 200. This reduction in harvesting capacity not only improves the economic performance of the directed fishery, it also can reduce interactions with undersized swordfish as well as protected and/or endangered species that are subject to by-catch on longline, such as sea turtles or billfish.

C. Billfish

ICCAT measures: The only management measure ICCAT has in place for billfish is the 1995 Resolution calling for the voluntary release, and tagging if possible, of all billfish caught alive by commercial fishing vessels.

Domestic measures: The most significant domestic regulation for billfish is the prohibition on fishing for, retaining, or selling Atlantic billfish by commercial vessel operators. In addition, recreational fishermen are subject to minimum size requirements as well as reporting requirements. Minimum sizes in lower jaw fork length are as follows: blue marlin 244 cm, white marlin 157 cm, sailfish 145 cm.

IV. Inspection schemes and activities

A. NMFS enforcement

The enforcement of NMFS regulations is carried out by the NMFS Enforcement Office, in conjunction with the U.S. Coast Guard, and in some areas, State fishery agencies. In addition to enforcement within the Federal waters within the 200 mile Exclusive Economic Zone (EEZ), NMFS Enforcement covers the highly migratory species (HMS) fisheries beyond the EEZ. Authority to enforce regulations implemented under ICCAT is provided by several laws, including the Magnuson Fishery Conservation and Management Act and the ATCA. NMFS Enforcement operates both on-shore and off-shore, monitoring fishing and landing activities, seizing contraband and illegally possessed property, and developing world-wide fisheries and economic intelligence in support of fisheries enforcement operations and for future planning purposes.

Fishing on ICCAT species is monitored and enforced by over 50 NMFS enforcement agents, working from Maine to the Gulf of Mexico to the Caribbean. Enforcement activities are carried out at sea (vessel boardings, sightings) as well as in ports and fish houses. NMFS agents conduct at-sea enforcement activities on board Coast Guard vessels as well as on unmarked vessels. Due to the difficulty in conducting effective at-sea enforcement, the bulk of NMFS enforcement activities occurs in ports when vessels are landing their catch. In contrast, the Coast Guard implements most of its enforcement at sea with the use of vessels as well as helicopters.

Each year, the United States submits an enforcement report to the ICCAT Secretariat which is held on file for review by Contracting Parties. The Secretariat currently has reports through 1995. The 1996 report will be submitted before the Tenth Special Meeting of the Commission.

B. Vessel Monitoring Systems (VMS) and electronic logbooks

The Western Pacific Fishery Management Council is currently in the final year of a three-year pilot VMS program. Over 200 fishing vessels are participating in the program, which is strictly for the purpose of monitoring the location of vessels. At the end of this third year, the program will be evaluated to determine the utility of VMS.

Regarding VMS in the Atlantic, NMFS is implementing a VMS pilot project. It is envisioned that six Inmarsat-C units will be placed on six vessels that have volunteered to participate in the pilot project. Three units will be placed on longline vessels, one on a drift gillnet vessel and one on a pair trawl. The units could be deployed differently if it is so decided. In conjunction with the VMS program, electronic logbook software will be installed on selected vessels in order to test real-time data reporting via satellite.

The electronic logbook is in phase two of development and the NMFS should be able to test data transmission by December, 1996. The Inmarsat-C units should be placed on boats in early 1997. There are at least three other VMS test programs being considered by NMFS, but they have not been implemented.

V. Other activities

A. Fishery observer deployments

1. Domestic longline observer coverage

The NMFS, Southeast Fisheries Science Center (SEFSC), Miami Laboratory initiated, in early 1992, the Pelagic Observer Program for coverage of the U.S. pelagic longline fleet. In conjunction with the Northeast Fisheries Science Center (NEFSC), Woods Hole Laboratory, both regional Centers, using contracted and NMFS observers, have collected catch data while aboard longline vessels fishing in the waters of the northwest Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. Selection of the vessels is based on a random, 5% sampling of the number of sets reported by the longline fleet. A total of 2,469 sets were recorded observed by personnel from the SEFSC and NEFSC programs from May, 1992, to December, 1995. Observers from the SEFSC region recorded over 41,000 fish species (primarily swordfish, tunas, and sharks), marine mammals, turtles, and sea birds during this time period.

2. Drift gillnet fishery observer coverage

The NEFSC placed observers aboard 11 different domestic drift gillnet vessels targeting swordfish, tuna, and sharks in calendar year 1995. Since the Atlantic swordfish, tuna and shark drift gillnet fishery is classified as Category I under the U.S. Marine Mammal Protection Act (thus requiring observer coverage), the NEFSC selected vessels for mandatory observer placement. Twenty observer trips, totaling 230 days, were conducted on these vessels in 1995. By-catch from this swordfish fishery included albacore, bigeye, yellowfin, bonito, little tunny, bluefin and skipjack tuna as well as numerous other species; by-catch for this fishery in 1993 was documented in the report to ICCAT on by-catches prepared for the 1995 SCRS. Personnel for observer coverage of this fishery were provided through deployment of NEFSC staff, direct contracting with individual observers by NEFSC, and through the NEFSC contractor.

3. Pelagic pair trawl fishery observer coverage

The NEFSC placed observers aboard 11 different domestic pelagic pair trawl vessels targeting tuna, predominantly bigeye, in calendar year 1995. Thirty-two observer trips, totaling 267 days, were conducted on these vessels during 1995. By-catch from this fishery included yellowfin, bluefin, albacore, bigeye, skipjack, yellow jack and swordfish. Personnel for observer coverage of this fishery were provided through the NEFSC contractor.

4. Foreign fishery observers

There was no foreign fishing activity in the U.S. Exclusive Economic Zone (EEZ) off the east coast during 1995.

B. Swordfish Import Monitoring

Pursuant to the "Resolution by ICCAT Concerning an Action Plan to Ensure the Effectiveness of the Conservation Program for Atlantic Swordfish", the United States has been monitoring swordfish imports by country of origin. As one of the major importers, trends in U.S. imports could be used to assess fishing activities by countries harvesting swordfish. Imports are presented in **Appendix IV**. One of the difficulties in using these figures to track swordfish fishing activities in the Atlantic is that country of origin as listed on import documents does not necessarily reflect ocean area of catch or flag state of the harvesting vessel. The United States continues to explore other avenues for following swordfish catches in other countries, including the improvement of import monitoring.

Table 1. Catches and landings, rounded to the nearest metric ton, of Atlantic tunas and tuna-like fishes, excluding billfishes, by U.S. fishermen, 1967-1995 [1]

Year	*BFT* [2]	*YFT* [3,4]	*ALB*	*BET* [3]	*LTA*	*SKJ* [3]	*BON*	*SWO* [5]	*SSM* [6]	*KGM* [6]	*OTH* [7]	*TOTAL*
1967	2,320	1,136	0	0	7	493	22	474	3,577	2,767	10	10,806
1968	807	5,941	0	18	6	3,314	43	274	5,342	2,813	2	18,560
1969	1,226	18,791	0	148	7	4,849	98	171	4,952	2,814	1	33,057
1970	3,327	9,029	0	195	158	11,752	83	287	5,506	3,050	0	33,387
1971	3,169	3,764	0	544	5	16,224	90	35	4,713	2,571	50	31,165
1972	2,138	12,342	10	212	212	12,290	24	246	4,863	2,213	0	34,550
1973	1,294	3,590	0	113	20	21,246	261	406	4,437	2,710	0	34,077
1974	3,638	5,621	13	865	51	19,973	92	1,125	4,990	4,747	1	41,116
1975	2,823	14,335	1	67	67	7,567	117	1,700	5,288	3,095	19	35,079
1976	1,931	2,252	0	28	5	2,285	23	1,429	6,385	4,053	30	18,421
1977	1,956	7,208	2	331	53	6,179	268	912	5,453	3,837	71	26,270
1978	1,848	9,747	9	248	113	8,492	224	3,684	3,310	2,507	31	30,213
1979	2,297	3,182	11	212	12	3,102	502	4,618	2,926	6,293	11	23,166
1980	1,505	2,118	21	202	88	3,589	195	5,624	5,429	10,726	513	30,010
1981	1,530	1,866	54	152	97	5,373	333	4,529	2,748	12,565	200	29,447
1982	812	883	126	377	87	731	209	5,410	3,747	9,863	962	23,207
1983	1,394	226	18	255	107	589	253	4,820	2,784	7,069	453	17,968
1984	1,317	1,252	25	408	41	817	217	4,749	3,904	7,445	883	21,058
1985	1,423	6,259	17	353	74	1,786	109	4,705	3,984	6,010	247	24,967
1986	1,655	5,775	162	747	103	1,004	83	5,210	5,957	5,682	336	26,714
1987	1,543	9,056	269	1,008	118	650	130	5,247	5,071	5,628	385	29,105
1988	1,505	10,268	115	919	204	36	88	6,171	5,097	5,810	410	30,623
1989	1,732	8,350	260	762	128	56	278	6,411	4,444	4,365	335	27,121
1990	1,769	5,406	386	650	173	240	298	5,519	4,272	5,940	390	25,043
1991	1,781	6,856	485	962	227	787	468	4,525	5,884	6,502	367	28,844
1992	1,128	7,158	377	752	595	524	497	4,236	5,724	7,091	545	28,627
1993	1,268	5,199	452	982	1,286	342	171	4,191	5,058	7,746	1,517	28,212
1994	1,238	8,094	672	1,328	1,142	49	129	4,074	4,632	6,186	886	28,430
1995[8]	1,451	8,131	545	1,207	1,312	81	116	4,551	1,554	3,970	1,371	24,289

1 Estimates of recreational catches off the northeast U.S. are included for all years for bluefin tuna and for all other tunas since 1986.
2 Includes estimated bluefin dead discards since 1986. (The 1986 estimate covered only some times and areas.)
3 Prior to 1981, figures include some catches of purse seiners flying other flags (Bermuda, Netherlands Antilles, Nicaragua, and Panama).
4 Includes small quantities of bigeye tuna prior to 1975.
5 Swordfish landings revised for 1994.
6 Does not include recreation landings of Spanish (1967-83) and king (1967-78) mackerels. 1995 landings are preliminary. King and Spanish mackerels (1991-94) have been revised.
7 This category includes blackfin and wahoo as well as the Task I category other tunas.
8 1995 data are preliminary.

NATIONAL REPORT OF URUGUAY *

by

O. Mora
National Institute of Fishing

1. The fishery

The Uruguayan tuna fleet, equipped with surface longline, continues operating in the Common Fishing Zone of Uruguay and Argentina and in adjacent international waters. In 1994, the number of active fishing vessels that comprised this fleet decreased to three vessels. In 1995, it increased to six and of these, five corresponded to licenses granted in previous years; one of these only operated for two months (Table 1). This is a multi-species fishery whose main target species is swordfish, particularly during the winter months, but which, depending on the market and the yields, also directs effort at bigeye tuna. In addition to these species, catches of yellowfin tuna and albacore are retained, the latter considered as by-catch together with billfishes, sharks, oilfish, gastoro, sea bream, and other pelagic species caught in very small amounts, such as bluefin tuna. Other incidental catches of fishes are discarded, together with sea birds and turtles. Sharks are included as part of the by-catches, although on occasion effort directed at some of these species has been detected.

Of the catches retained and landed, as shown in **Table 2**, the total annual values of tunas and tuna-like species declined in 1994 to 283 MT, although the total catch was higher (440 MT), due to the improvement of the information provided and to the increase in sharks landed. In 1995, the increase in the number of vessels in operation is reflected in the catches of tunas and tuna-like fishes (538 MT product weight), with similar proportions of swordfish (42%) and sharks (39%) in the landings. The total landings of sharks has been increasing, due to the landing of species which previously had been discarded and only their fins were marketed, and to the improvement mentioned above in the reported data. At any rate, the yearly fluctuations in the catches by species depend greatly on the market demands.

2. Research and statistics

The National Institute of Fishing (INAPE) is the only organism in Uruguay responsible for statistical monitoring and for research on these resources. The activities carried out in the last two years have been aimed at improving the statistics of the national fleet and to increased the monitoring of foreign vessels in Uruguayan ports, as well as to continuing the studies on the effect of the environment and on by-catches.

2.1 National fleet

a) Statistics

Even though improvement was observed in 1995 in the quality of the reported information on the fleet, gaps in data and false data continue to be detected, which is the reason why the statistics transmitted to the ICCAT Secretariat have been estimated, taking into account information from the fishing logbooks, as well as the landing declarations. At any rate, there is an evident need to rely on on-board observers, to be able, among other things, to adjust these data and for adequate monitoring of the landings; both these tasks have been impossible to carry out up to now due to the lack of personnel and means. At present, changes are being introduced in the fishing logbooks, so as to obtain more information on the catches retained and discarded, as well as instructing the fishermen on how to improve the quality of such information. Once the new format has been implemented, a copy will be sent to the ICCAT Secretariat.

In addition to the problems in the collection of catch and effort statistics, the product of this fishery is generally landed without heads, which continues to hinder size sampling activities at the ports.

* Original report in Spanish.

b) By-catches

The data on catches of sharks and other pelagic fish caught by the Uruguayan fleet are being processed and analyzed by species (**Table 3**). Better coverage of this information is expected with the utilization of the new fishing logbooks, which should include a breakdown by species of the total catch.

At the meeting of the Shark Working Group (Miami, February 1996), a paper was presented which synthesizes the available information on the catches of these species taken by the Uruguayan tuna fleet between 1981 and 1994.

c) Environment

There has been improved knowledge on the dynamics of the convergence fronts of the area, but the analyses of the relationship with the behavior of the species caught are not included.

2.2 Foreign flag vessels

a) With special permit

The information collected on board the U.S. flag vessel that operated in territorial waters from 1993 to 1995, with a special permit, mainly concerned the study of the gear and the fishing technique and focused on experimental fishing. In addition, some observations were conducted on the by-catches of birds and turtles, and the predator behavior of *Orcinus orca* on the catch. The results are part of internal reports and information presented at national scientific meetings.

b) Based at Uruguayan ports

In recent years, more activity has been observed at Uruguayan ports (Montevideo and La Paloma) of tuna vessels flying flags of member countries such as Spain and the United States, and those of non-members, mainly Panamanian and Taiwanese flag vessels (see section 4, Inspection).

3. Implementation of ICCAT management measures

In August, 1996, the INAPE presented to the Uruguayan Executive Branch of the Government a Draft Decree to update the Law of Fishing. This includes the regulations currently in effect, which were transmitted to the Secretariat in due course, on the minimum catch weights for swordfish (25 kg), bigeye (3.2 kg), and yellowfin (3.2 kg) (Decree No. 306/995), and that which prohibits the use of pelagic driftnets (Decree No. 692/991, Art. 8), as well as the new regulations. In this draft, swordfish are declared fully exploited (Art. 36). Once this is approved, it will be officially transmitted to the ICCAT Secretariat.

As regards the ICCAT Bluefin Tuna Statistical Document, the Uruguayan fleet catches this species as by-catch and in very minor percentages. At any rate, implementation of this Document is in process.

Copies of the Decrees currently in effect in Uruguayan laws relative to the implementation of ICCAT measures have been provided to the Secretariat.

4. Inspection

The INAPE is the official organism with competence in all matters of monitoring and control of activities relative to fishing. Staff of the Institute carry out port inspections in order to monitor compliance of the national management measures currently in effect. The ICCAT Inspectors of Uruguay also monitor the arrival of foreign flag tuna vessels. The current inspection coverage rate of Uruguayan flag vessels as well as those of other countries is insufficient due to the lack of personnel. For this reason work is being carried out on a monitoring scheme at ports and in Uruguayan territorial waters, with the collaboration of the Port Prefectures, Naval Aviation, and the Directorate of Maritime Traffic of the National Army.

For the moment there are no changes in the list of ICCAT Inspectors for Uruguay. (This list was provided to the Secretariat.) New designations are expected in 1997, and these will be transmitted to the Secretariat in due course. General information was collection from the foreign flag tuna vessels inspected and sighted in Uruguayan ports.

Table 1. Number of Uruguayan tuna vessels in operation, by GRT, 1993-1995

GRT	*1993*	*1994*	*1995*
< 200	2	3	3
201-300	2	-	3
Total	4	3	6

Table 2. Catches retained by the Uruguayan tuna fleet for the period 1993-1995

Species	*1993*	*1994*	*1995**	*%*
Swordfish	260	165	375	42
Bigeye tuna	48	37	71	8
Yellowfin tuna	20	59	47	5
Albacore	26	16	42	5
Bluefin tuna	0	+	2	+
Billfishes	0	6	1	+
Sub-total	*354*	*283*	*538*	
Sharks *	50	153	353	39
Others *	10	4	9	1
Total	**414**	**440**	**900**	

* product weight (DWT).
+ < 1 MT.

Table 3. Catches of sharks and other by-catches, retained and reported by the Uruguayan tuna fleet in 1995

Species	*MT (product weight)*
Isurus oxyrinchus	15
Prionace glauca	46
Lamna nasus	2
Carcharhinus spp.	15
Sphyrna spp.	8
Alopias spp.	1
Unidentified sharks	249
Lepidocybium flavobruneum	5
Unidentified fish	1