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**INTERNATIONAL COMMISSION  
for the  
CONSERVATION of ATLANTIC TUNAS**

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**R E P O R T  
for biennial period, 1978-79  
PART I (1978)  
English version**

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MADRID, SPAIN

1979

# INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

## *Member Countries (as of April 1, 1979)*

Angola, Benin, Brazil, Canada, Cuba, France, Gabon, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, South Africa, Spain, U.S.A., U.S.S.R.

## *Chairman of Commission*

Mr. E. B. YOUNG, Canada  
(from November 22, 1977)

## *First Vice-Chairman of Commission*

Dr. L. KOFFI, Ivory Coast  
(from November 22, 1977)

## *Second Vice-Chairman of Commission*

Mr. H. ROSA, Brazil  
(from November 22, 1977)

## *Panel Membership (as of April 1, 1979)*

<b>Panel</b>	<b>Contracting Parties</b>	<b>Chairman</b>
1	Angola, Brazil, Canada, Cuba, France, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, Spain, U.S.A., U.S.S.R.	Ghana (from November 21, 1978)
2	Canada, France, Japan, Korea, Morocco, Portugal, Spain, U.S.A., USSR.	Morocco
3	Brazil, Japan, Korea, South Africa, U.S.A., USSR.	Japan
4	Angola, Canada, Cuba, Japan, Korea, Portugal, Spain, U.S.A., U.S.S.R.	Spain

## *Council*

No election was conducted for the 1978-79 biennial period.

## *Standing Committees*

### **Committees:**

Committee on Finance and Administration (STACFAD)

Committee on Research and Statistics (SCRS)

### **Chairman**

Mr. C. J. BLONDIN, U.S.A  
(from November 22, 1977)

Mr. A. FONTENEAU, France  
(from November 22, 1977)

## *Secretariat*

General Mola, 17, 28001 Madrid (Spain)

*Executive Secretary:* O. RODRÍGUEZ-MARTÍN

*Assistant Executive Secretary:* P. M. MIYAKE

## LETTER OF TRANSMITTAL

The Chairman of the International Commission for the Conservation of Atlantic Tunas presents his compliments to the Member Governments to the Convention for the Conservation of Atlantic Tunas (signed in Rio de Janeiro, May 14, 1966), and to the Delegates and Observers representing said Governments, and has the honor to transmit the "**Report for the Biennial Period, 1978-79, Part I (1978)**", describing the activities of the Commission during the first half of said biennial period.

The volume contains reports of the First Special Meeting of the Commission, held in November, 1978, and of all the associated meetings of the Standing Committees and Sub-Committees. In addition, it contains a summary of the activities of the Secretariat, and the National Reports on scientific activities related to tuna fisheries carried out by the various countries.

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

*E. B. Young*  
*Commission Chairman*

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# CHAPTER I

## Secretariat Reports

### ADMINISTRATIVE REPORT 1978 COM/78/22 (Amended)\*

#### 1. Member Countries of the Commission

After the Fifth Regular Meeting of the Commission (Madrid 1977) the Secretariat was notified by the Food and Agriculture Organization of the United Nations (FAO) of the incorporation of two new countries to the Commission.

The Republic of Gabon deposited an instrument of ratification on September 19, 1977. The People's Republic of Benin deposited an instrument of adherence dated January 9, 1978.

In Accordance with Article XIV, paragraph 3, of the Convention, an instrument of adherence or ratification becomes effective on the date the instrument is deposited.

The Commission now has eighteen (18) member countries.

#### 2. ICCAT Meetings

##### *2.1. Location of the First Special Meeting of the Commission*

At the Fifth Regular Meeting of the Commission (Madrid, November 1977), it was agreed to hold the First Special Meeting of the Commission from November 15 to 21, 1978. This replaced the Regular Meeting of the Council which would have normally met.

Following the recommendations of the Commission, the Executive Secretary studied with great interest the possibility of holding the meeting in Las Palmas, Canary Islands (Spain). His study showed that holding the meeting in the Canary Islands would have represented a fifty percent increase in expenditures for the meeting. The Chairman of the Commission and the Standing Committee on Finance and Administration, respectively, were informed and it was decided to hold the First Special Meeting of the Commission in Madrid.

\*The Administrative Report presented at the Commission meeting was revised.

## *2.2. SCRS Officers Meeting*

As various SCRS problems have been pending since the last November meeting, its Chairman called an Officers Meeting in July in Madrid. The meeting was held on July 17-21, 1978, at the ICCAT Headquarters. The SCRS Chairman (A. Fonteneau), the Convener of the Sub-Committee on Statistics (S. Kume), the Convener of the Sub-Committee on Skipjack (G. Sakagawa) and the Secretariat staff attended the meeting. The meeting proved very productive as many of the pending problems have been solved. Various matters which had not been discussed before because of the limited time available during the SCRS session were also explored. One of the most important items discussed was expansion of the responsibilities of the rapporteurs for the species sections of the SCRS Report. The chief rapporteurs were asked to start drafting their parts of the Report in advance of the meeting. Also, they were requested to arrive in Madrid on Monday morning, November 6, 1978, with the second drafts which the scientists have more or less agreed upon. It was hoped that this would expedite the SCRS meeting so that the scientists can devote adequate time to other important matters (SCRS/78/6).

## *2.3. Sub-Committee on Skipjack*

The Sub-Committee on Skipjack also met at the time of the SCRS Officers Meeting in July, 1978, at ICCAT Headquarters in Madrid. Since most of the countries accepted the idea of the four-year International Skipjack Year Program starting in 1979, the Group assumed that the Program can be commenced accordingly. The Sub-Committee developed more detailed and refined program plans, reviewed the budget as well as the matching contributions pledged. The report containing these program plans and reviews was distributed in early September to the commissioners and scientists (COM-SCRS/78/14).

## *2.4. Working Group on Bigeye Size Regulation*

The Working Group was organized earlier this year. The outline of the Group's activities, as prepared by its Convener, Mr. M. A. Mensah, has been adopted and now the Group is working on the collection of basic data for the studies. The Group also met in Madrid in July at the time of the SCRS Officers Meeting. At that time, they confirmed that the first step was to exchange all available data and to collect the basic data from the present fisheries. The report is included in the Officers Meeting Report (SCRS/78/6).

## **3. Joint Training Course on Statistics and Sampling**

This Training Course was organized jointly by CEEAF, ICSEAF and ICCAT. Our Commission acted as the Course Coordinator and considerable time and effort was spent in this behalf.

A meeting of the three sponsoring agencies was held in February, 1978, at the ICCAT Headquarters in Madrid. At that time, participants were selected from among the

numerous applicants. One participant was selected among the member countries of the three aforementioned agencies which are classified as developing countries according to the U. N. list of economic development and was granted financial assistance to attend the Course.

The Spanish Oceanographic Institute (I. E. O.) extended an invitation and offered its lab facilities at Tenerife, Canary Islands for the Course. The three-week Course started on April 24, 1978. About 40 participants representing 18 countries attended the Course. Eight instructors lectured on the theoretical aspects of sampling and supervised the practical lab work. Besides financing participants and providing instructors, ICCAT, together with the I. E. O., arranged for hotel accommodations, meeting facilities, etc. and ICCAT and ICSEAF each provided a translator-secretary for the Course.

The Course was designed to give participants an introduction to statistical work, why those data are needed, sampling theory, practical aspects of statistics, design of a statistical system, data management, etc.

We hope that the three organizations can jointly publish the lectures of the Course as well as other Course material.

#### 4. Meetings at which ICCAT was represented

##### *a) Billfish Workshop*

A Workshop on stock evaluation of billfishes in the Pacific and Atlantic Oceans was held by the U. S. NMFS in Honolulu, Hawaii, on December 5 to 14, 1977, and the Assistant Executive Secretary represented ICCAT. The report of the Atlantic version was submitted to the SCRS as SCRS/78/7.

##### *b) FAO Fisheries Committee*

The Executive Secretary represented ICCAT at the FAO Fisheries Committee meeting held in Rome, on June 12-16, 1978.

#### 5. Cooperation with other organizations

##### *a) FAO*

As in the past, close working cooperation has been maintained with the FAO Fisheries Department. Mutual assistance in collecting statistics was maintained. FAO staff, particularly Dr. J. A. Gulland, made valuable contributions at the 1977 SCRS as well as during the inter-sessional period on various subjects.

##### *b) Inter-American Tropical Tuna Commission (IATTC)*

The exchange of scientific information has been maintained. Also, Dr. W. H. Bayliff of IATTC was invited as one of the lecturers for the Joint Training Course on



Statistics and Sampling held during 1978.

*c) Other organizations*

The Committee for the Eastern Central Atlantic Fisheries (CECAF) and the International Commission for the Southeast Atlantic Fisheries (ICSEAF) cooperated very closely with us in holding a joint training course. Besides, there was considerable exchange of information regarding various problems of data management, administration, etc. with ICSEAF since both organizations have their headquarters in Madrid.

The other organizations with which ICCAT has maintained close working relationships include, the Indo-Pacific Fisheries Council (IPFC), the Indian Ocean Fisheries Commission (IOFC), the International Commission for the Exploration of the Sea (ICES) and the International Commission for the Northwest Atlantic Fisheries (ICNAF).

**6. Coordination of research other than that mentioned previously**

The coordination of research carried out by the Secretariat during 1978 is summarized in Chapter I, "Secretariat Report on Statistics and Coordination of Research" and reported in detail in various SCRS documents (SCRS/78/9 to 29). Special activities during this year which warrant special mention are as follows:

*a) Collection of statistics*

Major improvements have been made concerning the Spanish tropical fleet and the U.S.S.R. fleet although various problems still remain to be solved.

*b) Data bank*

The data bank established with the INFONET system in 1977 at Madrid had been maintained, updated and utilized for all the statistical work executed by the Secretariat. A special contract was made with INFONET which provided for a discount up to 20 % on our use of their system. Also, the accumulation of experience in using the system as well as the upgrading of the Secretariat staff had reduced the operating cost to a great extent. The total cost for data processing for 1978 was about half that of 1977 while the work load was more than doubled. (For details see COM-SCRS/78/16.)

On the other hand, the Secretariat made a comparative study on the conventional system and that of purchasing a mini-computer system. The results are presented in COM-SCRS/78/17.

*c) Compilation of data*

This year the Secretariat processed three different types of raw data: logbook records and size data for the Spanish tropical fleet (submitted by the I. E. O.), size data for the Tema-based baitboat fleet (submitted by FRU) and ICCAT port sampling data.

*d) ICCAT joint tagging of young bluefin tuna*

Italy, Morocco and Spain organized cruises in 1978. Also, the United States and Japan contributed to the Special Fund established in 1975. (For details see COM-SCRS/78/12 and 15.)

**7. Publications***a) Biennial Report*

Part II of the Biennial Report for the biennial period 1976-1977 was printed in the three official languages of the Commission and distributed in July-October. As the printing cost is increasing rapidly every year, and as the volume becomes larger, the Secretariat made a study on how to best reduce the cost and labor involved in the issue's preparation. It seemed that the purchase of an IBM Composer would be a solution as it would cut the printing cost to about one half the present level. Besides, it would involve only one proofreading by the staff instead of two to three as is done at present.

*b) Statistical Bulletin*

The final edition of the Statistical Bulletin, Vol. 7 (for 1976) was issued in February, 1978. In early April, the Secretariat issued the first 1977 preliminary estimates of Atlantic tuna catches. The formal version of Volume 8 (for 1977 statistics) was completed and circulated in September, 1978.

*c) Collective Volume of Scientific Papers*

Volume VII (1977 SCRS papers) was prepared and distributed in March, 1978.

*d) Data Record*

The Data Record, Vol. 11 was prepared and distributed in March, 1978, but Vol. 12 was delayed until 1979 as a new format was proposed for this volume.

*e) Statistical Series*

The Statistical Series, Nos. 4, 5 and 6 were issued in September and October, 1978. Series 4 covers the results of ICCAT port sampling (1977); Series 5 covers the results of the I. E. O. sampling of the Spanish tropical fleet (1974-1977) and Series 6 covers the results of FRU sampling of Tema-based baitboats (1973-1977).

*f) Field Manual*

The Second Edition (English version) of the Field Manual was published in Novem-

ber, 1978. The French and Spanish versions are expected to be published in early 1979.

*g) Newsletter*

Newsletters, relating general information on Commission activities, were issued at intervals of approximately three months during 1978.

**8. Secretariat and Administration**

*a) Staff*

The contract with Mr. Arnaud de Boisset, who worked at the Secretariat as a statistical expert and programmer since 1972, was terminated in early 1978.

Also, Ms. Sherry Reiss, systems analyst with the Secretariat since 1976, has returned to the United States. The newly hired systems analyst at the Secretariat is Ms. Viveca Nordström, Swedish nationality, who is in charge of the data bank.

On September 1, 1978, Mr. Max Laurent, French nationality, joined the Secretariat as biostatistician.

*b) Office space for the ICCAT Secretariat Headquarters*

In the Administrative Report presented at the time of the Fifth Regular Meeting of the Commission, (Madrid, November 1977), we called the commissioners' attention to the insufficient office space at the Secretariat Headquarters. This lack of space is due to the increase in the staff as well as to an increase in the Secretariat's activities. In that report it was pointed out that we need at least 450 to 500 m<sup>2</sup> of space.

Our need for additional office space was heightened this year and it would be materially impossible to continue at our current office, especially if the Skipjack Year Program is approved by the Commission.

Following the recommendation of the Commission, the Executive Secretary established contact with the Spanish authorities, presented our problem to them and asked for a solution to the matter.

O. Rodríguez-Martín  
*Executive Secretary*

**FINANCIAL REPORT 1978**  
**COM/78/23 (Amended)\***

**1. Auditor's Report for the 1977 Fiscal Year**

The Auditor designated by the "Instituto de Censores de Cuentas de España" has examined the accounts and balance sheet of the Commission up to December 31, 1977. In compliance with Regulations 9-3 and 12-7 of the Financial Regulations and in accordance with the recommendations of the Council at its Second Regular Meeting, the Secretariat sent a copy of the Auditor's Report to all member country governments in May, 1978. An abstract of the same has been included in the Biennial Report, 1976-77, Part II, which was presented as a document of this Commission (COM/78/12).

**2. 1978 Budget**

The 1978 Budget for U.S.\$ 408,000, was approved by the Commission at its Fifth Regular Meeting (Madrid, November 1977). (See Appendix 3 to Annex 6 to the 1977 Proceedings.)

We began the Fiscal Year under the sign of austerity, which has governed our financial policies throughout the year. Therefore, we managed to carry out the additional activities assigned to the Secretariat by somewhat sacrificing on the conventional routine activities.

It should be noted that even though the budget is established in U.S. dollars, many expenses are paid in pesetas. The official inflation rate in Spain in 1978 was 16.5 o/o. On the other hand, the devaluation of the dollar with respect to the peseta was approximately 16 o/o.

December 1977 -- 1 US \$ - 82 pesetas

December 1978 -- 1 US \$ - 69 pesetas

As a result, the budget approved in November, 1977, has shown a 32 o/o decrease in purchasing power, with repercussions in the expenses of all the chapters, but especially in Chapters 3, 4 and 6.

\*Updated to the end of Fiscal Year 1978. Modifications approved by the Commission have been included.

### 3. Current status of Commission accounts

*Statement 1* shows the financial situation at the end of Fiscal Year 1977.

The state of accounts at the end of Fiscal Year 1977 showed a balance of \$82,049.23, from which \$9,600 was deducted for the settlement of A. de Boisset's cessation of employment. This amount (\$9,600) was paid in 1977, but applied to the 1978 budget. As a result, the balance in Cash and Bank is \$72,449.23.

There are contributions pending payment which correspond to the 1978 budget and total \$8,096.06. On the other hand, Canada's 1978 contribution for \$12,255.00 was paid before the end of 1977.

*Statement 2* shows the status of each member country's contribution. The pending 1978 contribution from Gabon, as well as amounts corresponding to previous years from Ivory Coast and Ghana, total \$11,711.95. There is also an extra-budgetary income pending which corresponds to the 1978 contribution from Benin, totaling \$2,958.00. On the other hand, Cuba, Senegal and Spain have positive balances due to the fluctuation in foreign currency exchanges.

*Statement 3* shows the budget and expenditures up to the end of Fiscal Year 1978. In accordance with that agreed by the Commission, the positive balance of \$26,730.70 was applied as follows:

- a) \$22,168.20 -- towards the purchase of an IBM MC Composer.
- b) \$ 4,500.00 -- towards the publication costs of the Field Manual  
(2nd Edition) - French and Spanish versions.
- c) \$ 62.50 -- towards the Working Capital Fund.

*Statement 4* shows the total of income and expenditures during Fiscal Year 1978 and the balance in Cash and Bank up to the end of the Fiscal Year. Also included as income on this statement is the 1979 contribution of Angola.

*Statement 5* shows the state of accounts up to the end of Fiscal Year 1978.

*Statement 6* shows the status of the Working Capital Fund, which amounted to \$54,393.50 at the close of Fiscal Year 1977. After adding the non-budgeted income corresponding to 1978 (\$9,048.09) the Fund shows a balance of \$63,441.59. This Fund is very useful as it serves to cover the possibility of delays in payment of the contributions, as well as to meet Commission expenses during the early months of the year until the early country contributions are received.

### 4. General Comments -- (Statement 5)

#### *Chapter 1 -- Salaries*

This Chapter shows a negative balance of \$2,911.06, which is due to the salary increases throughout the year in the U.N. salary scheme.

#### *Chapter 2 -- Travel*

Because of an excess of work at the Secretariat, the trips made by the staff had to be reduced to a minimum. For this reason, this Chapter shows a substantial positive balance (\$7,215.48), which may not be repeated in the future.

*Chapter 3 – Meetings (First Special Meeting of the Commission)*

The actual expenses for this chapter surpassed considerably (\$12,468.14) the budget allocated to it, as can be seen in the following table of expenses:

i) Simultaneous translation	\$ 9,002.19
ii) Extra staff	9,660.55
a) 4 multilingual translators*	
b) 1 receptionist	
c) 2 assistant receptionists	
d) 1 multicopy machine operator	
e) 1 assistant operator	
iii) Secretariat	5,290.44
a) Overtime (G category)	
b) Transportation, meals during meeting, and during transport of equipment to the hotel and back after meeting	
iv) Hotel – various conference rooms and coffee break	6,596.36
v) Cymen Company (electronic equipment)	3,956.52
vi) 3 Rank Xerox machines (Models 7000, 4500 & 310) and materials	5,677.42
vii) Various	<u>284.66</u>
TOTAL	\$40,468.14

\*Two of these translators were hired from October 9, 1978 up to the end of the meeting.

*Chapter 4 – Publications*

The preparation of the following publications has been charged to this Chapter:

- a) Biennial Report, 1976-77, Part II (English, French and Spanish)
- b) Statistical Bulletin, Vol. 7 (1976) Final Edition

ICCAT REPORT 1978-79 (I)

- c) Statistical Bulletin, Vol. 8 (1977) Preliminary Edition
- d) Collective Volume, Vol. VII (1) and (2)
- e) Data Record, Vol. 11
- f) Statistical Series, Nos. 4, 5 and 6
- g) Proceedings of the Fifth Regular Meeting of the Commission
- h) Newsletter
- i) Field Manual (2nd Edition) - English version

The expenses pertaining to this budget chapter are increasing steadily and sharply, due to the rising printing costs, the constant increase in the number of pages and the addition of new publications. Referring specifically to the Biennial Report, 1976-77, Part II, the actual printing cost was as follows:

— English version	\$ 8,188
— French version	6,050
— Spanish version	<u>5,107</u>
	\$19,345

As the costs have risen sharply, we studied the problem in detail and arrived at the conclusion that the major factor contributing to cost increases is the page setting done at the printer's. One solution would be to do the page setting at the Secretariat using our own means and then sending the offset masters to the printer for reproduction and binding. In this case, we would have to buy a composer machine, whose cost is \$22,168.20. This would also reduce to once the number of times the Secretariat staff has to proofread the reports.

In order to meet this expense, we could use the funds from the positive balance of Fiscal Year 1978; we hope to amortise the expense with two-three years.

The Commission accepted this suggestion of the Secretariat.

#### *Chapter 5 – Office Equipment*

We purchased furniture for the biostatistician and a typewriter under this Chapter.

#### *Chapter 6 – General Operating Expenses*

This Chapter includes those expenses corresponding to office material, reproduction of documents, postage, telegraph services, telephone, electricity, equipment maintenance contracts, office cleaning service, as well as the security bond and the auditor's fees. The breakdown is as follows:

FINANCIAL REPORT

Mailing expenses	\$ 7,600
Telegrams	650
Telephone	6,500*
Phono-telex service	500
Electricity	600
Office cleaning service	1,100
Rank Xerox copier	10,800
Office materials	5,000
Equipment maintenance	1,200
Security bond	1,500
Auditor's fees	1,000
Miscellaneous	<u>214</u>
	\$36,664

*Chapter 7 – Miscellaneous Expenses*

This Chapter includes minor expenses, such as repairs (plumber, painting, etc.), local transportation for office business and general expenses which are not applicable to the other budget chapters.

*Chapter 8 – Coordination of Research*

The budget for this Chapter has increased substantially due to the increase in the Secretariat's activities regarding research. The expenses pertaining to each subchapter are as follows:

	BUDGET	EXPENSES
a) Staff	\$ 71,000	\$ 64,924
b) Travel	10,000	4,279
c) Equipment	6,000	1,382
d) Data Processing	40,000	20,150
e) Miscellaneous	5,000	2,500
f) Training Course	<u>12,000</u>	<u>13,430</u>
TOTAL	\$144,000	\$106,665

\*Also included is the cost of the terminal telephone connection to the data center. Next year this terminal phone expense will be included in Chapter 8 (d) - Data Processing.



a) Staff

This sub-chapter covers M. Laurent (biostatistician - from September), S. Reiss (up to August), V. Nordström (systems analyst - from July), A. Rick and S. Martin (temporary statistical aid). It also included the settlement of A. de Boisset (\$9,600), and ICCAT samplers in Tenerife and Las Palmas (Canary Islands), Abidjan, Cape Town and St. Maarten (\$10,000).

In this sub-chapter there is a positive balance of \$6,076. This is because the biostatistician did not start working until September, instead of at the beginning of the year. Had he started earlier in the year, the balance would have been negative.

b) Travel

The lack of a biostatistician up to September is reflected in this sub-chapter. Charged to the sub-chapter were the trip expenses of the SCRS Officers (A. Fonteneau and S. Kume), the expenses for two biostatistician candidates (D. Cross and M. Laurent) for interviews, and a trip by the biostatistician to the Canary Islands.

c) Equipment

Included in this sub-chapter are miscellaneous computer expenses.

d) Data Processing

A total of \$40,000 was budgeted for this sub-chapter. In spite of the fact that the processing work carried out this year was more than doubled that which had been done in 1977, the cost was half that of the year before. This reduction is attributed to a more rational utilization of the equipment because of our accumulated experience. Besides, we have signed a rather advantageous contract with INFONET IBERMATICA and the results have been very satisfactory (See COM-SCRS/78/16).

e) Miscellaneous

Included in this sub-chapter are the expenses corresponding to tagging: the ICCAT annual lottery rewards for tag recoveries, and tagging material.

f) Training Course

Expenditures for the Course were within the budget forecasted, with only a slight negative balance.

## STATEMENT 1

## Statement at Close of Fiscal Year 1977

<i>ASSETS</i>		<i>LIABILITIES</i>	
	\$		\$
Cash and Bank	72,449.23	1. To the 1978 Budget:	
Settlement-A.de Boisset (termination of employ- ment) applicable to 1978 Budget	<u>9,600.00</u>	a) From positive balance 1977	13,000.00
	82,049.23	b) From the Working Capital Fund	10,000.00
Contributions pending payment	8,096.06	2. Status of Working Capital Fund	54,393.50
	<u>                    </u>	3. In Cuba's favor 1978	496.79
TOTAL	90,145.29	4. In Canada's favor 1978	<u>12,255.00</u>
			90,145.29

## STATEMENT 2

## Statement of Member Country Contributions in 1978

	1977 Balance	Contributions for 1978 Budget, ap- proved by the Commission	Contributions paid for the 1978 Budget	Other Contributions	1978 Balance
Angola . . . . .	--	9,764	9,764.00 (20/XII)	--	--
Brasil . . . . .	--	9,527	9,527.00 (28/III)	--	--
Canada . . . . .	--	12,255	1/	--	--
Cuba . . . . .	+ 496.79	14,403	13,986.37 (8/IV)	--	+ 80.16
France . . . . .	--	56,592	56,592.00 (7/III)	--	--
Gabon . . . . .	--	2,958	--	--	- 2,958.00
Ghana . . . . .	--	12,811	11,883.43 (29/V) (8/VIII)	--	- 927.57
Cote d'Ivoire . . . . .	- 8,096.06	12,945	12,945.00 (1/VI) (22/VI)	269.68	- 7,826.38
Japan . . . . .	--	36,379	36,379.00 (15/III)	--	--
Korea . . . . .	--	38,665	38,665.00 (12/V)	--	--
Maroc . . . . .	--	11,844	11,844.00 (12/VII)	--	--
Portugal . . . . .	--	19,242	19,242.00 (2/I/79)	--	--
Senegal . . . . .	--	10,330	10,330.00 (19/VIII)	1,313.00	+ 1,313.00
South Africa . . . . .	--	6,066	6,066.00 (8/IV)	--	--
España . . . . .	--	68,469	68,469.00 (19/VIII)	2,781.64	+ 2,781.64
United States . . . . .	--	42,745	42,745.00 (21/II)	--	--
U.S.S.R. . . . .	--	<u>20,008</u>	<u>20,008.00 (14/VII)</u>	<u>--</u>	<u>--</u>
	+ 496.79	385,000	368,445.80	4,364.32	+ 4,174.80
	- 8,096.06	(385,003)			- 11,711.95

1/ Canada paid its contribution (\$12,255) in December, 1977, and this amount is included in said Fiscal Year (See Statement 1).  
Benin - pending payment of extrabudgetary contribution (\$2,958).

## STATEMENT 3

## Fiscal Year 1978, Budget, Expenditures and Balance (\$)

	I	II	III
	<i>1978 Budget</i>	<i>Total expenditures Fiscal Year 1978</i>	<i>Balance</i>
1. Salaries . . . . .	152,000	154,911.06	- 2,911.06
2. Travel . . . . .	10,000	2,784.52	+ 7,215.48
3. Meetings . . . . .	28,000	40,468.14	- 12,468.14
4. Publications . . . . .	28,000	32,500.59	- 4,500.59
5. Office Equipment . . . . .	4,000	2,294.77	+ 1,705.23
6. Operating Expenses . . . . .	28,000	36,664.82	- 8,664.82
7. Miscellaneous . . . . .	4,000	3,882.64	+ 117.36
8. Coordination of Research . . . . .	144,000	106,664.91	+ 37,335.09
9. Contingencies . . . . .	10,000	1,097.85	+ 8,902.15
	<u>408,000</u>	<u>381,269.30</u>	<u>+ 55,275.31</u>
			<u>- 28,544.61</u>
			26,730.70
a) IBM MC Composer . . . . .		<u>22,168.20</u>	<u>22,168.20</u>
		403,437.50	4,562.50
b) Field Manual (2nd Ed.) French & Spanish . . . . .			4,500.00
c) To the Working Capital Fund			<u>62.50</u>
			0

## Tagging Fund

<i>Income</i>	<i>Expenses</i>	<i>Balance</i>
\$3,000	\$1,001.54	\$1,998.46

Income and Expenditures (\$)

<i>INCOME</i>		<i>EXPENDITURES</i>	
Cash & Bank at end of Fiscal Year 1977 . . .	82,049.23	From Regular Budget 1978 . . . . .	403,437.50
Income corresponding to 1978 Budget . . . . .	368,445.80	From contributions to Tagging Program . .	1,001.54
Other contributions . .	4,364.32	Cash & Bank . . . . .	73,070.90
U.S. contribution to Tagging Program . . .	2,000.00		
Japan's contribution to Tagging Program . . .	1,000.00		
Sale of Field Manual . .	10.00*		
Bank Interest 1978 . .	8,972.59*		
Angola 1979 contribution	10,668.00		
TOTAL . . . . .	477,509.94		477,509.94

\* To the Working Capital Fund.

FINANCIAL REPORT

STATEMENT 5

Balance Sheet at Close of Fiscal Year 1978

<i>ASSETS</i>		<i>LIABILITIES</i>	
1. <i>Banco Exterior de España</i>	\$	1. Status of Working Capital Fund	\$
a) Time deposit account	30,000.00	2. Tagging Fund	63,441.59
b) Checking account	35,853.03	3. In favor of: Cuba	80.16
c) c/a domestic Ptas. 367,475.48		Senegal	1,313.00
d) c/a convert. Ptas. 42,468.69		Spain	2,781.64
2. Cash on hand Ptas. 88,089.06		4. Field Manual (2nd Ed.) (French & Spanish)	4,500.00
Ptas. 498,033.23	<u>7,217.87</u>		
(1 US \$ = 69 Ptas.)	73,070.90		
3. Angola contribution, included in Fiscal Year 1979	<u>10,668.00</u>		
	62,402.90		
4. Contributions pending payment	<u>11,711.95</u>		
TOTAL	74,114.85		<u>74,114.85</u>

STATEMENT 6

Breakdown of the Working Capital Fund

At the end of Fiscal Year 1977	\$54,393.50
Bank interest (1978)	8,972.59 )
Sale of Field Manuals	10.00 )
	) \$9,048.09
Rounding off of contributions	3.00 )
Positive balance 1978	<u>62.50 )</u>
TOTAL	\$63,441.59

## STATEMENT 7

## International Commission for the Conservation of Atlantic Tunas -- Balance Sheet at Close of Fiscal Year 1978

<i>ASSETS</i>		<i>LIABILITIES</i>	
<i>Available:</i>		<i>Acquired holdings:</i>	
BANCO EXTERIOR DE ESPAÑA		From previous fiscal years	\$ 37,882.05
C/A 30-31279-Q	\$ 35,853.03	During Fiscal Year 1978	<u>\$ 24,462.97</u>
In time deposit account	\$ 30,000.00		\$ 62,345.02
C/A 30-17329-F in convertible ptas.	42,468.69		
C/A 30-17672-A in pesetas	367,475.48		
Cash on hand	ptas. <u>88,089.06</u>		
Total	ptas. 498,033.23		
At 69 ptas. per \$ 1		<i>Working Capital Fund:</i>	
	<u>\$ 7,217.87</u>	As shown in attachment	\$ 63,441.59
Total	\$ 73,070.90	<i>1979 Budget:</i>	
<i>Receivables:</i>		Balance from Tagging Fund	\$ 1,998.46
Gabon	\$ 2,958.00	For the 2nd Edition of the	
Ghana	\$ 927.57	Field Manual	<u>\$ 4,500.00</u>
Ivory Coast	<u>\$ 7,826.38</u>		\$ 6,498.46
	\$ 11,711.95	<i>Income received in advance:</i>	
<i>Equipment:</i>		1979 Angola contribution	\$ 10,668.00
Before 1978	\$ 37,612.85	Overpayment in contribution by:	
During 1978	<u>\$ 24,462.97</u>	Cuba	\$ 80.16
	\$ 62,075.82	Senegal	\$ 1,313.00
<i>Bonds</i>		Spain	<u>\$ 2,781.64</u>
	<u>\$ 269.20</u>	Total Liabilities	\$ 14,842.80
Total Assets	\$ 147,127.87	Undersecretariat of Merchant Marine of Spain,	
Furniture ceded by Undersecretariat of Merchant		furniture ceded	\$ 3,365.38
Marine of Spain	\$ 3,365.38		

The Executive Secretary:  
O. Rodríguez-Martín

Madrid, May 20, 1979

Certified:  
A. Oliver y Trujillo

## SECRETARIAT REPORT ON STATISTICS AND COORDINATION OF RESEARCH

COM-SCRS/78/12 (Amended)

### I. Statistics and Sampling

#### 1. Collection of 1977 statistics through national offices

The progress made by the national offices is shown in Tables 1, 2, and 3 (now contained in Appendix 5 to Annex 6 of the Proceedings) for Task I, Task II - catch and effort and biological statistics, respectively.

##### *a) Task I - Nominal annual catch statistics (Table 1)*

In Table 1, it is noted that the progress made in 1978 in collecting Task I data for 1977 was at approximately the same level as the previous year. By July, the majority of the important tuna countries had provided total annual nominal catches. Major improvements were made in the nominal catch data of Angola and the U.S.S.R.

##### *b) Task II - Catch and effort statistics (Table 2)*

The following major improvements were made in collecting Task II - catch and effort data during 1978:

*Korea* - Catch and effort data by 5° x 5° area are now more adequate and the coverage rate improved.

*Spain* - For the first time, catch and effort data for the Spanish tropical fleet (purse seine) became available. Raw logbook records collected by the Spanish Oceanographic Institute (I.E.O.) from 1974 through 1977 were submitted to the Secretariat. The Secretariat verified and processed the data by 1° x 1° area and by month as well as by ICCAT sampling areas. The results were distributed as Statistical Series-5 (SCRS/78/24). The coverage for the earlier years is poor but for later years (1976, 1977) it is fairly adequate. Besides the above, catch and effort data for bluefin tuna in the Bay of Biscay and for the Canary Islands fisheries have become available for the first time this year.

*U.S.S.R.* - For the first time, catch and effort data became available. The data are by month and FAO small areas, and by gear and species. Unfortunately, FAO areas, which are primarily designed for bottom fisheries, do not coincide with ICCAT areas. However, the FAO areas were matched to similar ICCAT areas as closely as possible



and the data have been entered into the data base by ICCAT area. Since the catch by U.S.S.R. has been increasing, over 10,000 MT, in the last few years, these data constitute an important contribution to ICCAT work.

*Brazil* - Brazil provided catch and effort data for their longline and foreign fleets. Since ICCAT has no coordinator in the Brazilian ports to collect logbooks from these boats, these data collected by the Brazilian scientists from the foreign fleets provide good supplemental data for the ICCAT port sampling program.

*c) Task II - Biological data*

Progress made during 1978 in the collecting of biological data is as follows:

*Angola* - For the first time, size frequencies were made available on the 1977 Angolan catch.

*Ghana* - Ghanaian sampling from their fleet as well as from the Tema-based foreign flag fleets continued and the data became more adequate. The raw data thus collected by the Ghanaian scientists have been sent to the Secretariat. The Secretariat verified and processed the data by ICCAT area, by month and by flag. In the past, the Secretariat reported a summary of yellowfin data only. This year, summaries of all species since 1973 are being circulated in Statistical Series-6 (SCRS/78/25).

*Spain* - For the first time, the size frequency data collected by the Spanish Oceanographic Institute (I.E.O.) at Atlantic landing ports from the Spanish tropical fleet were made available. Those data cover from 1974 through 1977 and the raw data were presented in the form of field records. The ICCAT Secretariat verified and processed the data by ICCAT surface areas and by month. The data were circulated in Statistical Series-5 (SCRS/78/24). Unfortunately, a major part of the samples taken in Abidjan could not be used since logbooks and associate information, such as location and month from which sampled catch was taken, were not available. Now, for the first time, major parts of all tropical tuna fleets are being sampled. Also, Spanish sampling efforts for other areas such as Canary Islands and the Bay of Biscay showed great improvements during 1978.

*U.S.A.* - The United States provided swordfish and billfish size frequencies which have been collected since 1938 through 1977 on magnetic tape.

*d) General comments*

As can be seen in the above observations, improvements in statistics have been very significant during 1978. Now, only a fraction of the total Atlantic catches are not covered either by catch and effort statistics or by biological sampling. However, timeliness in making data available is not yet satisfactory.

**2. Collection of 1978 catch estimates (Table 4)**

In 1978, again the Secretariat requested major member and non-member tuna

fishing countries to provide preliminary estimates of tuna catches and size frequencies for the current year. On August 4, the Secretariat circulated a request for this information (Circular 1978/13). The progress is shown in Table 4 (now included in Appendix 5 to Annex 6 to the Proceedings).

### 3. Statistical works in which the Secretariat has been directly involved in 1978

The Secretariat's effort to collect logbook records and size frequencies at Atlantic transshipping ports from longliners has been continued in 1977 and 1978. At Las Palmas, Tenerife and St. Maarten one local employee has been employed by the Secretariat as a part-time coordinator. These people abstract logbooks and measure the fish from landings. At Abidjan, in 1978 sampling was conducted by a local technician paid by ICCAT and supervised by CRO. There has been some difficulty in obtaining logbook abstracts at this port. At Capetown, the samplings have been conducted through a contract with the Sea Fisheries Department of South Africa up to mid-1978. The Secretariat has been informed that since the work burden at the Sea Fisheries Department is increasing, it is becoming more difficult for them to carry out tuna sampling for ICCAT. At the time of the writing of this report, the Secretariat is trying to hire a local person, paid by ICCAT, to continue this work, under the supervision of the Sea Fisheries Department. There has been some indication that the unloading of Oriental longline fleet at Uruguayan and Brazilian ports has been increasing. Also, as mentioned in the previous section, Brazilian scientists provided valuable data on longliners based at Brazilian ports. In 1979, the format of the port sampling program will be reviewed again and any necessary modifications will be made. In Table 5, a summary of the program is compared for 1975-76 and 1977.

### 4. Secretariat's evaluation of the present data coverage (Table 6)

Table 6 summarizes the Secretariat's view on the adequacy of the data coverage based on Sections 1-3 of this report and the data bases established at the Secretariat. In the table, "catch per effort" refers to the catch per effort data by 5° x 5° and quarterly for the longline fleets and 1° x 1° and monthly for the surface fleets. "Size frequency data" refers to either actual size frequency or raised size frequency (catch by age groups). The rating 1 (adequate), 2 (partially covered), 3 (not covered) is made arbitrarily by the Secretariat, particularly for the size frequency data. It is interesting to compare this table with Table 6 of last year's Secretariat report. Adequate progress is evident for the tropical surface fleet due to the new data that has been made available for the Spanish fleet.

### 5. Informal group for the improvement of worldwide tuna statistics

Since early 1978, ICCAT has proposed the creation of an informal group for the improvement of worldwide tuna statistics. This proposal includes the formation of a group consisting of regional agencies as well as some countries which are interested in improving worldwide tuna statistics. Since many countries fish in the Pacific, Atlantic and Indian Oceans, many problems are common to the three Oceans. This proposal has

been generally accepted by the scientists and organizations concerned and ICCAT is taking initiative in organizing this group which, for the time being, works through correspondence.

## II. Processing and dissemination of statistical information

### 1. Processing of data

The data bases established with the INFONET system have been maintained and updated in 1978. All the processing has been effected by this system. (In previous years, several simple jobs were done by an IBM computer at CIBERNOS, but these jobs have now been transferred to the INFONET system.) At present, three different types of work are conducted: compilation of the Statistical Bulletin, processing of raw data and documentation of catch/effort and size data bases. (For details see COM-SCRS/78/16.)

### 2. Dissemination of the information and publications

#### *a) Quick estimates*

With the assistance of national scientists, in April the Secretariat was able to issue the estimates for tuna catches made in 1977 by major fisheries. Reference should be made to Section I-2 of this report for 1978 estimates.

#### *b) Statistical Bulletin*

The first provisional issue of the Statistical Bulletin, Volume 8 (COM-SCRS/78/9), was circulated in September, 1978. This volume covers catches up to 1977. The final version is expected to be circulated in January, 1979. Again this year, Part 5, containing billfish statistics by species, is maintained. This table shows the Secretariat's estimates of billfish catches by species. They do not match with the official statistics which are shown by tables in parts 1-4.

#### *c) Data Record*

Volume 11, which contains all Task II data presented at the 1977 SCRS meeting and information received immediately afterwards, was issued in March, 1978. The next volume of the Data Record will be a tabulated print-out of the data bases we have in the Secretariat. Therefore, the data will be rearranged in a uniform format regardless of the form in which data are presented to the Secretariat. A sample of such data was presented to the SCRS as SCRS/78/29.

#### *d) Collective Volume of Scientific Papers*

Volume 7 (nos. 1 and 2) consisting of all the papers submitted at the 1977 SCRS meeting and whose inclusion was approved by the authors, was issued in March, 1978.

*e) Statistical Series*

Three volumes were issued during 1978. Volume 4 contains catch and effort and size frequencies collected by the Secretariat at transshipment ports in the Atlantic from Oriental longliners. The volume covers the fisheries in 1977 and was issued in September, 1978. There was some delay in issuing the data this year. The main reason is that longline trips were longer in 1977 and the catches made in 1977 were reported to the Secretariat as late as July. Volume 5 contains processed catch and effort and biological data collected by the Spanish Oceanographic Institute from their tropical fleets (see Sections I-1-b and c). Volume 6 includes biological data collected by the Ghanaian Fisheries Research Unit from the baitboat fleets operating from Tema. This volume covers catches made from 1973 through 1977.

*f) Field Manual -- Revised*

In 1977, a revised draft Field Manual was presented at the meeting. It was generally accepted and the SCRS and Commission recommended that the Secretariat receive comments on the draft by March 1, 1978, and that the issue be published in the same format as the first edition. Accordingly, a few scientists presented their comments on the draft. Since the comments were only of an editorial nature, they were all incorporated. The English version was presented as COM-SCRS/78/13. It is expected that the French and Spanish versions will be published during the coming year.

### III. Training Course on Statistics and Sampling

According to the recommendations and decisions made by the SCRS and Commission, the Secretariat started preparing this Training Course in 1976. Cooperation was solicited from other international organizations in 1976 and 1977, and CEEAF and ICSEAF agreed to hold this course jointly with ICCAT. The Coordinating Group was set up for this joint Training Course by the Secretariats of these three organizations and ICCAT served as the Secretary for this Coordinating Group. One or two applicants from each developing country of the members of one of these three organizations were selected to attend the course with financial assistance, including travel expenses as well as per diem expenses (20 participants). Besides, applicants who wished to attend the course at their own expense were accepted for the course. The course was held at the Laboratory of the Spanish Oceanographic Institute (I.E.O.), Tenerife, at their invitation. All the facilities, including lecture rooms, were provided by I.E.O. Eight instructors, including the staff of the Secretariat of the three organizations, participated in the course and 37 students from 18 countries attended. The course was held from April 24 to May 13. Training was given in theoretical as well as practical aspects. All the participants, students and instructors, evaluated the course as being very successful. Presently, we are requesting the instructors to provide a manuscript of their lectures. Eventually, the three organizations are planning to issue a collection of those lectures in one volume. ICSEAF and ICCAT provided one secretary each for the course.

#### **IV. Tagging Programs**

##### **1. Young bluefin tuna tagging program**

In 1977, the SCRS and the Commission recommended that a pilot program be started in 1978 for tagging bluefin tuna in the eastern Atlantic. Unfortunately, the responsibility of organizing such a program was not set and no initiative was taken in this project. Under the circumstances, the Secretariat circulated a note among the scientists to stimulate their interest in this project. In response to our request, Dr. C. Piccinetti (Italy) organized two cruises in the Mediterranean for tagging young bluefin tuna, one in late June and one in late August. Mr. J. C. Brêthes (Morocco) also organized a tagging cruise from Casablanca in late June to early July. The Secretariat consulted with Mr. Brêthes and decided to execute tagging from commercial purse seiners rather than using a Moroccan research boat (troller), as was done last year. There is a greater chance of tagging fish on a commercial boat than on a research boat. Also, if fish are not available, the cost of the program would be minimal, while tagging from a research vessel would be costly, regardless of the success of the cruises. Very unfortunately, bluefin tuna were not abundant in the area as was the case in 1977. As a result, only 7 fish were tagged. The situation was very similar for the Mediterranean and the Secretariat was informed by Dr. Piccinetti that there were no fish in this area in June and no commercial activities. As of the writing of this report, no report was received as to the August cruises. Three U.S. scientists and two Spanish scientists participated in these cruises at their own expense. The Secretariat was informed that Spain tagged over 170 young bluefin tuna in the Bay of Biscay.

The Moroccan tagging cruises were financed by the special trust fund established at the Secretariat, while the Italian and Spanish cruises were carried out at their own expense. In 1978, the U.S. contributed \$2,000 to the fund and the Japanese tuna industry contributed \$1,000. Besides this, the Japanese government contributed \$1,000 worth of tags. These tags are made of poliurethane and are resistant to extreme cold temperatures in storage (-45° to -50°C). The conventional tag is made of vinyl which can break at temperatures below -20°C.

##### **2. Tagging lottery**

This year the lottery was held at the Secretariat in Madrid on April 14, 1978. Two three hundred dollar prizes were awarded to a Portuguese and Taiwanese skipper.

##### **3. Tagging materials provided by the Secretariat**

The Secretariat provided countries which have conducted tagging with the materials needed. These countries included Brazil, Italy and Morocco. As the stock of plastic dart tags has been depleted, an order was made with the same Japanese firm from which the Japanese government ordered their tag contribution to ICCAT.

#### **V. Progress made by the Secretariat as to the assignments of the 1977 SCRS Meeting besides those mentioned above**

**1. Recruitment of a biostatistician**

The announcement of the vacancy of the post was circulated widely in early 1978. Among the applications received, two candidates were asked to come to Madrid for interviewing, and Dr. Max Laurent (France) was finally chosen as the ICCAT biostatistician. Because of the formalities involved with the French government, his actual arrival at the Secretariat was delayed until September 1.

**2. Development of the ICCAT Secretariat data bank**

See COM-SCRS/78/16.

**3. Preparation of a compendium of codings and specifications of computer magnetic tapes used by each laboratory**

See SCRS/78/28.

**4. Approval of proposed new sampling areas**

See SCRS/78/27.

**5. Establishment of a tagging data base at the Secretariat**

According to the recommendations by the Commission, the Secretariat has circulated a note requesting each member country to provide tagging data, including releases and recoveries, for all the tuna tagging experiments conducted in the past so that the Secretariat can make a data file for that information. As of the time of the writing of this report, Japan and Brazil responded to this request. The United States informed the Secretariat that a tape containing 1976 and 1977 data had been sent, but this has not yet been received. Several reminders were circulated with no response and consequently, the data file has not yet been made.

**6. Comparative study of computer systems**

Although the operating cost of the current computer system has been extensively reduced through accumulated experience in using the system, the Secretariat made some comparative studies of computer systems, i.e. conventional systems vs. mini or micro-computer systems. The report was presented as COM-SCRS/78/17.

**VI. Other research coordination done by the Secretariat in 1978 and general comments**

Many coordination activities were executed by the Secretariat besides those mentioned in this report. These include organizing the SCRS Officers Meeting, held in July, 1978, in Madrid, the Skipjack Sub-Committee Meeting held at the same time, preparing the final report, creating the Bigeye Working Group at the suggestion of the SCRS Chairman, and organizing the Working Group on Document Policy. In general, the work load

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of the Secretariat was double that of last year, while the financial aspect was tight. The Secretariat's activities were limited to those which have priority. Many scientific meetings in which ICCAT had previously been represented were not attended and many field trips which are desirable for improving statistics were not carried out. The addition of the biostatistician in late 1978 will hopefully improve this situation in the coming year.

(Tables 1-4 are included in Appendix 5 to Annex 6 of the Proceedings.)

**Table 5. Summary of Secretariat Port Sampling Program — 1975-1976-1977**

	<i>Korea &amp; Panama</i>			<i>Taiwan</i>			<i>TOTAL</i>		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
I. No. of valid logs abstracted/Estimated no. of trips*	196/220 (89)	214/220 (97)	230/280 (82)	115/230 (50)	190/270 (70)	257/400 (69)	311/450 (69)	404/490 (82)	487/680 (72)
II. Logged Catch/Official Statistics-1000 MT									
YF	13.3/15.3 (87)	11.1/11.2 (99)	14.6/16.3 (89)	1.0/2.4 (43)	.7/1.7 (42)	.9/ .5 (164)	14.3/17.7 (81)	11.8/12.9 (91)	15.5/16.8 (92)
BE	9.4/10.2 (92)	5.9/ 6.7 (88)	7.4/ 7.6 (98)	1.8/4.0 (47)	2.0/3.3 (61)	2.3/3.8 (60)	11.2/14.2 (79)	7.9/10.0 (79)	9.7/11.4 (85)
ALB	2.4/ 6.1 (39)	8.6/ 8.7 (99)	6.2/ 9.3 (66)	10.3/21.5 (48)	20.4/29.4 (69)	20.0/39.3 (51)	12.7/27.6 (46)	29.0/38.1 (76)	26.2/48.6 (54)
TOTAL**	28.5/33.2 (86)	30.7/29.2 (105)	32.6/38.8 (84)	14.0/29.4 (48)	24.8/36.6 (68)	24.3/47.4 (51)	42.5/62.6 (68)	55.5/65.8 (84)	56.9/86.2 (66)
III. No. of samples									
YF	90	183	180	13	19	17	103	202	197
BE	76	139	139	10	22	23	86	161	162
ALB	45	140	109	89	241	213	134	381	322
TOTAL	211	462	428	112	282	253	323	744	681
IV. No. of fish measured									
YF			8762			648	5201	9926	9410
BE			6889			1085	4137	8232	7974
ALB			10748			5431	7177	19829	16179
TOTAL			26399			7164	16515	37987	33563

\*No. in parentheses indicates % coverage.

\*\*Includes other species.



Table 6. Review of data availability for major fisheries – 1976-1977

		(1) Adequate coverage		(2) Partial coverage		(3) No coverage				
Species Area	Gear	Country	<u>1977 Catch</u>		<u>Catch/Effort</u>		<u>Biological</u>		Rating 77 76	
			(MT)	o/o	1977 Rating	Coverage o/o	No. fish measured	No. fish measured /100 MT		
BLUEFIN TUNA										
Atlantic										
	LL	Japan	4800	33	(1)	90 <sup>1</sup>	6252 <sup>1</sup>	130	(1)	
		U.S.S.R. <sup>2</sup>	520	4	(3)			-	-	(3)
		España	300	2	(3)			99	33	(1)
	Surface	España	2207	15	(1)	100	4434 <sub>1</sub>	200	(1)	
		U.S.A.	1956	13	(3)		3705 <sub>1</sub>	189	(1)	
		Canada	972	7	(1)	100	732	75	(1)	
		Maroc	888	6	(3)		-	-	(3)	
		Norway	764	5	(3)		-	-	(3)	
		U.S.S.R. <sup>2</sup>	742	5	(3)		-	-	(3)	
		Portugal <sup>1</sup>	628	4	(3)		-	-	(3)	
		France	592	4	(3)		-	-	(3)	
		Others	357	2	(3)		-	-	(3)	
		<u>TOTAL CATCH</u>	14706		14706	100	14706		100	
		SUM (1)			8021	54	10235		70	
		SUM (2)			0	0	0		0	
		SUM (3)			6685	46	4471		30	
Mediterranean										
	LL	Japan	600	5	(1)	90	-	-	(3)	
		España	300	2	(3)		-	-	(3)	
	Surface	Italy	6116	46	(1)	100	1266	21	(1)	
		France	3182	24	(3)		-	-	(3)	
		España	2207	16	(3)		-	-	(3)	

	Yugoslavia	932	7	(3)	-	-	(3)
	Others	54	.	(3)	-	-	(3)
	<u>TOTAL CATCH</u>	13391		13391	100	13391	100
	SUM (1)			600	4	6116	46
	SUM (2)			0	0	0	0
	SUM (3)			12791	96	7275	54

ALBACORE

LL	China (Taiwan)	39335	47	(1) <sup>3</sup>	10-80 <sup>3</sup>	5431 <sup>3</sup>	14	(1)
	Korea+ Panama	9345	11	(1) <sup>3</sup>	40-100 <sup>3</sup>	8762 <sup>3</sup>	94	(1)
	Japan	800	1	(1)	90	12896 <sup>7</sup>	1612	(1)
	Brasil	157	.	(1)	100	2963 <sup>7</sup>	1887	(1)
Surface	España	25154	30	(1)	100	428 <sup>8</sup>	2	(1) <sup>5</sup>
	France	6812	8	(1)		?	?	(1) <sup>5</sup>
	Italy	613	1	(3)		-	-	(3)
	Portugal <sup>1</sup>	504	1	(3)		-	-	(3)
	U.S.S.R. <sup>2</sup>	212	.	(3)		-	-	(3)
	Others	125	.	(3)		-	-	(3)
	<u>TOTAL CATCH</u>	83057		83057	100	83057		100
	SUM (1)			81603	98	81603		98
	SUM (2)			0	0	0		0
	SUM (3)			1454	2	1454		2

SKIPJACK

Surface	FIS	32397	28	(1)	100	?	?	(1)
	España	29885	26	(2)	20-40	6574	22	(1)
	Japan	16845	15	(1)	100			(1)
	Korea+Panama	7940	7	(2)	30	8450 <sup>6</sup>	26	(1)
	Ghana	7430	7	(2)	30			(3)
	U.S.S.R. <sup>2</sup>	6415	6	(3)		-	-	(3)
	Maroc	4330	4	(3)		-	-	(3)
	Angola	4036	3	(3)		22	11	(1)
	Cuba	2500	2	(3)		-	-	(3)
	Portugal <sup>1</sup>	2223	2	(3)		-	-	(3)
	Others	245	.	(3)		378	154	(2)
	<u>TOTAL CATCH</u>	114246		114246	100	114246		100
	SUM (1)			49242	43	98433		86
	SUM (2)			42255	37	245		0
	SUM (3)			22749	20	15468		14

Table 6. (Continued)

Species Area	Gear	Country	1977 Catch		Catch/Effort		No. fish measured	Biological No. fish measured /100 MT	Rating 77 76
			(MT)	o/o	1977 Rating	Coverage o/o			
YELLOWFIN									
	LL	Korea+Panama	16347	13	(1) <sup>3</sup>	40-100 <sup>3</sup>	10748	66	(1)
		Cuba	3800	3	(1)	100	2562 <sub>1</sub>	67	(1)
		Japan	1651	1	(1)	90 <sup>1</sup>	28684 <sub>1</sub>	1738	(1)
		U.S.S.R. <sup>2</sup>	574	.	(3)		-	-	(3)
		China (Taiwan)	531	. 1	(1)	10-80	648 <sub>1</sub>	122	(1)
		Brasil	326	.	(1)	100	16756	5140	(1)
	Surface	FIS	48898	38	(1)	100	?	?	(1)
		España	37549	29	(2)	20-40	11680	31	(1)
		U.S.A.	7207	6	(1)	100	850 <sub>6</sub>	12	(1)
		Japan	2400	2	(1)	100			(1)
		Angola	2085	2	(3)		206	10	(1)
		Maroc <sup>2</sup>	1971	2	(3)		-	175	(3)
		U.S.S.R.	1220	1	(3)		- <sub>6</sub>	-	(3)
		Korea+Panama	1075	1	(2)	30	.		(1)
		Others	1144	1	(2)		228	-	(1)
		<u>TOTAL CATCH</u>	126778		126778	100	126778		100
		SUM (1)			81160	64	121134		96
		SUM (2)			39768	31	0		0
		SUM (3)			5850	5	5644		4
BIGEYE									
	LL	Japan	10300	23	(1)	90	29075 <sup>1</sup>	283	(1)
		Korea+Panama	9493	21	(1) <sup>1</sup>	40-100 <sup>1</sup>	6889	75	(1)
		China (Taiwan)	3849	9	(1)	10-80 <sup>1</sup>	1085	28	(1)
		Cuba	1800	4	(1)	100	-	-	(3)
		España	1356	3	(3)		-	-	(3)
		U.S.S.R. <sup>2</sup>	1122	3	(3)		-	-	(3)
		Brasil	133		(1)	100	846 <sup>7</sup>	636	(1)

Surface FIS	4043	9	(1)		?	?	(1)
España 2	3561	8	(1)		2274	64	(1)
U.S.S.R. 1	3244	7	(3)		-	-	(3)
Portugal	2107	5	(2)		-	-	(3)
Korea+Panama	1489	3	(2)	40			(3)
Japan	1144	3	(1)	100	4400 <sup>6</sup>	150	(1)
Ghana	308	1	(2)	30			(1)
Others	160		(3)		-	-	(3)
<u>TOTAL CATCH</u>	44440	44440		100	44440		100
SUM (1)		34323		77	34320		77
SUM (2)		3904		9	0		0
SUM (3)		6213		14	10120		23

1 1976 data.

2 U.S.S.R. uses FAO areas and not ICCAT areas. For this reason the coverage is not adequate.

3 Data from the Secretariat.

4 Canary Islands.

5 No biological samples. Catches are classified by age categories.

6 Total of fish measured from Korea + Panama + Japan + Ghana was 7880 MT for yellowfin, 8450 MT for skipjack and 4400 MT for bigeye.

7 August 1976 - August 1977.

8 First half of 1977.

# CHAPTER II

## Records of Meetings

### PROCEEDINGS OF THE FIRST SPECIAL MEETING OF THE COMMISSION

Madrid, Spain, November 15-21, 1978

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Plenary Sessions of the Commission

Annex 1 – Agenda

Annex 2 – List of Participants

Annex 3 – Panel Reports

Annex 4 – Report of the Working Group on International Inspection

Annex 5 – Report of the Standing Committee on Finance and Administration  
(STACFAD)

Annex 6 – Report of the Standing Committee on Research and Statistics (SCRS)

#### Opening Plenary Session – November 15, 1978

##### Item 1. OPENING OF THE MEETING

1.1. The Commission held its First Special Meeting at the Hotel Castellana, Madrid, under the chairmanship of Mr. E. B. Young (Canada). He introduced Mr. V. Moro, Under-Secretary of Fisheries and Merchant Marine, Ministry of Transport, Spain.

1.2. Mr. Moro welcomed all the delegates and scientists attending the meeting. He emphasized the importance of the fishing industry in Spain and the keen interest which his country has in the conservation of marine resources. He referred to recent world-wide reformation of the management system of marine resources and hoped that a new, effective order would be established. He commented on the unique feature of ICCAT as to its very wide convention area and that it deals with highly migratory species for which an ocean-wide stock assessment is required. In this respect, he observed that the proposed International Skipjack Year Program is very important. He noted that

ICCAT had already adopted regulatory measures and hoped that those are properly enforced.

1.3. The Chairman, Mr. Young, formally opened the meeting and welcomed all delegates. He extended a special welcome to the People's Republic of Benin, although the delegate was not present at the session.

1.4. The Chairman explained that the First Special Meeting of the Commission was called instead of the Council Meeting this year by decision of the Commission in 1977. This was due to the important items that had to be discussed by the Commission in 1978. He emphasized that the Commission has to make a decision on the Skipjack Program which had been delayed for one year due to budgetary reasons. The Chairman also commended the hard work carried out by the scientists during the meeting of the Standing Committee on Research and Statistics (SCRS).

1.5. The delegations of the member countries were introduced. (See Annex 2 to the Proceedings.)

## Item 2. ADOPTION OF AGENDA, ARRANGEMENTS FOR THE MEETING AND APPOINTMENT OF SUBSIDIARY BODIES

2.1. The Commission adopted the Tentative Agenda, which was circulated 90 days before the meeting, without changes (herewith attached an Annex 1).

2.2. The Commission noted that the SCRS met during the preceding week and that the Standing Committee on Finance and Administration (STACFAD), the four Panels, and the Working Group on International Inspection are scheduled to meet during this week.

2.3. The Commission noted that a Joint Meeting of Panels 1 and 4 was held during the last Commission meeting session (1977) and reserved the possibility of having such a meeting again this year if the necessity arises.

2.4. The Canadian delegate proposed that his country would like to withdraw from the Chairmanship of Panel 1 since Mr. Young (Canada) was elected Chairman of the Commission after Canada had been elected Chairman of the Panel. The Commission accepted this resignation and instructed Panel 1 that the first point of business of the Panel would be the election of a new Chairman.

2.5. The Commission decided that Agenda Items 4 through 13 and Item 24 should be referred to the Standing Committee on Finance and Administration.

## Item 3. ADMISSION OF OBSERVERS

3.1. The Chairman reviewed the policy by which invitations to observers have been sent out. The Commission felt that this policy is satisfactory and recommended that the Secretariat follow the same criteria, until otherwise decided by the Commission.

3.2. All observers (countries and international organizations) attending the meeting were admitted and welcomed. (See Annex 2, List of Participants.)

3.3. Special comment was made by the observer from the European Economic Community (EEC). He recalled the recent change of policy within the EEC and mentioned that the EEC continued its interest to become a member of the Commission. In order to emphasize that the EEC and its member countries are unanimous in this matter, he asked to be seated next to the French delegation.

3.4. Other observers from various international organizations requested continued close cooperation with ICCAT in the future.

## Second Plenary Session — November 16, 1978

### Item 14. REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

14.1. Mr. A. Fonteneau (France), Chairman of SCRS, presented the Report of the Standing Committee on Research and Statistics (Annex 6) and summarized the scientific findings. He reviewed the satisfactory development in statistics on which the scientists could base their analyses on stock status.

14.2. Attention was drawn to various studies made on stock structures, stock conditions, effects of regulations and possible management methods. Mr. Fonteneau drew attention of all the Panels to Item 7 of the Report. Besides, Panels 1 and 4 should pay attention to Items 8 and 9, as well as to Appendix 7.

14.3. The SCRS Chairman drew the special attention of the Commission to the International Skipjack Year Program which had been first proposed in 1976. He noted that document COM-SCRS/78/14 summarizes the Program Plan well and he hoped that the Commission would give very serious consideration to this matter.

14.4. The SCRS Chairman also commented on the proposal made by the Committee to formulate a workshop on bluefin tuna, particularly to obtain essential agreements on the data base.

14.5. The Commission considered that the SCRS worked very hard and fully executed its duties within the limited time available to them. The Commission also thanked all the scientists and the SCRS Chairman for their efforts and congratulated them for the excellent work completed.

14.6. The Commission formally accepted and adopted the SCRS Report which is herewith attached as Annex 6.

## Third Plenary Session — November 20, 1978

### Item 22. INTERNATIONAL SKIPJACK YEAR PROGRAM

22.1. The Convener of the Sub-Committee on Skipjack, Dr. G. Sakagawa (United States) referred to the report of the Sub-Committee (COM-SCRS/78/14) which

presents the detailed ICCAT coordinated plan on the International Skipjack Year Program.

22.2. South Africa, Portugal and France stated that their respective governments had formally communicated to the Secretariat their approval of the Program, financial contributions and matching contributions (as shown in the revised Table 6 of the Program Plan).

22.3. The remaining countries present at the session (Brazil, Canada, Cuba, Ghana, Ivory Coast, Japan, Korea, Morocco, Senegal, Spain, U.S.A. and the U.S.S.R.) also expressed their support for the Program.

22.4. The International Skipjack Year Program as presented by the Sub-Committee on Skipjack was unanimously adopted by the Commission.

#### Item 17. REPORTS OF PANELS 1-4

17.1. The reports of the meetings of Panels 1, 2, 3 and 4 were presented. All the reports (attached herewith as Annex 3) were carefully reviewed and adopted by the Commission, together with the recommendations.

#### Final Plenary Session – November 21, 1978

#### Item 15. REPORT OF THE STANDING COMMITTEE ON FINANCE AND ADMINISTRATION (STACFAD)

15.1. The STACFAD Report was presented by its Chairman, Mr. C.J. Blondin (U.S.A.). The Commission reviewed the Report with particular attention to the following items on the Commission Agenda:

- Item 4. *Review of Panel Membership*
- " 5. *Administrative Report*
- " 6. *Relations with other organizations*
- " 7. *Commission publications*
- " 8. *Auditor's Report 1977*
- " 9. *Financial status 1978*
- " 10. *Working Capital Fund*
- " 11. *Review of the second half of the biennial budget (1979)*
- " 12. *Special Skipjack Budget (1979-1982)*
- " 13. *Member country contributions for the Special Skipjack Budget (1979-1982)*
- " 24. *Date and place of the next regular meeting of the Commission*

15.2. The Report, together with all the pertinent recommendations it contained concerning the above-mentioned items, was adopted. The Report is attached herewith as Annex 5.



Item 16. REPORT OF THE WORKING GROUP ON INTERNATIONAL INSPECTION

16.1. The Report of the Working Group was presented. The Commission recognized that the Group had completed its tasks at this time.

16.2. The Report of the Working Group was adopted by the Commission together with its recommendations and attached text of the port inspection scheme. The Report is attached herewith as Annex 4.

Item 21. WAYS TO RENDER EFFECTIVE THE PROPOSALS ADOPTED

21.1. The Commission recognized that this Agenda Item was extensively studied by the Working Group on International Inspection (Annex 4).

21.2. The Commission noted a proposal made by the Group that consideration be given to establishing an Infractions Committee. Mr. G. Stander (South Africa) suggested establishing a Standing Committee on International Inspection Enforcement in order to review annually the reports of international inspections carried out, to revise inspection forms and infractions, etc. It was agreed that this proposal be studied carefully in the coming intersessional period. Mr. Stander was asked to coordinate such a study. The Commission decided to include this subject in the Agenda of the 1979 Commission meeting in order to review the results of such a study.

Item 19. STATUS OF THE PROPOSALS ADOPTED BY THE COMMISSION  
REGARDING YELLOWFIN AND BLUEFIN

19.1. Document COM/78/19 was explained by the Executive Secretary. This document was distributed in July, 1978, and contained the enforcement status of the proposals adopted by the Commission for the conservation of yellowfin and bluefin stocks.

Item 20. OTHER POSSIBLE REGULATORY MEASURES TO BE CONSIDERED

20.1. The Report of the Joint Meeting of Panels 1 and 4 was presented. After reviewing the Report it was adopted by the Commission (attached as Annex 3).

20.2. The Commission noted that the Joint Meeting of Panels 1 and 4 proposed a new minimum size regulation on bigeye (Appendix 5 to Annex 3).

20.3. Japan stated that the minimum size regulation is not necessarily a conservation measure. It should have, if applied alone, little effect on the conservation of bigeye.

20.4. South Africa noted that this bigeye size limit recommendation is not really based on scientific evidence. Noting that dumping of undersized yellowfin is taking place and considering that there are other possible regulatory measures, South Africa opposed the recommendation.

20.5. The United States found that it is difficult to see enough scientific evidence to support such a bigeye size limit. However, since it may help the implementation of the yellowfin regulation, the U.S. supported the limitation and proposed that the third paragraph of the recommendation be amended as follows:

*"-- That the above regulatory measures shall remain in effect until December 31, 1983, and shall be the subject of general review during and at the time of the termination of the International Skipjack Year Program."*

This U.S. proposal for amendment was seconded by the U.S.S.R.

20.6. The Senegalese delegate expressed his regret at hearing such a proposal of amendment and noted that the protection measures the Commission is taking now would be cancelled four years later, if this amendment is approved. The delegate from Ivory Coast also opposed the U.S. proposal on the basis that the original recommendation on the bigeye size regulation was made on the consensus of Panels 1 and 4. He believed that there is no need to amend it at this stage. France joined the opinion of Ivory Coast and Senegal.

20.7. Portugal requested that a vote be taken by roll call. The Chairman decided to take a vote on the U.S. proposal for amendment first and then on the recommendation on the bigeye size regulation made jointly by Panels 1 and 4. It was confirmed that the proposal for the bigeye size limit was made under Article VIII.1 (b) (iii) of the Convention and therefore according to Rule 9, paragraph 2, a majority of the member countries of the Commission is needed to make a decision. According to Rule 9, paragraph 3 of the Rules of Procedure, a quorum existed as more than two-thirds of the Contracting Parties were present.

20.8. In voting for the U.S. amendment, two countries (United States and the U.S.S.R.) voted affirmative, eight countries voted negative (Brazil, Canada, Cuba, France, Ivory Coast, Senegal, South Africa and Spain) and four countries (Ghana, Japan, Korea and Portugal) abstained. Therefore, the amendment was defeated (2 affirmative votes).

20.9. For the bigeye size regulation as proposed by Panels 1 and 4, eight countries (Brazil, Cuba, France, Ivory Coast, Morocco, Portugal, Senegal and Spain) voted affirmative, four countries (Ghana, Japan, Korea and the U.S.S.R.) voted negative and three countries (Canada, South Africa and the United States) abstained.

20.10. The Commission adopted the recommendation on the bigeye size regulation on the basis that the majority of the member countries present supported it. The Commission instructed the Secretariat to take the necessary steps to inform the Contracting Parties of the recommendation according to Article VIII of the Convention.\*

Item 23. OTHER ACTIVITIES IN RESEARCH AND STATISTICS

23.1. No other activities in research and statistics were discussed at this time.

Item 25. OTHER MATTERS

25.1. No other matters were discussed.

Item 26. ADOPTION OF REPORT

26.1. The Commission adopted the Proceedings of the Opening, Second and Third Plenary Sessions.

26.2. The Commission decided that the Proceedings of the Final Plenary Session would be approved by mail as soon as possible after the meeting.

Item 27. ADJOURNMENT

27.1. The Meeting was adjourned.

\* After the adjournment of the First Special Meeting of the Commission, authorities of Japan, Korea and Canada questioned the interpretation of Article III of the Convention and Rule 9 of the Rules of Procedure. As a result, the Chairman declared that the recommendation did not receive enough support, that is, a majority of the Contracting Parties, and he asked for a vote by mail on the recommendation to give also the Contracting Parties who were not present at the meeting a chance to vote on this issue.

## AGENDA

### *Procedure of the meeting*

1. Opening of the meeting
2. Adoption of Agenda, arrangements for the meeting and appointment of subsidiary bodies
3. Admission of observers

### *Administration*

4. Review of Panel membership
5. Administrative Report
6. Relations with other organizations
7. Commission publications

### *Finance*

8. Auditor's Report 1977
9. Financial status 1978
10. Working Capital Fund
11. Review of the second half of the biennial budget (1979)
12. Special Skipjack Budget (1979-1982)
13. Member country contributions for the Special Skipjack Budget (1979-1982)

### *Reports to the Commission*

14. Report of the Standing Committee on Research and Statistics (SCRS)
15. Report of the Standing Committee on Finance and Administration (STACFAD)
16. Report of the Working Group on International Inspection
17. Reports of Panels 1-4
18. Reports of subsidiary bodies appointed by the Commission for the meeting

### *Measures for the conservation of stocks*

19. Status of the proposals adopted by the Commission regarding yellowfin and bluefin

COMMISSION PROCEEDINGS

20. Other possible regulatory measures to be considered
21. Ways to render effective the proposals adopted regarding international inspection at port and inspection at the national level

*Research*

22. International Skipjack Year Program
23. Other activities in research and statistics

*Other matters*

24. Date and place of the next regular meeting of the Commission
25. Other matters
26. Adoption of Report

*Adjournment*

27. Adjournment

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## REPORTS OF THE MEETINGS OF PANELS 1-4 AND JOINT MEETING OF PANELS 1 AND 4

### Report of the Meeting of Panel 1

Madrid, November 1978

#### 1. OPENING

The meeting was opened by the acting Chairman, Mr.D. A. MacLean (Canada) who called for nominations for Chairman. Ghana was proposed by Senegal and seconded by Ivory Coast. Ghana was elected Chairman of the Panel and Dr.E. A. Kwei (Ghana) took the Chair.

#### 2. ADOPTION OF AGENDA

The Tentative Agenda (Appendix 1), which had previously been circulated, was adopted without change.

#### 3. ELECTION OF RAPPORTEUR

Mr. J. S. Beckett (Canada) was appointed Rapporteur.

#### 4. REVIEW OF PANEL MEMBERSHIP

With the exception of Angola all other members (Brazil, Canada, Cuba, France, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, Spain, U.S.A. and the U.S.S.R.) were represented.

#### 5. REVIEW OF THE REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

The Chairman of the SCRS, Mr. A. Fonteneau summarized the Standing Committee's Report.

##### *a) Yellowfin*

Mr. Fonteneau noted the considerable increase in purse seine effort in the eastern

Atlantic and the continuing trend of offshore expansion of the fishing area where larger fish are taken. Quantities of undersized yellowfin continued to be taken and many of them are discarded. He reported that the status of the stock appeared sound, although heavily exploited, so that further increases in fishing effort would not likely increase the catch significantly. The total yield from the stock would, however, increase if catches of undersized fish were eliminated. Mr. Fonteneau stated that the SCRS had recommended that the Commission consider withdrawing the minimum size regulation since it was not being implemented fully and this was resulting in unreported catches and discards of undersized fish and was also compounding the yellowfin/bigeye misidentification problem. The SCRS recommended further that the Commission consider the institution of other regulatory measures (such as closed seasons and/or areas) to achieve an increase in the size of yellowfin at first capture. The SCRS was not in a position to make any detailed suggestions at this meeting but it was intended that the matter be studied during 1979 with a view to making detailed recommendations to the next meeting of the Panel.

*b) Skipjack*

Mr. Fonteneau noted that the skipjack resource appeared to be under-exploited although there was a lack of satisfactory information. This lack was the reason for the proposed International Skipjack Year Program.

## 6. REVIEW OF POSSIBLE MEASURES FOR THE CONSERVATION OF STOCKS

*a) Yellowfin*

Ivory Coast commended the SCRS for its work and supported the proposal that the SCRS study alternative methods of augmenting the effectiveness of the minimum size regulation. The regulation should, however, be retained and it was most important that it be implemented fully. Senegal concurred with these views and stated that the yellowfin stock was of vital importance to the coastal states of the area. He added that should the Commission not be able to implement effective conservation measures it would raise doubts as to the value of continued participation by his country in the Commission.

The U.S.A. expressed concern over the lack of full implementation of the minimum size regulation and observed that one of the most important elements was the collection of suitable data to permit development of additional regulations such as those suggested by SCRS.

Japan stated that while it was true that the proportion of undersized yellowfin in some fisheries remained high, despite the best efforts to reduce the level, it was most important to remember that the minimum size regulation was designed to reduce the quantity of small yellowfin taken. Thus the total quantity of undersized yellowfin being taken was more significant than the proportion in the catch. Japan had reduced greatly its take of yellowfin by shifting effort to skipjack and had also frozen the size of its baitboat fleet in order to ensure that the total take of undersized yellowfin was mini-



mized. France noted that it was discouraging to hear, year after year, that catches of undersized yellowfin continued to be a problem. It was essential that regulations be implemented properly and a Program of International Inspection might prove appropriate with respect to the minimum size regulation. In the meantime, the SCRS should pursue its proposed studies of complementary measures. Brazil deplored a situation where the scientific advice was that a meaningful regulation should be withdrawn because of incomplete implementation and supported the pursuit of a Program of International Inspection.

The Chairman of SCRS confirmed that the Japanese baitboat catches of yellowfin had been reduced by more than half and that the proportion of small fish was slightly lower. However, in response to a question by Senegal, he noted that the SCRS believed that the nominal catches of small yellowfin in the various fisheries did not reflect the actual catches due to the under-reporting of some catches and discarding of others and to misreporting of small yellowfin as bigeye.

Ghana stressed that regulations require honest and meaningful effort by all countries and stated that an effective scheme of Port Inspection should be pursued actively. He agreed that the SCRS should develop recommendations for additional measures. Cuba emphasized concern over the conservation of marine fauna and noted that if the Inspection Scheme resolves the problems of the enforcement of the existing regulations, the discards of fish less than regulatory size would not be considered. In Cuba's opinion, the difficulty originated with the mixed catches of yellowfin with other species that do not have any size regulation. This should be taken into account when studying the matter.

The representative from FAO noted that fisheries regulations are easier to make than to implement effectively and that it takes time to do so. Furthermore, since it had been shown in other fisheries that different regulations often complemented each other, the Panel should consider additional measures while retaining the minimum size regulation. Resolution of the problem was necessary to allow development of other fisheries, such as those for skipjack, which take small yellowfin incidentally. Ghana agreed that frustration over the first step should not prevent consideration of a second.

#### *b) Skipjack*

There was no discussion of this item.

### 7. RESEARCH NEEDED TO BE CARRIED OUT

#### *a) Yellowfin*

The Chairman of the SCRS reported that the Committee intended to make special efforts in the study of the size of the spawning stock and of possible stock/recruitment relationship in addition to the study of alternative measures for increasing the yield/recruit from the fishery. Japan requested that the SCRS pay particular attention to ways of reducing the impediments to development of certain fisheries that were created by the existing minimum size regulation, and that all countries cooperate to further such

a study. Brazil suggested that the SCRS should give priority to the study of closed areas/seasons and drew attention to the SCRS's request for additional and complete statistics.

*b) Skipjack*

The Chairman of SCRS drew attention to the Report of the Sub-Committee on Skipjack concerning the International Skipjack Year Program. France regretted that last year some countries had not been able to adopt the budget for the Skipjack Program so that this important matter had been delayed. He urged strongly that all countries now accept the Program and participate fully.

8. DATE AND PLACE OF THE NEXT PANEL MEETING

It was decided that the next Panel meeting would be held at the same time and place as the next meeting of the Commission.

9. OTHER MATTERS

There were no other matters discussed.

10. ADOPTION OF REPORT

The Report was adopted unanimously with some amendments on the motion of the U.S.A. and seconded by Portugal.

11. ADJOURNMENT

The meeting was adjourned.

**Report of the Meeting of Panel 2**

Madrid, November 1978

1. OPENING

The meeting was called to order by the Chairman, Mr. A. Layachi (Morocco).

2. ADOPTION OF AGENDA

The Tentative Agenda was approved and is attached herewith as Appendix 1.

3. ELECTION OF RAPPORTEUR

Dr. G. Beardsley (United States) was elected Rapporteur.

#### 4. REVIEW OF PANEL MEMBERSHIP

The following member countries were present: Canada, France, Japan, Korea, Morocco, Portugal, Spain, U.S.A. and the U.S.S.R.

#### 5. REVIEW OF THE REPORT OF THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

Mr. A. Fonteneau (France), Chairman of the SCRS, presented a brief overview of the Committee's deliberations and conclusions concerning the status of bluefin and albacore stocks in the North Atlantic. As regards bluefin, stock structure is still unclear. However, the possibility of separate stocks in the eastern and western Atlantic seems to be somewhat stronger this year. The Committee also felt that although existing regulations of a 6.4 kg minimum size and limits on fishing mortality had resulted in positive effects on both sides of the Atlantic, concern was expressed over the continuing increase in average size of large bluefin in the western Atlantic. This suggests that recruitment to the stock of age 6<sup>+</sup> is still poor.

The Committee recommended that the current regulatory measures be retained. It also noted that further benefits in yield-per-recruit could be obtained with an increase in minimum size although the practical problems of implementing such an increase had still not been addressed. The Committee also recommended that the Commission further examine the possibilities of managing Atlantic bluefin tuna under the two stock hypothesis.

As regards albacore, the Committee noted that the yield from the North Atlantic albacore stock was at a peak under the existing pattern of fishing. It also noted that if age-at-first-capture could be increased above the present size of about 43 cm, increases in yield might be obtained. The Committee pointed out that there was an apparent downward trend in recruitment accompanied by an increase in variability — classical signs of a dangerous condition.

The Committee made no specific recommendations but asked the Commission to examine methods of shifting fishing to larger sized albacore, and possibly limiting fishing effort in the event it becomes necessary.

#### 6. REVIEW OF POSSIBLE MEASURES FOR THE CONSERVATION OF STOCKS

##### *a) Bluefin*

The delegate from the U.S.A. complimented the Chairman and other members of the SCRS for their comprehensive examination and summary of the status of bluefin tuna stocks in the North Atlantic. He expressed concern over the condition of bluefin stocks and the apparent lack of enforcement of regulations in certain areas as well as the large increase in the catches by fishermen of some countries who are not ICCAT members. He pointed out that this situation was what prompted the U.S. proposed additions to the regulations last year. He also felt that the effectiveness of the Commission could be tested by its response to the bluefin problem.

The delegate from Portugal pointed out that although Portugal does not catch significant amounts of bluefin, his country was also concerned about the condition of bluefin stocks. He stated that the minimum size regulation of 6.4 kg was an appropriate regulation, but felt that the limitation on fishing mortality was an experimental regulation and was to be in effect for only one year. He expressed Portugal's desire to retain the freedom to expand their own tuna fishery. He felt that the possibility of separate stocks of bluefin in the North Atlantic was strong and that separate conservation measures should be applied to each stock.

Japan pointed out to members of the Panel that the longline fishery is a highly mobile, multi-species fishery and catch quotas by separate areas would be complicated and difficult to enforce. The evidence for two stocks was not clear, and he preferred the current measures for conservation.

The delegate from France stated that they had always taken a moderate position and that there were significant economic and social repercussions on their bluefin fisheries which in some areas were artisanal. He supported two stock management and the recommendations by the SCRS.

Spain stated that in view of the doubts expressed as to separate East and West bluefin stocks, they supported the current regulations.

The delegate from Canada stated that they were concerned about recent changes in fishing patterns for bluefin. He noted that the SCRS had indicated a lack of improvement of recruitment to the stock of age 6+ bluefin in the western Atlantic and that the relatively strong 1973 year-class did not appear in expected numbers in the 1977-78 winter longline fishery. He expressed some disappointment that SCRS had not recommended an increase in minimum size or an increase in measures to limit fishing mortality. He proposed additional measures for the conservation of Atlantic bluefin (full text of the Canadian proposal is attached as Appendix 2). The essence of Canada's proposal was:

- 1) Division of the North Atlantic into two management areas. The western North Atlantic was defined as West of 30° W longitude and North of 10° S latitude.
- 2) Fishing mortality in the western Atlantic be limited to levels of 1970-74.
- 3) An increase in minimum size in the western North Atlantic to 28 kg.

A considerable amount of discussion ensued by many countries regarding clarification of Canada's proposal. Japan requested the biological basis for choosing the levels of recent years as 1970-74 and felt that the period 1975-78 was more appropriate. Canada responded that they felt that 1970-74 was the base period for the regulations currently in effect.

France and Portugal requested a clarification of the proposal suggesting 30° W longitude as the dividing line and suggested 40° W longitude as more appropriate. Canada agreed that 40° might be more appropriate since in the northern part of the North Atlantic it was an established dividing line between ICCAT sampling areas for bluefin.

France also requested the basis for the 28 kg minimum size and Canada responded that SCRS has suggested the possibility of being able to distinguish between age 3 and age 4 bluefin (28 kg is the approximate size of a 4-year-old bluefin).

The delegate from Japan again expressed his concern over the basis for choosing the period 1970-74 and believed that bluefin stocks had stabilized in recent years. Canada

expressed their doubts that stocks had stabilized in the western Atlantic, pointing out the continued increase in average size of adult bluefin. Japan stated that recruitment of the spawning stocks appeared stable and that the exploitation rate by the longline fishery in the Gulf of Mexico was low.

At this point, the SCRS Chairman reviewed the Committee's conclusions regarding bluefin in the western Atlantic.

- 1) Mortality on young fish (ages 2-5) apparently has been reduced; escapement from the surface fishery has likely improved.
- 2) Average size of adult fish (above age 6) is continuing to increase, except in the Gulf of Mexico.
- 3) Strong 1973 year-class was not apparent in 1977-78 longline catch but it is not clear whether this is because of a decline in abundance or a change in availability.

The full text of the Canadian proposal was made available to the Panel for closer examination (Appendix 2). After a brief recess, the Panel reconvened to continue discussions on Canada's proposal. The delegate from Canada suggested leaving the proposal with the Panel until next year at which time Canada would submit the proposal to the Commission taking into account the comments and suggestions offered this year. France and Portugal supported Canada's suggestion.

#### *b) Albacore*

The U.S.A., although pointing out that the United States does not fish for albacore in the Atlantic, expressed concern over the apparent poor condition of the North Atlantic albacore stock. No other comments on albacore conservation measures were offered.

### 7. RESEARCH NEEDED TO BE CARRIED OUT

The Chairman of the SCRS highlighted the various recommendations of SCRS concerning statistics and research on North Atlantic bluefin and albacore. He pointed out that statistics on bluefin from the Mediterranean were particularly difficult to obtain because many countries fishing for bluefin were not members of ICCAT. Tagging in the eastern Atlantic to shed light on the stock structure question was particularly important. He also pointed out the need for tagging small bluefin in the western Atlantic before the beginning of the fishing season to determine current year estimates of fishing mortality. He also called the Panel's attention to the proposed bluefin tuna workshop which is scheduled to meet before the next SCRS meeting to examine in detail data problems and assessment methods for bluefin.

The observer from the European Economic Community (EEC) stated that although he could make no firm commitment, he believed that if EEC became a member of ICCAT, there would be a good probability of obtaining statistics on bluefin from countries who are members of and responsible to EEC.

The United States and Spain supported the recommendations of the SCRS and suggested that all countries fishing for Atlantic bluefin be invited to attend. Spain suggested

that the Secretariat send a resolution requesting data from the governments of non-member countries and offered to supply the text for such a request (Appendix 3).

The Chairman of the SCRS pointed out that one of the major problems with statistics for albacore was the apparent inconsistencies in the apportionment of some long-line catch data between the North and South Atlantic. He noted that errors in partitioning of these data could seriously affect the conclusions of SCRS regarding the status of Atlantic albacore stocks. He also pointed out the need for in-depth analyses of yield-per-recruit and for examining the effects of different fishing strategies on parent stocks and yield-per-recruit.

#### 8. DATE AND PLACE OF NEXT PANEL MEETING

The Panel agreed to meet at the same time and at the same place as the next Commission meeting.

#### 9. OTHER MATTERS

No other matters were discussed.

#### 10. ADOPTION OF REPORT

The report was adopted.

#### 11. ADJOURNMENT

The meeting was adjourned.

### **Report of the Meeting of Panel 3**

Madrid, November 1978

#### 1. OPENING

The meeting was called to order by the Chairman, Dr. A. Suda (Japan).

#### 2. ADOPTION OF AGENDA

The Tentative Agenda was adopted without change (Appendix 1).

#### 3. ELECTION OF RAPPORTEUR

Dr. P. Miyake (Secretariat) was designated Rapporteur.

#### 4. REVIEW OF PANEL MEMBERSHIP

All the member countries were present. Those are: Brazil, Japan, Korea, South Africa, U.S.A. and the U.S.S.R.

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

Mr. A. Fonteneau reviewed relevant parts of the SCRS Report for the Panel.

*a) Bluefin, South (Southern bluefin – Thunnus maccoyii)*

The species consists of a single stock which has been exploited extensively in the Atlantic as well as in the Indian and Pacific Oceans. It would be appropriate action to avoid further increase of fishing effort and thus to sustain the recruitment.

*b) Albacore*

The analyses suggested that the South stock is not being over-fished, and that increased fishing effort might (from the 1975 level) result in some increase in catch, but the amount of such an increase is likely to be very small. He added that there is some uncertainty in distribution of longline catch and effort between North and South and this should be further studied.

6. REVIEW OF POSSIBLE MEASURES FOR THE CONSERVATION OF STOCKS

*a) Bluefin, South (Southern bluefin)*

The Panel noted the voluntary regulatory measures taken by Japan on this species since 1971.

*b) Albacore – South*

No comments were made.

7. RESEARCH NEEDED TO BE CARRIED OUT

The Panel confirmed all the recommendations made by the SCRS concerning research needed on the stocks in question. The Panel noted that a stock assessment workshop on tunas in the Indian and Pacific Oceans will be held at Shimizu, Japan, in 1979 where southern bluefin stocks in the Indo-Pacific area will be reviewed.

8. DATE AND PLACE OF NEXT PANEL MEETING

The Panel agreed to hold its next meeting at the same time and place as the next Commission meeting.

9. OTHER MATTERS

No other matters were discussed.

10. ADOPTION OF REPORT

The Report was adopted.

11. ADJOURNMENT

The Meeting was adjourned.

**Report of the Meeting of Panel 4**

Madrid, November 1978

1. OPENING

The meeting of Panel 4 was opened by the Chairman, Mr. J. Conde (Spain).

2. ADOPTION OF AGENDA

The Agenda was adopted without change (Appendix 1).

3. ELECTION OF RAPPORTEUR

Mr. B. García (Cuba) was nominated Rapporteur.

4. REVIEW OF PANEL MEMBERSHIP

The Chairman reviewed the membership of Panel 4: Angola (absent), Canada, Cuba, Japan, Korea, Portugal, Spain, United States and the U.S.S.R.

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

The Chairman of the Panel asked Mr. A. Fonteneau, SCRS Chairman, to review the major points of the SCRS Report by species.

*a) Bigeye*

Production model analysis indicates that the stock is being intensively fished. Two hypotheses were discussed: one concerning the existence of two stocks, a North stock and a South stock; the other concerns the existence of a single stock in the Atlantic.

It seems that the catches of young bigeye in the surface fishery have shown signifi-



cant increases; more than 90 % of the bigeye caught by baitboats are smaller than the proposed regulatory size. The SCRS recommended the establishment of a 3.2 kg minimum size limit, which would result in an increase in yield-per-recruit, although the economic consequences on the various fleets dedicated to this species are not yet known.

The Cuban delegation expressed its support of that stated in the SCRS Report and proposed the establishment of the 3.2 kg minimum size limit. Japan stated that administrative measures such as intensification of guidance for identification of species by the various countries and a port inspection scheme, would help to solve the present problems. The delegate from Japan added that the minimum biological size is 30 kg, since fish below this size are still too small. Therefore, even if a 3.2 kg minimum size limit is established, it would promote the irrational capture of those fish which should not be caught.

The Korean delegation supported a continuation of studies on size regulations, an improvement in the activities of data collection and a continuation of the bigeye studies within the Skipjack Program. Lastly, the delegate from Korea noted that adoption of a 3.2 kg size limit is premature. (The complete text of the Korean statement is herewith attached as Appendix 4.)

Senegal also raised the question of the establishment of a minimum size limit and suggested that a joint meeting of Panels 1 and 4 be held.

The SCRS Chairman noted that the 3.2 kg size limit is not based on calculations, but that it is based on a similar regulation now in effect for yellowfin. The U.S. delegate stated that the 3.2 kg size limit was established in earlier years in order to resolve problems regarding yellowfin, and not for the conservation of bigeye stocks.

Cuba, France, Ivory Coast, Portugal and Spain noted that that it would be convenient to hold a joint meeting of Panels 1 and 4 in order to study the problem of the proposed measure. It was agreed that such a joint meeting would be held on November 17.

#### *b) Billfishes*

White marlin and blue marlin are being heavily exploited in the North Atlantic. No recommendations were presented due to a lack of precision in the techniques used to assess the stocks. However, close monitoring of the white marlin and blue marlin fisheries was advised, especially in the North Atlantic.

#### *c) Atlantic bonito*

No new studies were conducted.

#### *d) Other species*

There are insufficient statistical data on these species.

## 6. REVIEW OF POSSIBLE MEASURES FOR THE CONSERVATION OF STOCKS

### *a) Bigeye*

This matter is pending the results of the joint meeting of Panels 1 and 4.

*b) Billfishes*

Monitoring of the white marlin and blue marlin fisheries in the North Atlantic is advised, as well as an overall reduction of effort on these species.

*c) Atlantic bonito*

No remarks were made.

*d) Other species*

No remarks were made.

7. RESEARCH NEEDED TO BE CARRIED OUT

*a) Bigeye*

All types of research should be carried out on this species, including research on a size limit.

*b) Billfishes*

Catch statistics should be improved and studies on growth, mortality, state of the stocks, etc., should be carried out.

*c) Atlantic bonito*

No remarks were made.

*d) Other species*

No remarks were made.

8. DATE AND PLACE OF NEXT PANEL MEETING

The Panel decided to hold its next meeting at the same place and time as the next Commission meeting.

9. OTHER MATTERS

No other matters were discussed.

10. ADOPTION OF REPORT

The report was adopted.

## 11. ADJOURNMENT

The meeting was adjourned.

### **Report of the Joint Meeting of Panels 1 and 4**

Madrid, November 1978

#### 1. OPENING

Mr. E. B. Young (Canada), Chairman of the Commission, was elected Chairman of the Joint Panels and opened the meeting.

#### 2. ELECTION OF RAPPORTEUR

Mr. M. Hunter (Canada) was selected Rapporteur.

#### 3. DISCUSSION OF A MINIMUM SIZE LIMIT FOR BIGEYE

The Chairman of the SCRS reviewed the work and recommendations of the Committee, and confirmed and emphasized the Committee's previous recommendations that a minimum size limit of 3.2 kg be implemented. He noted that such a regulation would make the yellowfin size limit regulation more workable, and would be beneficial to the management of bigeye stocks, but there may be negative economic impacts on part of the fleet exploiting the stocks. The SCRS Chairman also noted that a number of alternatives to the imposition of a size limit should be studied, such as time/area closures and gear restrictions.

The delegate of Japan agreed that such alternatives should be further examined, and said that Japan could not support the imposition of a size limit for the time being. The delegate of Ghana believed that if a size limit were to be introduced, it should be as part of an overall management package, including alternative strategies. Failing that now, the size limit of 3.2 kg on yellowfin should be abolished. The delegate of Senegal proposed the adoption of a 3.2 kg size limit and was supported by the delegates of Ivory Coast, Spain, Cuba, France and Portugal. In doing so, Spain proposed that the matter be reviewed at the end of the International Skipjack Year Program and Portugal and Cuba joined this new proposal. The delegate of Korea explained the necessity for and continuation of the work of the recently organized Working Group on Bigeye Size Regulation and work on bigeye to be associated with the International Skipjack Year Program. The delegation opposed the adoption of a size limit at this time.

At the request of the Chairman, other delegations expressed their views. The delegates of Canada and Brazil supported the Senegalese proposals. However, Brazil stated that a review of the matter at the end of the Skipjack Year Program is needed; Moroccan and Angolan delegates were not present, and the delegates of the United States and the Soviet Union indicated that they would go along with the majority. In doing so, the delegate of the United States expressed the view that the imposition of a size limit should not be viewed as a response to a conservation problem and should

not extend beyond the period of the International Skipjack Year Program unless specific action is taken by the Commission. The delegate of the U.S.S.R. also indicated his concern regarding the lack of firm scientific data on which to base the decision.

The Chairman noted that 10 delegations supported the introduction of a 3.2 kg size limit for bigeye, 3 delegations were opposed and two were absent. It was decided that Panels 1 and 4 would recommend jointly the introduction of a size limit to the Commission.

Considerable discussion ensued on the period over which the regulation should be effective, with particular reference to the impact on the Skipjack Program. It was agreed that the regulations should be reviewed when the Skipjack Program terminates upon the proposal of Spain and supported by Portugal and Cuba. The text of the proposed regulation is attached herewith as Appendix 5.

#### 4. FUTURE RESEARCH REQUIRED

The Chairman of the SCRS noted two recommendations contained in the SCRS Report, concerning data collection (including the placement of scientific observers on-board fishing vessels) and the consideration of management alternatives to minimum size limits, e.g. closure of area and time.

#### 5. OTHER MATTERS

The Panels considered the possibility of moving consideration of bigeye to Panel 1 from Panel 4, and agreed that the Secretariat should examine the implications of such action for consideration at the next regular meeting of the Commission.

#### 6. DATE AND PLACE OF NEXT MEETING

The Chairman noted the possibility that Panels 1 and 4 may have to meet jointly next year to consider the business discussed in Item 5 above.

#### 7. ADOPTION OF REPORT

The Report of the Joint Meeting of Panels 1 and 4 was adopted on November 20, 1978.

#### 8. ADJOURNMENT

The meeting was adjourned.

*Appendix 1 to Annex 3*

**Agenda for Panel 1 (Tropical Tunas)**  
**Panel 2 (Temperate Tunas-North)**  
**Panel 3 (Temperate Tunas-South)**  
**Panel 4 (Other Species)**

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of Panel Membership
5. Review of the Report of the Standing Committee on Research and Statistics (SCRS)
6. Review of possible measures for the conservation of stocks:

<u>Panel 1</u>	<u>Panel 2</u>	<u>Panel 3</u>	<u>Panel 4</u>
a) Yellowfin b) Skipjack	a) Bluefin b) Albacore	a) Bluefin b) Albacore	a) Bigeye b) Atlantic bonito c) Billfishes d) Other species

7. Research needed to be carried out
8. Date and place of next Panel meeting
9. Other matters
10. Adoption of Report
11. Adjournment

*Appendix 2 to Annex 3*

**Canadian Statement with Respect to Conservation Measures  
for Bluefin Tuna in the North Atlantic  
(Attached to Report of Panel 2)**

Mr. Chairman:

The Canadian delegation is encouraged that the Standing Committee on Research and Statistics has examined closely the hypothesis that the stocks of bluefin in the eastern and western Atlantic Ocean are separate, with a minor amount of interchange between the two sides.

Over the past few years, we have observed a significant change in the pattern of

fishing effort for bluefin. Other Panel members are aware, from previous Commission meetings, of our concern about this change. With respect to the western Atlantic stock, SCRS has noted that the condition of the stock of fish of age 6 and above has not improved, in spite of the minimum size and mortality regulations. The SCRS also noted that the strong 1973 year-class did not appear in expected numbers in the winter long-line fishery, possibly because of the large catches made in recent years. SCRS concludes that changing the current fishing pattern is the key to providing for effective utilization of the resource.

The Canadian delegation must admit to some disappointment that, in spite of the recognition by SCRS of a continuing problem with bluefin in the western Atlantic, it cannot recommend at this time increases in minimum size to achieve a greater size at first capture. Similarly SCRS is not able to recommend a change in controls on fishing mortality, and we are led to wonder how long the Commission can continue to hope that present measures can protect the interests of its member nations.

It is not my intention, Mr. Chairman, to be overcritical of our scientists' efforts. Indeed, I believe the SCRS Report provides a stimulus to the Commission to act to change present conservation measures, if these conservation measures are not doing the job. We cannot expect the results of scientific analysis to be definite, because the nature of the animals with which we are dealing cannot permit 100 % certainty. We can, and do expect, however, that the Commission should act in a bold and innovative way in a situation where existing regimes are called into question.

Canada would, therefore, propose that the Commission institute immediately a management regime which separates eastern and western Atlantic bluefin stocks with no exchange of effort between the two areas. For the western Atlantic we would also propose that a regulatory system be established that would limit fishing mortality in specific areas of the western Atlantic to some past level. To be specific:

We would propose that for purposes of bluefin conservation, the western Atlantic Ocean be defined as the area West of 30° W longitude and North of 10° S latitude.

In this area we propose that fishing mortality be limited to the level existing in the years 1970-74 in the area.

With respect to size limits, we propose an increase from 6.4 kg to 28 kg. Such a size limit would afford greater protection for the large year-classes which are needed for recruitment to the spawning stock.

Mr. Chairman, we are prepared to apply such regulations to our own fishery. The measures we propose are severe, and would only be acceptable in Canada provided that current conservation measures in the eastern Atlantic are maintained.

*Appendix 3 to Annex 3*  
**Statement of the Spanish Delegation**  
(Attached to Report of Panel 2)

Resolution of the International Commission for the Conservation of Atlantic Tunas  
First Special Meeting of the Commission

Considering that the main objective of the International Commission for the Conservation of Atlantic Tunas is to provide for the adequate conservation and exploitation of Atlantic tuna stocks,

Considering that the Commission has observed with concern the lack of statistical data concerning bluefin tuna (*Thunnus thynnus thynnus*), particularly referring to countries around the Mediterranean Sea which are not members of the Commission,

Considering that obtaining these statistical data would have great importance for an adequate analysis of the current situation of bluefin tuna (*Thunnus thynnus thynnus*) stocks in the Atlantic,

The International Commission for the Conservation of Atlantic Tunas resolves to:

Request from all coastal countries of the Mediterranean Sea, which are not members of the Commission and which exploit bluefin tuna, their close collaboration to provide the Commission with all the statistical information they have, in particular, concerning the following:

- Total catch by gear and by area
- Fishing effort data
- Distribution of catch by size

The Commission requests the Chairman to send the text of this resolution to the governments of the coastal countries of the Mediterranean Sea, requesting their utmost collaboration for the adequate conservation of bluefin tuna stocks and the development of scientific knowledge concerning this species.

*Appendix 4 to Annex 3*

**Korean Statement Regarding a Review of Possible  
Measures for the Conservation of Bigeye Stocks**  
(Attached to Report of Panel 4)

1. The Commission should continue the activities of the existing Working Group on Bigeye Size Regulation in order to study further the necessity of this measure.
2. The Commission should strengthen research activities suggested in the "recommendations" of the bigeye section of the SCRS Report.
3. The Commission should strengthen its activities on data collection and analysis.
4. In regard to the activities of the International Skipjack Year Program, studies on bigeye should be conducted at the same time.
5. The Commission should study possible measures that could limit the catch of small-sized bigeye, including a minimum size limit.
6. The Korean Government plans to dispatch base representatives of fishing companies as well as government officials, if necessary, to give administrative guidance for this purpose.

7. The Korean delegation feels that taking measures for a 3.2 kg size limit on bigeye (at this moment) is premature.

*Appendix 5 to Annex 3*

**Proposed Bigeye Tuna Regulation**

(Attached to Report of Joint Meeting of Panels 1 and 4)

According to Article VIII-1 (b) (iii), Panels 1 and 4 jointly propose:

- *That the Contracting Parties take the necessary measures to prohibit any taking and landing of bigeye tuna (*Thunnus obesus*) weighing less than 3.2 kg.*
- *Notwithstanding the above regulations, the Contracting Parties may grant tolerances to boats which have incidentally captured bigeye tuna weighing less than 3.2 kg with the condition that this incidental catch should not exceed 15 % of the number of fish per landing of the total bigeye catch of said boats.*
- *That the above regulatory measures be the subject of general review at the time of the termination of the International Skipjack Year Program.*



## REPORT OF THE WORKING GROUP ON INTERNATIONAL INSPECTION

Madrid, November 1978

### 1. OPENING

The meeting was opened by Mr. R. Garcés Velazco (Cuba). He emphasized the possible benefits of enforcement of ICCAT regulations to the Commission members.

### 2. ADOPTION OF AGENDA

The Tentative Agenda was adopted without change, except to interchange 4-b (International Port Inspection) with 4-a (Inspections at the national level) (Appendix 1).

### 3. ELECTION OF RAPPORTEUR

Ms. S. Jelley (U.S.A.) was elected Rapporteur.

### 4. WAYS TO RENDER EFFECTIVE THE PROPOSALS ADOPTED

#### *4-a) Inspections at the national level*

The Working Group briefly reviewed the history of the development of the draft text now under consideration (COM/78/20). Dr. Gulland of FAO reviewed his comments submitted by letter (COM/78/21) which addressed the question of mechanisms for the effective enforcement of the ICCAT recommendations by ICCAT member countries at the national level. Such mechanisms would complement international port inspection and encourage compliance by fishermen of ICCAT member nations. He, therefore, suggested the establishment of an "Infractions Committee". Brazil, the U.S.A. and Cuba supported this suggestion.

#### *4-b) International Port Inspection*

Japan noted, as in 1977, that any country can unilaterally inspect a foreign flag vessel in its port. (A complete statement of Japan's view on various points of the draft text is attached as Appendix 3.)

The U.S.A. understood that paragraphs 4, 6, 8 and 9 will be interpreted to mean that action taken or penalties assessed as a result of a port inspection scheme will remain

the responsibility of the flag state. The U.S.A. is ready, however, to consider any recommendations of ICCAT concerning standard penalties.

The U.S.S.R. repeated its statements of 1977, i.e., inspection should not be conducted in a port, but on the high seas before the fish are processed. When a foreign flag vessel is in a country's fishing zone, a national of that country authorized to conduct ICCAT inspections may inspect the vessel. However, when a foreign flag vessel is outside a fishery zone, yet in the ICCAT convention waters, only a national of the vessel's flag state authorized to conduct ICCAT inspections may inspect the vessel.

The Working Group reviewed one section of the draft text at a time.

#### *Preamble*

Spain noted that any reference in the Preamble to Article III (I) of the Convention or any other Article should be deleted as the general tone of the Convention is adequate. Portugal and Ivory Coast agreed. Japan indicated that only Article III (I) of the Convention delegates legal authority to conduct international port inspection to the Commission, and therefore reference to it should be retained in the Preamble.

A compromise draft submitted by Spain that deleted mention of a specific article was adopted.

*Paragraph 1:* Senegal suggested that a vessel entering a port under conditions of *force majeure* should not be required to submit to inspection. A vessel would be subject to inspection during any other type of port visit, however, Korea and Japan felt that inspection should be at points of unloading and/or transshipment only. The consensus of the Working Group was that inspection would cover a sample of the vessels and every effort would be made to avoid degradation in quality, as stated in Paragraph 3 of the draft text, and Senegal's amendment was adopted.

The Working Group agreed with Spain and France that "Contracting Governments" would be changed to "Contracting Parties" throughout the text.

*Paragraph 2:* The Working Group noted that the format of an ICCAT identification card to be issued to persons authorized to conduct ICCAT inspections was adopted at a previous meeting of the Commission.

The Working Group Chairman, supported by South Africa, suggested that Paragraph 2 contain "The Commission shall communicate to the Contracting Parties the names of all authorized inspectors."

The United States reiterated that their interpretation of "to act" does not include assessment of penalties and prosecution.

*Paragraph 3:* Spain suggested that this paragraph refer to Paragraph 1 in order to exempt vessels in port under conditions of *force majeure*. There was a consensus on this change.

*Paragraph 4:* Portugal suggested that this paragraph specify that the inspector could sign the fishing log. This was adopted.

*Paragraph 5:* No comments.

*Paragraph 6:* Japan requested that this paragraph be deleted, since under the port inspection scheme, the vessel could be punished by both the port state and the flag state. Japan expressed a reservation vis à vis the port state's authority to prosecute a

foreign flag vessel (same as the U.S. position). Spain, however, supported the double sanctions.

*Paragraph 7:* No comments.

*Paragraph 8:* Japan requested that "on a similar basis" be reinserted after "(4)", as placed in an earlier draft. The Working Group agreed.

*Paragraph 9:* Spain requested that this paragraph refer to paragraphs 4-6, and some provision made to inform the Commission of any resistance to inspection. Japan requested that "action taken and fines imposed" be amended to "measures taken", since a fine would not always be assessed. The Working Group agreed to these changes.

*Paragraph 10:* No comments.

*Paragraph 11:* Ivory Coast and Senegal and Brazil requested that this paragraph (submitted by Korea) be deleted, since it is against the spirit of the Convention and infringes on the sovereign rights of the port state. Brazil declared that it would agree with the retention of the paragraph only if it would be modified to give the right to the port states to invite inspection by flag states. Based on this proposal, the Secretariat offered a revised draft, that included an invitation of the flag state inspector by the port state. This version was accepted by the Working Group.

The Working Group adopted the revised draft text for presentation to the Commission (Appendix 2). They advised, moreover, that the Commission consider establishing an Infractions Committee along the lines suggested by Dr. Gulland of FAO.

## 5. DATE OF ENTRY INTO EFFECT OF INTERNATIONAL INSPECTION SCHEME

Spain suggested that the adequate procedure would be that established in Article VIII of the Convention and the Working Group agreed to convey the review of the procedure to the Commission. The United States, Canada, France and Portugal supported this suggestion. Japan reserved its position at this point because Japan has doubt about the proposed procedure. In its view, recommendations to be made under Article VIII should be limited to those for regulatory measures.

## 6. DATE AND PLACE OF NEXT MEETING

Spain suggested, and the Working Group agreed, that since the Group had appeared to attain its objective, there would be no need for another Working Group meeting. The Commission should discuss dissolving the Working Group and replacing it with an Infractions Committee.

## 7. OTHER MATTERS

No other matters were discussed.

## 8. ADOPTION OF REPORT

The Report was adopted.

## 9. ADJOURNMENT

The meeting was adjourned.

*Appendix 1 to Annex 4*

### **Agenda for the Working Group on International Inspection**

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Ways to render effective the proposals adopted:
  - a) Inspection at the national level
  - b) International Port Inspection
5. Date of entry into effect of the International Inspection system
6. Date and place of next meeting
7. Other matters
8. Adoption of Report
9. Adjournment

*Appendix 2 to Annex 4*

### **ICCAT Scheme of Port Inspection**

In order to achieve the objectives set forth in the International Convention for the Conservation of Atlantic Tunas and to ensure its observance, the Commission adopts the following port inspection scheme:

1. Inspection shall be carried out by the appropriate authorities of the Contracting Parties, who will monitor compliance with the Commission's regulations at their own ports, during tuna transshipment or landing operations or during calls of tuna vessels, without discrimination between their own national vessels and those of other Contracting Parties. Vessels which enter a port because of *force majeure* are exempt from inspection.
2. Each Contracting Party shall notify the Commission of the names of the inspectors appointed for this purpose. The Commission shall communicate to the Contracting

Parties the names of all authorized inspectors. Each inspector shall carry identification supplied by competent authorities in accordance with a model approved by the Commission. This document shall be provided to the inspector upon appointment, and shall specify that the inspector has the authority to act according to arrangements approved by the Commission.

3. Prior to an examination, the inspector shall identify himself by presenting the identification described in (2) above. The inspector shall, when he considers it necessary, examine the characteristics of the catches of foreign and domestic flag tuna vessels, pursuant to paragraph (1). Inspections shall be carried out so that the vessel suffers the minimum interference and inconvenience and that degradation of the quality of the fish is avoided.

4. The inspector shall draw up a report of his inspection in a form standardized by the Commission. He shall sign the report in the presence of the master of the vessel, who shall be entitled to add or have added to the report any observations which he thinks suitable and which he must sign. The inspector should note in the vessel's logbook that an inspection was made. Copies of the report shall be given to the vessel's master and to the inspector's competent authorities who shall promptly transmit copies to the appropriate authorities of the flag state of the vessel and to the Commission.

5. In making his examination, an inspector may ask the master for any necessary assistance. The master shall enable the inspector to make such examination of catch or gear and any relevant documents as the inspector deems necessary, including fishing logbooks, to verify the observance of the Commission's regulations in force.

6. Resistance to an inspector or failure to comply with his instructions shall be treated by the flag state of the vessel in a manner similar to resistance to, or a failure to comply with the instructions of, any inspector of that state or Contracting Party.

7. Inspectors shall carry out their duties in accordance with the rules set out in this inspection scheme but they shall remain under the operational control of their authorities and shall be responsible to them.

8. Contracting Parties shall consider and act on reports of foreign inspectors, according to the provisions of paragraph (4), on a similar basis as the reports of national inspectors in accordance with their national legislation. The provisions of this paragraph shall not impose any obligation on a Contracting Party to give the report of a foreign inspector a higher evidential value than it would possess in the inspector's own country. Contracting Parties shall collaborate, in accordance with their legislation, in order to facilitate judicial or other proceedings arising from reports of inspectors acting under these arrangements.

9. The Contracting Parties shall notify the Commission of measures taken in those cases in which the report of an inspection conducted in accordance with paragraphs (4) - (6) indicates that a violation occurred.

10. All Contracting Parties shall instruct the masters of their tuna vessels on the ICCAT regulations in force. The masters shall also be informed regarding the cooperation to be given to the inspectors in national as well as foreign ports.

11. Contracting Parties whose vessels enter, land or transship their catches in ports other than their own, can send inspectors authorized by the Commission to inspect their own vessels, with respect to the observance of the Commission's regulations, having previously obtained an invitation from the port state in which the inspection shall be executed.

*Appendix 3 to Annex 4*

**Japanese Statement**

1. Port inspection is, by nature, a matter of sovereign right of the coastal states concerned. Any country can inspect unilaterally foreign fishing vessels in its own port if it wishes to. By saying this, we are not implying that Japan cannot join the work of the Commission to seek a proper and an adequate port inspection system. In formulating such a system of port inspection, the most important thing for us is, in our view, that the Commission must stay in its purview under the present Convention. We cannot go too far beyond the framework of the Convention.

In the present Convention, we cannot find a relevant provision or article other than Article III (I) on the basis of which we can formulate a port inspection system.

From this viewpoint, we would propose that the second draft of the port inspection scheme prepared by the Secretariat after incorporating various comments submitted by the respective Contracting Governments should be a basis of our discussion on this subject. This draft scheme is, in principle, acceptable for us as well, with some modification and clarification. We are of the opinion that with this maneuver we can formulate an effective port inspection system which is satisfactory to us.

2. The purpose of the port inspection system (guidelines) which we are presently considering is to verify whether or not the regulatory measures regarding incidental catches of undersized yellowfin tuna are properly observed.

Japanese tuna longline vessels are, for economic reasons, now mostly fishing for large size bluefin and bigeye tuna, which are sashimi materials, "raw fish", rather than yellowfin, albacore and skipjack tuna which are rather smaller fish inhabiting the upper layer of the ocean.

The former is good for sashimi "raw fish" whereas the latter are mostly used for canning. Therefore, those vessels are completely free from such problems as incidental catches of illegal undersized fish. Also, they operate throughout one year or more continuously until the catch load reaches a certain level. Those fish taken by the vessels are stored in temperatures lower than -50°C in order to maintain them in excellent quality for sashimi material and the catches are taken back to Japan where you only find a market place for sashimi fish.

## INTERNATIONAL INSPECTION

These vessels are visiting ports during their cruise from time to time for replenishment, not for landing or transshipping of their catches.

If the catches of these vessels are inspected at ports while visiting for replenishment, the quality of the fish stored at such a low temperature would be spoiled and would be of much less value on the market.

For these reasons, inspection at port under the present system, should be restricted to tuna fishing vessels landing or transshipping their catches at ports, not to those visiting the ports for replenishing.

3. Resistance to an inspector or failure to comply with his instructions shall be punished as an interference with exercise by the inspector of his official duty under general international law.

This particular provision (paragraph 6) appears to require punishment by both countries, that to which the inspector belongs and the flag state of the vessel. Therefore, we propose to delete this whole provision.

**REPORT OF THE STANDING COMMITTEE ON  
FINANCE AND ADMINISTRATION (STACFAD)**

Madrid, November 1978

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- Appendix 4 -- Revised Estimated Budget - 1979
- Appendix 5 -- Modified Skipjack Budget
- Appendix 6 -- Special Skipjack Budget -- Tables of member country contributions - 1979-82

Item 1. OPENING

1.1. The Standing Committee on Finance and Administration (STACFAD) met at the Hotel Castellana (Madrid, Spain) on November 15, 1978, and subsequent days. The meeting was opened by the Chairman of the Committee, C. J. Blondin (U.S.A.). He called the attention of the members to the fact that there are many important subjects to be discussed this year such as the International Skipjack Year Program.

Item 2. ADOPTION OF AGENDA

2.1. The Tentative Agenda, circulated 90 days prior to the meeting, was reviewed and adopted by the Committee (Appendix 1).

Item 3. ELECTION OF RAPPORTEUR

3.1. The Secretariat was designated Rapporteur.

Item 4. PANEL MEMBERSHIP

4.1. The Committee reviewed COM/78/18 which provided information on the background of the Panels, and confirmed the present rules concerning panel membership.

4.2. The Committee confirmed the present membership of Panels I through 4 (attached as Appendix 2). The Chairman mentioned that those countries which recently



became members of the Commission and still do not belong to any Panels may join them at any time according to the Rules of Procedure.

#### Item 5. ADMINISTRATIVE REPORT

5.1. The Administrative Report (COM/78/22) was presented and fully explained by the Executive Secretary. He noted that the People's Republic of Benin became a new member of the Commission during 1978. Thus, the Commission now consists of 18 member countries.

5.2. The Executive Secretary listed the various activities of the Secretariat. References were made to the SCRS Officers Meeting held in July, 1978; the Meeting of the Sub-Committee on Skipjack; the Meeting of the Working Group on Bigeye Size Regulation and the Joint Training Course on Statistics and Sampling, in all of which the Commission was directly involved. Besides, ICCAT was represented at the Billfish Workshop and the FAO Fisheries Committee by its staff members. He also reviewed the changes in the Secretariat staff.

5.3. Special mention was made concerning the insufficient office space for the ICCAT Headquarters in relation to the expanding activities and staff of the Secretariat. At its last meeting, the Commission instructed the Executive Secretary to look into the problem. He reported that he had contacted the proper authorities of the Spanish Government and was in the process of solving the problem. The requirements for the office space (attached as Appendix 3) proposed by the Executive Secretary have been reviewed and the Committee confirmed they are satisfactory and recommended that the Executive Secretary take action accordingly to secure the space. The Committee expressed its appreciation in advance to the Spanish Government, who is the host government of the Commission's seat, for solving the problem and for providing the Secretariat with adequate office space.

5.4. The Committee reviewed the Administrative Report and recognized the extensive work completed by the Secretariat during the year. It was recommended that the Commission approve the Report.

#### Item 6. RELATIONS WITH OTHER ORGANIZATIONS

6.1. The Committee studied the relationships the Commission had maintained with various international organizations (COM/78/22) and found them to be satisfactory.

#### Item 7. COMMISSION PUBLICATIONS

7.1. The Commission's policy regarding publications was explained by the Executive Secretary (COM/78/22). The Committee noted that during 1978, the Biennial Report, the Statistical Bulletin, the Collective Volume, the Data Record, the Statistical Series, the English version of the Field Manual (2nd Edition) and the Newsletters were issued.

7.2. The Committee commended the high standard and quality of all publications issued by the Commission and congratulated the Executive Secretary and his staff.

7.3. The Committee recommended that the Commission approve the continuation of the present publication policy.

#### Item 8. AUDITOR'S REPORT 1977

8.1. It was noted that the Auditor's Report (original in Spanish) with summary translations in English and French, was circulated to the head of each delegation in early 1978. The Report was reviewed and adopted by the Committee and then recommended to the Commission for adoption.

#### Item 9. FINANCIAL STATUS 1978

9.1. The Financial Report (COM/78/23) was presented and fully explained by the Executive Secretary. He emphasized the difficulties with finances caused by inflation and fluctuation in currency exchange rates. He reviewed the Commission's financial status forecasted to the end of fiscal year 1978, member country contributions, expenditures during 1978 by budget chapters, etc. He mentioned that the overall printing costs could be cut down by purchasing a composer-typewriter which can be used for making originals by the Secretariat itself for offset printing.

9.2. The Committee supported the proposal of purchasing a composer-typewriter in order to cut down the costs. The Committee decided to discuss this matter further when considering the 1979 Budget.

9.3. The Committee reviewed the financial status of the Commission and considered it satisfactory. The Committee recommended that the Commission adopt the Financial Report (COM/78/23).

9.4. The Committee noted that there is an unused balance of U.S. \$21,000 in the 1978 Budget. The decision on this unused budget should be made under Agenda Item 11 "Review of the second half of the biennial budget (1979)".

#### Item 10. WORKING CAPITAL FUND

10.1. The Committee reviewed Statement 7 of the Financial Report (COM/78/23), and found it to be satisfactory. It recommended that all the unbudgeted income would go into the Working Capital Fund.

#### Item 11. REVIEW OF THE SECOND HALF OF THE BIENNIAL BUDGET (1979)

11.1. The Revised Estimated Budget for 1979 was presented by the Executive Secretary (Appendix 4). He explained that the new budget was adjusted to meet the present economic situation, based on the experiences of financial practice throughout 1978.

11.2. The budget allocation for Chapter 4 - "Publications" is estimated under the assumption that the Commission authorize the Secretariat to apply the unused balance of the 1978 budget (U.S. \$21,000) for the purchase of a composer-typewriter. He added that the Publications budget in 1979 should be over U.S. \$30,000 if the composer is not available for use in the coming year.

11.3. The Committee approved the Revised Budget and recommended that the Commission adopt it. Also, the Committee recommended the Commission to authorize the Secretariat to apply the foreseen unused balance of the 1978 budget towards the purchase of a composer-typewriter.

11.4. The French delegate reminded the Committee that last year he had reservations concerning the amount of increase for the 1978-79 budgets. He indicated that he will agree to notify his government of the 1979 revised budget.

11.5. The Executive Secretary commented that when presenting the 1980-81 biennial budget at next year's meeting, it would be advisable to prepare an additional two-year forecasted budget (1982-83) so that Contracting Parties could have an idea of what their ICCAT contributions will be over an extended period.

#### Item 12. SPECIAL SKIPJACK BUDGET (1979-1982)

12.1. The Special Skipjack Budget proposed by the SCRS was discussed (COM-SCRS/78/14). It was noted that some reallocations of the budget between years were proposed by the SCRS.

12.2. The French delegation stated that while France, in principle, accepts the four-year Program as a whole at this time, their government can formally commit itself only for 1979 since any domestic budgetary procedure is practiced on a year-to-year basis. The U.S.A. and Canada agreed that such a practice is in effect in their countries as well.

12.3. With the above understanding, the Committee recommended that the Commission adopt the Skipjack Year Program Plan (COM-SCRS/78/14) and its budget (Appendix 5). It was understood that the Program Plan as well as the budget will be distributed to the Contracting Parties as soon as possible after the Commission meeting.

#### Item 13. MEMBER COUNTRY CONTRIBUTIONS FOR THE SPECIAL SKIPJACK BUDGET (1979-1982)

13.1. The country contributions calculated by the Secretariat based on the proposed budget were discussed. Again, many countries (Canada, Senegal, Spain, France, U.S.A. and Japan) stated that the four-year Program is acceptable but formal approval of the budget has to be on a year-to-year basis.

South Africa stated that they can commit themselves at this time for a four-year period.

13.2. The Committee recognized these difficulties and recommended that the budget and contributions for the four-year period be adopted by the Commission, with

the understanding that, at this time, the commitment of each member country is formally for 1979 only.

**Item 14. DATE AND PLACE OF NEXT REGULAR MEETING OF THE COMMISSION**

14.1. The possibility of holding the meeting outside Madrid was discussed, but the Committee recognized that this would increase the cost of the meeting by a considerable amount, unless some member countries offer to pay the difference.

14.2. The Committee recommended to the Commission that the Sixth Regular Meeting of the Commission be held for a one-week period, beginning November 14, 1979, in Madrid.

**Item 15. OTHER MATTERS**

15.1. The SCRS Chairman pointed out the SCRS's recommendation that an expert of the Secretariat staff be sent to the problem areas of the Mediterranean where statistical data on bluefin from non-member countries are insufficient. For such missions in other areas, he proposed that the Executive Secretary choose, based on economy or competency criteria, to send either an expert from the Secretariat or an expert from a neighboring member country to the concerned area.

15.2. This proposal was supported and the Committee recommended that the Commission approve it.

**Item 16. ADOPTION OF REPORT**

16.1. The Report was adopted.

**Item 17. ADJOURNMENT**

17.1. The meeting was adjourned.

*Appendix 1 to Annex 5*

**Agenda for the Standing Committee on  
Finance and Administration (STACFAD)**

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of Panel Membership
5. Administrative Report
6. Relations with other organizations
7. Commission publications
8. Auditor's Report 1977
9. Financial status 1978

10. Working Capital Fund
11. Review of the second half of the Biennial Budget (1979)
12. Special Skipjack Budget (1979-1982)
13. Member country contributions for the Special Skipjack Budget (1979-1982)
14. Date and place of the next regular meeting of the Commission
15. Other matters
16. Adoption of Report
17. Adjournment

*Appendix 2 to Annex 5*

**Panel Membership (as of February 28, 1979)**

<i>Countries</i>	<i>Panel 1</i>	<i>Panel 2</i>	<i>Panel 3</i>	<i>Panel 4</i>	<i>Total</i>
Angola . . . . .	X	--	--	X	2
Benin . . . . .	--	--	--	--	0
Brazil . . . . .	X	--	X	--	2
Canada . . . . .	X	X	--	X	3
Cuba . . . . .	X	--	--	X	2
France . . . . .	X	X	--	--	2
Gabon . . . . .	--	--	--	--	0
Ghana . . . . .	X <sup>1</sup>	--	--	--	1
Ivory Coast . . . . .	X	--	--	--	1
Japan . . . . .	X	X	X <sup>1</sup>	X	4
Korea . . . . .	X	X	X	X	4
Morocco . . . . .	X	X <sup>1</sup>	--	--	2
Portugal . . . . .	X	X	--	X	3
Senegal . . . . .	X	--	--	--	1
South Africa . . . . .	--	--	X	--	1
Spain . . . . .	X	X	--	X <sup>1</sup>	3
United States . . . . .	X	X	X	X	4
U.S.S.R. . . . .	X	X	X	X	4
	15	9	6	9	39

<sup>1</sup>Chairman of Panel.

*Appendix 3 to Annex 5*

**Requirements for the New Office Space for the ICCAT Secretariat**

In 1970, the Secretariat of the Commission was established in Madrid. At that time, the Spanish Government placed at the Secretariat's disposal an apartment of about 250 m<sup>2</sup>, located at Calle General Mola, no. 17, 7th floor, Madrid.

This was considered a temporary solution for the Commission offices, since at that time ICCAT was comprised of only 7 countries and there were 4-6 staff members.

In the 8 years since the Secretariat was established, its activities have increased considerably and the number of staff members has likewise increased to include translators, statisticians, analyst, biostatistician and a soon-to-be contracted Skipjack Coordinator, etc.

In conclusion, the present requirements for the ICCAT Secretariat are 500-600 m<sup>2</sup> of office space, including the following:

- a) Adequate office space for the Secretariat staff.
- b) Adequate office space for the execution of the data management tasks.
- c) Library/Conference room.
- d) A room for drafting and statistical work.
- e) Storage space for Commission publications.\*
- f) Work area for preparation and assembly of documents with various photocopy machines.
- g) Mail room for preparation of all outgoing Commission mail, etc.
- h) A room to receive Commission visitors.
- i) Adequate sanitary facilities.

\*As the Commission uses three official languages (English, French and Spanish), many publications are printed in the three languages. As a result, we have many volumes in "stock" and this increases from time to time.

## Appendix 4 to Annex 5

## Revised Estimated Budget - 1979

<i>Budget Chapter</i>	<i>Approved by the Commission (November 1977)</i>	<i>Revised by the Commission (November 1978)</i>
	\$	\$
1. Salaries	167,000	172,000
2. Travel	12,000	12,000
3. Meetings	30,000	43,000
4. Publications	25,000	22,000
5. Office equipment	4,000	4,000
6. General operating expenses	30,000	38,000
7. Miscellaneous expenses	4,000	4,000
	<u>272,000</u>	<u>295,000</u>
8. Coordination of Research		
a) Personnel	85,000	88,000
b) Travel	11,000	11,000
c) Equipment and Material	6,000	5,000
d) Data processing	40,000	25,000
e) Miscellaneous	5,000	5,000
	<u>147,000</u>	<u>134,000</u>
9. Contingencies	10,000	--
	<u>429,000</u>	<u>429,000</u>
TOTAL	429,000	429,000

**Modified Budget for the International Skipjack Year Program\***  
(USA \$)

<i>Activities</i>	<i>1979</i>	<i>1980</i>	<i>1981</i>	<i>1982</i>	<i>Total</i>
Tagging with dart tags	0	60,000	15,000	10,000	85,000
Port Sampling	0	5,000	35,000	5,000	45,000
Intensive Sampling	0	30,000	10,000	5,000	45,000
Genetics	0	8,000	2,000	0	10,000
Sub-totals	0	103,000	62,000	20,000	185,000
<i>ICCAT Coordination Services</i>					
Salaries	30,000	38,000	43,000	43,000	154,000
Office equipment and materials	0	2,000	5,000	5,000	12,000
Trip expenses	5,000	5,000	10,000	5,000	25,000
Operational expenses and contracts	7,000	12,000	15,000	15,000	49,000
Sub-totals	42,000	57,000	73,000	68,000	240,000
<b>GRAND TOTAL</b>	42,000	160,000	135,000	88,000	425,000

\*From COM-SCRS/78/14.



## Special Skipjack Budget - Table of Contributions by Member Countries

Country	Year 1979 — Total Budget (K) \$ 42,000										
	A N.º	B %	C .....	D (1,000 MT)	E .....	F %	G \$	H \$	I \$	J \$	K \$
Angola . . . . .	2	5.26	1.73	0	1.73	0.41			737	113	850
Bénin . . . . .	0	1.75	0	0	0	0			246	0	246
Brasil . . . . .	2	5.26	1.27	0	1.27	0.30			737	83	820
Canada . . . . .	3	7.02	0.66	0.16	0.82	0.19			982	54	1,036
Cuba . . . . .	2	5.26	10.20	0.56	10.76	2.52			737	706	1,443
France . . . . .	2	5.26	57.86	35.02	92.88	21.76			737	6,091	6,828
Gabon . . . . .	0	1.75	0	0	0	0			246	0	246
Ghana . . . . .	1	3.51	13.42	0	13.42	3.14			491	880	1,371
Côte d'Ivoire . . . . .	1	3.51	8.34*	5.34*	13.68	3.20			491	897	1,388
Japan . . . . .	4	8.77	42.02	0	42.02	9.84			1,228	2,756	3,984
Korea . . . . .	4	8.77	46.47	0*	46.47	10.88			1,228	3,048	4,276
Maroc . . . . .	2	5.26	4.76	1.02	5.78	1.35			737	379	1,116
Portugal . . . . .	3	7.02	6.73	7.69	14.42	3.38			982	946	1,928
Sénégal . . . . .	1	3.51	5.53	3.06	8.59	2.01			491	563	1,055
South Africa . . . . .	1	3.51	0.18	0.11	0.29	0.07			491	19	510
España . . . . .	3	7.02	83.87*	26.37*	110.24	25.82			982	7,230	8,212
USA . . . . .	4	8.77	33.38	21.03	54.41	12.74			1,228	3,568	4,797
USSR . . . . .	4	8.77	8.08	2.07	10.15	2.38			1,228	666	1,894
TOTAL . . . . .	39	100.00	324.50	102.43	426.93	100.00			14,000	28,000	42,000

A = Panel membership.

B = Percentage of payments for annual membership and panel membership (G + H).

C = 1975 catch (live weight).

D = 1975 canned production (net product weight).

E = Total C + D.

F = Percentage distribution of E.

G = Not applicable.

H = Not applicable.

I = 1/3 of \$ 42,000 distributed percentage-wise according to column B

J = 2/3 of \$ 42,000 distributed percentage-wise according to column F

K = Total I + J.

\* No reporting received by the Secretariat. Estimates by the Secretariat based on Statistical Bulletin Vol. 7 and other sources.

**Special Skipjack Budget - Table of Contributions by Member Countries**

Country	Year 1980 — Total Budget (K) \$ 160,000										
	A N.º	B %	C .....	D (1,000 MT)	E .....	F %	G \$	H \$	I \$	J \$	K \$
Angola . . . . .	2	5.26	1.73	0	1.73	0.41			2,807	432	3,239
Bénin . . . . .	0	1.75	0	0	0	0		936	0	936	
Brasil . . . . .	2	5.26	1.27	0	1.27	0.30		2,807	317	3,124	
Canada . . . . .	3	7.02	0.66	0.16	0.82	0.19		3,743	205	3,948	
Cuba . . . . .	2	5.26	10.20	0.56	10.76	2.52		2,807	2,688	5,495	
France . . . . .	2	5.26	57.86	35.02	92.88	21.76		2,807	23,206	26,013	
Gabon . . . . .	0	1.75	0	0	0	0		936	0	936	
Ghana . . . . .	1	3.51	13.42	0	13.42	3.14		1,871	3,353	5,224	
Côte d'Ivoire . . . . .	1	3.51	8.34*	5.34*	13.68	3.20		1,871	3,418	5,289	
Japan . . . . .	4	8.77	42.02	0	42.02	9.84		4,678	10,499	15,177	
Korea . . . . .	4	8.77	46.47	0*	46.47	10.88		4,678	11,610	16,289	
Maroc . . . . .	2	5.26	4.76	1.02	5.78	1.35		2,807	1,444	4,251	
Portugal . . . . .	3	7.02	6.73	7.69	14.42	3.38		3,743	3,603	7,345	
Sénégal . . . . .	1	3.51	5.53	3.06	8.59	2.01		1,871	2,146	4,018	
South Africa . . . . .	1	3.51	0.18	0.11	0.29	0.07		1,871	72	1,944	
España . . . . .	3	7.02	83.87*	26.37*	110.24	25.82		3,743	27,543	31,286	
USA . . . . .	4	8.77	33.38	21.03	54.41	12.74		4,678	13,594	18,272	
USSR . . . . .	4	8.77	8.08	2.07	10.15	2.38		4,678	2,536	7,214	
<b>TOTAL . . . . .</b>	<b>39</b>	<b>100.00</b>	<b>324.50</b>	<b>102.43</b>	<b>426.93</b>	<b>100.00</b>		<b>53,333</b>	<b>106,667</b>	<b>160,000</b>	

A = Panel membership.

B = Percentage of payments for annual membership and panel membership (G + H).

C = 1975 catch (live weight).

D = 1975 canned production (net product weight).

E = Total C + D.

F = Percentage distribution of E.

G = Not applicable.

H = Not applicable.

I = 1/3 of \$ 160,000 distributed percentage-wise according to column B.

J = 2/3 of \$ 160,000 distributed percentage-wise according to column F.

K = Total I + J.

\* No reporting received by the Secretariat. Estimates by the Secretariat based on Statistical Bulletin Vol. 7 and other sources.

**Special Skipjack Budget - Table of Contributions by Member Countries**

Country	Year 1981 — Total Budget (K) \$ 135,000										
	A N.º	B %	C .....	D (1,000 MT)	E .....	F %	G \$	H \$	I \$	J \$	K \$
Angola . . . . .	2	5.26	1.73	0	1.73	0.41			2,368	365	2,733
Bénin . . . . .	0	1.75	0	0	0	0		789	0	789	
Brasil . . . . .	2	5.26	1.27	0	1.27	0.30		2,368	268	2,636	
Canada . . . . .	3	7.02	0.66	0.16	0.82	0.19		3,158	173	3,331	
Cuba . . . . .	2	5.26	10.20	0.56	10.76	2.52		2,368	2,268	4,637	
France . . . . .	2	5.26	57.86	35.02	92.88	21.76		2,388	19,580	21,948	
Gabon . . . . .	0	1.75	0	0	0	0		789	0	789	
Ghana . . . . .	1	3.51	13.42	0	13.42	3.14		1,579	2,829	4,408	
Côte d'Ivoire . . . . .	1	3.51	8.34*	5.34*	13.68	3.20		1,579	2,884	4,463	
Japan . . . . .	4	8.77	42.02	0	42.02	9.84		3,947	8,858	12,806	
Korea . . . . .	4	8.77	46.47	0*	46.47	10.88		3,947	9,796	13,744	
Maroc . . . . .	2	5.26	4.76	1.02	5.78	1.35		2,368	1,218	3,587	
Portugal . . . . .	3	7.02	6.73	7.69	14.42	3.38		3,158	3,040	6,198	
Sénégal . . . . .	1	3.51	5.53	3.06	8.59	2.01		1,579	1,811	3,390	
South Africa . . . . .	1	3.51	0.18	0.11	0.29	0.07		1,579	61	1,640	
España . . . . .	3	7.02	83.87*	26.37*	110.24	25.82		3,158	23,239	26,397	
USA . . . . .	4	8.77	33.38	21.03	54.41	12.74		3,947	11,470	15,417	
USSR . . . . .	4	8.77	8.08	2.07	10.15	2.38		3,947	2,140	6,087	
<b>TOTAL . . . . .</b>	<b>39</b>	<b>100.00</b>	<b>324.50</b>	<b>102.43</b>	<b>426.93</b>	<b>100.00</b>		<b>45,000</b>	<b>90,000</b>	<b>135,000</b>	

A = Panel membership.

B = Percentage of payments for annual membership and panel membership (G + H).

C = 1975 catch (live weight).

D = 1975 canned production (net product weight).

E = Total C + D.

F = Percentage distribution of E.

G = Not applicable.

H = Not applicable.

I = 1/3 of \$ 135,000 distributed percentage-wise according to column B.

J = 2/3 of \$ 135,000 distributed percentage-wise according to column F.

K = Total I + J.

\* No reporting received by the Secretariat. Estimates by the Secretariat based on Statistical Bulletin Vol. 7 and other sources.

Special Skipjack Budget - Table of Contributions by Member Countries

Country	Year 1982—Total Budget (K) \$ 88,000										
	A N.º	B %	C .....	D (1,000 MT)	E .....	F %	G \$	H \$	I \$	J \$	K \$
Angola . . . . .	2	5.26	1.73	0	1.73	0.41			1,544	238	1,782
Bénin . . . . .	0	1.75	0	0	0	0			515	0	515
Brasil . . . . .	2	5.26	1.27	0	1.27	0.30			1,544	175	1,718
Canada . . . . .	3	7.02	0.66	0.16	0.82	0.19			2,058	113	2,171
Cuba . . . . .	2	5.26	10.20	0.56	10.76	2.52			1,544	1,479	3,022
France . . . . .	2	5.26	57.86	35.02	92.88	21.76			1,544	12,763	14,307
Gabon . . . . .	0	1.75	0	0	0	0			515	0	515
Ghana . . . . .	1	3.51	13.42	0	13.42	3.14			1,029	1,844	2,873
Côte d'Ivoire . . . . .	1	3.51	8.34*	5.34*	13.68	3.20			1,029	1,880	2,909
Japan . . . . .	4	8.77	42.02	0	42.02	9.84			2,573	5,774	8,347
Korea . . . . .	4	8.77	46.47	0*	46.47	10.88			2,573	6,386	8,959
Maroc . . . . .	2	5.26	4.76	1.02	5.78	1.35			1,544	794	2,338
Portugal . . . . .	3	7.02	6.73	7.69	14.42	3.38			2,058	1,982	4,040
Sénégal . . . . .	1	3.51	5.53	3.06	8.59	2.01			1,029	1,180	2,210
South Africa . . . . .	1	3.51	0.18	0.11	0.29	0.07			1,029	40	1,069
España . . . . .	3	7.02	83.87*	26.37*	110.24	25.82			2,058	15,149	17,207
USA . . . . .	4	8.77	33.38	21.03	54.41	12.74			2,573	7,477	10,050
USSR . . . . .	4	8.77	8.08	2.07	10.15	2.38			2,573	1,395	3,968
TOTAL . . . . .	39	100.00	324.50	102.43	426.93	100.00			29,333	58,667	88,000

A = Panel membership.

B = Percentage of payments for annual membership and panel membership (G + H).

C = 1975 catch (live weight).

D = 1975 canned production (net product weight).

E = Total C + D.

F = Percentage distribution of E.

G = Not applicable.

H = Not applicable.

I = 1/3 of \$ 88,000 distributed percentage-wise according to column B.

J = 2/3 of \$ 88,000 distributed percentage-wise according to column F.

K = Total I + J.

\* No reporting received by the Secretariat. Estimates by the Secretariat based on Statistical Bulletin Vol. 7 and other sources.

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

Madrid, November 8-14, 1978

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Text of Report

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**Item 1. Opening of the meeting**

The Chairman, Mr. A. Fonteneau (France), opened the Ninth Regular Meeting of the Standing Committee on Research and Statistics (SCRS). He welcomed all the attendants.

He compared the 1971 SCRS Report with that of 1977 and emphasized the marked improvement the scientists have made in population studies, statistics and all other research activities within the framework of ICCAT. Other activities such as training courses, workshops, etc. were also commended. The quick dissemination of documents, information, statistics, etc. through the Secretariat was also highly praised.

The SCRS Chairman referred to the large amount of data not being accumulated and pointed out that there are no facilities on the national or the Secretariat level to handle all these additional data on a timely basis. Also, the increased work that analyzing these data involves was pointed out.

Lastly he referred to the organization of the SCRS meeting. The ever-increasing work now makes it impossible to dispose of all the problems within the 6 days of plenary sessions available for the meeting. He commented on the new system adopted by the Committee whereby the rapporteurs of each species concentrate their efforts on reviewing pertinent papers presented to the Committee so that the limited time available to the SCRS can be used most efficiently.

The Executive Secretary extended a welcome to all the attendants. He commented on the close cooperation between the SCRS Chairman and the Secretariat. He thanked all the scientists for their assistance and collaboration throughout the year.

Each member country delegation introduced its members. (The List of Participants is attached to the Proceedings of the Commission meeting as Annex 2.)

## Item 2. Adoption of Agenda and arrangements for the meeting

The Tentative Agenda, circulated in advance of the meeting, was adopted (attached herewith as Appendix 1).

The following scientists were assigned as rapporteurs for Item 7, "status of stocks" sections of the SCRS Report.

7-a Yellowfin tuna	W.W. Fox* (U.S.A.), R.H. Pianet (Senegal)
7-b Skipjack tuna	R.H. Pianet* (Senegal), W.W.Fox (U.S.A.)
7-c Bluefin tuna	G.L. Beardsley* (U.S.A.), F.X. Bard* (France), Z. Suzuki (Japan), T.D. Iles (Canada)
7-d Albacore	J.Y. LeGall* (France), N. Bartoo (U.S.A.) A.G. Garcés (Spain)
7-e Bigeye	S. Kume* (Japan), G. Sakagawa (U.S.A.)
7-f Billfishes	R. Conser* (U.S.A.), Z. Suzuki (Japan)
7-g Southern bluefin Small tunas	S. Kume* (Japan) P.M. Miyake* (Secretariat)

Dr. P. M. Miyake (Secretariat) was nominated rapporteur for all other Items of the Agenda. Dr. J. A. Gulland (FAO) was nominated as coordinator of all the SCRS rapporteurs.

An Ad Hoc Working Group on the Admission of SCRS Documents was established and the Messrs. Cendrero, LeGall, Rosa and Miyake were asked to review the qualification of submitted documents.

\*Chief Rapporteur

The SCRS Chairman also established an Ad Hoc Working Group on Small Size Yellowfin-Bigeye Tuna Statistics and the Messrs. Marcille (France), Kwei (Ghana), Amon (Ivory Coast), Sakagawa (U.S.A.), Kume (Japan), Santos (Spain) and Miyake (Secretariat) were named to that Working Group. The terms of reference of this Group were to make the best possible estimates for bigeye and yellowfin of the surface catches for the past years, so that population analyses can be based on more correct figures.

### **Item 3. Admission of Observers**

All the observers (listed in Annex 2 to the Proceedings) were introduced and admitted with a warm welcome.

### **Item 4. Admission of scientific papers**

Mr. O. Cendrero (Spain) reported on the results of the meeting of the Ad Hoc Working Group on the Admission of SCRS Documents. The Report of the Group is herewith attached as Appendix 2.

He noted that there were five different types of documents which did not meet the criteria set up for documentation of scientific results. His Group tried to apply the rule with some flexibility. All the documents which could have been used by the rapporteurs were all adopted, but those that did not comply with the required qualification to a large extent were not accepted.

The Committee concurred with all the recommendations made by the Ad Hoc Working Group.

The SCRS Chairman also asked the Working Group on Document Policy, which had been established earlier in 1978 to review the basic publication policy for the ICCAT scientific documents, to meet during this session. The Group now consists of the following: O. Cendrero (Spain), R. Letaconoux (France) and I. Barrett (U.S.A.).

### **Item 5. Report of the 1978 Officers Meeting**

The Report (SCRS/78/6) was presented to the Commission by its Rapporteur, Dr. P. M. Miyake (Secretariat). He explained that the meeting was called by the SCRS Chairman because many new assignments were made to the SCRS during the 1977 Commission meeting but at that time many scientists had already left Madrid. Therefore SCRS could not make the corresponding arrangements for each new task. Also, meetings of the Sub-Committee on Skipjack and the Working Group on Bigeye were held.

The meeting was very productive in discussing many important items concerning SCRS research activities which had not been discussed during the past SCRS sessions due to the limited time available. These include, document policy, organization of the meeting, time schedules, etc.

The Officers Meeting Report includes deliberations of the Working Group on Bigeye but the Sub-Committee on Skipjack presented a separate report.

The Chairman suggested that a similar meeting be held during the coming 1978-79 intersessional period. There was a general feeling that the Officers Meeting was very productive and this suggestion was agreed upon by the Committee.

## Item 6. Review of national fisheries and research programs

All the countries present verbally reported the recent developments of their national fisheries and research activities.

### 6.1. *Angola*

### 6.2. *Benin*

### 6.3. *Brazil*

In 1977, the total catch of tunas and related species in Brazilian waters was 4,619 MT. The total catch by longliners (4 national and 7 leased) was 2,915.3 MT, consisting of yellowfin tuna, 28 %/o, albacore 18.6 %/o, bigeye tuna 14.1 %/o, broadbill swordfish 11.1 %/o, marlins 12.4 %/o and other species, e.g. king mackerel, dolphins, sharks, etc., 15.6 %/o.

The artisan fisheries, by trolling and gill-nets, contributed with about 1,704.1 MT, consisting mainly of 1,500 MT of king and spotted Spanish mackerels and 204.1 MT of blackfin tuna.

### 6.4. *Canada*

Tuna catches in 1977 were limited to 972 MT of bluefin; 241 MT being purse seined small fish and the remainder larger fish taken by rod and reel or incidentally in traps. In addition, small quantities (113 MT) of swordfish were landed by longline vessels. Preliminary data for 1978 indicate 241 MT small bluefin, 318 MT yellowfin and 86 MT skipjack taken by purse seine; 421 MT of large bluefin taken by rod and reel or in traps; and 1,500 MT of swordfish by longline. All bluefin landings have been sampled extensively for size and age, including the collection of otoliths and vertebrae. Limited local tagging of large fish has been continued and the nine recaptures reported in 1977-78 include 3 in the Gulf of Mexico. Considerable research has been carried out on large bluefin held in pound nets for fattening to increase the market value, including the monitoring of environmental parameters for correlation with biological observations; the study of tag retention; the oral administration of tetracycline for short-term growth studies; the study of visceral temperature, ambient temperature, swimming



depth, swimming speed and tail beat frequency data telemetered ultrasonically; the effect of diet on flesh quality; and the apparently successful use of radio-immunoassay techniques for discrimination of sex using minute blood samples. Considerable progress has been achieved in computer analysis of bluefin rod and reel logbook data. 1977 data are being analyzed to establish the validity of the techniques and data for 1975, 1976 and 1978 will soon be available for comparative study.

#### 6.5. *Cuba*

After analyzing data for the first three quarters of the year, it is noted that up to now Cuban catches of tunas and tuna-like species for 1978 have similar characteristics to those of 1976 and 1977. It is, therefore, expected that catches will be at a level similar to previous years, or about 10,000 MT, with fishing effort similar to or slightly less than in other years.

Research in the 1977-78 period included monthly biological and fishing studies in all fishing areas, with emphasis on skipjack, blackfin and yellowfin. Collection of catch and effort data from all vessels of the Cuban fleet which catch the aforementioned species in areas of the central East Atlantic and central West Atlantic was also carried out.

A preliminary evaluation of the spawning biomass of skipjack in the central West Atlantic was also conducted and periodical evaluations of tropical tuna populations in the above-mentioned areas were also continued.

These works were carried out with a direct collaboration between the research and production areas, which permitted more effectiveness in Cuban fishing operations during the last period.

#### 6.6. *France*

#### 6.7. *Gabon*

#### 6.8. *Ghana*

#### 6.9. *Ivory Coast*

#### 6.10. *Japan*

In 1977, the Japanese longline fisheries harvested about 44,000 MT of tunas and tuna-like fishes from the Atlantic Ocean. 1977 catches by two major gears (longline and pole-and-line) remained at about the same level as those in 1976. The catch of the longline fishery has recently been directed to bigeye and northern and southern bluefin. During 1977 and 1978, southern bluefin fishing in the South Atlantic increased remarkably. Eighteen Japanese baitboats operated based at Tema in 1977 and 1978, and skipjack predominated the baitboat catches.

During 1977-1978 catch and effort and size data were collected from the Atlantic Japanese tuna fisheries. Those were processed and presented to SCRS routinely. Also, efforts were continued on a study of fisheries biology and stock assessments of Atlantic tuna resources. The details of all of the above are discussed in the Japanese National Report(SCRS/78/54).

#### *6.11. Korea*

In 1977, Korean commercial catches of tuna and tuna-like fishes from the Atlantic Ocean amounted to 45,051 MT, of which 38,849 MT were caught by 120 longliners and 6,202 MT by 15 baitboats. The major species caught were yellowfin, albacore, bigeye and skipjack.

As for research activities this year, the Korean government initiated tagging of tuna and tuna-like fishes by longliners in all the oceans even though on a small scale.

#### *6.12. Morocco*

#### *6.13. Portugal*

In 1977, the Portuguese tuna catch was 9277 MT, representing a 60 % increase from the 1976 catch. Baitboats catch 65 % of the total. Skipjack in the Azores Islands is the most important species in the catch (4662 MT). The catch breakdown by areas is shown in the National Report. 88 % of the catch comes from the months of May to September, although tuna are caught throughout the year.

#### *6.14 Senegal*

In 1977, approximately 55,000 MT of tuna were either transshipped or landed at Dakar: 11,500 MT were caught by the Dakar-based fleet (4,500 MT of yellowfin, 4,500 MT of skipjack and 2,500 MT of bigeye); 21,000 MT were transshipped by large FIS purse seiners (13,500 MT of yellowfin, 7,000 MT of skipjack and 500 MT of bigeye) and 22,000 MT were transshipped by Spanish purse seiners (7,500 MT of yellowfin, 13,500 MT of skipjack and 1,000 MT of bigeye). For 1978, preliminary estimates indicate that 13,000 MT of tuna were landed and 22,000 MT of tuna were transshipped, which shows a decrease in activities. Scientific research was carried out as in the past years, as well as samplings. Studies concerning the growth and fecundity of skipjack are being carried out and preliminary results have been obtained. A tagging cruise released approximately 1,200 tunas of three species (80 % bigeye, 10 % skipjack and 10 % yellowfin) in June. Senegal has participated in the organization of the International Skipjack Year Program and is also actively collaborating in the Program.

#### *6.15 South Africa*

### 6.16. Spain

In 1977 Spain caught about 105,000 MT of tunas in the Atlantic. These catches were made in three major fishing areas as follows: Gulf of Guinea - 69,000 MT; Canary Islands - 7,000 MT; and off the Spanish peninsular coasts - 29,000 MT.

In 1978 fishing effort was increased in the Gulf of Guinea with the entry in operation of two new purse seiners. On the other hand, fishing effort decreased in the other fishing zones, especially on bluefin and albacore.

Research in Spain during 1977 and 1978 was centered principally on the collection of basic statistics, catch, effort and biological data. Besides, various tuna tagging cruises were carried out. In the Bay of Biscay 170 bluefin and 130 albacore were tagged this year. A pilot tagging cruise was carried out in a trap off southern Spain. On this cruise 580 small tunas and tuna-like fishes were tagged. A research cruise was carried out and tuna eggs and larvae were collected in the Mediterranean Sea, North of Sicily. The latter cruise was in collaboration with the ESPI and Marine Biology Laboratory of Fano, both in Italy.

### 6.17 United States

The United States commercial catch of tunas and tuna-like fishes from the Atlantic Ocean increased in 1977 to approximately 24,831 MT from 18,353 MT in 1976. The increase was primarily due to increased participation of U.S. purse seiners in the eastern tropical Atlantic tuna fishery. Total catch in 1977 for the tropical tuna fleet was 13,585 MT, up from 4,532 MT in 1976.

In 1977, the United States catch of bluefin tuna was 1,956 MT. The catch was held to the same level as in 1976 through stringent regulations of the fishery.

In 1977-78, United States research activities on Atlantic tunas and tuna-like species were concentrated on life history studies, stock assessments, fishery evaluations and related topics in support of domestic management requirements and in response to recommendations of the SCRS. Collection of fishery and biological data from the U.S. tropical tuna, bluefin tuna and sport fisheries continued in 1977-78. Also, biological data were collected from U.S. imports of Atlantic-caught tunas in Puerto Rico. Results of the research effort are contained in the 14 documents presented to the SCRS.

### 6.18. U.S.S.R.

The total 1977 U.S.S.R. catch of tunas and tuna-like species was 19,245 MT, 6,460 MT more than in 1976, while the tuna catch was 14,960 MT. In the central-eastern Atlantic 6,674 MT of skipjack, 4,086 MT of bigeye, 1,794 MT of yellowfin, 932 MT of small tunas and 212 MT of albacore were caught. In the South-eastern Atlantic, 1,262 MT of tuna were caught, but the species were not determined.

Bigeye, yellowfin and albacore were fished by longliners and the rest by pole-and-line and trolling or as a by-catch of the trawl fishery.

The swordfish catch by longliners was 87 MT in the central-eastern Atlantic and 34 MT in the South-eastern Atlantic, a decrease from 562 MT in 1976.

In 1978 the fishery was conducted in the central-eastern Atlantic and 3,822 MT of tunas, 363 MT of swordfish and 512 MT of Atlantic bonito were caught. The fishery in the South-eastern Atlantic caught 875 MT of tunas and 26 MT of swordfish. The total catch for the period January-June, 1978 was 4,697 MT -- 3,914 MT of bigeye, 591 MT of yellowfin, 192 MT of skipjack and 389 MT of swordfish.

Cohort analysis conducted shows that bigeye stocks exploited by motherboats in the Gulf of Guinea remain at a rather stable level during the last 7 years. Calculations of theoretical dependence of length on body weight suggest a possibility of different groups of bigeye between North and South of the Equator. In accordance with the parameters of the von Bertalanffy equation, limited length is 253.7 cm and limited mass is 363.8 kg.

Size compositions of skipjack in the central-eastern Atlantic are quite variable. The size range is from 28.0 cm to 64.0 cm with the average of 35.9 - 53.8 cm. Between different periods skipjack of different size compositions are fished not only in different areas, but also in the same area, indicating the complicated population structure of skipjack.

The analysis of biological data showed that the age of swordfish caught in the eastern Atlantic is 1-8 years and their annual growth is 10-30 cm.

#### *6.19 Italy*

In 1978, the Italian bluefin tuna fishery developed differently than in previous years; a delay of one month seems to exist in the fishing season. This led to a sharp decrease in catches by traps and to a decline in catches of the spawning stock by purse seiners. For June-July, the catch can be estimated at 3,000 MT. Nevertheless, in October and November, purse seiners made good catches of young tunas of 2-5 years in the Tyrrhenian and Adriatic Seas.

In 1978, research laboratories continued to study the various bluefin tuna fisheries.

Several research cruises were carried out:

a) With the participation of Mr. A. Dicenta (Spain), a cruise took place in July off Sicily, to try to determine the natural mortality rate of tuna larvae as well as the spawning period;

b) Attempts to collect large quantities of bluefin tuna eggs, in view of an eventual culture, were carried out off Sicily, with the participation of three Japanese scientists;

c) A tagging cruise of young bluefin tuna was carried out in the Adriatic Sea with the collaboration of ICCAT and Mr. F. Mather (U.S.A.). Unfortunately, due to the unstable behavior of the tunas, there were no catches made during the cruise.

d) Research on the spawning seasons and zones of different tuna species and their relationship to hydrological conditions was conducted.

## **Item 7. Review of conditions of stocks, with a brief presentation of major papers on this subject**

### *7-a. Yellowfin*

#### **a-I. Review of current research**

Research on yellowfin tuna over the past year concentrated on the basic problems identified at last year's meeting. Several documents dealt with the problem of improper identification of yellowfin and bigeye tunas (SCRS/78/18, 32, 72 and 73) and with the effect of a bigeye minimum size limit at 3.2 kg on several fisheries for yellowfin tuna (SCRS/78/44 and 102). Documents SCRS/78/70 and 86, respectively, evaluated measures of catch-per-unit-effort (CPUE) for the surface fishery and developed estimates of relative recruitment based on CPUE. The effects of alternate stock structure hypotheses and the relation between surface-caught and longline-caught yellowfin received emphasis in this past year's report (SCRS/78/56, 65 and 73). Four documents dealt with the status of the yellowfin stocks as a whole (SCRS/78/56, 67, 74 and 75) and six documents provided detailed information on several of the Atlantic fisheries for yellowfin (SCRS/78/44, 55, 79, 94, 95 and 102).

#### **a-II. Review of fisheries data**

##### *a.II.1. Catch trends*

Yellowfin tuna are caught throughout the tropical and temperate waters of the Atlantic Ocean, Caribbean Sea and Gulf of Mexico. Catch statistics for the various fisheries are given by type of gear in Table 1. The total Atlantic (including the adjacent seas and gulfs) catch has increased over the last twelve years from an average of 68,000 MT for 1964-66 to over 120,000 MT in recent years, 1975-77. The 1977 catch, 131,900 MT was the highest recorded for the Atlantic yellowfin tuna fishery. The best estimate of the 1978 catch at the time of the meeting was 128,000 MT.

There are basically three fisheries in the Atlantic: the longline fishery throughout the distribution range of the yellowfin tuna population, the eastern Atlantic surface fishery, and a small western Atlantic surface fishery. Over the last decade the catch trend for the longline fishery has been relatively stable averaging about 26,000 MT (1966-1977), and fluctuating between 16,000 MT (1967) and 32,000 MT (1973). The expected longline catch of yellowfin for 1978 is 18,000 MT (27,000 MT in 1977).

The eastern Atlantic surface fishery began as a baitboat fishery off the West African coast from the late 1960's to the present but developed rapidly, primarily as a purse seine fishery. The eastern Atlantic surface catch has trended upwards over the past twelve years surpassing the longline fishery in 1966, and reaching a record catch of about 105,000 MT in 1977. The 1978 catch is expected to be about 110,000 MT, a new record. The baitboat catch has declined in the 1970's and in recent years has represented less than 10 % of the eastern Atlantic surface catch. The purse seine catch

has continued to increase and in recent years has represented over 90 % of the eastern Atlantic catch. Recent increases (1974-77) in the eastern Atlantic surface catch, resulted primarily from the fishery developing further offshore rather than from increases in fishing effort in the traditional nearshore fishing areas. Depending on how one chooses the line which delimits the traditional fishing areas (Figure 1) the amount of catch taken from the offshore expansion of the fishery was about 20-40 % of the eastern Atlantic surface catch in 1975-77 (SCRS/78/67 and 74).

The western Atlantic surface fishery has been rather small with an average annual catch of about 2,000 MT (1972-77). In 1978, fishing activity increased toward the end of the year and about 4,000 MT are expected to be taken.

A minimum size regulation of 3.2 kg entered into effect on July 1, 1973, as had been originally recommended by SCRS, to improve the yield of the Atlantic yellowfin fishery. Despite this, most of the catch (in terms of number of fish) in the surface fishery continue to be fish less than two years old. According to age composition data from the the fishery for 1974-77, which involves several assumptions, it is estimated that an average of 68 % of the yellowfin were less than two years old (SCRS/78/67). From 1974 through 1976, the average percentage of yellowfin caught below the minimum size limit of 3.2 kg (55 cm) was in excess of 60 % for baitboats and in excess of 20 % for purse seiners.

Small bigeye tuna are still occasionally reported as yellowfin tuna and the reverse is also true.

However, the net effect on the total catch statistics may not be as serious as previously thought (SCRS/78/72); i.e. for 1976 the adjustment to the reported bigeye and yellowfin catches was estimated to be only 700 MT (minus for bigeye and plus for yellowfin).

#### *a-II.2. Effort trends*

The trends of fishing effort in the Atlantic longline fishery and eastern Atlantic surface fishery are shown in Table 2. Longline fishing effort for yellowfin reached a peak in 1973, but by 1976 longline fishing effort had declined by 33 % (SCRS/78/55). The trend in surface fishing capacity continues to increase with an estimated increase of about 12 % from 1976 to 1977. For 1978 the carrying capacity as a measure of total fishing effort in the surface fishery is expected to increase further (about 23 %), in part due to increased participation of American purse seiners. The trends in effective fishing effort (and hence in fishing mortality) are discussed in the next section.

#### *a-II.3. Trends in catch-per-unit-effort*

Various estimates of catch-per-unit-effort (CPUE) for the surface and longline fisheries in the Atlantic Ocean were presented in documents SCRS/78/65, 67 and 74. Some of these are tabulated in Table 3 and the indices that are believed to best measure abundance are shown in Figure 2.

CPUE estimates in catch per standard FIS-class-3 purse seiner days at sea for the eastern Atlantic surface fishery were 4 % lower in 1977 than in 1976, which follows

the general trend of decreasing CPUE (3.46 for 1964-68, 2.34 for 1969-73 and 2.26 for 1974-77), SCRS/78/74.

A more rapid decline was shown for the CPUE estimate in SCRS/78/67 with a 44 % decline for large seiners in the traditional zone between the 69-73 and 74-77 periods. This CPUE was corrected for several suspected biases in the nominal measures of CPUE and, therefore, may be a better measure of relative density of the yellowfin stock.

Atlantic-wide CPUE for the longline fleets from 1975 to 1976 was estimated to have decreased by 3 or 11 % (SCRS/78/55 and 74, respectively). Document SCRS/78/65, however, showed a 33 % increase between the same two years. According to SCRS/78/74 CPUE continued to decline generally over the period from 1964 to 1976 (37.48 for 1964-68, 23.69 for 1969-1973 and 22.52 for 1974-76).

It may be noted that there are many different available indices of CPUE in the eastern Atlantic surface fishery, each referring to particular types of gear, national fleets or area of fishing (see Table 3). While there was some general agreement between these figures, there were also obvious differences of detail. Some of these may reflect real differences in the changes in abundance of fish of different sizes, or in different areas. However, each of these indices was subject to various sources of bias, as discussed in SCRS/78/70. It was believed that the combined indices using data from most of the surface fisheries provide reasonable measures of changes in abundance, but there may be still some residual bias. If so, the indices of CPUE such as those shown in Figure 2 were more likely to under-estimate changes in true abundance than to over-estimate them.

### a-III. Stock Structure

An accurate appraisal of the stock conditions of yellowfin tuna depends on the actual stock structure in the Atlantic. Two questions must be answered:

1) The first question concerns the relationship between yellowfin tuna exploited by longliners and surface gear. If the mixing rate between these two groups of fish is high and continuous, then increases in the surface catch would lower the catch rates of longliners, and vice versa; the assessments of the stock condition must, therefore, take into account both the surface and longline fisheries simultaneously. If, on the other hand, the groups of fish are more or less independent, then separate assessments can be made for the short term and the degree of common spawning would determine the independence of assessments for the long term.

Documents SCRS/78/56, 65 and 74 showed that there was a good correlation between CPUE of these two gears among years; document SCRS/78/65 showed the correlation was very good if small fish were removed from the surface catch. Additionally, document SCRS/78/65 showed that there was a good seasonal correlation between the monthly surface and longline CPUE's during the first three quarters in the eastern Atlantic offshore area. However, monthly surface and longline CPUE were not correlated seasonally in the three coastal subareas of the eastern Atlantic (SCRS/78/65). The weight

of the current evidence seems to be that yellowfin caught by surface and longline gears should be considered together when making an assessment of the condition of the stocks.

2) The second question concerns the relationship among yellowfin tuna in the coastal eastern, offshore eastern, central and western Atlantic (including the Caribbean Sea and Gulf of Mexico). If the mixing rate among these areas is high, then yellowfin tuna may be assessed and managed as a single stock. -However, if the mixing rate is low among any of the major subareas, then yellowfin could be assessed and managed as a collection of separate stocks.

Tagging studies reported in earlier years indicated that small yellowfin in the coastal eastern Atlantic areas migrate along the shore during the first two to three years of life and may later migrate offshore and seasonally return to the coastal areas. The latter inshore-offshore migration of older yellowfin is not supported by direct evidence and there are no estimates of mixing rates between coastal eastern and the offshore eastern areas (SCRS/78/10).

A similar picture of seasonal movements along the African coast is provided by an analysis of the seasonal CPUE for small areas (1° areas for surface gears and 5° areas for longliners).

A comparison of the recent production model analyses and those of earlier years (before the offshore expansion in the eastern Atlantic) revealed a difference that was most easily explained by the current fishery exploiting a somewhat larger stock. That is, we may hypothesize an eastern Atlantic stock that is composed of a number of sub-groups of fish. Between these groups, living at different average distances offshore, there may be some but not complete mixing.

Production model analyses (SCRS/78/67 and 73) indicated that considering the present pattern of fishing, the degree of mixing between the inshore and offshore areas may not be critical, and that with the models used, it makes little difference whether the two areas are assessed independently or in combination. These conclusions might be different with more complex models.

Document SCRS/78/65, through examining longline CPUE seasonably by major eastern, central and western areas, concluded that there could be important westward migrations of yellowfin between the first and third quarters of the year and eastward during the third and fourth quarters. There is, however, no direct evidence of mixing between the major concentrations of yellowfin tuna in the eastern Atlantic and in the western Atlantic. Therefore, the assessments will be made by the two assumptions as in the past.

- 1) A single Atlantic-wide stock, and
- 2) Two stocks separated by 30° W longitude.

#### a-IV. Population parameters

Estimates of the annual coefficient of natural mortality ( $M$ ) were made in previous years (SCRS/76/71) and generally fell within the range of 0.6 to 0.8. A variety of values (ranging from 0.6 to 1.20, and in some cases increasing with age) had been



used in studies reported to the present meeting (SCRS/78/32, 67 and 75), but none of these documents independently estimated the values of  $M$  they utilized.

The annual coefficient of fishing mortality ( $F$ ) was reestimated in three documents (SCRS/78/56, 67 and 75) using cohort analysis. Document SCRS/78/56 estimated age-specific annual  $F$ 's by year for age groups I-VI which were averaged over the 1966-68 cohorts and the 1969-71 cohorts.

Age-specific annual  $F$ 's by quarter of the year were estimated for ages 0-VI in SCRS/78/67 and for ages 0-VII in SCRS/78/75. Document SCRS/78/75 further broke the  $F$ 's down by gear (pole-and-line, purse seine, and longline) of the 1965-68 cohorts (the only complete cohorts) and estimated an  $F$ -vector by gear for the 1975 fishery.

Comparison of the various estimates of  $F$  is difficult because of the different ways they were estimated, averaged or combined. However, comparing the estimates of  $F$  in SCRS/78/67 and SCRS/78/75 for 1975 showed that after adjusting for the differences in assumed  $M$ , the  $F$ 's for ages II-IV were very similar; the  $F$ 's for the other ages were different because of the different growth curves used in the two documents. There was a new hypothesis on the growth of yellowfin presented in document SCRS/78/67 for ages 0 and I and V-VII which is different from that used in the past and in SCRS/78/75. Both analyses fundamentally used the growth relationship of Le Guen and Sakagawa (1973), which is based on measurements of yellowfin tuna larger than 60 cm. SCRS/78/75 extrapolated the relationship back to smaller individuals (30-60 cm) that are recruited to the fishery. However, an adjustment in the growth patterns of younger individuals was presented in SCRS/78/67, based on data collected from Tema landings since 1973 (Figure 3). No new length-weight studies were presented.

Both analyses presented size range for age classes by quarter of the year developed from their growth curves and length frequencies. The first quarter of the 0 age group was the same for both size ranges, but they did not agree in quarters 2, 3 and 4. There was an overlap in size ranges for their age group I and the differences became insignificant by age group III. The growth proposed in SCRS/78/67 serves to reduce the age for a given length, by approximately six months at 45 cm to no difference at 60 cm. Attention to resolving this difference in the interpretation of growth is required.

#### **a-V. Status of stocks**

##### *a-V.1. Production model analysis*

Production model analyses of yellowfin tuna stocks were conducted in five documents (SCRS/78/56, 65, 67, 73 and 74). The estimates of CPUE, and hence effective fishing effort, used in the documents differed. In addition, the division of the total longline catch between the eastern and western Atlantic at 30°W longitude differed substantially between documents. Attention to resolving these differences is required.

The application of production models to yellowfin has to be done with caution because of the problem of finding an index of CPUE that accurately reflects changes in abundance, as discussed in Section a-II.3.

i) Total Atlantic stock

Production model analyses using the assumption of a single Atlantic-wide stock of yellowfin tuna were conducted in documents SCRS/78/67 and 74. Document SCRS/78/67 fit only the exponential production model ( $m = 1$ ) and used a new measure of CPUE for the years 1969-77 (Figure 4-A). Document SCRS/78/74 fit three production models ( $m = 0, 1$  and  $2$ ) to the CPUE used in previous years for the period 1964-77 (Figure 4-B).

The results in document SCRS/78/74 continue to support the conclusion that the curve relating average sustained catch to estimates of effective fishing effort is broad and flat-topped, i.e. the curve labeled with  $m = 0$  in Figure 4-B. However, it must be noted that while the curve labeled with  $m = 0$  implies that sustainable catch theoretically never declines at very high levels of effective fishing effort, this cannot be true. At some high level of effective fishing effort the stock will become so depressed as to result in a significant reduction in recruitment and the sustainable catch will decline. It is not known at what level of effective fishing effort the decline in sustainable catch will occur.

The estimates of maximum sustainable yield (MSY) of yellowfin from the total Atlantic stock ranged from 108,000 MT to 162,000 MT depending on which of the curves in Figures 4-A or 4-B is actually true. These estimates were 8 to 17 % higher than those provided in last year's report (SCRS/78/10). This is due to still further off-shore expansion of the eastern Atlantic surface fishery. The curves for  $m = 1$  showed that while fishing effort has not quite reached the level which produces MSY (10-15 % higher than the 1977 level of fishing effort), the MSY is less than the current level of catch. The curve for  $m = 0$  showed some increases in catch can be made with further increases in fishing effort at the expense of a further reduction in CPUE. Despite the difference in CPUE used in SCRS/78/67 and 74, nearly identical results were obtained with the same model ( $m = 1$ ); the MSY was estimated at 116,000 MT and 109,000 MT, respectively, with a 10-15 % increase in effective fishing effort.

ii) Eastern Atlantic stock

Production model analyses using the assumption of a separate eastern Atlantic stock were conducted in documents SCRS/78/67 and SCRS/78/74. Both documents fit the production models to the eastern Atlantic surface data under the assumption of constant longline fishing (Figures 5-A and 5-B). Document SCRS/78/67 also attempted to divide the total longline catch into eastern and western components and fit the production models to those data (Figure 6).

Again despite the differences in measures of CPUE, the general picture is the same. The stock is heavily fished. Under the more conservative hypotheses ( $m = 2.0$  and  $m = 1.0$ ) the present effort is approaching or at about the level giving the MSY, and no significant increases in yield from the average current levels can be expected (estimates of MSY around 90,000 MT to 100,000 MT by adding the longline catches to the estimates of surface MSY). On the more optimistic hypotheses ( $m = 0$ ) significant increases in yield can be obtained (MSY = 143,000 MT), but, if correct, this would require a very great increase in effort, and a corresponding decrease in catch-per-unit-effort. It must be stressed that these analyses concern the fishery as it is at present operating. In recent

years the expansion of the fishery offshore has been accompanied by some increase in the estimates of MSY. Apart from some effects due to changes in the size of fish caught, this increase was believed to be largely due to the fishery harvesting a somewhat larger stock. It is not known to what extent this increase might be continued by a further expansion westward. Inasmuch as such an expansion is practicable and will harvest groups of fish not currently exploited, or only exploited lightly, there are greater opportunities for increased catch than these production models would suggest.

### iii) Western Atlantic stock

Two documents conducted production model analyses on the assumption of a western Atlantic stock (SCRS/78/56 and 65). Both analyses used only longline data and ignored the 2,000 MT surface fishery. The big difference between these two analyses was the amount of longline catch allocated to the western Atlantic for years since about 1969. SCRS/78/56 allocated about 18,000 MT and SCRS/78/65 allocated about 14,000 MT. The estimate of document SCRS/78/56 was based on extrapolation of the total longline catch from the Japanese longline data; and document SCRS/78/65 was mainly based on the ICCAT data file and published Taiwanese data.

If the two analyses give equivalent estimates of the MSY, one corresponds to a present effort at about the MSY level, and the other to a present effort well past that level.

While these analyses showed that little or no additional catch can be taken from the western Atlantic by increasing the longline effort, experience in other areas, including the eastern Atlantic, suggests that a different pattern of fishing, such as increased surface fishing on medium-sized fish, could significantly increase the total yield. It is not possible to make any quantitative estimate of what this increase might be. It will clearly depend critically on the degree to which the western Atlantic is indeed a separate stock.

#### *a.V.2. Yield-per-recruit analysis*

On the basis of several studies, the Commission instituted a minimum size limit on Atlantic yellowfin of 3.2 kg or 55 cm in 1973. It was estimated that under the then current fishing pattern this would either give a small increase in yield-per-recruit, or if under-sized fish were discarded dead, would not affect the yield-per-recruit. The main objective of the size limit was to discourage the development of fisheries on small yellowfin. Since that time the fisheries have changed dramatically. Purse seine catches have increased greatly, and have shifted to larger fish. Catches of both baitboats and longliners have decreased, and there has been a shift to smaller fish by the baitboats.

To take account of these changes, updated yield-per-recruit analyses were done for the eastern Atlantic. Three documents, SCRS/78/56, 67 and 76, estimated  $F$  vectors in different manners as noted before. All three documents concluded that there has been an increase in yield-per-recruit. Document SCRS/78/56 estimated an increase of 7 % in equilibrium yield-per-recruit based on the average  $F$ 's for 1966-68 versus 1969-71

cohorts. Document SCRS/78/67 estimated an increase in realized yield-per-recruit of 18 % between the average of the years 1969-71 and 1975-77. Document SCRS/78/75 estimated only a 3 % increase in equilibrium yield-per-recruit when comparing the 1975 fishing year with the average for 1966-72.

Document SCRS/78/75 also compared changes in yield-per-recruit between gears. The longline fishery experienced a 57 % reduction in equilibrium yield-per-recruit, the purse seine fishery a 55 % increase, and the baitboat fishery a 45 % decrease. The longline fishery's experience was due to the downstream effect from the purse seine and baitboat catches. The purse seine fishery's experience was due to increased effort and a shift to larger fish. The baitboat's experience was due to reduced effort on older fish and increased effort on very small fish.

As earlier analyses have shown, increases in yield-per-recruit to the fishery as a whole can be obtained with an increase in size-at-first-capture or a moderate increase in fishing effort. The longline fishery would gain by any increase in size-at-first-capture up to about 120 cm (SCRS/78/75), the purse seine fishery would gain by any increase up to 110 cm, and the baitboat fishery would lose by any increase in size-at-first-capture (SCRS/78/75).

The situation in respect to changes in minimum landing size is more complex. If the fishermen avoid catching small fish, then the benefits to the fishery as a whole will occur as predicted by the yield-per-recruit model. On the other hand, if small fish continue to be caught, and are discarded dead, there may be little or no increase in effective size-at-first-capture, and no benefit. Indeed, there will be a wastage of discarded fish.

Documents SCRS/78/44 and 102 noted problems with discards by baitboats of yellowfin under the current 55 cm minimum size limit. Japanese Tema-based baitboats discarded 1,130 MT of undersized yellowfin in 1977 while landing only 2,488 MT (SCRS/78/102). Similar, but higher, rates of discarding were noted by document SCRS/78/44 for two trips of Tema-based baitboats accompanied by Ghanaian technicians in 1978.

### *a.V.3. Recruitment analysis*

Three documents (SCRS/78/56, 67 and 75) estimated and analyzed recruitment in the eastern Atlantic for recent years. Cohort analysis was used in documents SCRS/78/56 and 75 to obtain estimates of the abundance at age 1. Document SCRS/78/67 combined a use of CPUE at ages 1 and 2 with cohort analysis to give estimates at age 0. The cohort analysis did not give a solution for the 1974 year-class but the CPUE at age 1 and 2 suggested that it was poor. The resulting estimates of recruitment are shown in Figure 7.

For the first series (SCRS/78/67) which estimated recruitment at age 0, recruitment fluctuated considerably but has remained rather constant over the total time period of 1968-75 - 53.6 million fish for 1968-71 and 55.5 million for 1972-75 (discarding the 1974 point as having no solution). The other two analyses, which included estimates for earlier years than the first and were for age 1 recruitment, showed increased recruitment over their time periods. However, as pointed out in SCRS/78/75 the 1966

cohort was at the same level as the 1969-72 cohorts, which were estimated to be remarkably stable, while it is likely that the 1965, 1967 and 1968 cohorts were below average.

There is no suggestion as yet that the increased catches over the past decade have had any harmful effect on recruitment. However, the CPUE of big fish in the longline fishery has decreased (SCRS/78/55). In view of this trend and of the increased catches of large fish by purse seiners, the size of the spawning stock, and of subsequent recruitment need to be carefully monitored.

#### *a-V.4. Current appraisal*

Regardless of the stock structure assumed, the Committee's appraisal of the condition of the yellowfin stock is unchanged from previous years. The stock (or stocks) are heavily fished, particularly in the eastern Atlantic. Given the present geographical distribution of the fishery and pattern of fishing by different gears, it is unlikely that appreciable increases in yield can be achieved by increasing the amount of fishing effort. The increases in total catch that have occurred in recent years seem to have been largely the effect of geographical expansion in the area of fishing. It is not known to what extent a further expansion can be achieved, or what further increase in catch might result from such an expansion.

The level of the catches also depends on the sizes of fish caught. An increase in the effective size-at-first-capture should increase the yield. Conversely, increased fishing on small yellowfin would tend to decrease the total long-term yield.

#### *a-VI. Effects of regulations*

The effects, if any, of the current minimum size regulation of 3.2 kg or 55 cm with a 15 % tolerance in number per landing are impossible to ascertain at this time. This is due to the lack of information on the catches of undersized fish which are misidentified as bigeye tuna or vice versa and on the quantity of fish that are discarded. It is not known if the existence of the size limit has discouraged the growth of fisheries for under-sized yellowfin; if so, then it surely has had some positive, though incalculable, effect. Increases in yield-per-recruit are estimated to have occurred after the institution of the size limit, but are partly due to changes in the levels of fishing mortality by the three major gear components and to shifts in the ages they fish that are independent of the size limit.

#### *a-VII. Recommendations*

##### *a-VII.1. Statistics*

- i) The actual catches of small yellowfin and small bigeye must be estimated through:

- a) Increased species composition sampling in Puerto Rico of the American catch;
  - b) Species composition sampling with the use of diagnostic characters to identify species at landing sites even where the small tunas are landed.
  - c) Correction of reported landings through species composition sampling of the major purse seine fleets, e.g. FIS and Spanish fleets.
  - d) Collection of information on catches not passing through normal market channels.
- ii) The amount of small yellowfin discarded at sea must be estimated through:
- a) Sending technicians to sea to estimate and record amounts of discards.
  - b) Or, failing this, encouraging fishermen to record estimates in logbooks.
- iii) Logbooks should be modified to require catch by set for purse seiners rather than catch by day and should provide for entries involving running time (i.e. not searching for fish), time down for repairs (i.e. not searching for fish nor conducting any part of a set), duration of each set and total time at sea. These data are required for studies aimed at improving CPUE as a measure of relative population density and for actual use if the studies are successful in improving CPUE as a population density index.
- iv) More data are needed from certain longline fleets in order to divide their catches between the eastern and western Atlantic.
- v) In addition to the technical improvements in logbooks mentioned under recommendation iii), better coverage is needed for some important tropical tuna fleets.

#### *a-VII.2. Research*

Research needs to be continued along established lines, covering such matters as compilation and improvement of CPUE data, use of production models, estimation of recruitment, etc. In addition, the following should be carried out:

- a) Re-examination of the evidence on growth.
- b) Monitoring of the size of the spawning stock, and its possible relation to recruitment.
- c) Examining of methods (other than a minimum size limit) that might lead to an increase in the size-at-first-capture.

#### *a-VII.3. Management*

The Committee noted that there appears to be, in some fisheries, considerable practical difficulties in implementing the 3.2 kg size limit, to such an extent that at

least its direct effect may be small. However, the existence of the size limit is giving rise to uncertainties or inaccuracies in the data base which is essential for accurate scientific assessment of the state of the stock. The Committee therefore repeated its recommendation of last year that if no action can be taken to apply the size regulation, the regulation be cancelled so at least more accurate statistics of the landings by different species can be obtained.

At the same time, it is clear that the yield from the fishery as a whole would benefit from measures that would limit or reduce the catches of small yellowfin, and the Committee recommended that the Commission give serious attention to the possibilities of such measures, other than a minimum size limit. These might include closed areas or closed seasons, or controls on the use of certain types of gear.

#### a-VIII. Evaluation of the progress made according to the assignments made in 1977

All the recommendations made at the 1977 Committee meeting were observed. Some studies need to be continued.

#### a-IX. Assignments of future work to the scientists

- |  |              |
|--|--------------|
| - Production model, yield-per-recruit  | R. Rinaldo   |
| - Fecundity-recruitment  | A. Fonteneau |
| - Estimate of migration by CPUE<br>age analysis  | E. Yanez     |
| - Study (from a multi-specific approach)<br>of stock conservation measures, other<br>than size limit | Z. Suzuki    |

### 7.b. Skipjack

#### b-I. Review of current research

Research conducted on Atlantic skipjack has been minimal in 1978. The preparation for the International Skipjack Year Program could be the cause. The Program required much preparation and since it would answer most of the questions asked concerning skipjack stocks, research activities have been delayed until the decision on the proposed Skipjack Program is taken. The final Program Plan, its activity plans and budget were presented in document COM-SCRS/78/14. Nevertheless, several other documents were presented to the SCRS. Most of these documents presented new or updated data (SCRS/78/ 24, 25, 27, 45, 54, 62, 80, 95). Document SCRS/78/50 presented preliminary results of a growth study based on the dorsal spines of 41 skipjack taken from the Dakar area. Document SCRS/78/69 analyzed incidental skipjack catch made by Japanese commercial longliners in the Atlantic. Document SCRS/78/101 reviewed catch distribution and relative abundance of skipjack based on the activity of Japanese bait-

boats and purse seiners in the Gulf of Guinea. SCRS/78/102 analyzed detailed data from Tema-based baitboats in 1977 and attempted to evaluate the specific interactions between skipjack and yellowfin-bigeye.

Document SCRS/78/68 analyzed the development of the skipjack catches and the fleets in the eastern Atlantic. An evaluation of the status of the stocks was also made.

Document SCRS/78/79 traced the history of Atlantic tuna fisheries from 1959 to 1975, particularly referring to the U.S. participation.

Skipjack catches and catch rates were examined as well as size distributions and status of the stock.

Finally, SCRS/78/70 analyzed fishing effort of FIS purse seiners and in particular the distribution between yellowfin and skipjack.

## **b-II. Review of fishery data**

### *b.II.1. Catch trends*

Skipjack is caught in the eastern and western tropical areas of the Atlantic. Statistics are shown in Table 4 for the years 1965-1977. Skipjack catches have increased greatly since the 1960's until 1971 when catches reached 85,000 MT. Since then, there has been variability in catches which fluctuated between 75 and 115,000 MT. The estimated catch for 1977 was 118,000 MT, which was the record catch for skipjack. This surpassed the 1974 catch by 2,000 MT. This large 1977 catch was probably due in part to catches that had not previously been reported, in particular, the U.S.S.R. catch. This totaled 6,674 MT in 1977, mostly caught by pole-and-line -- partly by trolling and trawling. The preliminary estimate of the 1978 catch is about 106,000 MT.

Most (95 % or more) of the catches come from the eastern Atlantic. An average of 3,000 MT is caught annually in the western Atlantic. Longliners report their incidental catches, but there are very small approximately 100 to 200 MT per year.

Catches by baitboat decreased regularly from 1969 (when they represented 64 % of the total) until 1972. Since then catches have been stabilized at 32-33 % of the total. The rest is caught by purse seiners. Baitboat catches of skipjack are still important, while baitboat catches of yellowfin are presently minimal (9 % of the total yellowfin catch in 1977).

### *b.II.2. Effort trends*

Tuna fisheries are of a multi-species nature and skipjack are caught by the same vessels which catch yellowfin. Table 5 shows the trend in estimated nominal fishing effort expressed in effective carrying capacity. The total nominal effort had increased constantly since 1967, and showed a sharp increase in 1972. In 1977, carrying capacity increased by 12 % over the 1976 level. It was estimated the increase in 1978 over 1977 was by 23 %.



### *b-II.3. Trends in catch-per-unit-effort (CPUE)*

Document SCRS/78/68 made a detailed analysis of CPUE by FISM\*, Japanese and U.S. fleets in the eastern Atlantic (Figure 8). The estimated standardized average CPUE in the eastern Atlantic fluctuates greatly from one year to the next, and the range of the fluctuation can even be double that of the CPUE.

CPUE's observed in 1977 were high, only slightly less than those in 1971 and somewhat higher than those for 1974, both very good years for the skipjack fishery. This high availability of skipjack was the main cause for the very high total catch recorded in 1977. The preliminary estimate of CPUE in 1978 (for the FISM and Spanish fleets in the Dakar area) showed a decrease of about 20 %.

### **b-III. Stock structure**

As was observed during the Dakar Working Group (SCRS/76/89), skipjack larvae can be found in the entire intertropical Atlantic. However, nothing is known on the structure of the stock.

Analysis of Japanese commercial longline catches (SCRS/77/69) demonstrated that skipjack were found in the entire Atlantic, but that most longline catches were made in the second or third quarter in the northwestern area, and in the first or fourth quarters in the central East and southwestern Atlantic. This, however, does not prove nor confirm the unity of the stock.

In the eastern Atlantic (SCRS/78/68), it was noted that CPUE fluctuated in relatively the same manner for all areas. This may suggest a certain unity of the stocks, or at least that the stocks may have the same origin (i.e. they originate from a single recruitment).

In all cases, there are many uncertainties, and it is strongly recommended that new research be carried out on this problem. The International Skipjack Year Program should help in answering these questions.

### **b-IV. Population parameters**

A growth study was conducted on skipjack in the area of Dakar based on dorsal spines (SCRS/78/50). Results indicated a slow growth (8.1 cm/year) for fish of a size range of 40 to 60 cm. The size-age relationships are the following: 41 cm at 1-year, 49 cm at 2-years and 57 cm at 3-years. There were no observed size-age differences between sexes.

### **b-V. Status of stocks**

\*FISM - French-Ivorian-Senegalese-Moroccan tropical fleets.

All judgements on skipjack stock conditions should be considered with prudence, since there is little knowledge for this species, either concerning reliable effort data to use in production models, or on parameters of growth and mortality to use in yield-per-recruit models.

*b-V.1. Production model analysis*

i) Entire tropical Atlantic

Because of the uncertainties in skipjack stock structure and the little importance of skipjack fisheries in the West, nothing can be said concerning this matter.

ii) Eastern Atlantic

Since the first attempt to evaluate the level of the stock was made in 1976 (SCRS/76/78), many estimates have been made without any result (Figure 9). Document SCRS/78/89 attempted to use many types of effort (in particular using data from areas that have better data available), but the attempt was unsuccessful. Whichever index was used, there was too much variation in the data. Therefore, it could not determine which of the following two hypotheses is right: that average CPUE is the same at all effort levels (i.e. there is no effect of fishing); or that there is a considerable decline in average CPUE at higher effort levels (i.e. fishing is affecting the stock). Two problems could be noted:

- The lack of precise and reliable data on several important skipjack fisheries limits the reliability of the results, particularly because the FIS fleet whose data were used mainly in the analyses does not seem to be representative of the fisheries in general.
- The abundance index used (catch per days at sea) seems to be a poor measure of CPUE in this type of fishery. This was suggested last year (SCRS/77/97) and was confirmed this year (SCRS/78/70).

In order to continue studies it is absolutely necessary that the first problem be resolved and that the second be studied more in depth in order to provide a CPUE index which is more closely related to the real abundance of this stock.

iii) Western Atlantic

Because of the very small catch (approximately 3,000 MT since 1974) and the lack of information on this fishery, no studies could be made in this area.

*b-V.2. Yield-per-recruit analysis*

No new studies have been presented on this subject since the report of the Dakar Working Group (SCRS/76/89). The Working Group at that time concluded that no gain could be expected from the implementation of a size regulation under the present level of stock exploitation. This opinion was based on the stability of size frequency distributions since 1969, the moderate exploitation rate of the species, its limited growth potentiality in weight and the short period of availability of skipjack in the fishery. This result is still valid, regardless if growth is estimated to be slow or rapid.

#### *b-V.3. Recruitment analysis*

The present fishery only exploits a small number of age classes (1 or 2 according to growth estimates). Therefore, much of the observed large year-to-year variations in catches was likely due to variations in recruitment (year-class strength). However, the changes in the availability of the stock to fishing (e.g. due to changes in behavior or distribution) may also have contributed to the observed variations in catches. If so, the true variations in abundance, and therefore in year-class, could be less than those observed in catch. In any case it is possible to distinguish good years (1971, 1974, 1977) from poor years (1975, 1976) and that may be related to good or poor year-classes recruiting in those years.

#### *b-V.4. Current appraisal*

Since the only evaluations made on stock conditions were for the eastern Atlantic and as there was little knowledge on this species, caution must be exercised. Nevertheless, several developments can be noted.

- Though the status of the stocks is not well known, the stock condition seems to be satisfactory, since the drop in catch observed in 1975 was offset by an increase to a record high level in 1977. High catches corresponded as much to high CPUE value as to an increased amount of effort.
- The large catch fluctuations are probably due to large variations in the availability of the species and/or in recruitment. Besides, the shift of effort between yellowfin and skipjack might also cause, or strengthen, such fluctuations in catch.
- The commercial fisheries exploited only one or two year classes (40 to 60 cm fish) in the eastern Atlantic, though it is not known to what extent large skipjack, which are occasionally caught in the longline fishery, form a significant resource.

From these observations it appears that catches of skipjack can almost certainly be increased, possibly by a large amount. The possibilities of increase and the actual magnitude of any increase, depend on (a) the intensity to which the group of fish in the eastern Atlantic are currently exploited, (b) the abundance of fish larger than those

currently harvested, and (c) the existence and magnitude of a stock of skipjack in the western Atlantic independent of that in the East. The Skipjack Year Program aims to resolve these problems, and is discussed under Item 11 of the SCRS Agenda.

**b-VI. Effects of regulations**

No regulations are actually in effect or are being considered.

**b-VII. Recommendations**

*b-VII.1. Statistics*

Statistics concerning skipjack are adequate, at least for the major fleets. An effort should be made to collect data from the small fleets for which data reporting is not adequate or reliable.

*b-VII.2. Research*

A large research effort is necessary in order to obtain good stock exploitation. The International Skipjack Year Program was formulated to do so; it is described in detail in Item 11.

*b-VII.3. Management*

Though general knowledge of skipjack is poor, the present information suggests that there is no need for management measures at the present time.

**b-VIII. Evaluation of the progress made according to the assignments made in 1977**

Only the first assignment (updating the generalized production models) has been completed. Progress is being made on studies of growth and fecundity.

**b-IX. Assignments of future work to the scientists**

Future assignments would be related to the decision taken on the International Skipjack Year Program.

## 7-c. Bluefin

### c-I. Review of current research

Considerable progress has been made in response to the 1977 SCRS recommendations for research on Atlantic bluefin. These recommendations included (1) the continued monitoring of recruitment to fisheries exploiting small fish, (2) expanded tagging programs, particularly in the eastern Atlantic, (3) the standardization of age-size tables, (4) the use of sensitivity analyses to evaluate the impact of population parameter estimates, stock structure hypotheses and age composition of the catch on assessment, (5) an evaluation of the probable effect of an increase in the current minimum size limit, and (6) continued yield-per-recruit analyses with revised estimates of growth rate and of age-specific fishing mortality patterns.

Documents SCRS/78/40, 43, 53, 61, 90 and 92 dealt with recruitment in both eastern and western Atlantic for various ages or age groups of bluefin.

Reports were presented on bluefin tagging in the Bay of Biscay (SCRS/78/46), off the coast of Morocco (SCRS/78/15), and in the western Atlantic (SCRS/78/41). SCRS/78/81 summarized tagging results on giant bluefin in Canadian waters, and SCRS/78/98 showed, from a pilot study, that tagging young bluefin caught in traps is feasible.

SCRS/78/49 presented a comprehensive review of previous ageing work on Atlantic and Mediterranean bluefin and SCRS/78/37 provided three growth models based on tag-recapture data.

SCRS/78/41 presented an analysis of size frequency by set in the U.S. purse seine fishery.

SCRS/78/47 reported on a similar study on size composition of schools fished in the Bay of Biscay by the baitboat fishery.

SCRS/78/53 estimated, by VPA (Virtual Population Analysis), the recruitment of age-1 bluefin in the eastern Atlantic for a range of assumed starting  $F$ 's. In a sensitivity analysis for the western Atlantic, a different range of starting  $F$ 's was used, from 0.001 to 0.1 (SCRS/78/40). In addition, SCRS/78/40 evaluated the effect of a postulated significant increase in growth in rate on estimated stock size.

SCRS/78/91 presented information on the biology, fisheries and possible mariculture of bluefin in the Mediterranean Sea and gave some new information on fisheries in this area. SCRS/78/83 reported on various aspects of biological research conducted on giant bluefin held in impoundment in Canadian waters, and SCRS/78/85 presented data on sex identification of bluefin by radioimmunoassay techniques. SCRS/78/35 presented length-weight data from bluefin caught off the Moroccan coast.

### c-II. Review of fisheries data

#### c-II.1. Catch trends

Table 6 gives the national catches (by gear-type when possible) for the years 1970 to 1978 for the Mediterranean Sea, the eastern North Atlantic and the western North

Atlantic. Those for 1978 are provisional and incomplete. For some fisheries, especially of non-member countries, additional information was presented to the Committee which gave catch statistics different from the official ICCAT figures presented in the Statistical Bulletin. The sources for these revised figures are shown as footnotes to the table.

i) Mediterranean Sea

The estimated total bluefin catch in 1977 was 13,189 MT, about 17 % lower than the high 1976 level.

ii) Eastern Atlantic

In 1977, the catch increased to about 6,000 MT from about 5,000 MT in 1976. Most of the European-based fisheries showed increases: in particular, increases were recorded in catches of small fish by the Moroccan purse seine fishery; of giant fish by the Spanish baitboat fisheries in the Canary Islands and the Azores; and of mediums and giants in the Spanish and Moroccan trap fisheries. Data for 1978 were incomplete but showed signs of reduced catches from the juveniles fisheries. However, catches from the Spanish and Moroccan trap fisheries continued to increase.

Total catches for the eastern Atlantic and Mediterranean were lower in 1977 than in 1976 but still higher than those of the early 1970's.

iii) Western Atlantic

The 1977 catch was 5,858 MT, i.e. at about the 1976 level. The only noticeable change was an increase in the catch by the Japanese longline fishery. Preliminary estimates for 1978 are for slight declines in catch for all fisheries in the western North Atlantic.

*c-II.2. Effort trends*

i) Mediterranean Sea

Longline effort did not change greatly from 1975 to 1977, but declined substantially in 1978. Effort in the trap fisheries of Sicily, Tunisia, Libya and Spain is not documented. Data are lacking also for the other small coastal fisheries (particularly in the Adriatic Sea and around Sicily) which are known to catch small bluefin. Purse seine effort is somewhat better recorded. Twenty-five French boats operated in 1977 and recorded an average of 104 fishing days per boat compared to 112 in 1976. Significant improvement in both catch and effort data is essential if sound scientific advice is to be given, particularly for this area.

ii) Eastern Atlantic

A general decrease in nominal effort in the small-fish fisheries in 1977 was well-marked. In the Bay of Biscay in 1977 baitboat fleet effort declined to about 50 % of

the 1975 levels. SCRS/78/92 evaluated Moroccan effort over the period 1961-1977 and showed that a decreasing trend was interrupted in 1977. Longline effort has decreased regularly since 1974, while there has been an increase in the effort exerted by the trap fisheries of Morocco and Spain

No information is available for Azores baitboat effort nor for the Norwegian fishery.

### iii) Western Atlantic

Effort in the Japanese longline fishery and the U.S. and Canadian fisheries for giant bluefin has remained more or less constant since 1975.

## c-11.3. Trends in catch-per-unit-effort

### i) Mediterranean

In the western Mediterranean several sets of CPUE were available. CPUE of longline (number of fish per 100 hooks) showed the same trend as in the Ibero-Moroccan Bay, a decline from 1974 to 1976 and an increase in 1977. This fishery fished 6 to 15 year-old bluefin. CPUE of French purse seiners in the Gulf of Lion which fished ages 1 to 12 years but mainly 1-5 years and CPUE of Italian purse seiners in the Tyrrhenian Sea during the spawning season (mainly 10 to 20 year-olds) were fairly comparable for 1970-1975. However, those CPUE estimates were rather rough due to the lack of accuracy in basic data.

Preliminary estimates of these CPUE's for 1978, are not available because of the late start of Mediterranean fisheries in this year.

### ii) Eastern Atlantic

The CPUE for the Bay of Biscay fishery increased slowly from 1972 to 1978 (SCRS/78/90). Units used were metric tons of young fish (ages 1-6) per baitboat day at sea. CPUE (MT by total boat season) were available for the Moroccan surface fishery on age-1 fish and indicated a wide fluctuation without any consistent trend for the 1972-1978 period.

Longline CPUE (number of fish per 100 hooks) in the Ibero-Moroccan area showed a continuous decline from 1973 to 1976, but an increase in 1977 (SCRS/78/43). Preliminary estimates of CPUE for Moroccan and Spanish traps (MT per trap) increased in 1978. Both of these fisheries are mainly based on medium and large fish (6 to 15 years).

### iii) Western Atlantic

CPUE data for the major fishing areas of the western Atlantic were presented in SCRS/78/43. CPUE in coastal areas from off Newfoundland to off New York, where small bluefin are caught, indicated a wide fluctuation without any appreciable trend.

CPUE for the spawning stock in the Gulf of Mexico decreased from 1975 to 1977, but increased in 1978.

### c-III. Stock structure

It is still not possible to choose between the two hypotheses of a) a single Atlantic stock or b) two distinct stocks, one in the East and one in the West. Some new information available to the Committee, as well as voluminous past information relating to this problem, concerned three main lines of evidence -- the general biology of the fish (including the geographic location of spawning grounds), tagging, and the similarity or otherwise of the patterns of year-classes on the two sides of the Atlantic.

On the eastern side, a large spawning area exists in the western Mediterranean basin where spawning occurs in June and July and involves fish from about 50 kg in weight upwards. By the end of the year young bluefin disperse over the western Mediterranean and some, at least, through the Strait of Gibraltar to overwinter in Moroccan waters. From here they become part of a general migration pattern over the eastern Atlantic until they reach maturity. As adults, they move back through the Strait of Gibraltar for spawning. After spawning, medium-size fish tend more to remain in the Mediterranean whereas older fish tend to return to the Atlantic, some moving to the North and some to the Canary Islands where they are subjected to a directed fishery (SCRS/78/83, 62). There does not seem to be any spawning area in the eastern Atlantic outside the Mediterranean. These biological facts support the view that the fish in the Mediterranean and in the East Atlantic belong to the same stock. In the western Atlantic stock spawning occurs in the Gulf of Mexico.

Tagging studies tend to support a view of low mixing between eastern and western fish. Table 7 gives a summary of tag release and return data on each side of the Atlantic. Only a very small percentage of the fish tagged were recaptured on the other side of the Atlantic. The only characteristic migratory route seems to be that of large tunas from the West Atlantic and towards the Norwegian fishery, via the Gulf Stream. Even this migratory pattern seems sporadic, and no tags have been recovered from Norway in the last several years. The returns of small fish, tagged in the western Atlantic, and caught in the Bay of Biscay were almost all from one year, and this interchange across the Atlantic seems to be highly variable.

The pattern of recruitment, and the relative strengths of successive year-classes are not very clear, especially in the eastern Atlantic fisheries, but there do seem to be differences. In the West, the 1973 year-class was, at the time of recruitment, clearly extremely strong, relative to adjacent year-classes. The pattern in the East is less clear, but it appears that the 1974 year-class was good, though not so outstanding relative to adjacent year-classes as the 1973 year-class in the West.

In conclusion, it may be stated that the present evidence (which is still somewhat weak) is towards the hypothesis of separate eastern and western stocks, with a small, and variable, interchange of fish between them. However, the evidence is still far from sufficient to reject the alternative hypothesis that there is a single Atlantic-wide stock.



#### c-IV. Population parameters

The current state of knowledge of bluefin growth in the North Atlantic and the Mediterranean was reviewed and discussed in SCRS/78/37, 41 and 49. Agreement on age and growth in the early part of the life history was good (see Figures 10 and 11) but the ageing of individuals larger than about 200 kg still presents difficulties. SCRS/78/41 provided evidence that more than one hyaline band may be laid down in the otolith each year in these giant bluefin. Material for the period November to March is scarce and is required to substantiate this hypothesis of multiple seasonal growth zones. In the 1977 SCRS Report it was noted that there was some evidence of an increased growth in recent years. This could be important, especially in yield-per-recruit analyses, and more studies are needed.

No definite advances have been made in 1978 to improve estimates of natural mortality rates. SCRS/78/40 indicated that the minimum-size-at-first-capture to give maximum yield-per-recruit is very sensitive to the value assigned to  $M$  and emphasizes the need to obtain better estimates for this parameter.

#### c-V. Status of stocks

##### c-V.1. Production model analysis

Because of the complex age structure of the fishery, and the absence of any single over-all index of effort or abundance these models were not readily applied to bluefin fisheries and no analysis was attempted.

##### c-V.2. Yield-per-recruit analysis

###### i) Eastern Atlantic stock

SCRS/78/53 analyzed data from the eastern Atlantic by cohort analysis and derived a structural model. Two periods corresponding to the cohorts of 1945-50, and of 1960-1965, respectively, were compared which differed greatly in the exploitation pattern. During the life of the former group the exploitation of large fish dominated fishing patterns; in the life of the latter group small fish were also exploited heavily. The structural model analysis showed that yield-per-recruit that would be obtained under the two patterns of fishing are very different. The former would give a  $Y/R$  of about 60 kg, while the latter only 9 kg. This difference is close to the relative decline in total yield from about 23,000 MT to about 5,000 MT, which occurred over about the same period.

The decrease in catches could be explained by changes in fishing pattern, and there was no need to hypothesize a change in recruitment levels between the two periods. The analysis did not deal with data from the Mediterranean fisheries, and this fact must be borne in mind in considering these results.

In recent years, the nominal effort on small fish in the eastern Atlantic appeared to have decreased. If nominal effort is a good measure of fishing mortality, then this would tend to increase the yield that can be obtained from a given recruitment.

ii) Western Atlantic stock

SCRS/78/40 provided an updated analysis of yield-per-recruit for bluefin in the western North Atlantic.

The pattern of fishing occurring in 1970-71 was estimated to give a yield-per-recruit 30 % lower than that obtainable from the pattern of fishing in 1960-61. The difference was due to the higher fishing mortality on young fish in the 1970-71 purse seine fishery.

This analysis indicated that substantial increases in yield-per-recruit would have occurred if age-at-first-capture had been higher in 1970-71; large increases in  $F$  would not have increased the yield significantly during that period. It is likely that yield-per-recruit has increased somewhat in the western Atlantic due to regulations in force since 1976. These reduced the harvest of age 0-1 fish and limited removals of age 2-5 fish. Fixed parameter simulations indicate that further increases can be realized. With  $M = 0.2$ , the maximum yield-per-recruit would be achieved if fish less than 146 cm fork length (age 6) are not harvested. If  $M = 0.1$ , then maximum yield-per-recruit is achieved with a size-at-first-capture of 225 cm (age 13).

The practical problem of avoiding fish below a higher minimum size than is now in force was addressed by examining the size-composition of different schools in 1977 and 1978 (SCRS/78/41). It appeared in those years that 2 and 3-year-old bluefin formed distinct schools. If these schools can be distinguished by the purse seiners before setting net, this could reduce the problem of discards of fish smaller than the minimum size in purse seine sets in case the size limit were increased.

iii) Total Atlantic

No new yield-per-recruit analysis was presented for the combined Atlantic fisheries, and previous conclusions that increased yields would result from increasing the size-at-first-capture still hold good.

*c-V.3. Recruitment analysis*

i) Eastern Atlantic stock

Data from three different fisheries, the Bay of Biscay baitboat fishery, the Moroccan purse seine fishery and the Mediterranean Bay of Lion purse seine fishery were examined for evidence on recruitment patterns. The Moroccan data must be used with caution because effort in that fishery is dependent on the availability of fish near the coast (SCRS/78/92). The baitboat fishery, however, is a directed fishery and exploits bluefin tuna that have escaped the Moroccan fishery. The Mediterranean purse seine

fleet can direct effort to the more abundant year classes anywhere in the 2-12 age range, so that without very careful analysis the observed catches cannot easily be used to provide information on recruitment.

CPUE data for age 1 in the Moroccan fishery and ages 2 in the Bay of Biscay fishery, are shown in Figure 12. The CPUE for the Moroccan fisheries did not give a significant trend but the 1974 year class was relatively large at age 1 in 1975 (SCRS/78/71). The apparent abundance of 2 year olds in the Bay of Biscay as measured by CPUE has tended to increase in recent years – a trend not shown by the Moroccan fishery. The 1974 year-class appeared as average or rather better, though not as strong as the 1975 year-class. More studies which might include determination of reliable effort and CPUE indices, are required before more positive statements about the recruitment in the eastern Atlantic can be made.

#### ii) Western Atlantic stock

An index of recruitment to the western Atlantic stock, that took account of all recorded catches was provided by Virtual Population Analysis (SCRS/78/40) (see Figure 13). This showed that during the period 1960-73 there were considerable fluctuations in the abundance of age 1 fish. Abundance was high in 1960-61, and again in 1974 (corresponding to the 1973 year-class) and very low in 1967 and 1973.

Results also showed that the abundance of the juvenile stock (age 2-5) decreased from 1960 to 1969 (corresponding to the development of the purse seine fishery) and that no further decline has since occurred (SCRS/78/40). The same analysis showed a decreasing adult stock (age 6<sup>+</sup> or more) from 1968 to 1974. The reliability of stock size estimates for later years (1974-77) was poor, though abundance appeared to have stabilized.

#### iii) Total Atlantic

Virtual Population Analysis based upon nominal catch data from the entire Atlantic Ocean (SCRS/78/40) showed the same stock size trends from 1960 to 1973 as previous studies reported to SCRS. Recruitment, as measured as the numbers in the stock at age 1 was estimated to have decreased during the period 1961-1968 (see Figure 3 in SCRS/78/40). It was noted that documented catches used in this analysis for 1960-1976 from the eastern Atlantic, particularly the Mediterranean Sea were believed to be inaccurate and that those inaccuracies may have affected stock size estimates.

### c-V.4. *Current appraisal*

#### i) Eastern Atlantic

Stock status in the eastern Atlantic perhaps showed encouraging signs of improvement over previous years. Quantitative information on recruitment was not very accurate.

Available recruitment indices have apparently been maintained or have increased in recent years (Figure 11), though these indices should be treated with some caution. The 1974 year-class appeared to be relatively strong in the Moroccan purse seine fishery at 1-year-old in 1975. Nominal fishing effort in terms of days fishing in the Bay of Biscay baitboat fishery has declined by almost 50 % since 1976. The committee discussed at some length the possible changes in the average fishing power of the individual vessels in this fishery, for example by the withdrawal of the less efficient vessels, but could reach no definite conclusion on this.

If indeed the fishing mortality has decreased in the same way as the nominal effort, it might be expected that the escapement from the surface fishery has increased. More studies are needed on trends in true fishing effort. Catches of medium-sized bluefin (ages 4-10) are recovering in the trap fishery in the Ibero-Moroccan area after low levels in 1971-75 (Figure 3 of SCRS/78/61), and in 1977 age 6-10 bluefin appeared in the Japanese longline catch in the Atlantic off the Strait of Gibraltar in higher numbers than in 1975 and 1976.

The situation in the Mediterranean is less clear. The lack of comprehensive catch and effort data makes it difficult to adequately assess the status of fisheries in the Mediterranean Sea. There appears to be a close relationship between the eastern Atlantic and Mediterranean so that the lack of adequate assessment data from the Mediterranean dictates prudence in drawing conclusions in the status of the entire eastern Atlantic-Mediterranean population based on reasonable information from only the eastern Atlantic fisheries.

#### ii) Western Atlantic

The Committee's appraisal of the western Atlantic bluefin stock has not changed significantly since 1977. Although the minimum size regulations and mortality limitations implemented by ICCAT appeared to have reduced mortality on young bluefin and thus should increase escapement out of the surface fishery and into the spawning group, the condition of the stock of bluefin of age 6 and above did not appear to have improved. The average size for giant fish in the western North Atlantic continued to increase in 1978 in all fisheries, except in the Japanese longline fishery in the Gulf of Mexico.

It had been expected that as the strong 1973 year-class reached maturity, it would cause a recovery in the adult stock. This year-class has figured prominently in catches of surface and (more recently) longline fisheries up till 1977. However, it did not appear in expected numbers in the 1977-78 longline catch (SCRS/78/43, Figure 6). This may have been merely a sampling effect, but an alternative explanation was that this, initially very strong, year-class had been reduced to an average level (or lower) by the large catches that had been taken from it during the last few years (Tables 2, 3 and 4 of SCRS/78/40). This reinforced the concerns expressed in the 1977 SCRS Report that unless controls are placed on the harvest of immature bluefin the expected increase in the spawning stocks may not materialize. If controls are not placed on catches of young mature fish, then the spawning stock may decrease, and recruitment failure may then

Although the estimates of abundance are crude, both longline CPUE data and Virtual Population Analyses indicate that the 1973 year-class was relatively large and latter year-classes are not, so that the best opportunity for an early increase in spawning stock has been to make the most of this year-class.

New analysis also reemphasized the degree of improvement in yield-per-recruit that could be realized by reducing fishing mortality on the younger age groups still further. The practical problem of changing the current fishing pattern is therefore central to the problem of effective utilization of the resource.

### iii) Total Atlantic

The Committee's appraisal of the status of the total Atlantic stock has not changed significantly over the past year. Appraisal of the status of the stocks in some areas is difficult and imprecise. There was some evidence of increases in stock abundance in certain areas, i.e. the Bay of Biscay, off the Strait of Gibraltar, and in the Ibero-Moroccan Bay (see section c-V.4.i). SCRS/78/40 conducted a Virtual Population Analysis for the total Atlantic stock. In general, abundance of small bluefin, ages 1-5, was estimated to have decreased in the 1960's and early 1970's although the trend has now apparently stabilized. Abundance of age 6 and older bluefin appeared to have increased from 1960-1968, decreased from 1968-1974, and has apparently stabilized at rather low levels since. As already noted, confidence in such an analysis can be affected by inaccuracies in the data used in SCRS/78/40 from the eastern side of the Atlantic and the Mediterranean.

## c-VI. Effects of regulations

Available information on the diverse fisheries for small bluefin in the Atlantic indicates that the 6.4 kg minimum size limit has had varying results in reducing the capture of undersized bluefin. In the Bay of Biscay baitboat fishery the percentage (by number) of undersized bluefin in the catch has increased from 1.4 % in 1976 to 16.0 % in 1978. In the French Mediterranean purse seine fishery, the catch of undersized bluefin in 1977 was about 10 %. The estimates catch of undersized bluefin in the Moroccan purse seine fishery in 1978 was 65,000 fish, a substantial decline from an average of about 100,000 fish in the previous eight years. In the western Atlantic purse seine fishery the catch of bluefin less than 6.4 kg was about 1 %, a level that has been maintained since the implementation of the minimum size limit. The catch of undersized bluefin in the U.S. sport fishery has averaged less than 1,100 fish (about 25 % of the U.S. sports fishery catch by numbers) during the period 1976-78.

The effects of actions taken to limit fishing mortality to the levels of recent years can be evaluated by examining available catch and effort data from the various major fisheries on bluefin. The regulation has been in effect for three years and is implemented by limiting catch, effort, or both.

In the eastern Atlantic catches in 1978 by the French-Spanish baitboat fishery in the Bay of Biscay were almost the same as the 1977 catch. Nominal effort in this

fishery decreased by 50 % from 1976, and apparent CPUE increased. Coupled with an apparent increase in recruitment, it would appear that fishing mortality has declined if indeed nominal effort is a reliable index of mortality. Catches in the longline fishery in the eastern Atlantic and Mediterranean declined slightly in 1978 from 1977 levels and fishing effort was also reduced. It is encouraging to note that in 1977 a significant portion of the Japanese longline catch off the Strait of Gibraltar consisted of age 6-10 bluefin, a group that had been noticeably absent in the catches in previous years. CPUE also increased in the area.

In the Mediterranean purse seine fishery the effort, as reflected by the number of vessels and the extent of the area fished began to stabilize in 1975 after a period of rapid increase.

In the western Atlantic catches in the purse seine fishery have been stable at around 1,300 MT over the past three years due to a limitation of catch. Catch in numbers of fish has been reduced by almost half during that period resulting in increasing escapement to the medium age groups. A small portion of the 1978 catch consisted of the relatively strong 1973 year-class (age 5); this year-class has now moved through the surface fishery. Since the purse seine fishery has been under regulation since 1976 and catch has been more or less constant it is quite likely that fishing mortality has remained constant or decreased. The catches of giant bluefin in the U.S. and Canadian fisheries was about 3,300 fish in 1978, comparable to levels maintained since 1976 when catch limitations were imposed. The average size has continued to increase suggesting that recruitment into these older age classes is still weak or that earlier large year classes are continuing to die away. Fishing mortality on giant bluefin tuna in the western Atlantic thus appears to be increasing.

Catches in the Japanese longline fishery in the western Atlantic including the Gulf of Mexico were 3,000 MT in 1977 and may be about the same in 1978.

In the absence of independent estimates of fishing mortality in these fisheries (e.g. from tagging, or cohort analysis) it was not clear to what extent these changes in nominal fishing effort had resulted in similar changes in fishing mortality. The Committee's assessment of fishing mortality for 1977-78 relative to average levels of 1973-74 and 1960-75 is summarized in Table 8.

## c-VII. Recommendations

### c-VII.1. Statistics

The lack of important data on most of the fisheries in the Mediterranean had been previously noted on many occasions. Although some progress for this year could be claimed, information is still urgently needed for the following categories:

- i) Catch data, especially for the coastal fisheries exploiting small bluefin.
- ii) Size data or even catch breakdown by commercially used categories for un-sampled fisheries.
- iii) Effort data from fisheries not currently reported on.

The Committee also strongly recommended that scientists conducting research on bluefin tuna agree upon a common data base on catches and size-frequency for the period since 1960, prior to analyses for the next SCRS meeting.

Last year's recommendation concerning the informal exchange of data between experts resulted in some progress (SCRS/78/91) and this recommendation was repeated this time.

In addition, the possibility of sending experts from the ICCAT staff, or from national laboratories acting on behalf of ICCAT to carry out a data exchange with scientists of those countries concerned, and especially non-member countries, should be considered seriously.

There is a lack of sufficient data for the eastern Atlantic fisheries also, and considering the possibility that the same population is involved, efforts to improve both the Mediterranean and eastern Atlantic data base should be coordinated.

Although the collection of statistics in the western Atlantic is fairly comprehensive, special efforts should be made to collect length statistics as well as weight information from the giant bluefin fishery in the U.S. and Canada.

#### *c-VII.2. Research*

While noting the considerable advances that have been made in various research areas during the past year, the Committee emphasized that several critical areas still needed to be addressed. The hypothesis of two separate stocks in the eastern and western North Atlantic requires confirmation. One approach to this, which should be more carefully considered in relation to Atlantic bluefin, is the collection and analysis of serological and similar genetically controlled material. Further studies should also be made of the possible existence of a spawning area outside the Mediterranean in the eastern Atlantic.

The most direct approach to the stock structure problem remains tagging. The SCRS recommendation in 1977 for a cost and funding analysis to estimate a minimum level of tagging necessary to provide a reasonable answer to the structure problem is still valid. It was recommended that the use of traps in southern Spain near the Strait of Gibraltar to capture very small bluefin (age 0) for tagging be implemented (SCRS/78/99). Moreover, if tagging is carried out, it is also highly desirable that the work should be planned and executed in such a way as to provide information on other important characteristics of the stock, such as fishing mortality, stock abundance and recruitment.

Similarly, it was also recommended that pre-season tagging be conducted in the western Atlantic on small bluefin to develop estimates of the current season's fishing mortalities, and of current stock size. This information is essential to confirm the stock size estimates in SCRS/78/40. In addition, the data from the earlier large-scale experiments should be fully analyzed to provide estimates of these quantities in earlier years.

More studies are needed of the various effort units used in the bluefin fisheries. In the absence of good indices of CPUE it is very difficult to obtain adequate measures of recruitment into the various fisheries. In several fisheries there have been more or less clear indications of changes in the efficiency of a unit of nominal fishing efforts

For example, the use of aircraft by purse seine fleets in the western Atlantic and Mediterranean may seriously affect the validity of nominal CPUE data from these fisheries. The Committee recommended that a review be made of the effectiveness of different effort units, including an analysis of fishing strategy using spotter aircraft, and the possible effects on CPUE of changes in effectiveness (e.g. of the withdrawal of the less efficient boats).

No substantial progress has been made in developing agreed upon techniques to age bluefin greater than 10 years of age. A considerable amount of effort has been placed on this problem, but it still does not appear possible to solve the problem in the near future. The Committee noted, however, that the ability to adequately and consistently identify age groups by size for these larger fish may not be critical for adequate stock assessment at this stage, and recommended that standard age composition of catch tables should be developed based on agreed-upon size-at-age keys. It is also noted that SCRS/78/49 provided a size-at-age key for eastern Atlantic bluefin based on a summary of previous ageing studies.

Some progress was made in providing sensitivity analyses evaluating the effects on stock assessment of using different population parameter estimates, stock structure hypotheses, and growth rates. The Committee recommended that these studies be extended in scope. The Committee also recommended that these studies be initiated as a matter of high priority to produce valid estimates of natural mortality from available data.

### *c-VII.3. Management*

The regulation presently in effect controlling size-at-first-capture and levels of fishing has apparently had effect on each side of the Atlantic. Potential yield-per-recruit has probably increased on both sides of the Atlantic as a result of the current minimum size of 6.4 kg. However, yield-per-recruit analyses showed that additional increases could be obtained by raising further the minimum size limit. Practical methods of doing this have still not been established although an approach to the problem was outlined in SCRS/78/41 and 77. The Committee, therefore, recommended that the present limit be maintained, and was not yet in a position to recommend practical measures to achieve a higher effective size-at-first-capture.

Actions in accordance with the Commission's recommendation to limit fishing mortality appeared to have been generally effective in terms of limits on catch or nominal fishing effort. There is as yet no direct and independent evidence as to the effect on fishing mortality. It can be expected that there has been some control on mortality. This should lead to some increase in spawning stocks and these are indication of an increase in adult fish in some areas. However, it does not appear that a recovery of spawning stock, to a level at which there need be no concern about future recruitment has yet been achieved. The Committee, therefore, recommended that the present controls on fishing mortality be maintained.

The Committee had examined the stock structure of Atlantic bluefin for a number of years. The answer to this problem is still not abundantly clear, however, it seems



increasingly apparent that management based on the separate stock premise might be a more efficient method of conserving Atlantic bluefin tuna stocks. The Committee, therefore, recommended that the management measures adopted by the Commission should take more account of separate stock hypothesis. As a rough guide to the relative magnitude of the two stocks, it may be noted that as an average over the years 1960-1974, the western Atlantic stock accounted for 14 % of the numbers in the total Atlantic stocks and 18 % of the catches of fish 6 years old and older (see Table 9).

Since the general type of measures needed (raising the age-at-first-capture and limiting the fishing mortality) are the same under both hypotheses of stock structure, this would imply no major change in management measures, though the following points should be noted:

i) Since fishing mortality needs to be controlled on both stocks, fisheries which can operate on either stock should control the distribution of their effort so that there is no large-scale increase in effort on one stock by diversion of fishing from the other stock.

ii) Where agreement can be reached on further measures to conserve the stock on one side of the Atlantic, implementation of these measures does not have to await agreement on uniform Atlantic-wide implementation.

iii) However, there may be some exchange across the Atlantic, and failure to manage the stock on one side of the Atlantic could have serious repercussions on the other.

#### c-VIII Evaluation of the progress made according to the assignments made in 1977

<i>TASK</i>	<i>NAME</i>	<i>PROGRESS</i>
Analysis of stock structure	J.C. Tyler (U.S.A.)	Partly done
Studies of repercussion on production of variable recruitment	F.X. Bard (France) J.C. Tyler (U.S.A.)	Not done
Age determination	J.C. Tyler (U.S.A.)	Partly done
Interaction in a multi-specific fishery	J.C. Tyler (U.S.A.) S. Kume (Japan)	Not done
Analysis of index of recruitment	J.C. Tyler (U.S.A.) F.X. Bard (France)	Partly done
Estimation of effort in a multi-specific fishery	J.C. Tyler (U.S.A.) S. Kume (Japan)	Not done

## c-VIII. (Continued)

<i>TASK</i>	<i>NAME</i>	<i>PROGRESS</i>
Production model	J. C. Tyler (U.S.A.)	No result
Cohort analysis (including stock recruitment)	J.C. Tyler (U.S.A.) S. Kume (Japan) F. X. Bard (France) H. Farrugio (France)	Western Atlantic--complete Eastern Atlantic--partly
Age structure table of catches	J. C. Tyler (U.S.A.) S. Kume (Japan) F. X. Bard (France) H. Farrugio (France)	Western Atlantic--complete Eastern Atlantic--partly Mediterranean--partly
Yield-per-recruit	J. C. Tyler (U.S.A.) S. Kume (Japan)	Western Atlantic--complete Eastern Atlantic--partly
Impact of regulations on conservation	J. S. Beckett (Canada) J. C. Tyler (U.S.A.) J. L. Cort (Spain) H. Farrugio (France) S. Kume (Japan)	No result
Studies on percentage of undersized fish	J. C. Tyler (U.S.A.) J.C. Rey & J.L. Cort (Spain) F. X. Bard (France) H. Farrugio (France)	Western Atlantic--complete Eastern Atlantic--partly Mediterranean--partly

## c-IX. Assignments of future work to the scientists

The Committee requested that the following tasks be undertaken in 1978-1979:

*Specific problems to solve in 1978-79 for bluefin*

<i>TASK</i>	<i>PRIORITY</i>	<i>COUNTRIES</i>
Tagging in the eastern Atlantic Ocean	High	Secretariat, France, Spain, Morocco
Age determination for large fish	Low	United States, Canada
CPUE indices as recruitment index	High	France, United States, Japan
Current mortality estimate in the western Atlantic	High	United States, Canada, Japan
Sensitivity analysis	High	United States, France, Canada
Natural mortality evaluation	High	United States

## **7-d. Albacore**

### **d-0. Introduction**

The Atlantic albacore fishery, with over 13 participating countries, ranks with yellowfin and skipjack tunas in economic importance. In 1977 Atlantic-wide albacore catches (including the Mediterranean) totaled 73,900 MT. The management of the albacore stocks in the Atlantic poses many of the traditional problems faced by other multi-gear fisheries.

### **d-I. Review of current research**

A substantial volume of research on Atlantic albacore was presented this year in the areas of basic biology, statistical results and population dynamics. In the area of basic biology, three studies contributed to the analysis of stock structure and migration routes. Document SCRS/78/46 reported on a tagging campaign on juveniles caught in the surface fisheries. Analysis of biometric data and tagging data on juveniles (SCRS/78/34), as well as serological analyses (SCRS/78/71) have been done.

Biostatistical data and updated data on catch, effort and CPUE for various fisheries were presented. The French-Spanish surface fishery is being carefully studied. Information on catch size frequencies and sex ratios from the live bait fisheries in the Azores Islands and the Canary Islands were presented in documents SCRS/78/63 and 62.

New data, including numbers and types of vessels and catch rates for major longline fleets, were presented in documents SCRS/78/94 and 105. A revision of the general characteristics of the longline fishery separating data on young and adults was presented in document SCRS/78/58.

Evaluations of the stock as well as population dynamics analyses were presented for both the northern and southern stocks. Documents SCRS/78/89 and 77 evaluated the status of the southern stock. The northern stock was evaluated by production model analyses (SCRS/78/64), cohort analyses (SCRS/78/63 and 76) and simulation techniques (SCRS/78/52).

### **d-II. Review of fisheries data**

The Atlantic population is divided into two principle stocks, North and South, and the fishery statistics are reported as such. According to the ICCAT Secretariat (SCRS/78/12), 98 % of the 1977 albacore catch data were satisfactory, meeting the ICCAT criteria for Task I, II and biological data of all national fisheries. Because of the increasing importance of the Taiwanese longline fishery, the samples taken by the ICCAT Secretariat (SCRS/78/23) will augment the samples taken by the Taiwanese national office (SCRS/78/105). The adequate data on the albacore fisheries can explain the relatively advanced state of studies being conducted on this species. The main past uncertainties concern the division of the Taiwanese catch between the northern and southern stock. It may be that the proportion taken from the southern stock has been under-calculated.

*d-II.1. Catch trends*

Atlantic-wide catches of albacore (Table 10, Figure 14) rose rather steadily since 1940 to a peak of 88,000 MT in 1965. From 1965 to 1975 catches have slowly dropped in an erratic manner to 74,000 MT in 1977. The estimated 1978 catch was not available; however, the surface fisheries have recorded exceptional catches during the first half of the year.

Catches from the North stock are taken by both longline and surface fisheries. Surface catches fluctuated in the 40,000 MT to 50,000 MT range from 1956 to 1967. The catches dropped to 27,000 MT during the 1967 to 1973 period. Catches in 1975 and 1976 rose slightly to 31,000 MT and 34,000 MT, respectively.

Longliners have been fishing the northern albacore stock since 1956. Catches have risen from a few tons in 1956 to a peak of 15,000 MT to 16,000 MT in the 1963 to 1965 period (Figure 14). After 1965, longline catches dropped to the 5,000 to 8,000 MT range through 1969. From 1970 to 1972 catches near 10,000 MT were realized. The 1973 to 1977 catches were somewhat higher: at 20,000 MT, 14,000 MT, 9,000 MT, 21,000 MT and 12,800 MT, respectively.

Longline catches from the South Atlantic (Figure 10) rose steadily from 21 MT in 1956 to an early peak of 36,000 MT in 1966. After a drop in catches in 1967, the catch rose erratically to a record high of 42,000 MT in 1972. Since 1972 the catch has been in the 18,000 MT to 23,000 MT range. The 1977 catch was not available separately for the South stock; however one estimate placed it near 26,800 MT.

The Atlantic-wide breakdown of catches by national fleet and gear during 1976-1977 is as follows:

YEAR	STOCK	GEAR				
		Longline		Surface		
		Taiwan	Korea	Japan	Spain	France
1976	North	68.3 %	25.5 %	6.25 %	80 %	20 %
	South	81.4 %	17.9 %	0.1 %	-	-
1977	North	60.2 %	39.1 %	0.7 %	75 %	25 %
	South	82.1 %	16.0 %	1.9 %	-	-

The trend in longline catches from the southern stock showed no clear trend, but it must be noted that if the distribution of the reported Taiwanese catches has under-represented the southern stock catches there could very well be a change in the observed trend. The longline catches from the northern stock have shown an increasing trend in the last 10 years bringing catches back to the level of the years 1965-70, the previous period of high catches.

#### *d-II.2. Effort trends*

The surface fleet in the traditional areas, the Bay of Biscay and adjacent areas has shown a slow decline over the last 15 years. Baitboat effort in the area of the Azores has increased since the fishery began in 1975.

The longline effort in the North Atlantic has shown a general increase in the last 10 years due in part to the fleets of Korea and Taiwan (SCRS/78/58). Longline effort in the South Atlantic has remained relatively stable in the last 10 years with the exception of high effort in 1971, 1972 and 1973 (SCRS/78/58).

#### *d-II.3. Trends in catch-per-unit-effort*

i) Surface: Considering all the age classes caught by the French-Spanish fleet, CPUE of the various northeastern Atlantic surface fisheries has fluctuated, but with a general declining trend, from 1960 to 1970. A slight increase in CPUE has occurred from 1973-1976.

ii) Longline: During 1960-76, longline catch rates on the northern and southern stocks showed a similar pattern to that of surface fisheries, i.e. a regular yearly decline of approximately 6 % (SCRS/78/58). This is characteristic of many longline fisheries. The longline CPUE in the North has shown a general decline since the late 1950's (SCRS/78/58). However, the CPUE has leveled or risen slightly in the last several years. This increase in CPUE might be explained by the increase in Korean catches of adult fish.

#### **d-III. Stock structure**

One of the basic problems concerning Atlantic albacore management is stock structure. The division of the population into two large stocks (in terms of management), North and South, is accepted by most of the experts even though exchanges between these two units have been noted. Also there is a possibility of mixing of albacore between the South Atlantic and the Indian Ocean. One of the most in-depth studies (SCRS/78/76) faced this problem from a dynamic point of view conducting the same analyses (i.e. stock/recruitment relationship) on the northern stock alone and on the entire (northern and southern stocks).

Concerning the fine structure of the better known northern stock and above all the portion supporting the surface fisheries, preliminary examination of tagging, serological and biometric data (SCRS/78/34 and 71) tended to support the theory of heterogeneity on the northeastern Atlantic albacore stock. This theory would support the concept of the separation of a "traditional" group migrating from the Canary Islands to the Bay of Biscay from an "Azorian" group. These two groups appear to have two distinct migration routes offshore (at about 20°W) and more coastal, but from time to time there is a passage closer to Europe by the Azorian population. The French-Spanish tagging effort, associated with the development of the autumn live bait fishery in the Azores, and with the almost permanent Canary Islands fishery will allow us to improve our knowledge on the migratory routes specific to each group.

**d-IV. Population parameters**

Few new estimates of population parameters were presented. Natural mortality rate ( $M$ ) was assumed to be about 0.2 from age 0 to 5 in two papers presented to the Committee (SCRS/78/63 and 73). Beyond age 5 two hypotheses have been suggested. Either  $M$  may remain at 0.2 or rise slowly to 0.8 by age 10.

There are two age-length equations currently in use, one by Bard and one by Beardsley. The estimated age-at-size differs by about one half year between the two age-length equations which led to some discrepancies in the estimate age compositions. However, this difference was not sufficient to produce significant discrepancies between analyses in respect of the major conclusions about trends in recruitment or about the current status of the stock. The differences between age-length keys should be quickly resolved.

Since 1972 surface fishing effort, particularly for trollers, has decreased so that the  $F$  for ages 2 and 3 is reduced. The  $F$  values rise rapidly from age 5 on (SCRS/78/76, Fig. 6). This is due to the longline and autumn surface fisheries exploiting the North stock.

Age-specific fishing mortality rates were presented for both the North stock (SCRS/78/76) and the South stock (SCRS/78/77). Age-specific  $F$  for the North stock rises from zero at age 0 to about 0.8 at age 2 or 3 (depending on the age-length key used) and drops to less than 0.1 at age 4 or 5. The surface fishery is responsible for these  $F$  values. The  $F$  values rise rapidly from age 5 on, exceeding 1.0 by age 10. The longline fishery is responsible for these  $F$  values.

Age-specific  $F$  values for the South stock showed a smooth rise from near zero at age 3 to slightly over 1.0 at age 10. The longline fishery is responsible for these  $F$ 's.

*d-V.0. Status of stocks*

i) Southern stock

The South Atlantic albacore stock has, since fishing began in 1956, been exploited only by longline.

ii) Northern stock

The analysis of the various fisheries exploiting this stock is becoming more detailed (SCRS/78/63 and 52). Six individual fisheries can be defined (Figure 14.2).

1. Surface troll fishery - 2-5 year old fish, mostly juveniles (France and Spain) in the Bay of Biscay to the Azores.
2. Summer live-bait surface fishery - 2-6 year old fish, mostly juveniles (Spain) in the Bay of Biscay.
3. Autumn live-bait fishery - 5-12 year old adults, from Spain to the Azores since 1974.
4. Year round live-bait fishery - 5-12 year old adults, from the Iberian Peninsula to the Canary Islands, since 1970.
5. Winter longline fishery - 4-7 year old young adults, (Taiwan) in the northern Atlantic.

6. Summer longline fishery – 5-12 year old adults, (Korea) in the northern Atlantic.

To summarize, a simple division can no longer be made and it can no longer be said that the surface fishery exploiting juveniles is in contrast to the longline fisheries exploiting adults. For example, fishery 3 (surface) is becoming very similar, in terms of the age structure of the catch to fishery 6 (longline).

#### *d-V.1. Production model analysis*

##### i) Southern stock

Two production model analyses (SCRS/78/77 and 89) were presented. Although these analyses used considerably different effort standardization methods the best estimates of both analyses estimated MSY in the 28,000 MT to 32,000 MT range, bracketing last year's MSY estimate. The effort level associated with MSY (Figure 15) is approximately 87 million nominal hooks. This is approximately the level of effort expended in 1971-72. Since 1972 there has been some decrease in the total longline effort, and catches in the last five years have been below the estimate of MSY.

##### ii) Northern stock

One production model analysis (SCRS/78/64) was presented. The analysis, using standardized effort, indicated that the fishery was operating on the left hand limb of the curve, below MSY. The Committee felt, however, that the dramatic shift of the data from the right hand limb of the production model to the left hand limb from last year's analysis may have been due, in part, to the separation of adults and young in the longline catch and the subsequent restandardization of the data as well as the addition of new data. Accordingly, the Committee performed its own production model analysis (Figure 17).

This analysis differed from that presented last year (Figure 22 of the 1977 SCRS Report) in the inclusion of data for two more years, 1975 and 1976, and revised estimates of the standardized fishing effort in the years 1962-1969. The effects of these changes are to slightly increase the estimates of the effort at which the MSY occurs (to 60,000 units) and slightly decrease the estimate of MSY (to 49,000 MT compared with 51,000 MT).

It should be pointed out that there are severe practical and theoretical problems in applying a simple production model to a complex fishery like that for North Atlantic albacore. The existence of fisheries on different age-groups, and the changing balance between these fisheries invalidates some of the basic assumptions of the model. The chief value of the model is, therefore, to provide a rather general guide to the status of the stock. To this extent, the present analysis was consistent with that of last year in showing that the stock is heavily exploited.

*d-V.2. Yield-per-recruit*

i) Southern stock

One yield-per-recruit analysis for the South stock (SCRS/78/77) was presented using average age-specific F values derived from a cohort analysis (with recruitment size of 55 cm). The point corresponding to the present pattern of fishing (effective-size-at-first-capture of 55 cm, and fishing effort equal to the average in 1973-75) is shown in Figure 12. This corresponds to a yield-per-recruit of 7.65 kg. For greater values of fishing effort, or increased size-at-first-capture (up to 100 cm) the yield-per-recruit did not differ much from this, and the theoretical maximum yield-per-recruit was a little more than 8 kg, less than 5 % above the present value.

ii) Northern stock

One yield-per-recruit analysis for the northern stock was presented (SCRS/78/76). This was based on a size-at-recruitment of about 45 cm (smaller than that used for the yield-per-recruit analysis of the southern stock). No account was taken of different groups of fish within the northern stock, which was treated as a single unit. The analysis, based on a cohort analysis, provided estimates of the yield that would be taken in each major segment of the fishery (trollers, baitboats, and longliners), as well as the total yield.

The results are shown in Figure 18, which gives the isopleths of yield as a function of size-at-first-capture and of changes in effort from the present level (assuming all gears change in the same proportion). The present pattern of fishing is also marked in the Figure.

If the size-at-first-capture is not changed, the yield-per-recruit would be increased, though only very slightly, by a decrease in fishing effort. On the other hand, increasing the size-at-first-capture could result in a more significant increase in yield-per-recruit. The yield taken in the different fisheries (especially in the longline fishery) depends on the effort in all the other fisheries. This is discussed further in section d-V.4.

*d-V.3. Recruitment analysis*

i) Southern stock

One analysis of recruitment to age 3 (or 4 depending on the age-length key used) was presented (SCRS/78/77). The conclusion, based on cohort analysis was that recruitments from the 1960 to 1966 year classes were fairly constant at about 3.6 million fish per year. The 1964 year-class was weaker than average, at 2.4 million recruits.

ii) Northern stock

Analysis of 1955-1975 cohorts in the northern stock provided estimates of recruitment during that period (SCRS/78/63 and 76). Though estimates differed slightly



according to the age key used, they were similar in the two studies. In addition, there was a very good fit between the calculated recruitment levels and the abundance indices (of age 3, according to SCRS/78/63).

The most important fact is the general decline in recruitment and an increase in the variability of recruitment during the last fifteen or more years (see Figure 19). The recruitment indices (CPUE of recruited classes) in the last three years (1973-75) were higher than in 1972, but these indices are consistent with the general picture (increased variability, and decreasing average recruitment) over the past fifteen years.

Stock/recruitment relationship - A long series of indices of the abundance of the parent stock was available from the longline CPUE, associated with the indices of recruitment (CPUE, age 2-3, SCRS/78/63 and CPUE, age 1, SCRS/78/76). These allowed analysis to be made of the stock/recruitment relation. The two analyses agreed in that the Ricker model (Figure 20) of stock/recruitment relationship was more satisfactory than the Beverton equation:

$$R = 8.835 P.e^{-0.221.P}$$

The present spawning stock is only about 20-25 % of that in 1957, and presumably even smaller in proportion to that which existed before any exploitation of albacore had started. Though the recruitment in the last three years is above the very low level of 1972, it appears that the stock is still in a highly unsatisfactory state in which recruitment is highly variable, and in which there is a real (if non-quantifiable) chance of a serious recruitment failure.

#### *d-V.4. Changes in fishing strategy - North stock*

A study was made (SCRS/78/52) of the effects of different fishing strategies using a simulation technique based on a self-generating deterministic model, and a structural model of the Ricker type, using quarterly intervals. A complete study of all possible strategies was not possible, but the effort of different combinations of troll and live-bait fisheries was examined for four different levels of longline effort. The live-bait fisheries were assumed to catch fish from 2-5 years old, operating fairly equally on all four ages, while the trollers were assumed to take predominantly 3 and 4 year old fish.

Considering different levels of longline effort, the analysis showed that if there is little or no longline fishing, the greatest total yield would be taken with a fairly intense surface fishery, with a maximum yield of around 40,000 MT. On the other hand, if there is an intense longline fishery, the greatest yield (up to 60,000 MT) would be taken with a very low level of surface effort.

Considering a fixed level of longline fishing, the analysis examined the effects of changing from trolling to live-bait, on the assumption that, in economic terms one unit of live-bait fishing was equivalent to two units of trolling. This showed that, under the assumption made concerning the age composition of the catches by the two gears, there would be some increase in total catch, though very small, by changing from troll to live-bait. This benefit would tend to decrease as the amount of longline fishing increased.

This study needs to be extended, to take account of the more complex structure of the fishery noted in section d-V.0.ii), and in particular the autumn live-bait fishery on medium to large fish. Also needed are estimates of the effect on the abundance of the spawning stock of different strategies. Though these additional calculations have not been done, it seems probable, from the yield-per-recruit calculations that a switch in surface fishing effort towards the larger fish, would lead to increases in total catch and in spawning stock.

*d-V.5. Current appraisal*

i) Southern stock

The two production models were in close agreement. Both suggested that the stock is not being over-fished and that increased fishing effort (from the 1975 level) might result in some increase in catch, but the amount of such increase is likely to be very small.

ii) Northern stock

Analyses presented this year reinforced previous concerns about the health of the northern stock. Production model results indicated the fishery has been operating in the MSY region for the last 12 years. Catches greater than the MSY of 50,000 MT were taken in 6 of the last 12 fishing years. Yield-per-recruit analyses confirmed that the stock is heavily fished. The only opportunity for significant increases in yield-per-recruit would come from increasing the effective size-at-first-capture, possibly from diverting more of the surface fishing effort into the autumn baitboat fishery on larger fish. It was noted that some changes in this direction have already taken place, and that the surface effort on small fish has fallen considerably since 1972. In this respect, the stock is in a more healthy state than it would otherwise be.

The most concern related to recruitment. Data presented to the 1978 meeting again showed an apparent decline in recruitment as an average trend since 1960, and a considerable, and increasing, variability in the recruitment. In the spawner-recruit relations presented, it was indicated that the spawning stock is apparently at a low level of about 1/5 of its original size. Further, the period of large fluctuations in recruitment is associated with the period of low parent stock abundance. These symptoms have been followed in a number of stocks of herring and similar small pelagic species (but not so far in any tuna stocks) by a more or less complete failure in recruitment, and a collapse of the fishery. The Committee could not say how likely it is that similar events will happen in the albacore stock, but the situation is certainly one that the Commission should view with serious concern.

iii) General conclusion on both stocks

An up-to-date estimate of the geographical distribution of the albacore catches for 1977 by the Taiwanese longline fisheries was provided by experts from Taiwan. This

led to the transfer of 11,500 MT from the reported catches of the northern stock to the catches of the southern stock. This change did not alter the general conclusions of the Committee based on the available data up to 1976, especially as concerns the relation between the amount of fishing and sustained catch in the two stocks.

However, it did alter the Committee's assessment of the precise state of the stock in 1977. If the estimated distribution of catches is confirmed, it would appear that the southern stock is more heavily fished than believed, with the effort and catches in 1977 being close to the MSY level. Conversely, the 1977 effort on the northern stock would be less than previously believed; this leads to a somewhat less pessimistic assessment of the present abundance of the spawning biomass.

#### **d-VI. Effects of regulations**

No regulations are in force for albacore.

#### **d-VII. Recommendations**

##### *d-VII.1. Statistics*

i) Surface -- A particular effort of historical analysis of Portuguese fishing data for catch, effort and population structure for the Azores is required. This analysis must be completed by actual Portuguese fishing data in the area.

ii) Longline -- The distribution of longline catch between the northern and southern albacore stocks must be improved by the joint action of the Secretariat and national experts (especially those that concern the Taiwanese fleet).

##### *d-VII.2. Research*

i) The long-term future of yield-per-recruit and the fecundity of the stock should be studied under possible different exploitation hypotheses.

ii) Complementary research should be carried out on the nature of the stock-relationship in the northern stock.

iii) The impact of the different parent-recruit relationships possible while using self-generating models in simulation techniques should be studied.

iv) The incidence of different fishing strategies of the abundance of the parent stock should also be studied.

v) The minimum level at which the parent stock must be maintained should be researched and, logically, the methods possible to obtain and maintain the minimum level should be analyzed.

*d-VII.3. Management*

– Northern stock

The Committee recommended that the Commission give attention to three classes of management measures:

- i) Measures to increase the yield-per-recruit by increasing the effective size-at-first-capture.
- ii) Measures to increase the abundance of the spawning stock.
- iii) Measures that might have to be introduced very rapidly to preserve the stock if there should be a recruitment failure.

The first of these will certainly be beneficial, even if the benefits are not large. Various measures (size limits, controls on fishing with gears, or on times or places at which small fish are caught) could achieve the objective. The Committee did not have specific proposals to make, but did note that a switch in the surface fishing effort away from the summer fishery towards the autumn fishery on larger fish would have the desired effect.

Measures to improve the spawning stock are more important. While the Committee could not be sure that there would be a recruitment failure at the present level of spawning stock, there is a definite *risk* of a failure. The Committee believed strongly that measures should be taken to reduce this risk by increasing the spawning stock.

Measures under (i) would give some increase, but other measures (e.g. catch quotas or effort limitation) which reduce the amount of fishing would be equally or more effective.

It was hoped that the Commission would not have to take measures to deal with a recruitment failure, but the apparent trends in recruitment suggested this would not be an impossible event. Experience in other fisheries showed that if there is a recruitment failure, measures must be taken very quickly (while the older fish remaining in the stock can still contribute significantly to the spawning biomass). These measures generally will require a substantial cut in fishing mortality and hence an even greater cut in catches. For this reason the Committee recommended at its 1977 session (para. 5.3-2) that the Commission "determine the practical fishery management decisions...so that these decisions could be applied quickly and efficiently, in case it would appear necessary in the future". The Committee had no information about action taken in response to this recommendation. It hoped that the implication is that the Commission and its member countries are satisfied that there is an adequate legal and administrative machinery to introduce appropriate measures (e.g. drastic reduction in catches, if and when they may be needed).

In this context, the Committee recommended to the Commission to examine measures, such as a diversion of fishing effort, the introduction of a quota system, or control on the fishing efforts of different gears, which might achieve the management objectives described above.

## 7.e. Bigeye

### e-I. Review of current research

A total of 12 documents dealing with Atlantic bigeye tuna were reviewed by the Committee. Two of them (SCRS/78/59 and 62) were essentially data reports; the remainder were analytical reports.

SCRS/78/59 presented age composition data for bigeye tuna caught by the 1976 longline fishery. Data on the catch of the Canary Islands-based baitboat fleet were presented in SCRS/78/62.

The analytical documents fell into three general categories:

- i) Those that addressed the problem of misreporting of catches of yellowfin tuna as bigeye tuna and vice-versa (SCRS/78/30 and 72);
- ii) Those that presented results of stock assessment (SCRS/78/31, 32, 33, 60, 94 and 103); and
- iii) Those that evaluated some practical considerations involved in establishing a common minimum size limit (3.2 kg) for yellowfin and bigeye tuna (SCRS/78/44 and 102).

### e-II. Review of fisheries data

#### e-II.1. Catch trends

Total reported catch of bigeye tuna (Table 11), from the Atlantic increased steadily from 20,200 MT in 1965 to a peak of over 52,000 MT in 1974 and 1975. It then decreased to 35,800 MT in 1976 and increased to 36,100 MT in 1977. Increases in the catch since about 1971 have been primarily due to the surface fisheries.

The bigeye tuna catch has been larger (60-70 %) in the North Atlantic than in the South Atlantic for both longline and surface fisheries (SCRS/78/31). In the North Atlantic, the major surface catch is landed by baitboats of Spain (Canary Islands) and Portugal operating in the northeastern Atlantic region. In the South Atlantic, the major surface catches are made in the Gulf of Guinea.

Reported catches of Atlantic bigeye tuna apparently are inaccurate because of misreporting of bigeye tuna catches as yellowfin tuna and vice-versa. A procedure for adjusting the bigeye tuna catch of the FIS\* fleet was described in SCRS/78/30. The procedure was applied to the catch of the FIS fleet and extended to the catches of the Spanish purse seine fleet (SCRS/78/31). Catches of Tema-based baitboats were adjusted according to information described in SCRS/78/72. These adjusted catches are shown in Table 12.

\*French-Ivorian-Senegalese

### *e-II.2. Effort trends*

Longline fishing effort in the entire Atlantic, in terms of effective effort for big-eye tuna, fluctuated upward during 1957 to 1975. Since then it has decreased to 1.1 million hooks per 5° square (SCRS/78/60). In the North Atlantic, bigeye tuna fishing effort followed the same pattern as for the entire Atlantic effort. In the South Atlantic, on the other hand, fishing effort fluctuated upward during 1959 to 1971. It then remained between 0.9 million and 1.2 million hooks per 5° square during 1971-76.

There is currently no good measurement of fishing effort for the surface fishery. In the surface fishery, bigeye tuna is only a small portion of the total tuna catch. However, judging from recent increases in the catch of bigeye tuna by the surface fishery, it is most likely that the fishing effort has also increased.

### *e-II.3. Trends in catch-per-unit-effort*

The annual hook-rate of bigeye tuna (CPUE) for the longline fishery was estimated from catch-effort data of Japanese and Taiwanese longline fleets (SCRS/78/60). The CPUE in the entire Atlantic showed a gradual decreasing trend up to 1973 before markedly increasing in 1974. In 1976, it decreased, hitting an all-time low of about half the CPUE's of earlier years (Figure 21). This trend in CPUE for the entire Atlantic was mirrored in the CPUE for the North Atlantic. In contrast a relatively high CPUE was observed in the South Atlantic during the late 1960's, but since then, it has decreased and stabilized at a level of about 60 % of the high CPUE during the late 1960's

### **e-III. Stock structure**

No new document was presented on the stock structure of bigeye tuna in the Atlantic Ocean. Documents dealing with stock assessment, however, used different stock structure hypotheses.

One hypothesis was that there are two relatively independent stocks in the Atlantic separated at the equator. Another hypothesis is that there is only one stock in the Atlantic. Each of these hypotheses although based on some biological information has not been vigorously tested for their validity.

### **e-IV. Population parameters**

There was not much information on population parameter estimates for Atlantic bigeye tuna. Estimates of natural mortality rate frequently adopted for bigeye tuna are 0.4 and 0.5. Growth equations are those developed by Champagnat and Pianet (1973) and Yukinawa and Yabuta (1963) for Atlantic bigeye tuna. These growth curves give quite similar results for fish commonly captured by the fishery.

## e-V. Status of stocks

### e-V.1. Production model analysis

#### i) Entire Atlantic

Adjusted catches and effort, expressed in longline effective hooks were analyzed with the generalized production model (SCRS/78/31 and 103). During recent years the fishery has been approaching the MSY level (see Figure 22). Depending on the parameters used in fitting the curve, further increases in the amount of fishing would tend to decrease the total yield (if  $m = 2.0$ ), or give a small to moderate increase (with  $m = 1.001$  or  $m = 0$ ). Corresponding estimates of maximum sustainable yield (MSY) varied from 49,000 MT up to 100,000 MT. The most likely estimates of MSY were judged to be in the range of 49,000 MT to 55,000 MT, i.e. not much greater than that achieved in some recent years.

The recent marked increase in the catches of small tuna represent a big change in the pattern of exploitation. This change can be expected to affect the relation between fishing effort and sustained yield, as estimated by a production model. This may alter the value of MSY, and the level of fishing effort at which it may be attained.

#### ii) North Atlantic stock

Results of production model analysis for the fishery in the North Atlantic were presented in SCRS/78/31 and 103. The fit of the model to the data was not very good (Figure 23). One curve (for  $m = 2.0$ ) suggested that the fishing effort is approaching the level giving the maximum sustainable yield; other curves (for  $m = 1.001$  and  $m = 0$ ) suggested that further increases in effort could result in significant increases in sustainable yield. The range in estimates of MSY were correspondingly wide, from 33,900 MT to 81,600 MT, compared to 27,800 MT to 65,600 MT presented to the 1977 SCRS. The best estimates of MSY for the stock were judged to be in the range of 33,900 MT to 38,600 MT.

Actual annual yields fluctuated widely about the equilibrium value; recent catches have varied between less than 20,000 MT and nearly 40,000 MT.

#### iii) South Atlantic stock

Production model was fitted to catch and effort data for the bigeye tuna fishery of the South Atlantic (SCRS/78/31 and 103). This fishery includes the longline fishery South of the equator, as well as the Tema-based baitboats. The degree of fit of the model to the data was high ( $r^2 = 0.8$ ) and yielded a range of MSY's of 16,400 MT to 29,000 MT. The best estimates were judged to be from 16,400 MT to 17,900 MT, which were slightly higher than those (16,000-17,000 MT) estimated by the 1977 SCRS. The analyses also indicated that the fishing effort is close to the level giving the MSY. The fishery should, therefore, be monitored closely for appreciable changes in fishing effort or fishing patterns (Figure 24).

*e-V.2. Yield-per-recruit analysis*

i) Total Atlantic stock

Yield-per-recruit (Y/R) calculations for bigeye tuna presented at the 1977 SCRS session (SCRS/77/81) showed that, for the mortality rates used, the greatest yield-per-recruit would be obtained with an age-at-first-capture of 3.5 years.

However, in the actual bigeye fishery in the Atlantic, fishing mortality varies with age. The present fishery could be roughly classified into three groups:

- F-1 -- Baitboat fishery in the Gulf of Guinea catching mainly 1-year-old fish;
- F-2 -- Purse seine fishery in the tropical Atlantic and baitboat fishery in the northeastern Atlantic catching 1-and 2-year-olds; and
- F-3 -- Longline fishery catching 3.5 to 9 year-olds.

The actual yield-per-recruit will depend on the balance between these fisheries. For example, SCRS/78/33 showed that if the fishing mortality rate in either F-1 or F-2 were reduced to zero, then the Y/R of F-3 would be expected to increase by 30 to 50 %.

A similar analysis was made to estimate the impact of taking 1.0 to 1.5 year-old fish as compared to not taking the fish until they are larger (older) (SCRS/78/103). The results indicated that removals at 1.0 to 1.5 year-old fish results in a decline of about 2.7 times in Y/R as compared to the case where the fish were allowed to grow and be taken at larger sizes. It was, however, noted that the accuracy of the analysis is dependent upon the assumptions made and the input parameters, especially fishing mortality rate of each gear. The assumptions were not yet vigorously tested. No separate analyses of yield-per-recruit were made for the northern or southern stocks.

*e-V.3. Recruitment analysis*

Estimates of recruitment at age 1 from cohort analysis for the total Atlantic stock were given in SCRS/78/33. These provided interesting information on the general pattern of recruitment in recent years, but further analysis to determine recruitment appears warranted to test some of the assumptions used. No separate analyses were attempted for the northern or southern stocks.

*e-V.4. Current appraisal*

i) Total Atlantic catch

The total catch of bigeye tuna in the Atlantic Ocean increased from about 20,000 MT in 1965 to a record high of 52,400 MT in 1974 and 1975. In 1976, it declined to about 35,800 MT, but in 1977 the reported catches edged upward slightly to 36,100 MT. The true catches may have been as high as 46,000 MT (see Table 12). Fishing effort is



believed to have followed a similar trend. The stock is now exploited at a high level. The present fishing effort is probably at around the level giving the MSY (estimated to be around 49,000 MT-55,000 MT). Catches in particular years can be expected to vary considerably about the equilibrium. For example, the catches in 1975 and 1976 were markedly above and below the equilibrium line respectively, though the effort was estimated to be about the same in the two years. Substantial increases in yield cannot be expected from further increases in fishing effort with current fishing patterns (Figure 22). In fact, continued large catches of small bigeye tuna by the surface fishery or increases in the proportion of small fish in the total catch will tend to decrease future yields and affect escapement to the spawning stock.

#### ii) North Atlantic stock

The current level of fishing effort is believed to be below that giving the MSY. Increased effort, with the same pattern of fishing should, therefore, be expected to result in some increase in sustainable yield, though this increase may be small. However, the actual yield will depend on the sizes of fish caught. If there is an increase in the numbers of small fish taken, the yield can be expected to be less than it would be if catches are predominately of large fish.

#### iii) South Atlantic stock

The current appraisal for this stock is primarily based on the results of production model analysis. Results indicated that recent levels of fishing for bigeye tuna in the South Atlantic are high and are within the range of the MSY levels; consequently, increased fishing effort would most likely not result in a proportionate increase in yield. Furthermore, increased catches of small bigeye tuna by the surface fishery, could have an adverse impact on future catches.

### e-VI. Effects of regulations

No regulations are in force for bigeye tuna.

### e-VII. Recommendations

#### e-VII.1. Statistics

Fishery statistics on Atlantic bigeye tuna have improved over the past few years, but there is still a need for further improvement. The Committee is particularly concerned that a large portion of the yellowfin and bigeye catches are not being sampled to ensure that an accurate species breakdown of catch is obtained and reported to the Secretariat. The Committee recommended that procedures to sample landings of yellowfin tuna and bigeye tuna at ports of landing such as those employed in Puerto Rico, U.S.A., be more widely applied particularly for catches landed by the FISM, Spanish and Tema-based tropical tuna fleets.

*e-VII.2. Research*

The Committee reviewed the accomplishments of research of bigeye tuna of the Atlantic Ocean and concluded that (1) some basic information on the population biology of bigeye tuna is currently inadequate and (2) questions concerning the effects of establishing a common size limit for yellowfin and bigeye tunas have only partially been answered. The Committee recommended that research on age and growth, maturity and fecundity, stock structure, natural mortality rate, recruitment index, fishing mortality rate, and abundance index be emphasized since this information is important for accurately assessing the status of the stocks and for evaluating management options.

The Committee also recommended that research be continued on evaluating the quantitative effects of establishing a common size limit on yellowfin and bigeye tunas. Emphasis should be on (1) determining actual catches of bigeye tuna through sampling tropical tuna landings for species composition and (2) evaluating methods of reducing the catch of small bigeye tuna. This latter task requires collection of data on species and size composition data by single set or single operation of purse seiners and baitboats.

The Committee noted that plans of the International Skipjack Year Program call for field activities in areas where both bigeye and skipjack tuna are caught. Every effort should, therefore, be made to collect information on bigeye tuna during execution of the Program's activities, including the tagging of small bigeye tuna in the Gulf of Guinea area.

*e-VII.3. Regulations*

In 1977, the SCRS recommended that a common minimum size regulation of 3.2 kg be seriously considered for bigeye and yellowfin tunas because such a limit would (1) solve the problem of undersized yellowfin tuna being landed and reported as bigeye tuna and (2) increase the yield-per-recruit of bigeye tuna to the fisheries. The SCRS also pointed out that such a limit would benefit some fisheries, e.g. longline, and adversely affect others, such as Tema-based baitboats. The catch of skipjack tuna would also be affected because skipjack tuna are caught with small bigeye tuna by surface gears, and indeed are the main constituent of the catches.

From 1974 to 1977, the amount of small bigeye tuna (<3.2 kg) in the surface catch increased from 0.7 million fish to 1.3 million fish. Analysis presented in SCRS/78/33 demonstrated that yield-per-recruit would increase if these small fish were allowed to grow to a larger size before removal. However, the landings of bigeye by the Tema-based baitboat fleet would be seriously affected if a 3.2 kg minimum size regulation for bigeye tuna were instituted.

Because of the practical problems that would be met if a 3.2 kg size limit were introduced for bigeye, the Commission asked the SCRS to study the matter further. It also posed three specific questions (p. 71 of the 1977 Biennial Report).

- 1) Can the fisheries now catching small bigeye successfully shift their effort to older age groups?

- 2) Would there be any effect on recruitment?
- 3) Would it result in substantial wastage through dumping?

To deal with these problems a special working group has been established to investigate the problem, and the data needed are being collected, particularly concerning the size and species composition of fish in individual schools.

Data collection and analysis have not been completed, but some early results were reported (SCRS/78/44, 72 and 102). These showed that in the baitboat fishery in the Gulf of Guinea bigeye are present throughout the year, and at all seasons the proportion of fish less than 3.2 kg is high. The proportion of bigeye in the total catch of all species varies through the season, and appears (Table 2 of SCRS/78/102) to be particularly low in April-June and high in the second half of the year. However, even in this low season some bigeye were present in many of the schools (SCRS/78/44). The implication of this preliminary analysis was that the fishery would have difficulty in changing the nature of its operation so as to avoid the incidental capture of small bigeye. Other, more flexible fisheries (e.g. purse seiners) may have less difficulty in shifting their effort to older age groups.

As regards dumping, the Committee believed that, in some fisheries, a strict compliance with a 3.2 kg size-limit would lead to significant dumping. However, if a minimum size-limit regulation included a provision for an accidental catch of a certain percentage of undersized fish, the results in practice might be that most of the undersized bigeye caught incidentally would be landed.

In summary, the results of investigations since last year were first to strengthen the Committee's conclusion that protection of small fish would be beneficial to the bigeye stock, and to confirm its previous recommendation that the Commission should give serious consideration to the establishment of a 3.2 kg size limit.

However, the studies have also confirmed the existence of serious problems with the practical implementation of such a regulation. The Committee could not, therefore, make any qualified recommendation concerning this or other specific measures. However, it did recommend that the Commission continue to give serious consideration to any measures that could limit the catch of small bigeye, including the application of a minimum size limit.

#### e-VIII. Evaluation of the progress made according to the assignments made in 1977

<i>TASKS</i>	<i>STATUS</i>
1. Production model	Completed
2. Cohort analysis	Completed
3. Size/age composition	Completed
4. Yield-per-recruit	Not completed
5. Analysis of impact	Partially completed

6. Study of proportion of undersized fish	Completed
7. Investigation of variability of recruitment	Not completed
8. Interaction of multi-gear fisheries	Completed
9. Estimation of effective effort in multi-species fishery	Not completed

**e-IX. Assignments of future work to the scientists**

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<i>TASKS</i>	
1. Production model	U.S.A., Japan, France
2. Cohort analysis	France
3. Size/age composition	Japan, Spain, France
4. Yield-per-recruit	Japan, France
5. Analysis of impact of regulations	Ghana, Japan
6. Study of proportion of undersized fish	U.S.A., Japan, France, Korea
7. Investigation of variability on recruitment	Japan
8. Estimation of effective effort in multi-species fishery	Japan

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**7-f. Billfishes**

**f-I. Review of current research**

In past years, increased emphasis has been placed on the assessment of the status of stocks of Atlantic billfishes. In December, 1977, a Billfish Assessment Workshop (SCRS/78/7) was held in Honolulu, Hawaii, and was attended by scientists representing many of the nations that harvest billfishes in the Atlantic. Although all five recognized species of Atlantic billfishes (blue marlin, white marlin, sailfish, longbill spearfish, and swordfish) were considered, problems with inadequate and unrefined catch data, lack of information on stock structure, and an apparent inability to adequately define effective effort prevented the group from reaching any firm conclusions regarding the status of stocks.

SCRS/78/39 attempted to deal with these problems by further refining available catch data for blue and white marlins, by conducting sensitivity analyses on various stock structure assumptions and number of age classes in the fishery, and by expanding on previous techniques of assessing effective fishing effort.

SCRS/78/100 also evaluated the status of stocks of blue and white marlin, but the authors restricted their analysis to the North Atlantic. Both documents were similar in their treatment of the data and in their preliminary conclusions drawn.

Three papers were presented on swordfish (SCRS/78/38, 51 and 87). Document SCRS/78/38 presented length and weight data on 168 swordfish caught off the U.S. coast by the recreational rod and reel fishery. The coefficients were given to convert lengths to round weight. SCRS/78/51 compared the catches and catch rates, fleets and fishing methods, size frequencies, morphometry and sex ratios of swordfish taken by Spanish and Brazilian longline fleets off their respective coasts. SCRS/78/87 presented biological and morphometric data on swordfish caught by the Spanish longline fleet in the Atlantic and Mediterranean and commented on apparent differences between the two areas.

## **f-II. Review of fisheries data**

### *f-II.1. Catch trends*

Landings of swordfish in the Atlantic Ocean and Mediterranean Sea in 1977 were 17,751 MT, the highest total reported in the past ten years (Table 14). Over a third of this total (6,948 MT) was recorded from the surface fishery; only 80 MT were reported from this fishery in 1976 and no catch prior to that. Landings from the western North Atlantic harpoon and longline fishery, however, are probably still substantially under-reported. Restrictions on the sale of swordfish containing high concentrations of mercury have substantially reduced reported catches. In addition, a relatively large recreational fishery for swordfish has developed in U.S. waters in the past few years and the bulk of these catches are unrecorded.

Landings of billfishes other than swordfish (blue marlin, white marlin, sailfish and spearfish) in the Atlantic and Mediterranean in 1977 totaled 3,704 MT (Table 15). This was 15 percent less than the 1976 level and less than half of the 1970-75 average (8,506 MT). Landings of blue marlin increased from 1,225 MT in 1976 to 1,940 MT in 1977, a 58 percent increase. This total, however, was still substantially below levels attained in earlier years. Landings of sailfish (including spearfish) and white marlin in 1977 were at the lowest levels since the early 1960's.

### *f-II.2. Effort trends*

Documents SCRS/78/39 and SCRS/78/100 indicated that fishing effort (as measured by fishing intensity) on blue and white marlins in 1976 declined substantially from previous years, particularly in the North Atlantic where 1976 levels were about

half those of the previous year. Fishing intensity in the total Atlantic on both species had stabilized at rather high levels since 1970, and 1976 represented a substantial deviation from the pattern of the previous six years.

Although there were few data on fishing effort for swordfish, it seemed apparent that in the western North Atlantic, at least, fishing effort in both the longline and recreational fisheries has increased substantially in recent years.

### *f-II.3. Trends in catch-per-unit-effort*

Catch-per-unit-effort (CPUE) trends for blue and white marlin caught in the Japanese longline fishery were presented for the total Atlantic (SCRS/78/39) and for the North and South Atlantic separately (SCRS/78/7, 39 and 100).

For blue marlin, CPUE trends in the total Atlantic and in the North and South Atlantic separately were very similar. Following an initial period of rather high catch rates and sharp year-to-year fluctuations, CPUE fell sharply from 1962-1966 then began a very gradual decline to its lowest level in 1976.

For white marlin in the North Atlantic, CPUE increased to a peak in 1966 then declined fairly steadily over the next ten years. In the South Atlantic, CPUE peaked in 1961, fluctuated widely for the next 6 years, then fell sharply and steadily through 1976. It should be cautioned, however, that only Japanese data are used to describe trends in CPUE and from 1971 through 1976 Japanese effort in the South Atlantic has been minimal so that the description of CPUE trends during this period may be misleading. CPUE of sailfish and spearfish in the Japanese longline fishery were examined from an area North of the equator and West of 40°W longitude (SCRS/78/7). It was believed that most of the catch in this area was sailfish. No consistent trends were evident and the history of the fishery is marked by rather large fluctuations in CPUE.

CPUE for swordfish in the Japanese fishery rose steadily up until 1969, declined slightly, then leveled off over the past six years (SCRS/78/7).

### **f-III. Stock structure**

No new evidence was presented on stock structure of Atlantic billfishes. SCRS/78/7 presented in detail available evidence on stock structure for each of the Atlantic billfishes and concluded that although separate concentrations of adults and separate spawning areas and seasons were apparent in the North and South Atlantic (and in the Mediterranean for swordfish), there was also a strong likelihood of considerable intermixing between the two areas. It was recommended that future analyses deal with the various hypotheses on stock structure and that sensitivity analyses be conducted to evaluate the effect different stock structure assumptions would have on the assessment of the status of stocks. SCRS/78/39 presented such an analysis for blue marlin and white marlin and concluded that estimates of MSY appeared to be only moderately sensitive to stock structure assumptions; however, estimates of optimal fishing effort were highly sensitive.

#### f-IV. Population parameters

SCRS/78/7 summarized the information currently available on billfish population parameters. Growth information was given for all species other than spearfish; mortality estimates based on tag returns were given for white marlin, sailfish, and swordfish; spawning seasons and geographical areas were given for all species other than spearfish; and fecundity estimates were given for white marlin and sailfish.

Preliminary age determinations have been done for sailfish and swordfish but no age determinations are currently available for any of the other billfishes.

#### f-V. Status of stocks

##### f-V.1. Production model analysis

Production model analysis for the billfish fishery is particularly difficult to conduct because a large portion of the billfish landings are incidental catches from the tuna longline fleets. Although the fishing intensity calculation, used in SCRS/78/7, 39 and 100 adjusted nominal effort to account for this problem, it could not account for all of the changes in catchability which may have occurred due to changes in harvesting strategies and target species of the longline fleets. Despite the uncertainties, interpretive difficulties, and other possible shortcomings, production model analysis can provide a rough characterization of the billfish fishery and can be a useful management tool.

Production model analysis was conducted for blue marlin and white marlin under the stock hypothesis that (1) there is a single Atlantic-wide stock for both species and (2) there are two stocks, one in the North Atlantic and one in the South Atlantic with the equator serving as the dividing line.

##### i) Atlantic-wide stock

SCRS/78/39 estimated maximum sustainable yield (MSY) to be approximately 5,000 MT for blue marlin and 3,300 MT for white marlin. The corresponding optimal fishing intensity ( $f_{opt}$ ) levels were about 640,000 and 1,050,000 hooks per five degree square for blue marlin and white marlin, respectively. Some minor variation in these estimates occurred depending on the number of significant year classes assumed to be in the fishery. The only previous Atlantic-wide MSY estimate was approximately 4,000 MT for blue marlin (SCRS/75/32). The larger MSY estimated in SCRS/78/39 (5,000 MT) is primarily due to the incorporation of Cuban, Korean and U.S. recreational landings into the data base.

The equilibrium yield curves displayed in SCRS/78/39 (Figures 25 and 26) showed that the level of average fishing intensity has been greater than the optimal level and equilibrium yields have been below MSY since 1970, for both species. Caution is required, however, in interpreting these management parameters for the Atlantic-wide stock in recent years because of the unstable nature of the abundance index in the South Atlantic (see section f-V.1.iii).

## ii) North Atlantic stock

SCRS/78/39 estimated MSY for blue marlin to be approximately 3,000 MT with a corresponding  $f_{opt}$  of 660,000 hooks per five degree area. SCRS/78/100 estimated MSY to be approximately 2,400 MT with an  $f_{opt}$  of about 1,050,000 hooks per five degree area. Some minor variation occurred in both papers due to various assumptions concerning the number of significant year classes in the fishery. The SCRS/78/39 MSY estimate was larger due to (1) the incorporation of a longer time series of data which included several years with large catch and (2) the incorporation of the U.S. recreational catch into the total blue marlin landings data. The  $f_{opt}$  estimates from SCRS/78/100 were nearly twice those of SCRS/78/39 also because of the different time series used. The equilibrium yield curves displayed in SCRS/78/39 indicated that the level of average fishing intensity has been greater than the optimal level and the equilibrium yields have been below MSY since 1971. Although the statistical measure of the goodness-of-fit was quite good, the authors cautioned that the model may not be depicting the true relationship between yield and fishing intensity, because the sequential positioning of the points relative to the yield curve conflicts with some of the underlying biological theory of the model. For similar reasons, MSY and  $f_{opt}$  were calculated in SCRS/78/100 but the authors chose not to display the yield curve through the data.

This analysis differed from the production model analysis presented last year in that MSY estimates were lower and current effort levels were greater than  $f_{opt}$ . However, the two analyses differed greatly in the data used, the area covered, the methodology used for calculating effective effort, and the degree of fit of the production model. In addition, last year's SCRS Report indicated that the "Index Area" approach used for estimating effective effort in last year's analysis, may have amplified an artifact in the relationship between catch and effort for some specific years. For these reasons, the current analysis appeared to provide a better assessment of the status of the fishery.

For white marlin, SCRS/78/7, SCRS/78/39 and SCRS/78/100 all estimated MSY and  $f_{opt}$ . Document 7 estimated MSY at 2,133 MT, document 39 at approximately 1,950 MT, and document 100 at approximately 1,700 MT. The differences are due, in part, to varying estimates of U.S. recreational landings. SCRS/78/100 did not incorporate any U.S. catch estimates; SCRS/78/7 used preliminary estimates and SCRS/78/39 used more refined estimates (approximately 30 % of the preliminary estimates). However, in some years, e.g. 1974, the differences in total landings data were as much as 35 % and cannot be attributed solely to differences in U.S. catch estimates. As with the blue marlin,  $f_{opt}$  estimates varied greatly for the white marlin. SCRS/78/39 estimated  $f_{opt}$  (1,350,000 hooks per 5° square) at twice the level estimated in SCRS/78/100 (740,000 hooks) and the SCRS/78/7 estimate (1,057,000 hooks) was midway between those estimated in SCRS/78/39 and 100. In this case, the differences were attributable to a somewhat different procedure and choice of standard years in the annual fishing intensity calculation.

Despite the differences in catch, MSY and  $f_{opt}$  estimates, all of these analyses indicated that the recent level of exploitation of white marlin is at or about the MSY level (see Figure 27). The conclusion was basically the same as last year.



### iii) South Atlantic stock

SCRS/78/39 estimated MSY to be approximately 2,700 MT for blue marlin and 2,200 MT for white marlin. The corresponding  $f_{opt}$  estimates were about 1,450,000 and 1,300,000 hooks per five degree area for blue marlin and white marlin, respectively. However, the production model did not adequately fit the data as it had for the other stock assumptions and consequently yielded little useful management information. This was largely due to the exclusive use of Japanese longline statistics for calculating the index of abundance which caused the index to be very unstable in recent years when Japanese catch and effort were minimal.

#### *f-V.2. Yield-per-recruit analysis*

No studies were presented for billfishes.

#### *f-V.3. Recruitment analysis*

No studies were presented for billfishes.

#### *f-V.4. Current appraisal*

Under the single Atlantic-wide stock hypothesis, there has been a significant decline in CPUE since the early 1960's for both blue marlin and white marlin. The 1976 level of average fishing intensity was 36 % and 20 % greater than the optimal level for blue marlin and white marlin, respectively, while the equilibrium catch of the two species was only 34 % and 71 % of the MSY, respectively. It was not clear to what degree the less reliable abundance index in the South Atlantic (see section f-V.1.iii) had biased these results, but under this stock hypothesis the fishery needs to be closely monitored to guard against possible depletion of the stocks and recruitment overfishing. Further analysis is required before a more definitive appraisal can be made for either species under this stock structure hypothesis.

Under the separate North and South Atlantic stock hypothesis, little appraisal can be done on the South Atlantic stocks other than to point out the overall declining trend in CPUE (based on Japanese statistics) since the early 1960's for both blue marlin and white marlin. In the North Atlantic, it appeared that the stock of white marlin is being exploited at or about the MSY level and further increases in effort are not likely to produce substantial increases in yield. In the case of blue marlin, standard production model analysis indicated that the stock has been overfished for the past six years, but there is also evidence that the model may not be appropriate for the data at hand (see section f-V.1.ii). Under this hypothesis, as with the Atlantic-wide stock hypothesis, the blue marlin fishery needs to be carefully monitored to guard against possible depletion of the stock and recruitment overfishing. Further analyses are required before

a more definitive appraisal can be made for blue marlin in the North Atlantic and for both species in the South Atlantic.

**f-VI. Effects of regulations**

No regulations are in force for billfishes.

**f-VII. Recommendations**

*f-VII.1. Statistics*

In general, the major problem areas revolve around inadequate or inaccurate reporting of total catch, inadequate effort data, and the lumping or combining of all or certain species of billfishes in reporting catch statistics.

Specifically, it was recommended that:

i) Attempts should be made to obtain better catch statistics in the Canadian and U.S. fisheries for swordfish, though it was recognized that there may be difficulties in doing this as long as the ban on the sale of swordfish containing high levels of mercury remains in effect;

ii) Data on species composition should be obtained for those fisheries presently reporting "unclassified" catches of billfishes; and

iii) Landings for all species should be reported separately for North and South Atlantic to facilitate sensitivity analysis on stock structure.

*f-VII.2. Research*

The lack of basic data on growth, mortality rates, and stock structure severely hampers many of the standard analyses used in population dynamics. To correct these deficiencies and to provide a better theoretical base for future analyses, it was strongly recommended that:

i) Studies be initiated on age and growth of billfishes to provide accurate data and population parameters for yield-per-recruit studies and cohort analyses;

ii) Further work be done on both the commercial and recreational fisheries for billfishes to determine indices of abundance which account for changes in species composition of the longline fleets and the incidental catch problem;

iii) The available tagging data be thoroughly analyzed to evaluate important information on exploitation rates and to determine whether or not tagging data can reasonably be utilized in stock assessment work; and

iv) Simulation studies be conducted in order to measure the sensitivity of production model parameter estimates to changing catchability in the longline fleet and variation in recruitment.

It was further recommended that the analyses required to answer the questions raised by the production model analysis in this Report be carried out so that a definitive appraisal of the status of the stocks can be made.

### *f-VII.3. Management*

No management measures were recommended at this time but it was recommended that the white marlin and blue marlin fisheries be closely monitored, especially blue marlin in the North Atlantic, and that serious consideration be given to methods of reducing effort on blue marlin and white marlin as a precautionary measure in the event that further analysis continues to show overfishing.

### **f-VIII. Evaluation of the progress made according to the assignments made in 1977**

#### *PROGRESS MADE ON 1977 ASSIGNMENTS*

##### **A. Tasks to be undertaken and updated every year (list of names applied to 1978)**

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#### *TASKS*

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- |   |  |
|---|--|
| 1. Production models  | * G. L. Beardsley (U.S.A.) <sup>1/</sup>   |
| 2. Size/Age composition of catch<br>by fisheries (in Table) | * G. L. Beardsley (U.S.A.) <sup>2/</sup><br>S. Kume (Japan)<br>J. S. Beckett (Canada)<br>J. C. Rey (Spain) |
| 3. Yield-per-recruit  | * G. L. Beardsley (U.S.A.) <sup>3/</sup>   |

\* Person with primary responsibility

1/ Done

2/ Completely or partially done, but to be updated

3/ Not done

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**f-IX. Assignments of future work to the scientists**

**A. Tasks to be undertaken and updated every year (list of names applies to 1979)**

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*TASKS*

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1. Production models	R. Conser (U.S.A.) S. Kikawa (Japan)
2. Size/Age composition of catch of catch by fisheries (in Table)	* G. L. Beardsley (U.S.A.) S. Kume (Japan) J. S. Beckett (Canada) J. C. Rey (Spain)
3. Yield-per-recruit	* G. L. Beardsley (U.S.A.)
4. Investigation of variability of recruitment and catchability on yield	R. Conser (U.S.A.) S. Kikawa (Japan)
5. Estimation of effective effort in multi-species fishery	M. Honma (Japan) R. Conser (U.S.A.)

\* Person with primary responsibility

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**7-g. Southern bluefin and small tunas, etc.**

**g-1. Southern bluefin tuna**

A single stock of southern bluefin tuna is common between the Atlantic, Pacific and Indian Oceans. The major part of the world southern bluefin catch is taken by longline in the Pacific and Indian Oceans or by surface fisheries around Australia. The following analyses were, therefore, made for the entire southern bluefin stock of these three oceans.

Effort in the longline fishery increased rapidly until 1968, but has since remained relatively constant at 90-100 million hooks annually throughout the distribution range of the species, mainly South of 40°S latitude. The longline catch has decreased from 65,000 MT in peak years of 1960 and 1961 to 22,000 MT in 1975 and then increased slightly to 30,000 MT during 1976. Provisional statistics showed that both catch and effort in 1977 remained at the same level as in 1976. Since 1971, the catch in the surface fishery has remained constant at a level of 8,000-9,000 MT.

Catch-per-unit-effort in the longline fishery has declined, particularly in 1975, to approximately 25 % of the earlier level. However, in 1976, it improved slightly due to increased catch of fish of 80 to 110 cm (recruiting size to the longline fishery) as well as of larger fish.

The Japanese longline fishery has been operating since 1971 under a self-imposed regulation to avoid catching smaller fish and maintain or increase the size-at-first-capture (up to about age 7) and hence to increase the yield-per-recruit. After commencement of the regulation, the decline in the age-at-first-capture, which was fairly continuous from 8 years in 1956 to less than 6 years in 1973, seemed to have been halted but the regulation was not so effective as expected. Recruitment appeared to have been maintained to the surface fisheries, but to have decreased to the longline fishery which harvests fish of 4 years or older. The species has been heavily fished in the past years and the spawning stock may have been reduced to 10-20 % of the earlier levels. Therefore, it would be appropriate action to avoid further increase of fishing effort and thus to sustain the recruitment. More studies on the interaction between the surface and longline fisheries and stock-recruitment relationship should be continued by the scientists concerned. In this connection the Committee repeated its hope, expressed in last year's report that there should be a full exchange of information regarding southern bluefin between ICCAT and other bodies (e.g. IOFC and IPFC) concerned with this species.

#### g-2. Small tunas

Catches of small tunas and tuna-like fishes, excluding skipjack, for 1977 were reported to be 68,000 MT (Table 16). However, it was difficult to discuss the fluctuation in terms of the level of abundance or stock size. As was pointed out frequently in the past, statistics for small tunas have been inaccurate and incomplete. Also, for many countries they were reported as "others". However, the "others" category also includes big tunas not classified. When the statistics are improved and those tunas which had been previously included in "others" are classified by species, naturally this category will decline. On the other hand, recent improvements in statistics in general encouraged more countries which catch small tunas either to report them in each species category or in the general "small tunas" category. This may tend to increase the reported catch of this group of species.

- i) Blackfin tuna (*T. atlanticus*) – Major catches are made by Brazil and the Dominican Republic.
- ii) Little tunny (*Euthynnus alletteratus*) – Up to 1974, big catches of little tunny by Liberia have been estimated by FAO. However, these figures are doubtful. Since 1975, those have been dropped from the table and this explains the major reduction in these catches in recent years. Angolan catches were low in 1975 and 1976, but have returned to their previous level in 1977.
- iii) Bonito (*Sarda sarda*) – In early years, many skipjack catches were misreported as bonito. In recent years, the catch of bonito has been fluctuating between

8,000-20,000 MT. The low catch (5,342 MT) of this species in 1977 was due to the lack of reporting by the major Mediterranean bonito countries, such as Greece, Italy and Turkey.

- iv) Frigate tuna (*Auxis* spp) -- The catch level in recent years stayed in the vicinity of 10,000 MT, except in 1976 and 1977. In 1976, the catch decreased to 5,000 MT. This was due to the lack of reporting by the Mediterranean countries. The situation was similar for 1977, but the catch increased to 20,000 MT. This sudden increase was attributed to the increase in the catch reported by Ghana for its artisan fishery and may represent at least in part increased statistical coverage of that particular fishery.
- v) King mackerel and Spanish mackerel -- It seemed that a few species of *Scomberomorus* and probably *Acanthocybium* have been mixed up under these categories. The catches have been fluctuating widely without any trend. Recent low catches again are due to the lack of statistics from the Mediterranean countries.

Very little research was done on small tunas. Document SCRS/78/36 referred to the occurrence of larvae of little tunny and frigate tuna off southern Brazil. Document SCRS/78/98 indicated that many little tunny were tagged by Spanish scientists in Ceuta in 1978. Several national reports (SCRS/78/45, 54, 80, 83, 96, 97 and 104) provided catch information for various small tuna species.

It was recommended that more accurate or any statistics from various non-member countries in the Mediterranean should be made available.

Though no assessments have been made about the magnitude of these resources, qualitative information e.g. on distribution of larvae (SCRS/78/36), suggested that the stocks of some of these species e.g. *Auxis* could be large.

## Item 8. Report of the Working Group on Bigeye Size Regulation

The Report of the Working Group, which met in July at the time of the SCRS Officers Meeting, was presented by its permanent rapporteur, Mr. S. Kume (SCRS/78/6). Also the report on the progress made after that meeting by the Group was reported by Mr. Kume (attached herewith as Appendix 7). The Committee approved both reports.

## Item 9. Review of progress made on assignments for bigeye

The Committee recognized that very little progress was made by the Working Group so far and hoped that this Group would be more active in the coming year.

The Committee also noted that a research recommendation was made concerning yellowfin (Item 7-a.VII.2), which suggested to start a new study on the methods (other than a size limit) that might lead to an increase in the size-at-first-capture. Some of these methods (e.g. area or seasonal closure) may be equally applicable to bigeye, and in any case are likely to have an impact on the fisheries for skipjack and bigeye.

Since this problem is very closely associated with those presently assigned to the Working Group on Bigeye Size Regulation, the Committee agreed to expand the terms of reference to this Group to include the studies thus suggested on yellowfin.

#### **Item 10. New area of research such as economic study by SCRS**

The Committee noted that the studies proposed at the 1977 Commission Meeting, concerning the economic and other aspects of the implementation of a size limit for big-eye tuna, went beyond the purely biological aspects of tuna research, which had been the main concern of SCRS in the past. At the same time, it was also recognized that stock management of resources must take account of these non-biological factors and the Commission needed advice on the technical aspects of these matters. It was felt that the more detailed economic questions which might require sophisticated economic analysis would involve analysis at the national level. The Commission required rather broader advice on general economic questions. For example, it is often suggested that it would be economically advantageous to exploit a stock at a level of fishing effort less than that giving the MSY; the Commission would find it useful, in determining an optimum level of fishing effort, to have in addition to estimates of total catch, rough measures of gross costs, and likely net economic returns at different levels of total fishing effort.

A large expansion in the subjects covered by SCRS could involve increase in the time taken from meetings, in the expertise required in the Committee, and in the data base necessary for it to do its work. However, it was felt that, if the Committee confined itself to rather general economic statements, the present duration of the Committee meetings and its composition (which comprised considerable experience in the practical aspects of tuna fishing) would be adequate.

It was, however, important that, as far as possible, the Commission should be very specific when drafting questions to the Committee, and in fact the Committee could help in framing appropriate questions.

It was also noted that most of the biological analyses concerned the historical examination of past data. If the advice of the Committee is to be useful to the Commission, it should be made, as far as possible, in relation to the situation likely to arise in the future. It was, therefore, recommended that the data base available to the Committee should be widened to include information on, for example, new vessel construction, that could be used in providing realistic estimates of future trends in fishing effort.

#### **Item 11. Report of the Sub-Committee on Statistics**

The Report of the Sub-Committee on Statistics (Appendix 5) was presented by its Convener, Mr. S. Kume. The SCRS adopted this Report and endorsed all the recommendations made by the Sub-Committee.

## **Item 12. Review of Atlantic tuna statistics and data management system**

The Committee noted with special interest a recommendation made by the Sub-Committee on Statistics in its Report to form a Working Group on Data Management. The SCRS Chairman, Mr. A. Fonteneau, created the Working Group and nominated Mr. J.R. Pascual (Spain) as the Convener. The following members were also nominated for the present time by the Chairman: Messrs. A. Laurec (France), S. Kume (Japan), G. Sakagawa (U.S.A.), A.L. Coan (U.S.A.), R.H. Pianet (Senegal), R. Garcia Moreno (Cuba) and P.M. Miyake (Secretariat).

The Group was instructed to have a first meeting during the present SCRS session in order to draft possible terms of reference to the Group. Consequently, the members of the Group attending the SCRS met immediately and presented their report to the SCRS. The Committee adopted the report and confirmed the recommendations and terms of reference suggested by the Group. The report is attached herewith as Appendix 8.

The Assistant Executive Secretary explained the Secretariat's activities concerning statistics during the past inter-sessional period and referred to SCRS/78/12.

The dissemination of data was the subject of a lengthy discussion. Some scientists were in favor of publication of data while some felt such publication would be unnecessary as long as the catalogue of data available at the Secretariat is widely distributed and if the magnetic tapes or a hard copy of listings can be obtained upon request from the Secretariat.

The Committee recommended to the Commission that the Data Record (in its new format presented in document SCRS/78/29), the Statistical Bulletin and the Statistical Series publications be maintained for another year under the present publication policy. In the meantime, the Working Group on Data Management should review the problems of data processing, exchange, archive and dissemination. The results of such studies would introduce a better basis on which the decision on statistical publications can be made.

The Committee recommended that the data be checked carefully to eliminate all errors before publication, as long as this procedure does not cause undue delay.

## **Item 13. Report of the Sub-Committee on Skipjack**

Two reports of the Sub-Committee on Skipjack were presented: one (COM-SCRS/78/6), which is a report of the Sub-Committee's meeting in July, 1978, in Madrid and another (Appendix 6) which is the report of its meeting during the 1978 SCRS session. Dr. G. Sakagawa, Convener of the Sub-Committee, presented both reports to the Committee. The Committee reviewed and adopted both reports.

## **Item 14. Review of the Skipjack Year Program**

The Committee fully endorsed all the recommendations made in the above two reports of the Sub-Committee on Skipjack and recommended that the Commission give very serious consideration to the Program now presented in the reports.



**Item 15. Review of SCRS programs and coordination of future plans**

The Committee noted that the work load for the scientists at the SCRS meeting is now at a saturation level and unless some new organizational procedures are adopted, it will be difficult for the scientists to concentrate on the subjects of major importance. With this in mind, the Committee reviewed the present rapporteur system adopted for 1978. Another system which the ICES adopted whereby small groups of scientists meet prior to the scientific sessions was also reviewed. Since the ICES procedure means that many scientists have to be in Madrid for a longer time than at present, the Committee felt that some intermediate solution could be found. For example, the first review of the various papers submitted can be done by pre-selected rapporteurs, and afterwards a small group of interested scientists for each species can meet to review the draft of the report. In this regard, the Committee authorized the holding of an SCRS Officers Meeting during the inter-sessional period. At such a meeting the Officers can review in depth any administrative matters, such as the organization of the next SCRS meeting, publication policy, data management system, etc. The results of their discussions can then be presented to the SCRS in an already refined form, so that the scientists attending the meeting have clear-cut ideas of the problems and alternative solutions. It was hoped that such a procedure will facilitate the scientists' work in making their final decisions and bring about a smooth running of the meetings.

The idea of holding one or two workshops in the future was discussed. A few alternative workshops were suggested, including a Bluefin Assessment Workshop in 1979, a Bigeye Workshop in 1979, and an Albacore Stock Assessment Workshop in 1980. There was concern that adequate preparation should be made prior to any workshop, and in particular, that there should be a sound data base.

It was felt that there would not be major changes in past bluefin statistics in the near future and, in view of the problems encountered by the bluefin rapporteurs this year, that a workshop on bluefin stock assessment was desirable in 1979. A small Ad Hoc group met to prepare a proposal for a workshop on bluefin. The report of this group was presented by its Chairman, J.S. Beckett (Canada) and the SCRS adopted the report (Appendix 9) with its recommendations.

**Item 16. Assignments and responsibility of each scientist**

In each species chapter (Item 7-a through g) a section is provided to review the assignments given and the persons responsible for them are listed. The Committee, therefore, requested the scientists to pay attention to these sections. Additional responsibilities and assignments for scientists are found in the reports of the Working Group on Bigeye, the Sub-Committee on Statistics, and the Sub-Committee on Skipjack. In case there is any uncertainty in responsibilities, the SCRS Chairman was authorized to nominate scientists for those specific assignments.

### **Item 17. Cooperation with other organizations**

The subjects discussed at the ICES symposium on the problem of stock management of pelagic fish held in Aberdeen, Scotland, during July 1978, was reported by the SCRS Chairman who attended that meeting. This could also be the main problem which ICCAT is trying to solve and some cooperation between these two organizations would be of future mutual benefit. It was also recommended that the relationships between ICCAT bluefin tuna scientists and the ICES Bluefin Group be strengthened in the future.

Dr. J.A. Gulland, on behalf of FAO and its regional fishery bodies, stressed the real need for very close collaboration between ICCAT and those organizations he represents.

### **Item 18. Report of the Working Group on Publication Policy**

Mr. O. Cendrero (Spain), Chairman of the Working Group on Publication Policy, presented the report of the Working Group. The Committee discussed the report in depth and requested the Group to modify it slightly. The revised report was presented and adopted by the Committee (attached herewith as Appendix 4).

### **Item 19. Scientific publications**

The Committee's discussion was focused on the Collective Volume of Scientific Papers, as the statistical publications were already discussed under Agenda Item 12.

Two aspects were considered: The improvement in the scientific quality of the papers presented, and the distribution and availability of the papers on which the Committee's analyses and advice were based.

It was recognized that most of the papers presented to the Committee were interim reports on work in progress, and could not be expected to have the same scientific quality as carefully refereed and edited papers appearing in standard scientific journals. At the same time it was important that the scientific content of the working papers should be maintained at a high level. This might be best done by the scientists concerned taking note of the discussions on their papers among the members of the Committee.

It was also recognized that it was highly desirable that ICCAT scientists and others interested in tuna should have easy access to the papers presented at each session, for example, in determining the basis of advice given by SCRS in previous years; for this the Collective Volume has been very convenient. However, the present volume is difficult to use as the format of each paper is quite different. It was recommended that the Secretariat provide the scientists preparing SCRS reports with a standard format so that the Collective Volume would be easier to use.

The possibility of preparing another publication with titles and abstracts of all the SCRS documents was discussed. While recognizing the advantage of having such a new series, which might be given a wide circulation and thus provide better information on the Commission's scientific work, the Committee felt that this procedure should not be followed if it means sacrificing more important tasks assigned to the Secretariat. The Committee recommended that the Working Group on Publication Policy review this possibility.

In conclusion, the Committee recommended that the present policy for the Collective Volume be maintained for one additional year. Clear instructions on the format of scientific papers should be distributed to the scientists so that the Collective Volume would be easier to read. In the meantime, the Working Group on Publication Policy should carefully review the means to upgrade the contents, the possibility of selection of papers, etc. Each national office should send their comments on this matter to the Working Group. The Group should also study the possibility of establishing a new Scientific Journal where only a very few, high quality papers would be selected to be published in a more permanent form.

#### **Item 20. Progress made by the Secretariat regarding assignments given to it**

The Secretariat's activities, which had not been reviewed previously under various Agenda items, were reported by the Assistant Executive Secretary. He reported that the Training Course on Statistics and Sampling held jointly by ICCAT/ICSEAF/CECAF in April, 1978, in Tenerife, Canary Islands, was very successful. He then explained the coordination which the Secretariat executed for promoting young bluefin tagging cruises in the eastern Atlantic. He commented that files at ICCAT Headquarters concerning tagging carried out in the past by member countries were not complete. The Committee considered that a complete file of tuna tagging results was useful, and that only the Secretariat was in the position to create such a file. It recommended that the Secretariat continue its efforts and report those national laboratories which have tagging data but have not yet supplied them to the Secretariat, in order to complete the file.

#### **Item 21. Other matters**

The Spanish delegate stated that his country is planning two bluefin tagging cruises, one by trap in southern Spain and the other by baitboat in the Bay of Biscay. Mr. H. Aloncle (France) commented that an improvement in tagging material would be necessary so that the lettering on the tags is still legible after a tagged fish has been at sea for a few years.

The Assistant Executive Secretary commented that the Secretariat was in the process of obtaining Urethane tags which are highly resistant to extremely cold temperatures.

#### **Item 22. Recommendations**

The attention of Panel 1 was drawn to sections 7-a and 7-b; Panel 2 to sections 7-a and 7-d; Panel 3 to 7-d and 7-g and Panel 4 to sections 7-e, f and g. The view of the Committee concerning the status of the fishery, stocks and research, effects of regulations and any recommendations concerning statistics, research and management are stated for each species.

Furthermore, the attention of Panels 1 and 4 was drawn to sections 8 and 9 of this Report, as well as to Appendix 7. Those sections and the Appendix deal with the specific assignments which the Panels and Commission gave to the scientists at the 1977 meeting concerning the possible effects of a bigeye size limitation on other fisheries. Numerous recommendations to the Commission were presented in this report. Special attention should be given to Items 13 and 14 in which the proposed International Skipjack Year Program was reviewed and presented by the Committee. The Committee wholeheartedly supported this Program.

**Item 23. Date and place of next meeting**

The Committee decided that the 1979 meeting would be held at the same place and during one week preceding the 1979 Commission meeting. The rapporteurs of each species section will meet two days prior to the opening of the SCRS meeting, at the same place of the SCRS meeting.

**Item 24. Adoption of Report**

The Report was adopted.

**Item 25. Adjournment**

The meeting was adjourned.

**Table 1. Atlantic yellowfin catch (1,000 MT)**

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 <sup>1</sup>
TOTAL . . . . .	69.0	61.8	56.8	81.0	91.7	75.8	71.2	93.3	93.3	107.3	118.3	120.2	130.1	128.0
Longline . . . . .	37.2	23.5	15.5	24.1	26.8	27.2	27.0	28.6	31.6	29.5	27.7	25.1	26.6	18.1
China (Taiwan) . .	.2	1.1	2.7	7.9	10.8	7.1	4.4	4.7	2.7	2.3	2.4	1.7	.3	.7
Japan . . . . .	36.9	22.4	12.8	13.9	10.0	6.8	10.6	6.5	3.8	3.5	4.2	3.4	1.5	1.0
Korea Panama . . .	0.	0.	0.	2.3	6.0	13.3	9.9	11.2	18.4	18.7	17.7	14.1	17.3	11.4
Others . . . . .	.1	0.	0.	.1	.1	0.	2.1	6.2	6.7	4.9	3.4	5.8	7.5	5.0
Surface - East Atlantic	28.2	34.7	35.0	52.8	60.9	44.5	42.2	61.8	59.0	76.2	88.6	94.2	102.5	104.5
-Purse seine . . . . .	7.6	13.9	17.9	29.2	44.7	34.3	31.1	47.2	42.8	54.4	81.5	85.2	91.4	98.4
FIS . . . . .	5.4	7.5	8.9	12.6	14.7	18.0	18.0	24.6	25.0	32.8	42.9	46.4	45.5	53.9
Japan . . . . .	1.1	4.8	5.2	7.5	5.8	1.3	2.2	2.8	1.5	.9	.1	0.	0.	-
Spain . . . . .	1.0	1.0	2.0	2.6	4.5	5.8	7.0	7.6	12.8	14.4	23.0	34.9	37.3	33.6
USA . . . . .	0.	0.	1.1	5.9	18.8	9.0	3.8	12.0	3.0	5.6	14.0	1.7	6.4	10.9
Others . . . . .	.0	.6	.7	.7	.9	.2	.0	.2	.4	.7	1.4	2.2	2.1	-
-Baitboat . . . . .	20.6	20.7	17.1	23.5	16.2	10.1	11.2	14.6	16.2	21.0	7.1	9.0	11.0	6.1
Angola . . . . .	1.9	1.3	.9	1.1	.4	.3	.5	.6	.6	.8	.1	1.0	1.9	.6
FIS . . . . .	14.7	15.9	14.9	19.9	14.2	8.1	7.8	8.4	5.6	6.4	2.8	4.2	3.5	3.4
Ghana . . . . .	0.	0.	0.	0.	0.	0.	0.	.0	.1	.3	.5	.3	.6	} 1.8
Japan . . . . .	1.3	.5	1.3	2.2	.9	1.0	2.5	4.4	8.0	8.3	1.0	2.2	2.5	
Korea+Panama . .	0.	0.	0.	0.	0.	0.	0.	.4	1.0	2.6	1.7	.7	2.1	
Spain . . . . .	2.7	3.1	0.	.4	.6	.7	.4	.7	.8	2.0	1.0	.2	.3	-
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	.5	.1	.3	.1	.3
-Other gears . . . . .	0.	.0	.0	0.	.0	0.	.0	.0	.0	.8	.0	.0	.2	1.4
Surface - West Atlantic	0.	0.	0.	0.	0.	0.	0.	2.9	2.3	1.6	2.0	.6	.8	4.0
Surface - Uncl. region .	0.	0.	0.	0.	0.	0.	.4	0.	.4	0.	0.	0.	0.	-
Uncl. gears . . . . .	3.6	3.7	6.2	4.1	3.9	4.1	1.5	.0	0.	.0	.0	.3	.2	-

<sup>1</sup>Provisional estimates.

**Table 2. Estimated carrying capacity (thousands of metric tons) and fishing effort for yellowfin tuna of the eastern Atlantic Ocean**

	1967 <sup>1</sup>	1968 <sup>1</sup>	1969 <sup>2</sup>	1970 <sup>2</sup>	1971 <sup>2</sup>	1972 <sup>2</sup>	1973 <sup>2</sup>	1974 <sup>2</sup>	1975 <sup>2</sup>	1976	1977	1978 <sup>2,10</sup>
Surface estimated effort <sup>5</sup> (x 10 <sup>5</sup> standard days at sea) . . . . .	9.24	11.43	20.03	19.69	23.30	24.30	29.38	31.67	42.55	40.53	—	
Longline estimated effort (x 10 <sup>3</sup> hooks by 5° x 5° square) . . . . .	516	673	799	938	1542	1247	1670	1359	1225			
Carrying capacity												
BB — Ivory Coast-Senegal <sup>7</sup> . . . . .	3.7	3.9	3.0	2.9	2.5	2.4	1.8	1.7	1.5	1.0	1.0	1.1
BB — Tema-based <sup>4</sup> . . . . .	1.2	1.2	0.9	0.9	1.2	2.6	4.0	5.4	3.6 <sup>6</sup>	5.4	5.4	5.4
Total BB . . . . .	4.9	5.1	3.9	3.8	3.7	5.0	5.8	7.1	5.1	6.4	6.4	6.5
PS — FIS <sup>7</sup> . . . . .	1.5	1.6	4.9	5.9	7.3	11.4	14.1	16.1	19.3	18.5	18.6	19.6
PS — Spain . . . . .	0.6	1.0	2.1	2.1	4.5	7.5	7.9	10.5	17.1	20.1	23.3	26.3
PS — Others . . . . .												1.9
Total PS . . . . .	2.4	3.2	11.4	13.4	15.6	26.8	24.9	22.1	46.8	40.3	46.1	58.3
Total BB — PS . . . . .	7.3	8.3	15.3	17.2	19.3	31.8	30.7	29.2	51.9	46.7	52.5	64.8

1 Estimates from ICCAT Biennial Report, 1974-75, Part II (1975).

2 Estimates for 1969-1975 from Peter Miyake (SCRS/76/13) (except FIS).

3 U.S.A. estimate weighted by the number of months on the spot.

4 Includes Japan, Korea, Panama and Ghana.

5 Estimates from Coan and Fox (SCRS/77/62). (Eastern Tropical Atlantic only).

6 Japanese estimate weighted by the number of months on the spot (SCRS/77/37).

7 New FIS estimate from 1969-76 (SCRS/77/100).

8 Data from Honma and Suzuki (SCRS/77/59, Total Atlantic).

9 Portugal-Congo.

10 Provisional estimates.

**Table 3. Yellowfin yearly CPUE by gear and category (tons by day at sea)**

	<i>1969</i>	<i>1970</i>	<i>1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
Baitboat - iced well . . . . .	0.81	0.60	0.91	.69	.77	1.05	.76	1.22	1.10
Baitboat - freezer 40 T . . . . .	1.22	1.10	1.04	1.13	0.79	1.11	0.66	1.23	.98
Baitboat - freezer 90 T . . . . .	1.75	1.42	1.35	1.94	1.57	1.71	(0.90)	(1.73)	(1.84)
Medium size purse seiner 90 T . . . . .	3.06	1.96	1.93	2.28	1.93	1.82	1.89	1.61	1.70
Med. size purse seiner 200 T . . . . .	2.41	2.70	2.92	2.87	2.76	2.80	2.45	2.41	2.37
Med. size purse seiner 400 T . . . . .	4.36	4.69	3.23	4.38	4.84	4.42	4.99	5.27	5.46
Med. size purse seiner 700 T . . . . .	(12.52)	(4.00)	(5.79)	6.35	6.37	6.28	8.55	7.04	7.46
Med. size purse seiner+1,000 T . . . . .				(2.64)	4.62	5.25	6.48	6.35	4.56

Table 4. Atlantic skipjack catch (1,000 MT)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 <sup>1</sup>
TOTAL . . . . .	28.0	36.4	22.4	48.4	29.1	49.4	74.3	73.4	75.5	116.6	62.2	78.1	122.4	105.9
Surface - East Atlantic . . . . .	26.4	34.6	19.7	45.9	27.3	47.0	71.9	71.9	72.6	113.0	58.5	74.4	119.5	103.2
-Purse seine . . . . .	3.6	5.3	7.1	22.7	14.4	30.8	49.6	51.6	50.7	76.9	38.8	37.1	66.7	66.2
FIS . . . . .	.7	1.9	1.6	5.1	3.8	9.2	13.8	16.7	8.7	24.8	13.9	16.2	29.5	29.0
Japan . . . . .	1.8	1.4	2.2	6.3	.7	3.5	6.2	3.4	1.5	.9	.1	0.	0.	-
Spain . . . . .	1.0	1.9	2.3	7.1	5.0	5.7	12.1	19.3	17.8	31.1	16.9	17.8	29.1	25.0
USA . . . . .	.1	.0	.5	3.3	4.8	11.8	16.2	12.2	21.2	20.0	7.4	1.8	5.9	12.2
Others . . . . .	.0	0.	.6	.9	.1	.6	1.2	.1	1.3	.1	.5	1.4	2.3	-
-Baitboat . . . . .	22.8	29.3	12.6	23.2	12.8	16.2	22.2	20.2	21.9	36.0	15.2	27.3	40.5	32.7
Angola . . . . .	1.3	2.8	2.0	4.2	1.8	.9	1.9	1.5	1.3	3.4	.6	1.5	3.8	2.0
FIS . . . . .	3.5	4.5	3.9	7.9	4.6	4.8	5.7	3.8	3.7	4.7	1.8	2.0	2.9	3.1
Ghana . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	.1	.7	1.3	2.1	3.5	} 24.9
Japan . . . . .	6.3	4.4	3.7	7.3	4.9	7.5	11.7	10.1	13.0	18.7	3.7	15.0	16.8	
Korea+Panama . . . . .	0.	0.	0.	0.	0.	0.	0.	.7	1.1	3.1	6.3	4.4	7.6	
Spain . . . . .	8.5	16.2	2.0	3.0	1.4	1.8	2.7	4.1	2.6	5.4	.8	.6	.7	.5
Others . . . . .	3.2	1.5	.9	.8	.1	1.1	.1	.0	.1	.1	.7	1.6	5.2	2.2
-Other gears . . . . .	.1	0.	0.	.0	.1	0.	.1	.1	.0	.1	4.5	9.9	12.2	4.3
Surface - West Atlantic . . . . .	0.	0.	0.	0.	0.	0.	1.6	1.1	2.5	3.1	3.2	3.5	2.5	2.5
Surface - Uncl. region . . . . .	0.	0.	0.	0.	0.	0.	.2	0.	0.	0.	0.	0.	0.	-
Uncl. gears <sup>2</sup> . . . . .	1.5	1.8	2.7	2.5	1.7	2.4	.7	.3	.4	.5	.5	.2	.4	.2

1 Provisional estimates.

2 Includes longline.



**Table 5. Estimated carrying capacity (thousands of metric tons) and standardized fishing effort (thousands of days fished) for skipjack tuna in the eastern tropical Atlantic**

	1967 <sup>1</sup>	1968 <sup>1</sup>	1969 <sup>2</sup>	1970 <sup>2</sup>	1971 <sup>2</sup>	1972 <sup>2</sup>	1973 <sup>2</sup>	1974 <sup>2</sup>	1975 <sup>2</sup>	1976 <sup>2</sup>	1977 <sup>2</sup>	1978 <sup>2,9</sup>
Surface estimated effort <sup>5</sup> (x 10 <sup>3</sup> standard days at sea)	9.24	11.43	20.03	19.69	23.30	24.30	29.38	31.67	42.55	40.53	—	46.9
Carrying capacity												
BB — Ivory Coast-Senegal <sup>7</sup>	3.7	3.9	3.0	2.9	2.5	2.4	1.8	1.7	1.5	1.0	1.0	1.1
BB — Tema-based <sup>4</sup> . . . . .	1.2	1.2	0.9	0.9	1.2	2.6	4.0	5.4	3.6 <sup>6</sup>	5.4	5.4	5.4
Total BB . . . . .	4.9	5.1	3.9	3.8	3.7	5.0	5.8	7.1	5.1	6.4	6.4	6.5
PS—FIS <sup>7</sup> . . . . .	1.5	1.6	4.9	5.9	7.3	11.4	14.1	16.1	19.3	18.5	18.6	19.6
PS—Spain . . . . .	0.6	1.0	2.1	2.1	4.5	7.5	7.9	10.5	17.1	20.1	23.3	26.3
PS—U.S.A. <sup>3</sup> . . . . .	0.3	0.6	4.4	5.4	3.8	7.9	2.9	5.5	10.4	1.7	4.2	10.5
PS—Others <sup>8</sup> . . . . .												1.9
Total PS . . . . .	2.4	3.2	11.4	13.4	15.6	26.8	24.9	22.1	46.8	40.3	46.1	58.3
Total BB—PS . . . . .	7.3	8.3	15.3	17.2	19.3	31.8	30.7	29.2	51.9	46.7	52.5	64.8

- 1 Estimates from ICCAT Biennial Report, 1974-75, Part II (1975).
- 2 Estimates for 1969-1975 from Peter Miyake (SCRS/76/13) (except FIS).
- 3 USA estimate weighted by the number of months on the spot.
- 4 Includes Japan, Korea, Panama and Ghana.
- 5 Estimates from Pianet (SCRS/78/68) (Eastern Tropical Atlantic).
- 6 Japanese estimates weighted by the number of months on the spot.
- 7 New FIS estimate for 1969-76 (SCRS/77/100).
- 8 Portugal, Congo.
- 9 Provisional estimate.

**Table 6. Bluefin tuna catches by country, gear, and area, 1970-1978. When these figures differ from the Statistical Bulletin, Vol. 8, they are based on estimates by the scientific staff**

<i>Fishery</i>		1978 <sup>1</sup>	1977	1976	1975	1974	1973	1972	1971	1970
<b>WESTERN ATLANTIC</b>										
Subtotal		4,663	5,858	5,213	4,977	3,529	3,371	2,626	5,842	5,001
Canada	Large	392	644	514	350	664	367	228	206	426
	Small (PS)	241	298	332	291	103	635	260	935	1,161
USA	Large	763	802	769	715	731	199	516	518	829
	Small (PS)	913	1,058	1,069	1,986	804	970	1,622	2,651	2,498
	Sport (small)	54	56	29	122	322	103	—	—	—
Japan <sup>3</sup>	LL	2,300	3,000	2,500	1,513	905	1,097	0	1,532	87
<b>EASTERN N. ATLANTIC</b>										
Subtotal		5,081	6,016	4,863	9,794	5,711	3,628	3,935	4,088	4,861
France	Surf	598	592	267	778	550	532	900	800	800
Morocco	PS	296	595	331	2,624	590	512	531	30	406
	Trap	637	222	0	0	7	1	122	63	286
Norway	PS	—	583	413	900	800	100	100	600	400
Portugal	BB	—	155 <sup>4</sup>	218 <sup>4</sup>	321	1	21	1	1	—
Spain	BB-Can	800	1,250	832 <sup>5</sup>	932	546	906	—	800 <sup>5</sup>	—
	BB-NE	550	720 <sup>6</sup>	612 <sup>6</sup>	891	1,009 <sup>6</sup>	1,008 <sup>6</sup>	1,469 <sup>6</sup>	1,194 <sup>6</sup>	1,469
	Trap	600	339 <sup>7</sup>	490 <sup>7</sup>	448 <sup>7</sup>	13	504	250	600	1,500
Japan <sup>3</sup>	LL	1,500	1,500	1,700	2,900	2,195	44	562	—	—

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Subtotal		8,747	13,189	15,982	11,135	13,407	5,792	5,765	5,199	3,337
France	PS	1,000	3,180	3,800 <sup>8</sup>	1,600 <sup>8</sup>	1,800 <sup>8</sup>	1,400 <sup>8</sup>	1,100 <sup>8</sup>	2,200 <sup>8</sup>	1,100
Italy	Trap	500	698	650	713	1,000	317	667	746	677
	PS	6,000	8,000 <sup>9</sup>	9,010	6,270	6,000	2,200	2,300	—	—
	Uncl		34	12	500	500	500	500	500	500
Japan	LL	200	600	1,000	1,260	2,195	246	112	—	—
Libya			288	—	—	500	400	300	600	500
Malta		47	47	25	37	21	1	1	1	1
Morocco	Trap		—	222	—	14	1	36	37	—
	BB	—	—	332	264	590	—	1	42	—
Spain	Uncl	—	68 <sup>10</sup>	100 <sup>10</sup>	103 <sup>10</sup>	192 <sup>10</sup>	274 <sup>10</sup>	124 <sup>10</sup>	129 <sup>10</sup>	69 <sup>10</sup>
Tunisia		—	—	220	167	245	227	400	496	266
Yugoslavia		1,000	932	562	155	317	224	200	326	90
Algeria	Trap	—	40	49	66	33	1	1	100	1
Turkey		—	—	—	—	—	1	23	22	133
TOTAL N. ATLANTIC										
Subtotal		3	54	66	55	192	238	114	3,158 <sup>2</sup>	109
Korea		3	3	10	23	56	66	30	3,039	—
Taiwan		—	51	56	32	136	172	84	119	109
TOTAL		18,494	25,117	26,075	25,961	24,287	13,029	12,400	18,287 <sup>2</sup>	13,308

1 Provisional estimates.

2 May include southern bluefin.

3 Japanese longline catches split between East and West Atlantic by Z. Suzuki.

4 From ICES Bluefin Tuna Working Group - 1978, 1977.

5 From A. Santos.

6 From J.L. Cort.

7 From ICES Bluefin Tuna Working Group - 1978, 1977, 1976.

8 From H. Farrugio.

9. From G. Piccinetti.

10. From J.C. Rey.

**Table 7. Results of bluefin tuna tagging with returns up to 1977 in the Atlantic (Source: SCRS/78/90).**

	<i>Number of fish tagged</i>	<i>Return on same side of Atlantic</i>	<i>Transatlantic returns</i>	<i>Comment on recoveries</i>
W. Atlantic	18,400	3,003	39	Bay of Biscay
			8	Norway
E. Atlantic	790	126	6	Off N. America

NOTE: Figures include returns during the same season as tagging.

**Table 8. Estimated changes in fishing mortality in North Atlantic bluefin fisheries**

<i>FISHERY</i>	<i>PERIOD</i>		<i>FISH CATEGORY</i>
	<i>1973-74 to 1977-78</i>	<i>1968-75 to 1977-78</i>	
<b>Eastern Atlantic</b>			
Bay of Biscay . . . . .	decrease	decrease	small, medium
Morocco PS . . . . .	decrease	decrease	small
Longline East Atlantic . . . . .	decrease	uncertain	large, medium
Traps East Atlantic . . . . .	increase ?	increase ?	large, medium
Purse seine Mediterranean . . . . .	increase	increase	small to large
Traps Mediterranean . . . . .	increase ?	?	large, medium
Longline Mediterranean . . . . .	decrease	uncertain	large, medium
Canarian baitboats . . . . .	?	?	large
<b>Western Atlantic</b>			
Harpoons, hooks, nets . . . . .	increase	increase	large
Nets and hooks . . . . .	decrease	decrease	small
Longline . . . . .	increase	increase	medium, large

**Table 9. The proportions of the total estimated numbers of age 6 and older Atlantic bluefin tuna stock size and catch in the western part of the Atlantic Ocean.\***

<i>YEAR</i>	<i>STOCK SIZE</i>	<i>CATCH</i>
1960	.15	.03
1961	.18	.10
1962	.16	.04
1963	.19	.26
1964	.20	.28
1965	.17	.33
1966	.15	.26
1967	.15	.18
1968	.13	.59
1969	.13	.12
1970	.12	.10
1971	.11	.10
1972	.11	.14
1973	.11	.13
1974	.11	.10
Average	.14	.18

\*Ratios listed were calculated as the numbers in the western part divided by the total numbers.

**Table 10. Atlantic albacore catch (1,000 MT)**

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 <sup>1</sup>
TOTAL . . . . .	88.3	75.0	74.9	72.1	76.2	70.7	83.5	83.9	73.7	72.1	61.7	76.9	74.2	
North Atlantic . . . . .	57.7	47.8	54.5	43.0	40.0	39.7	50.6	40.4	46.6	51.6	39.8	54.8	45.6	
–Surface . . . . .	43.4	39.8	49.0	38.5	32.2	30.3	40.0	34.9	26.7	37.2	31.0	34.0	32.1	
Baitboat . . . . .	0.	16.4	17.6	13.7	13.8	14.5	15.5	8.4	8.7	15.6	21.1	20.3	14.9	
France . . . . .	0.	3.7	4.2	2.4	1.8	2.0	1.6	1.1	1.0	.5	.7	1.1	0.	1.4
Spain . . . . .	0.	12.7	13.4	11.3	12.0	12.5	13.9	7.3	7.7	13.8	19.4	18.8	14.9	
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.2	1.0	.4	.1	
Trolling . . . . .	0.	23.4	31.4	24.9	18.4	15.9	24.5	26.5	18.0	8.5	9.9	13.7	17.1	
France . . . . .	0.	10.6	12.4	11.9	8.2	4.6	8.2	8.7	5.1	8.5	5.4	5.6	6.8 <sup>2</sup>	3.2
Spain . . . . .	0.	12.8	19.0	13.0	10.2	11.3	16.3	17.8	12.9	0.	4.5	8.1	10.3	
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
Other gears . . . . .	43.4	0.	0.	0.	0.	0.	0.	0.	0.	13.1	.0	.1	.1	
–Longline . . . . .	14.3	8.0	5.5	4.5	7.8	9.4	10.6	5.5	19.9	14.4	8.8	20.8	13.6	
China (Taiwan). . . . .	0.	.1	.1	1.1	1.5	2.2	2.7	4.1	10.0	8.2	5.4	14.0	7.7 <sup>3</sup>	15.0
Japan . . . . .	14.3	5.9	4.8	3.3	4.7	5.9	6.5	1.3	1.5	2.1	1.3	1.3	.8	.6
Korea . . . . .	0.	2.0	.6	.1	1.6	1.3	1.5	.1	8.5	4.1	1.9	5.3	5.0	6.0
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	.1	.1	0.	
South Atlantic . . . . .	30.0	26.7	19.8	27.8	34.6	29.8	31.5	41.2	22.2	19.5	20.9	19.3	26.8	
–Surface . . . . .	0.	0.	0.	0.	0.	0.	0.	.1	.1	.1	.2	.0	.1	
–Longline . . . . .	30.0	26.7	19.8	27.8	34.6	29.8	31.5	41.1	22.1	19.4	20.8	19.2	26.8	
China (Taiwan). . . . .	.1	.1	1.7	7.6	13.4	14.7	17.7	25.3	21.7	18.0	16.1	15.4	22.1 <sup>3</sup>	8.6
Japan . . . . .	28.3	21.0	7.7	11.9	6.3	5.9	3.2	2.1	.3	.1	.3	.1	.1	.2
Korea . . . . .	.5	4.7	9.7	7.2	14.4	8.7	10.0	13.5	.0	1.1	4.2	3.4	4.3	1.5
Others . . . . .	1.1	.8	.7	1.2	.4	.5	.5	.2	.1	.2	.2	.3	.2	
Mediterranean. . . . .	.5	.5	.5	.5	.7	.6	.5	.7	.5	.5	.5	.6	.6	
Uncl. regions . . . . .	0.	0.	0.	.0	0.	0.	0.	1.4	4.2	.4	.5	2.1	1.1	
–Surface . . . . .	0.	0.	0.	.0	0.	0.	0.	.1	.0	0.	.0	0.	.1	
–Longline . . . . .	0.	0.	0.	0.	0.	0.	0.	1.3	4.2	.4	.5	2.1	1.1	
Uncl. gears . . . . .	.1	.1	.1	.7	.9	.6	.9	.1	.1	.1	.1	.1	0.	

1 Provisional estimates.

2 Including baitboats.

3 Based on data presented by Taiwan. Breakdown by ICCAT Port Sampling showed North 14,013 MT and South 15,802 MT.

Table 11. Atlantic bigeye catch (1,000 MT)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978 <sup>1</sup>
Total . . . . .	29.2	19.0	12.0	18.2	23.0	27.0	44.6	34.8	42.2	51.9	52.1	40.8	43.1	
Longline . . . . .	28.9	18.7	11.2	16.2	19.8	21.4	36.3	30.9	35.0	35.7	35.6	25.8	28.9	
Argentina . . .	.4	.2	.1	.3	.2	.1	0.	0.	.0	.0	.1	.2	.1	
Brazil . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	.1	.2	.1	.2	.1	
China (Taiwan)	0.	.6	2.2	5.3	7.5	7.6	5.5	5.0	3.8	3.1	4.0	3.3	3.0	2.0
Cuba . . . . .	0.	0.	0.	0.	0.	0.	3.2	2.0	2.6	2.4	1.9	1.3	1.8	
Japan . . . . .	28.5	17.6	8.5	10.3	10.3	9.0	20.3	18.1	22.6	22.7	19.4	9.2	10.0	5.0
Korea . . . . .	0.	.3	.3	.3	1.9	4.7	7.4	5.7	5.8	7.4	10.2	6.7	7.6	13.7
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	.0	0.	0.	4.9	6.3	
Surface . . . . .	.1	.0	.5	1.1	.6	.3	7.8	3.9	7.2	16.1	15.0	13.4	14.2	
—East Atlantic . .	.1	.0	.5	1.1	.6	.3	7.8	3.9	7.2	16.1	15.0	13.4	14.2	
FIS . . . . .	0.	0.	0.	0.	0.	0.	0.	.3	2.5	1.3	1.4	1.1	4.0	
Ghana . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	.0	.3	.7	.3	3.0
Japan . . . . .	.1	.0	.5	1.1	.5	.1	.2	.3	.2	.7	.3	3.6	1.1	.5
Korea . . . . .	0.	0.	0.	0.	0.	0.	0.	.0	0.	1.0	2.2	1.7	.8	
Portugal . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	9.1	4.9	2.1	4.0	
South Africa . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
Spain . . . . .	0.	0.	0.	0.	0.	0.	7.0	3.1	4.4	3.2	5.7	4.2	3.6	4.4
USA . . . . .	0.	0.	0.	.0	.1	.2	.5	.2	.1	.9	.1	.0	.3	
Others . . . . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	.0	0.	.0	
—West Atlantic . .	0.	0.	0.	0.	0.	0.	0.	0.	.0	0.	0.	.0	0.	
—Uncl. region . .	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	
Uncl. gears . . . . .	.1	.3	.3	.9	2.6	5.3	.5	0.	0.	0.	1.5	1.7	0.	

1 Provisional estimates.



Table 12. Annual catch of bigeye tuna (in thousands of tons)\*

	<i>Longline catch</i> <sup>1</sup>	<i>Adjusted surface catch</i>			<i>Adjusted total</i>	<i>Unadjusted surface</i>
		<i>Others</i> <sup>2</sup>	<i>Tema</i> <sup>3</sup>	<i>Total</i>		
1965	28.9	5.5	0.3	5.8	34.7	0.1
1966	18.7	5.2	0.1	5.3	24.0	0.0
1967	11.2	9.3	0.4	9.7	20.9	0.5
1968	16.2	4.4	0.7	5.1	21.3	1.1
1969	19.8	8.9	0.3	9.2	29.0	1.7
1970	21.4	9.0	0.2	9.2	30.6	1.5
1971	36.8	13.3	0.6	13.9	50.7	7.8
1972	31.3	9.9	1.0	10.9	42.2	3.9
1973	35.3	13.8	2.0	15.8	51.1	7.2
1974	36.2	15.4	2.8	18.2	54.4	16.1
1975	35.9	15.6	1.4	17.0	52.9	15.0
1976	35.9	15.6	1.4	17.0	52.9	15.0
1977	26.0	18.3	1.7	20.0	46.0	10.1

\* Both adjusted catch for misreporting and unadjusted catch are shown for the surface fishery.

1 Unadjusted (Table 1).

2 Except Tema-based baitboats (from SCRS/78/31).

3 Adjusted using a factor of 0.22 for the years up to 1975 and 0.15 and 0.28 for 1976 and 1977, respectively, to the combined catch of yellowfin and bigeye.

**Table 13. Estimated catch of bigeye smaller than 3.2 kg. in the eastern tropical Atlantic, 1974-77 (based on SCRS/78/32 with adjusted Tema data by SCRS/78/72).**

	<i>FIS</i>	<i>TEMA</i>	<i>OTHERS</i>	<i>TOTAL</i>
Catch in weight (1,000 MT)				
1974	2.24	2.82	2.1	7.16
1975	3.3	1.41	2.1	6.81
1976	3.4	1.37	2.3	7.07
1977	7.0	1.71	4.0	12.71
Catch in number (million)				
1974	.18	.88	.21	1.27
1975	.45	.67	.36	1.48
1976	.63	.56	.52	1.71
1977	.88	.77	.63	2.28
Number < 3.2 kg. (million)				
1974	.02	.65	.03	0.70
1975	.135	.62	.22	0.975
1976	.24	.53	.25	1.02
1977	.28	.72	.26	1.26
Number < 3.2 kg. (%)				
1974	12.1	73.4	15.7	55.1
1975	30.1	92.9	61.6	65.9
1976	37.8	94.0	47.6	59.6
1977	31.6	93.0	41.7	55.3



**Table 15. Landings (MT) of white marlin (WM), sailfish and spearfish (SF), and blue marlin (BM) in the Atlantic Ocean and Mediterranean Sea, 1968-77 (ICCAT Statistical Bulletin, Vol. 8)**

	<i>WM</i>	<i>SF</i>	<i>BM</i>	<i>TOTAL</i>
1968	2339	2426	3875	8640
1969	2507	1767	4112	8386
1970	2654	2835	5661	11150
1971	2884	1909	4670	9463
1972	2442	1779	3186	7407
1973	2104	1393	2716	6213
1974	2706	1678	3865	8249
1975	1899	1395	2936	6230
1976	2332	750	1225	4307
1977	1148	616	1940	3704

**Table 16. Atlantic small tuna catch (1,000 MT)**

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Blackfin tuna ( <i>T. atlanticus</i> ) . . . . .	.1	.1	.1	.2	.2	.2	.2	.4	.5	.3	.2	.2	.3
Atlantic little tuna ( <i>E. alletteratus</i> ) . . . . .	5.0	8.1	8.9	8.1	9.0	13.6	10.9	8.0	7.4	7.3	.9	.8	2.2
Atlantic bonito ( <i>S. sarda</i> ) . . . . .	31.4	29.2	49.1	31.8	61.5	28.6	21.5	16.3	12.4	17.7	13.0	9.5	10.6
Frigate tuna ( <i>A. thazard</i> ) . . . . .	9.4	7.2	9.3	9.5	11.0	12.6	10.9	13.5	9.7	11.9	9.1	6.4	21.7
King mackerel ( <i>S. cavalla</i> ) . . . . .	10.6	11.4	12.4	12.4	12.4	11.9	11.9	13.0	16.5	16.8	14.8	15.9	14.4
Spotted spanish mackerel ( <i>S. maculatus</i> ) . . . . .	6.3	7.0	6.4	7.9	9.0	10.7	6.0	11.3	14.0	6.6	7.9	9.4	9.0
Others . . . . .	27.9	21.1	28.4	20.8	26.7	27.3	21.0	28.2	23.6	17.5	18.0	10.0	26.7
Total . . . . .	90.8	84.0	114.5	90.8	129.7	104.8	82.2	90.7	84.1	78.1	63.9	52.3	84.8

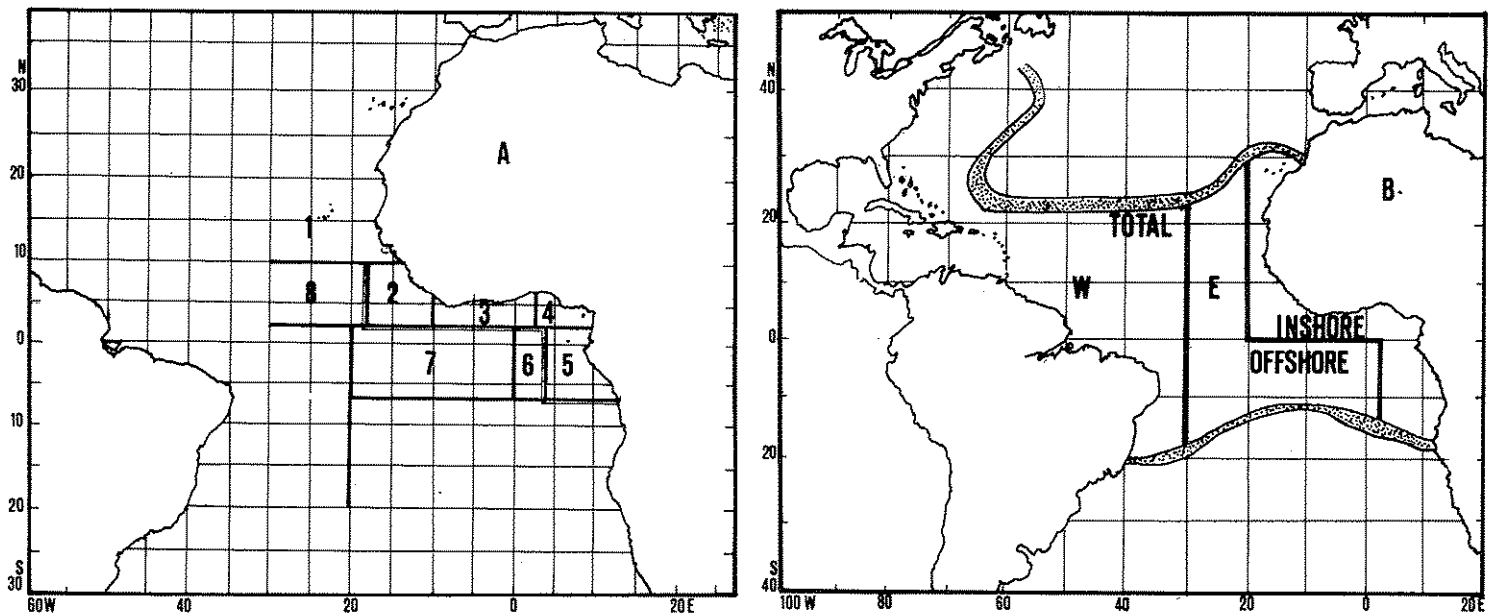


Fig. 1. Limits between offshore and inshore yellowfin fishing areas used in two studies. A) SCRS/78/67; B) SCRS/78/74.

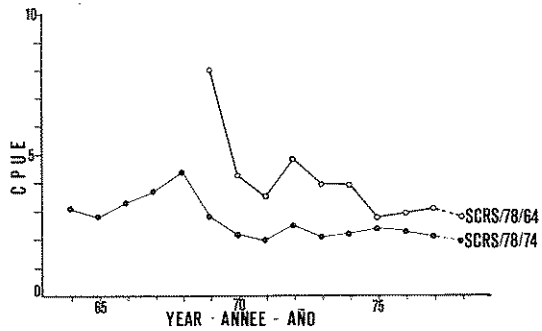


Fig. 2. Annual change of CPUE based on two different estimates.

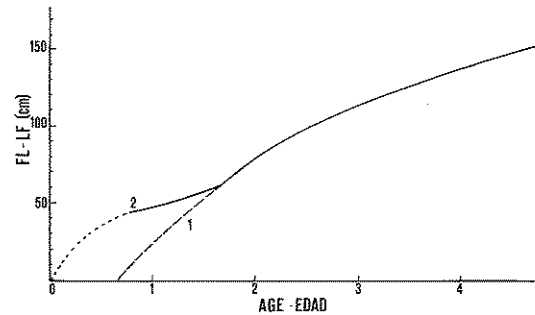


Fig. 3. Possible growth curves for yellowfin of less than 60 cm in size. 1) Extrapolation from LeGuen and Sakagawa; 2) Assuming slow growth.

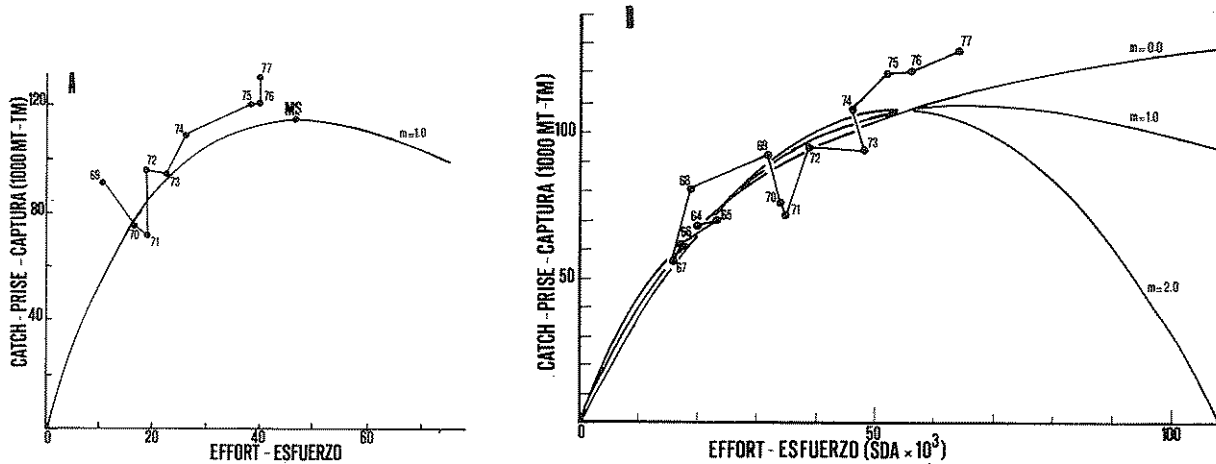


Fig. 4. Equilibrium yield curves for various production models fitted to catch and effort data of the total Atlantic fishery for yellowfin tuna - A) 1969-77 - SCRS/78/67; B) 1964-77 - SCRS/78/74.

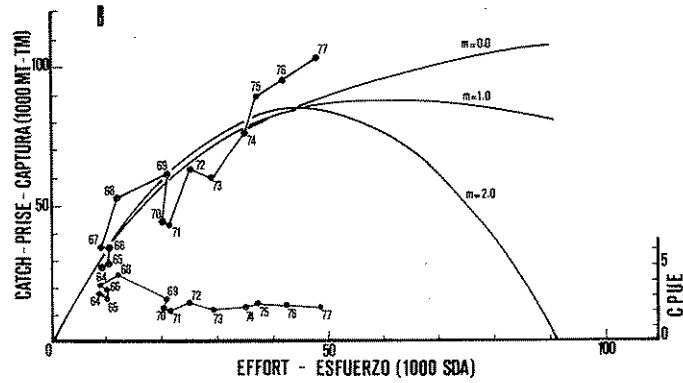
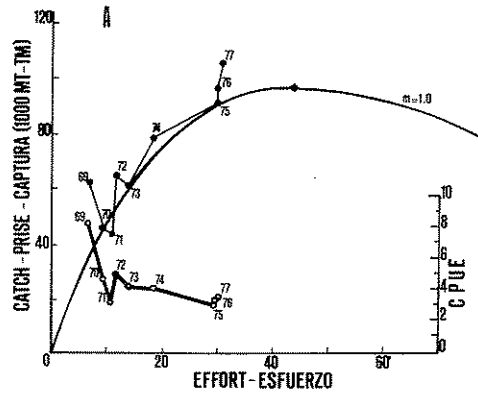


Fig. 5. Relationship between catch and effort and CPUE and effort for the eastern Atlantic yellowfin surface fishery - A) 1969-77 - SCRS/78/67; B) 1964-77 - SCRS/78/74 (Data from large purse seiners fishing offshore areas are included).

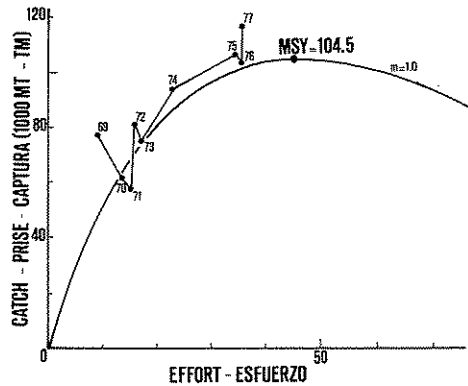


Fig. 6. Production model fitted to total eastern Atlantic fisheries of all gears.

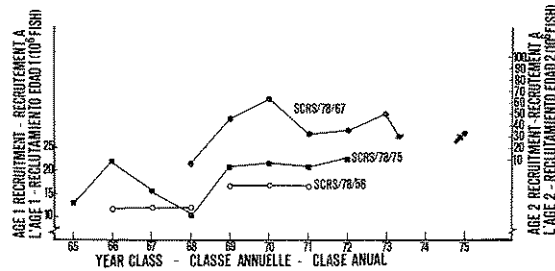


Fig. 7. Estimated yellowfin recruitment to ages 1 and 2 by year of birth.



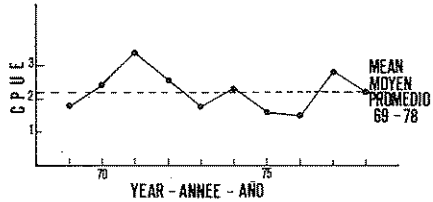


Fig. 8. CPUE trend (standardized in FIS cat. 3 med. PS units) observed in Annobon area, coastal E. Atlantic (SCRS/78/68). 1978 value was estimated 20 % lower than 1977 (SCRS Report).

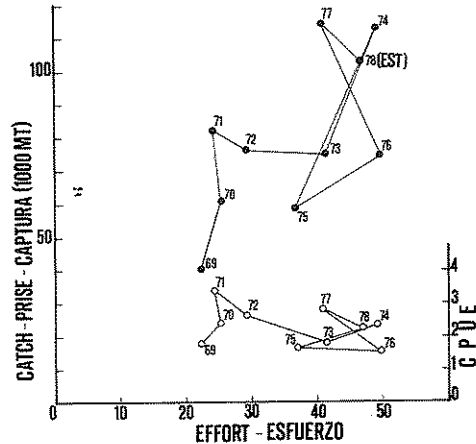


Fig. 9. Relation between catch and effort and effort and CPUE for skipjack, 1969-78 (SCRS/78/68). The CPUE figures are those from Fig. 8.

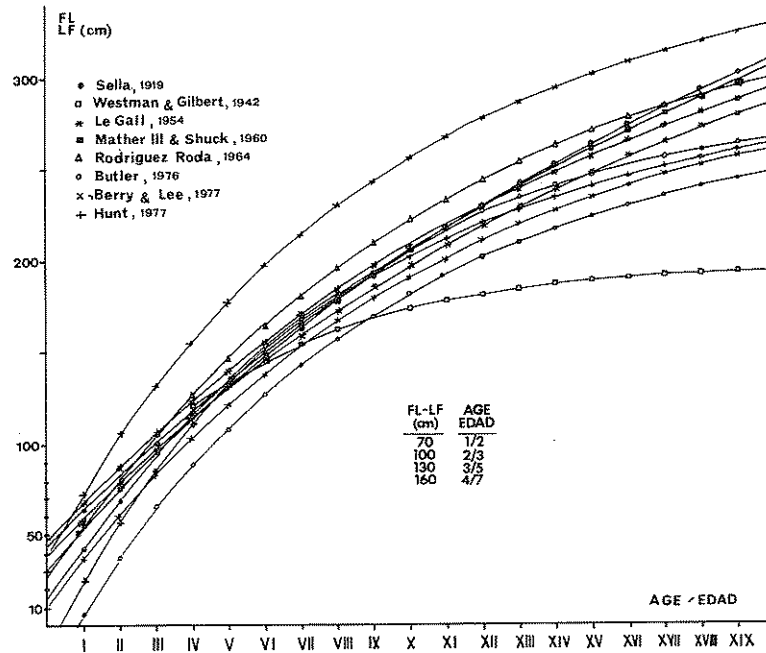


Fig. 10. Curves for absolute growth in length (von Bertalanffy model) for bluefin from 0-20 years old (SCRS/78/49).

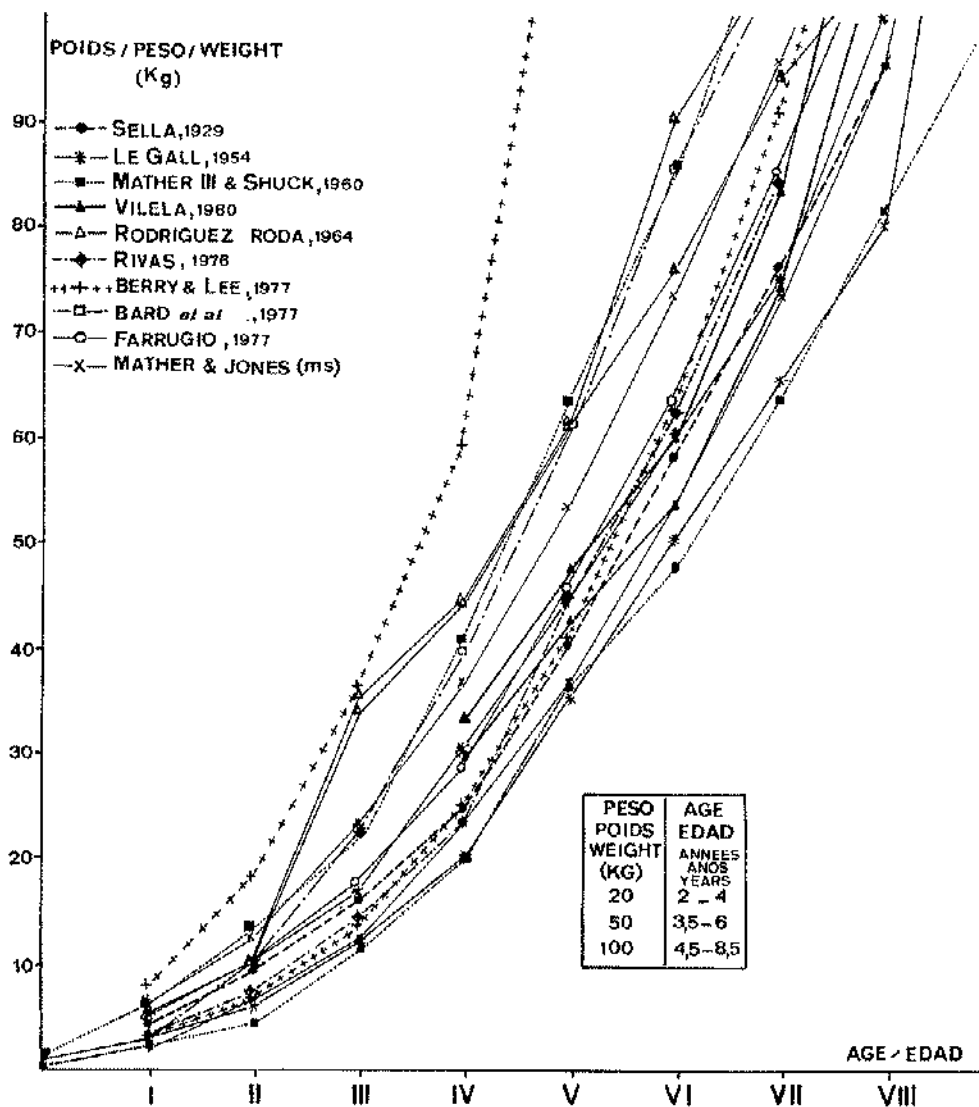


Fig. 11. Curves for absolute growth in weight for bluefin during the first 8 years of life (SCRS/78/49), by various authors.

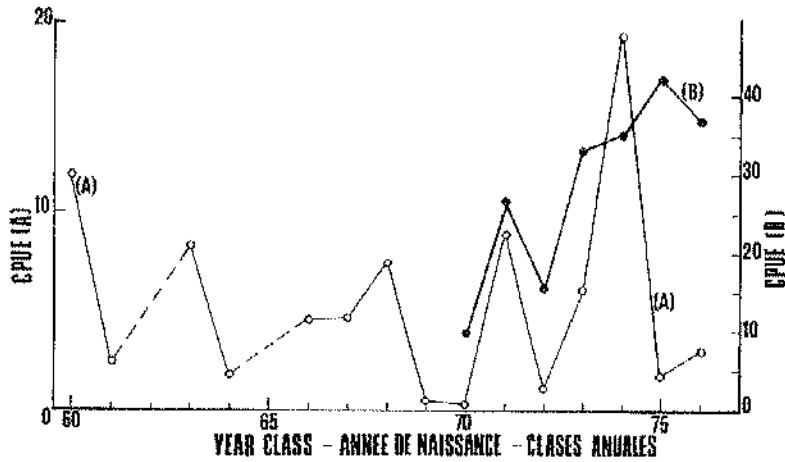


Fig. 12. Recruitment indices for bluefin tuna in the eastern Atlantic - A) CPUE of Moroccan purse seiners - age-class 1; B) CPUE of baitboats in the Bay of Biscay - age-class 2.

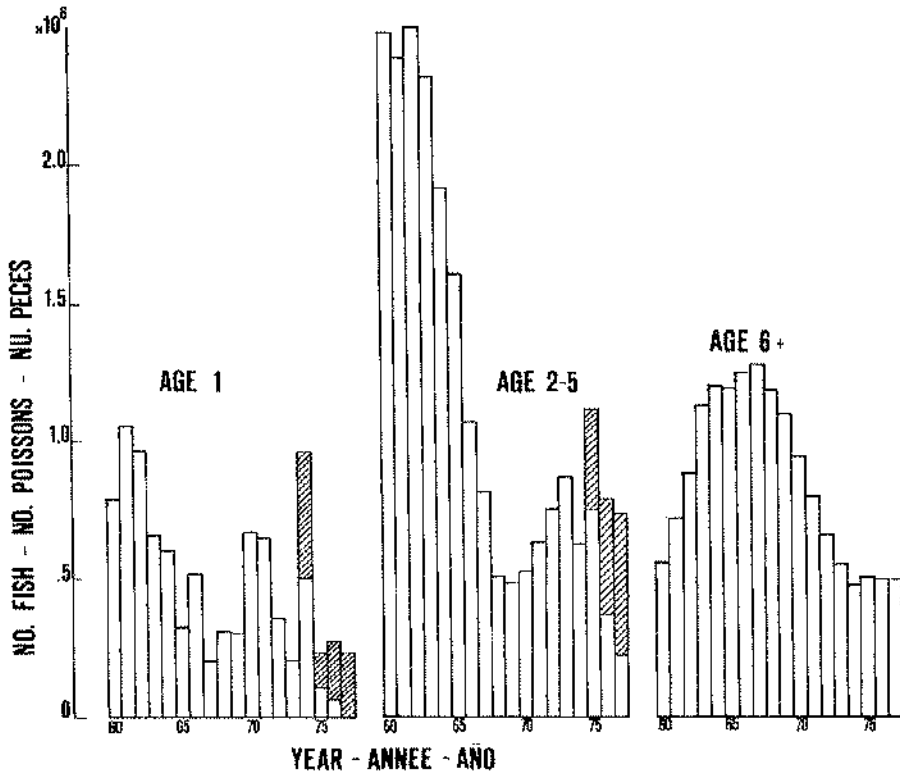


Fig. 13. Western Atlantic bluefin tuna stock size trends.

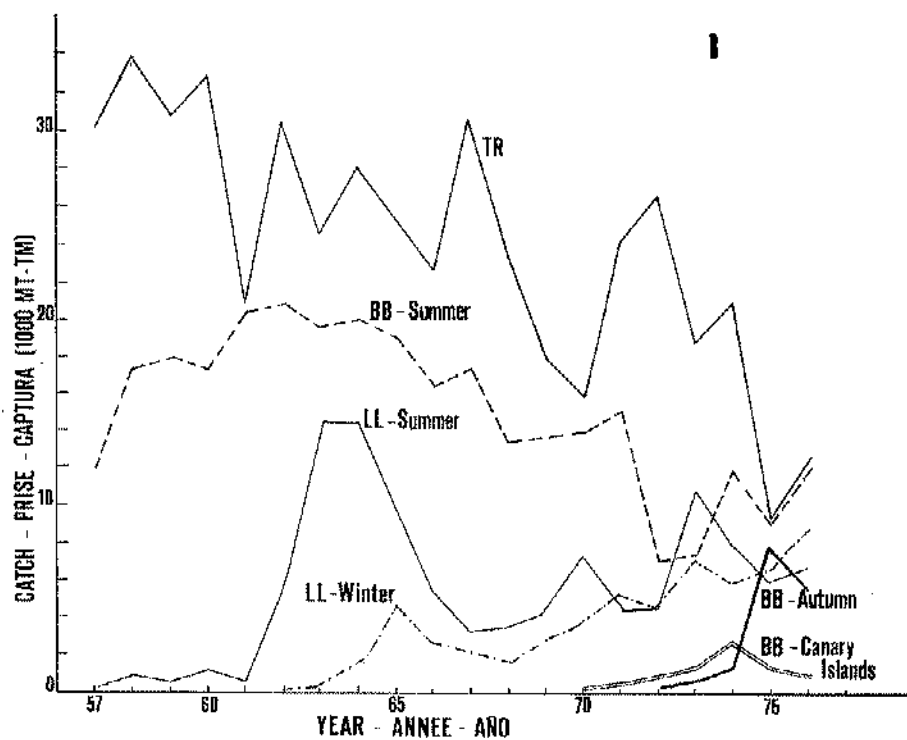
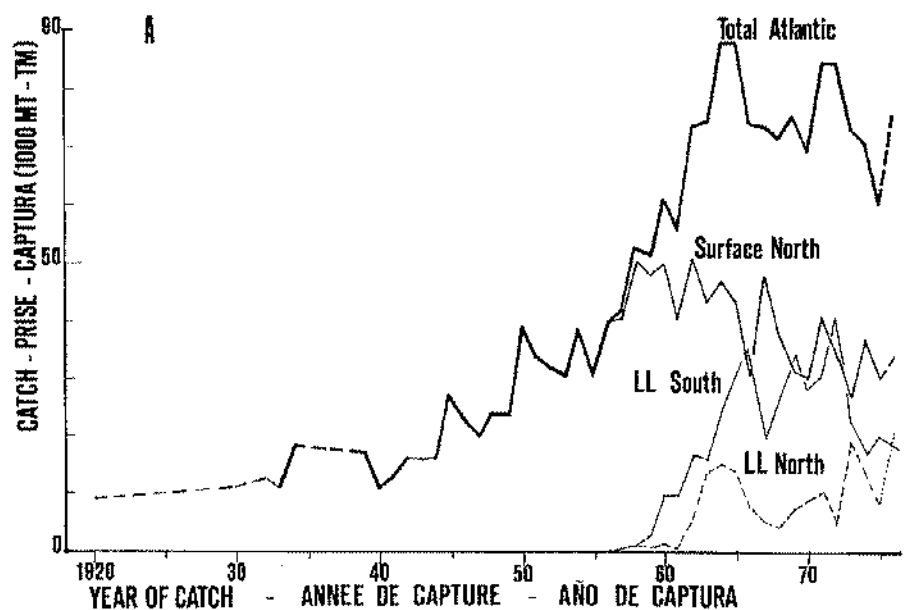


Fig. 14. Catches of Atlantic albacore by stock and principal fishery - A) Surface vs. longline SCRS/78/76; B) by fisheries (SCRS/78/58).

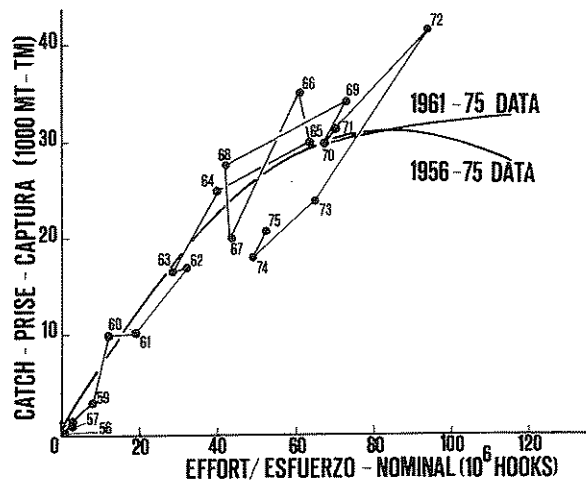


Fig. 15. Production model fitted to South Atlantic albacore catch and effort data for two time series (SCRS/78/77).

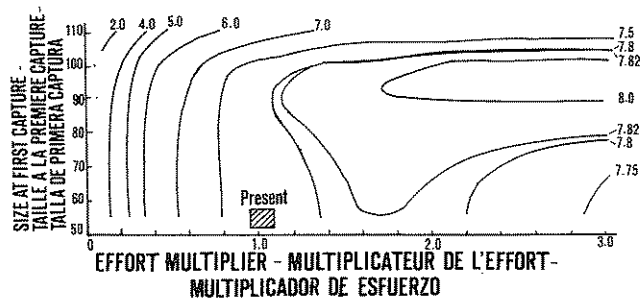


Fig. 16. Isoleths of South Atlantic albacore yield per recruit in kg. (SCRS/78/77),  $M = 0.2$ , MEAN EFFORT at 1973-75 level.

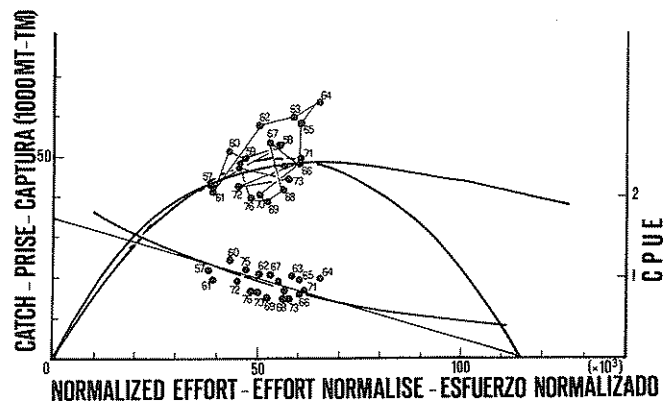


Fig. 17. Production models fitted to North Atlantic albacore catch and effort data (Committee analysis).

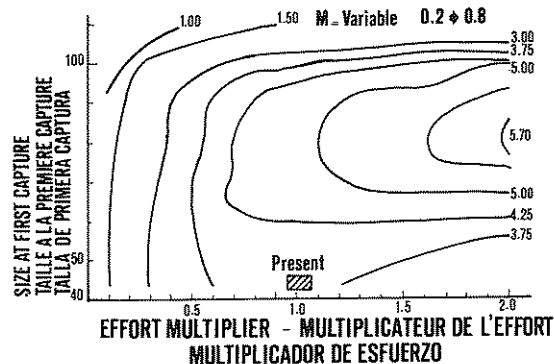


Fig. 18. Isoleths of North Atlantic albacore yield per recruit (at 45 cm) in kg. to the entire fishery under two natural mortality assumptions (SCRS/78/76).

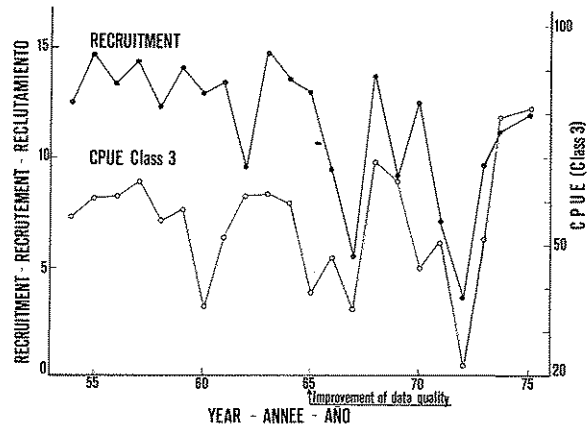


Fig. 19. Recruitment levels in the North Atlantic albacore stock (SCRS/78/63).

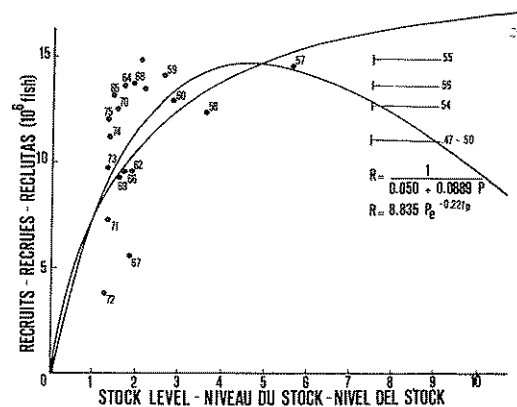


Fig. 20. Indices of North Atlantic albacore spawning stock and recruitment fitted with both the Ricker and Beverton-Holt models (SCRS/78/63).

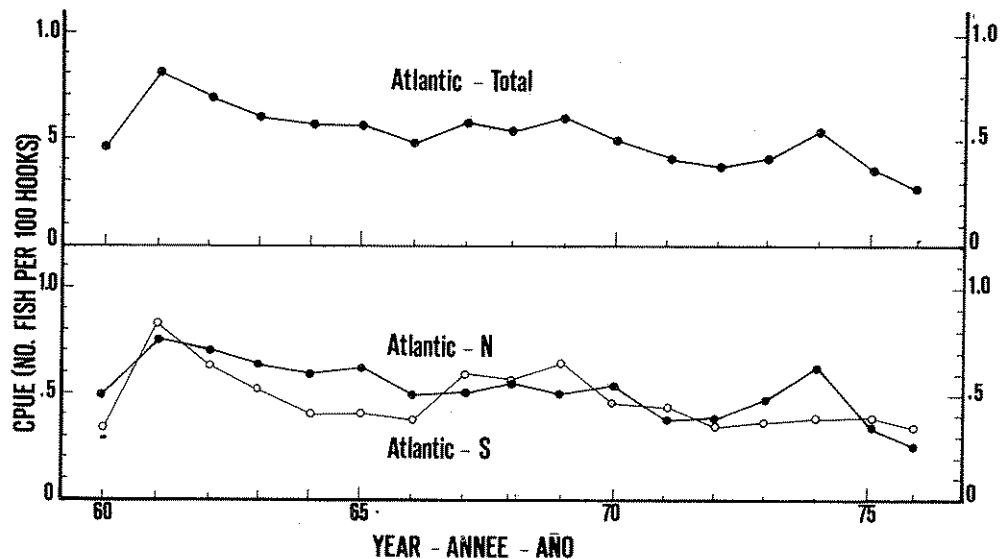


Fig. 21. Annual change in hook rate of bigeye tuna in the whole Atlantic (upper panel) and N. and S. Atlantic (lower panel), based on data of Japanese and Taiwanese longline fisheries combined, 1960-1976.

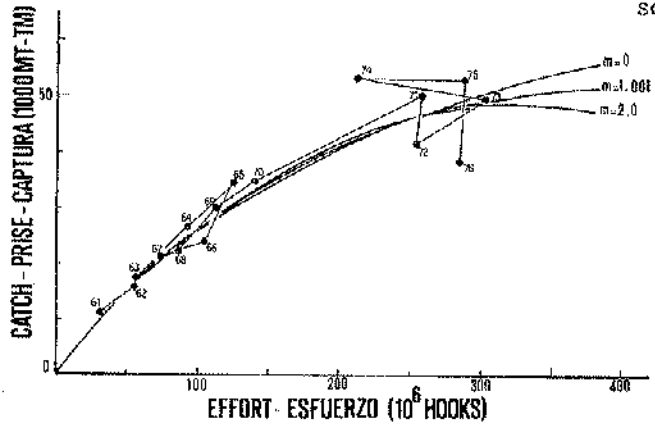


Fig. 22. Yield curves obtained from the production model analysis for bigeye tuna in the whole Atlantic Ocean, 1961-76.

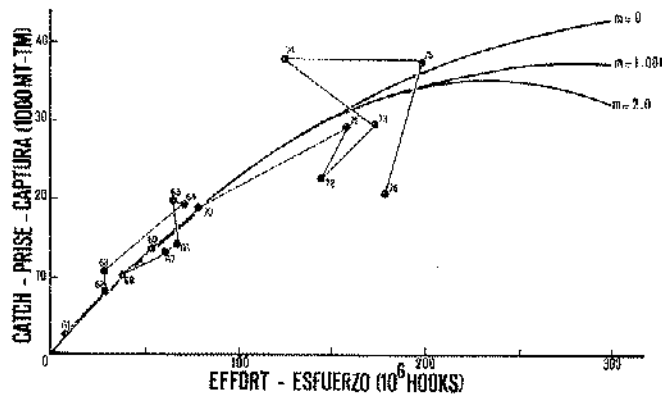


Fig. 23. Yield curves obtained from the production model analysis for bigeye in the North Atlantic, 1961-76.

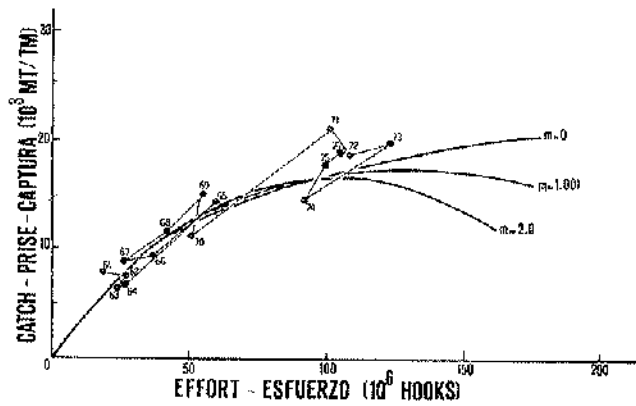


Fig. 24. Yield curves obtained from the production model analysis for bigeye in the South Atlantic, 1961-76.

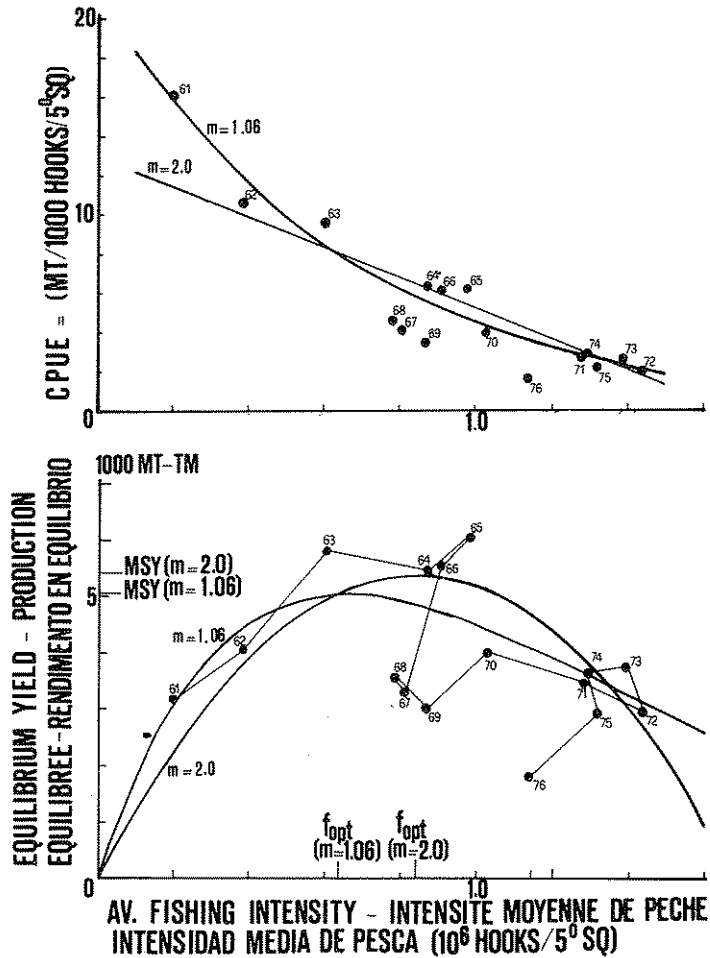


Fig. 25. Equilibrium yield curves for blue marlin assuming five significant year-classes.

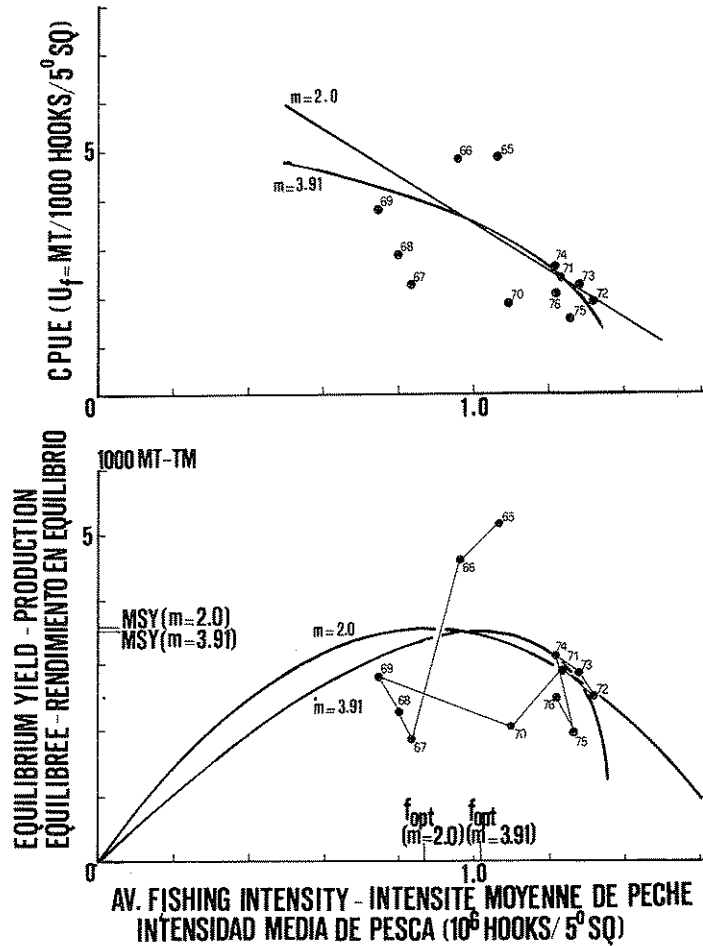


Fig. 26. Equilibrium yield curves for white marlin assuming four significant year-classes.



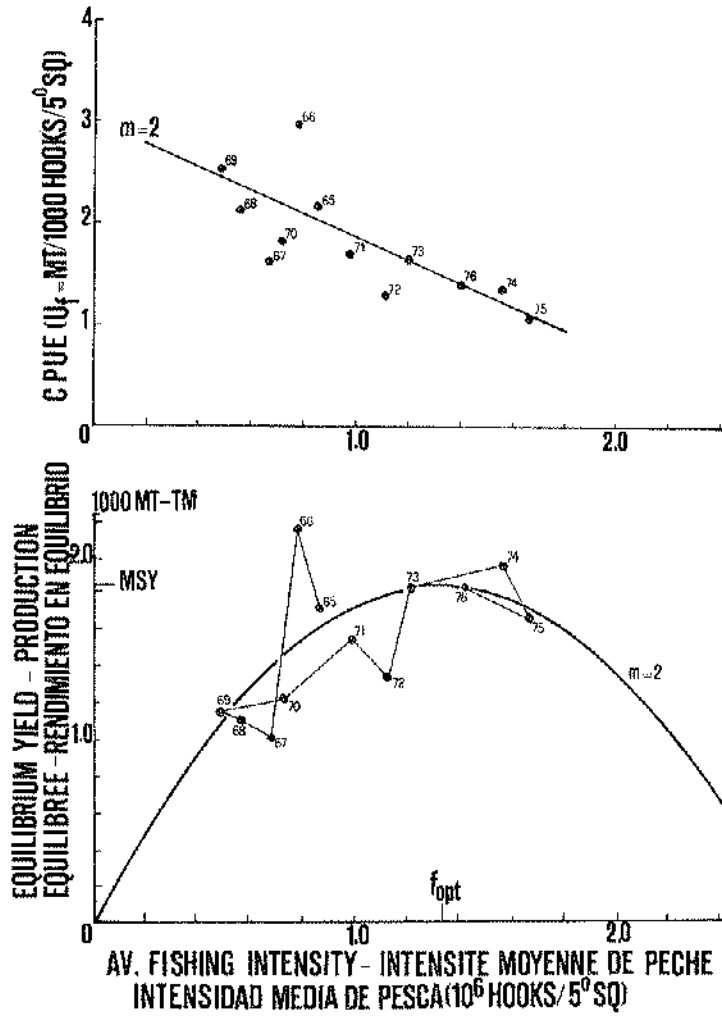


Fig. 27. Equilibrium yield curves for white marlin in the North Atlantic assuming four significant year-classes.

**AGENDA FOR THE STANDING COMMITTEE ON  
RESEARCH AND STATISTICS (SCRS)**

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Admission of observers
4. Admission of scientific papers
5. Report of Officers Meeting
6. Review of national fisheries and research programs
7. Review of conditions of stocks, with brief presentation of major papers on this subject
  - a) Yellowfin
  - b) Skipjack
  - c) Bluefin
  - d) Albacore
  - e) Bigeye
  - f) Billfishes
  - g) Southern bluefin and small tunas, etc.
8. Report of the Working Group on Bigeye Size Regulation
9. Review of progress made on assignments for bigeye
10. New area of research such as economic study by SCRS
11. Report of the Sub-Committee on Statistics
12. Review of Atlantic tuna statistics and data management system
13. Report of the Sub-Committee on Skipjack
14. Review of the Skipjack Year Program
15. Review of SCRS research programs and consideration of future plans
16. Assignments and responsibility of each scientist
17. Cooperation with other organizations
18. Report of the Working Group on Publication Policy
19. Scientific publications
20. Progress made by the Secretariat regarding assignments given to it
21. Other matters
22. Recommendations
23. Date and place of next meeting
24. Adoption of Report
25. Adjournment

*Appendix 2 to Annex 6*

**REPORT OF THE AD HOC WORKING GROUP ON THE  
ADMISSION OF SCRS DOCUMENTS**

The Ad Hoc Working Group on the Admission of SCRS Documents consisted of the Messrs. O. Cendrero (Spain), J.Y. Le Gall (France), H. Rosa (Brazil) and P.M. Miyake (Secretariat). The Group met to discuss the "late arrival" documents.

First, the Group reviewed the current document policy and thought that the policy should be followed as criteria as closely as possible.

The Group recognized that there were four different categories of documents which did not meet the qualifications set out by the policy:

- i) Titles and summaries not submitted a month in advance, but 60 copies were delivered by the deadline (48 hours before the opening of the SCRS meeting) – documents SCRS/78/94, 95, 100, 101, 102 and 103.
- ii) A copy of the document was delivered by the deadline but 60 copies were not sent – documents SCRS/78/68 and 69.
- iii) Titles and summaries were submitted, but the 60 copies were delivered only 24 hours before the opening of the meeting – documents SCRS/78/18, 29, 51, 87 and 98.
- iv) No titles nor summaries were received in advance and 60 copies were delivered on the opening day of the meeting – 5 documents from Cuba.

The Group recognized that the rapporteurs have had some difficulties in reviewing documents in categories iii) and iv). The Secretariat made a few copies available only for the rapporteurs for the documents in category ii).

The Group recommended the following:

- a) Documents in category i) (no preliminary notice but 60 copies were received on time) should be accepted.
- b) Documents in category ii) (60 copies were not delivered) should be accepted and included in the Collective Volume, if appropriate, but the Secretariat has no obligation to make 60 copies for general distribution.
- c) Documents in category iii) (60 copies received 24 hours prior) should be accepted but the rapporteurs are not obliged to use them.
- d) Documents in category iv) (no preliminary notice, but 60 copies delivered on opening day) should not be accepted but the delegation presenting the documents is free to distribute them. These documents should not be included in the next issue of the Collective Volume.

The Group noted that the policy was in general well-observed and facilitated the scientists' work. The Group recommended that the policy be maintained next year and it should be more strictly observed by all the scientists.

It was also recommended that, if possible, 60 copies of the National Reports should also be received, so that they can be distributed to the meeting attendants.

*Appendix 3 to Annex 6*

**LIST OF DOCUMENTS**

- |           |  |
|-----------|--|
| SCRS/78/1 | Tentative Agenda of the SCRS / Ordre du jour provisoire du SCRS / Orden del día provisional del SCRS.  |
| 2         | Annotated Tentative Agenda of the SCRS / Observations à l'ordre du jour provisoire du SCRS / Observaciones al orden del día provisional del SCRS.  |
| 3         | Tentative Time Schedule of the SCRS / Horaire provisoire du SCRS / Horario provisional del SCRS.   |
| 4         | Tentative Agenda of the Sub-Committee on Statistics / Ordre du jour provisoire du Sous-Comité des Statistiques / Orden del día provisional del Subcomité de Estadísticas.  |
| 5         | Tentative Agenda of the Working Group on Bigeye Size Regulation / Ordre du jour provisoire du Groupe de Travail sur la Réglementation de Taille du Thon Obèse / Orden del día provisional del Grupo de Trabajo sobre Regulación de Talla del Patudo.   |
| 6         | Report of the SCRS Officers Meeting, July, 1978 / Rapport de la réunion de responsables SCRS, juillet 1978 / Informe de la reunión de cargos oficiales del SCRS, julio 1978.   |
| 7         | Report of the Billfish Stock Assessment Workshop, Atlantic session, Honolulu, December, 1977.  |
| 8         | Summary of the ICES Symposium on Stock Management of Pelagic Fish, Aberdeen, July, 1978 / Bilan résumé du symposium du CIEM sur la gestion des stocks de poissons pélagiques, Aberdeen, juillet 1978 / Resumen del simposio del CIEM sobre la ordenación de los stocks de las especies pelágicas, Aberdeen, julio 1978 – A. Fonteneau. |
| 9         | Statistical Bulletin, Vol. 8 / Bulletin Statistique Vol. 8 / Boletín Estadístico Vol. 8 (COM/78/9).  |
| 10        | Report of the 1977 Meeting of the SCRS / Rapport de la réunion de 1977 du SCRS / Informe de la reunión de 1977 del SCRS (COM/78/10).   |
| 11        | 1978 SCRS Report / Rapport SCRS 1978 / Informe SCRS 1978 (COM/78/11).  |
| 12        | Secretariat Report on Statistics and Coordination of Research /  |

- Rapport du Secrétariat sur les statistiques et la coordination de la recherche / Informe de la Secretaría sobre estadísticas y coordinación de la investigación (COM/78/12).
- 13 Field Manual for Statistics and Sampling of Atlantic Tunas and Tuna-like Fishes (second edition) (COM/78/13).
- 14 The Report of the Sub-Committee on Skipjack, Madrid, July, 1978 / Rapport du Sous-Comité Listao, Madrid, juillet 1978 / Informe del Subcomité Listado, Madrid, julio 1978 (COM/78/14).
- 15 Bluefin tuna tagging off the Atlantic coast of Morocco in 1978 - J. C. Brêthes, J. M. Mason, Jr. (COM/78/15).
- 16 Progress Report on the ICCAT Data Base, 1978 -- P. M. Miyake (COM/78/16).
- 17 A Comparative Study of the Mini-computer and the Conventional Data Processing Systems -- V. Nordström, P. M. Miyake (Com/78/17).
- 18\* Yellowfin and Bigeye Catch Compositions for the Entire Atlantic Fisheries -- P. M. Miyake, V. Nordström.
- 19 Collective Volume of Scientific Papers, Vol. VII-1 / Recueil de Documents Scientifiques Vol. VII-1 / Colección de Documentos Científicos Vol. VII-1.
- 20 Collective Volume of Scientific Papers, Vol. VII-2 / Recueil de Documents Scientifiques Vol. VII-2 / Colección de Documentos Científicos Vol. VII-2.
- 21 Data Record, Vol. 11 / Recueil de Données Vol. 11 / Colección de Datos Vol. 11.
- 22 Document withdrawn.
- 23 Statistical Series-4 / Séries Statistiques-4 / Series Estadísticas-4.
- 24 Statistical Series-5 / Séries Statistiques-5 / Series Estadísticas-5.
- 25 Statistical Series-6 / Séries Statistiques-6 / Series Estadísticas-6
- 26 Examples of Catalogues of ICCAT Data Bases.
- 27 New ICCAT Sampling Areas
- 28 Compendium of Descriptions of Data Bases Created by Various Laboratories.
- 29\* Sample Formats for the New Data Record Series -- P. M. Miyake
- 30 Estimation des prises et des structures de taille des patudos capturés par la flottille FIS -- J. Marcille, N. Armada.

\*Late arrival.

- 31 Estimation du stock de patudo atlantique à partir des modèles de production — J. Marcille.
- 32 Les prises de jeunes albacores et patudos dans l'Atlantique Oriental Tropical; conséquences en matière d'aménagement — J. Marcille, N. Armada.
- 33 Niveau d'exploitation du patudo atlantique (années 1969 à 1976) — J. Marcille.
- 34 Nouvelles remarques sur la structure du stock de germon (*Thunnus alalunga*) dans le nord-est atlantique — H. Aloncle, F. Delaporte.
- 35 Données numériques sur les petits thons rouges (*Thunnus thynnus*) capturés sur le plateau continental marocain — H. Aloncle.
- 36 Occurrences of the scombrid larvae in South Brazilian waters — Y. Matsuura.
- 37 Aspects of the growth of Atlantic bluefin tuna determined from mark-recapture data — M. L. Parrack, P. L. Phares.
- 38 Length and weight data for western Atlantic swordfish, *Xiphias gladius* — G. L. Beardsley, R. J. Conser.
- 39 Status of stocks of blue marlin, *Makaira nigricans*, and white marlin, *Tetrapturus albidus*, in the Atlantic Ocean — R. J. Conser, G. L. Beardsley.
- 40 An analysis of Atlantic bluefin tuna catches, 1960-1976 — M. L. Parrack, S. L. Brunenmeister, S. Nichols.
- 41 A review of the Southeast Fisheries Center biological and statistical research on the structure and the status of Atlantic bluefin tuna stocks — J. C. Tyler, R. E. Baglin, F. H. Berry, M. I. Farber, L. R. Rivas.
- 42 Proposed terminology for size groups of the North Atlantic bluefin tuna (*Thunnus thynnus*) — L. R. Rivas, F. J. Mather.
- 43 Analysis on the Atlantic bluefin tuna stock caught by longline fishery, based on the data up to 1978 — C. Shingu, K. Hisada.
- 44 The bigeye size regulation issue — E. A. Kwei, M. A. Mensah
- 45 Ghana country report, tuna fishery, 1977.
- 46 Mercado de atunes, *Thunnus thynnus* y *Thunnus alalunga*, en el Golfo de Vizcaya durante el verano de 1978 — J. L. Cort, J. C. Rey.
- 47 Sobre la migración del atún rojo, *Thunnus thynnus*, del Golfo de Vizcaya, según los distintos grupos de edad — J. L. Cort.
- 48 Résultats de la campagne de pêche au thon rouge en Méditerranée française en 1977; premières observations pour 1978 — H. Farrugio.
- 49 Revue comparative des études sur la croissance du thon rouge *Thunnus thynnus* (Linné, 1758) — H. Farrugio.

- 50 Détermination de l'âge de listaos, *Katsuwonus pelamis* L., débarqués à Dakar; note préliminaire – P. Cayré.
- 51\* Estudio comparativo sobre la biología y captura del pez espada, *Xiphias gladius* L. (1758), obtenidos por las flotas española y brasileña – A. F. de Amorim, C. A. Arfelli, A. G. Garcés, J. C. Rey.
- 52 Etude de l'effet sur les captures de germon nord-atlantique d'un changement de stratégie d'exploitation – F. X. Bard.
- 53 Commentaires sur le recrutement et l'état d'exploitation (*Thunnus thynnus*) en Atlantique Est – F. X. Bard.
- 54 Japanese tuna fishery and research in the Atlantic, 1977-1978 – S. Kume.
- 55 Overall fishing intensity, catch, catch by size and spawning indices of yellowfin tuna in the Atlantic tuna longline fishery, 1956-1976 – M. Honma.
- 56 Yield of Atlantic yellowfin tuna under different hypotheses on the stock structure – Z. Suzuki.
- 57 Recent status of the southern bluefin tuna stock – K. Hisada, C. Shingu, T. Yonemori.
- 58 Estimation of overall fishing intensity of Atlantic longline albacore, 1956-1976 – T. Shiohama.
- 59 Age composition of the bigeye tuna caught by Atlantic longline fishery, 1976 – S. Kume.
- 60 Overall fishing intensity of Atlantic longline fishery for bigeye tuna, 1956-1976 – S. Kume.
- 61 Indices de abundancia de la CPUE para los diferentes grupos de edad del atún rojo, *Thunnus thynnus*, del Atlántico Este – J. L. Cort.
- 62 Campaña atunera de la flota canaria en 1977 y resultados preliminares durante el 1<sup>er</sup> semestre de 1978 – Al. Santos Guerra, S. O. Torres Nuñez.
- 63 Commentaires sur l'état du stock de germon (*Thunnus alalunga*) Nord Atlantique en 1978 – F. X. Bard, A. González-Garcés.
- 64 Modelo de producción del stock nor-atlántico del atún blanco (*Thunnus alalunga*) – A. Garcés, T. Shiohama.
- 65 Analyse des prises par unité d'effort (P.U.E.) du yellowfin de la pêche palangrière Atlantique. Relations avec les P.U.E. de pêche de surface – E. Yanez R.

- 66 Document withdrawn.
- 67 Etude de l'état des stocks d'albacores (*Thunnus albacares*) au 31 Décembre 1977 – A. Fonteneau, J. Marcille.
- 68\*\* Etat des stocks de listao (*Katsuwonus pelamis*) au 31 Décembre 1977 – R. Pianet.
- 69\*\* Prises de listao des flottilles palangrières – R. Pianet.
- 70 Analyse de l'effort de pêche des senneurs FIS – A. Fonteneau.
- 71 Recherches sur l'hétérogénéité du stock du germon (*T. alalunga*) du N.E. Atlantique par électrophorèse – S. B. Hue.
- 72 Adjusted catches of yellowfin and bigeye tunas for 1976 Atlantic fishery – G. T. Sakagawa, A. L. Coan.
- 73 Effects of Atlantic yellowfin tuna (*Thunnus albacares*) stock structure hypotheses on production model analysis – R. G. Rinaldo, A. L. Coan.
- 74 A production model analysis of yellowfin tuna (*Thunnus albacares*) stocks in the Atlantic Ocean, 1964-77 – A. L. Coan, W. W. Fox.
- 75 Changes in yield-per-recruit of yellowfin tuna (*Thunnus albacares*) under the ICCAT minimum size regulation – N. W. Bartoo, A. L. Coan.
- 76 The status of the North Atlantic albacore (*Thunnus alalunga*) stock – N. W. Bartoo.
- 77 An examination of the harvest status of South Atlantic albacore (*Thunnus alalunga*) – N. W. Bartoo.
- 78 Guinea current upwelling – A. Bakun.
- 79 A review of the yellowfin-skipjack tuna fishery of the Atlantic Ocean and American participation, 1956-75 – G. T. Sakagawa, A. L. Coan, T. C. Murphy.
- 80 Canadian National Report, 1977-78.
- 81 An update of Canadian large pelagic tagging.
- 82\*\*\* Preliminary analysis of catch and effort data for the Canadian Gulf of St. Lawrence rod and reel fishery for bluefin tuna.
- 83 A report on the progress of research on impounded bluefin tuna in St. Margaret's Bay, Nova Scotia.
- 84\*\*\* Behaviour and physiological studies of impounded bluefin tuna by ultrasonic telemetry.
- 85 The application of radioimmunoassay to sex identification in bluefin tuna.

\*\* 60 copies not accompanied.

\*\*\*Not received.



- 86 Estimation de l'abondance d'une classe d'âge: Utilisation des CPUE de plusieurs engins, en différentes zones et saisons -- A. Laurec, A. Fonteneau.
- 87\*\* Nuevos datos sobre la pesquería española de pez espada, *Xiphias gladius*, biología y morfometría -- J. C. Rey, A. González-Garcés.
- 88 Sur les premières récupérations de thons rouges marqués en juillet 1977 au large du Maroc -- J. C. Brêthes.
- 89 Production model analysis on albacore stock in the South Atlantic, 1956-76 -- T. Shiohama.
- 90 Etat de la pêcherie franco-espagnole de thon rouge (*Thunnus thynnus*) du Golfe de Gascogne (1972-78) -- F. X. Bard, J. L. Cort.
- 91 Report of Working Group on biology, fisheries and mariculture of bluefin tuna (*Thunnus thynnus*) in Mediterranean Sea / Rapport du Groupe de Travail sur la biologie, la pêche et l'aquaculture du thon rouge (*Thunnus thynnus*) en Mer Méditerranée -- F. X. Bard, J. Y. Le Gall.
- 92 Essais d'estimation d'une prise par unité d'effort pour la pêcherie de surface de thon rouge à Casablanca (Maroc) -- J. C. Brêthes.
- 93\* Korean fisheries and research activities on tunas and tuna-like fishes in the Atlantic Ocean in 1977.
- 94 A note of some aspects in hook rate of Korean Atlantic tuna longline fishery for 1975-77 -- J. U. Lee, B. Y. Kim, J. S. Hue.
- 95 Comentarios sobre las actividades de la flota FIS y los cerqueros españoles en el Atlántico Este durante 1976-77 -- Al. Santos Guerra.
- 96 Informe nacional de España 1977-78 -- A. González Garcés.
- 97\* Informe nacional. Pesquerías cubanas de túnidos en el Atlántico durante el año 1977 -- Delegación de Cuba.
- 98\*\* Campaña piloto de marcado de túnidos en la almadraba "Aguas de Ceuta". Octubre 1978 -- J. C. Rey, J. L. Cort.
- 99\* Rapport de recherches 1977. France -- H. Aloncle.
- 100 Status of the white and blue marlins caught by the longline fisheries in the North Atlantic Ocean, 1956-76 -- S. Kikawa, M. Honma.
- 101 Distribution and apparent relative abundance of skipjack tuna by the Japanese surface fisheries in the Gulf of Guinea -- S. Kikawa, N. Higashi.
- 102 An analysis on the catch of Atlantic Japanese pole-and-line fishery in 1977 -- S. Kume.
- 103 A note on the present status of the Atlantic bigeye tuna -- S. Kume.

\*Late arrival.

\*\*60 copies not accompanied.

- 104 Review of United States fisheries and research activities on tunas and tuna-like fishes of the Atlantic Ocean for 1977-78- SWFC/SEFC.
- 105\* National Report of China (Taiwan), 1977 -- Tuna Research Group.
- 106 Report on research and fisheries of the tuna resources in Brazil -- J.A. Negreiros A.

\*Late arrival.

*Appendix 4 to Annex 6*

**REPORT OF THE WORKING GROUP ON PUBLICATION POLICY**

1. The Working Group, comprised of the Messrs. Cendrero (Spain), Letaconnoux (France) and Barrett (U.S.A.) met on November 9, 1978.

2. After prior discussion, the Group considered that the quality of the Collective Volume should be improved in both its printing and its presentation as well as in the quality of the published works.

3. Taking into account that the number of documents presented to the SCRS increases each year, which complicates and increases the cost of publication of the Collective Volume, the Group suggests that this series be replaced by a publication that would include only those documents which the Working Group, together with the species rapporteurs, will select each year after a prior meeting held to study the documents. All the documents would be presented with a sufficient number of copies or would be reproduced by the Secretariat, in order to distribute them to all the attendants at the annual SCRS meeting and to be able to keep a stock of them available for other interested scientists. The Secretariat would determine the most convenient and least costly method which should be adopted for this new publication.

4. In order to facilitate reproduction and printing of the documents, an instruction guide for the presentation of originals (format, margins, figures, tables, typing) will be prepared and distributed to the national correspondents. The documents that do not comply with the instructions and that have been selected for publication will be returned to their authors to be redone according to the instructions. The Working Group will determine a deadline date for the return of the corrected originals. The documents not received by the Secretariat by the deadline date will not be included in the publication.

5. The following criteria will be observed for selection of works to be published:

a) Documents which provide new data concerning tuna population dynamics and which allow for the improvement of stock evaluation and management by mathematical models will have priority.

b) Documents concerning evaluation by direct methods (acoustic, aerial survey) will also be included in the publication.

- c) National Reports will continue to be published in the Biennial Report.
- d) Documents concerning species biology, tagging, behavior, etc. will not be published unless they provide data which increase knowledge on the status (for example, evaluations on spawners through ichthyoplankton).
- e) Basic data of published works will not be included in the series for economical reasons.

6. The documents will only be published in their original language. Translation into the other official languages of the Commission will be done only for the summaries and possibly for the titles of the tables and figures.

7. These proposed criteria should be approved by the SCRS, and before their final adoption they will be discussed at an *ad hoc* meeting of the Working Group, species rapporteurs and SCRS Officers. Until such time, the present publication policy will remain in effect.

*Appendix 5 to Annex 6*

## REPORT OF THE SUB-COMMITTEE ON STATISTICS

### 1. Opening of the meeting

The meeting was opened by the Convener, Mr. S. Kume (Japan). He considered the Atlantic as having the best tuna statistics in the world according to the effort of all scientists but noted that there are still some problems to be solved in the future.

### 2. Adoption of Agenda and arrangements for the meeting

The Agenda (Addendum 1) was adopted without change and Dr. P. M. Miyake (Secretariat) was appointed Rapporteur.

### 3. Examination of progress made by national offices (Tables 1, 2, 3 and 4)

*Angola:* Catch and size frequencies were reported for 1977 and for the early half of 1978. In particular, it was noted that Task II data were reported for 1978 for the first time.

*Brazil:* Logbook abstracts (Task II) were provided by Brazilian scientists not only for Brazilian longliners but for the foreign flag boats based in Brazilian ports.

*Canada:* Data for all Tasks were collected routinely.

*Cuba:* Cuba provided all Task I and II catch and effort statistics for 1977 for its major fishery, i.e. longline fishery.

*France:* All the Task I and II data were collected routinely and provided to ICCAT on a timely basis. Some improvement was observed for the Mediterranean fisheries but more improvement is expected for the future.

*Ghana:* Landings and biological data are being obtained in collaboration with the fishermen from all Ghanaian flag boats as well as from foreign flag boats based at Tema. Also Ghanaian scientists participated in some cruises and studied the real compositions of yellowfin and bigeye. Task II catch and effort data are also being collected from the Ghanaian flag fleet.

*Ivory Coast:* All Tasks are being completed. This year bigeye catches by the FIS fleet which were not reported in previous years were estimated and all the size data concerning this species were also assembled and made available. Considerable improvement in statistics was observed.

*Italy:* Catch, catch and effort (Task II) and size data on Mediterranean bluefin tuna were presented for 1977.

*Japan:* Catch and effort (Task II) and biological data were provided for all fisheries, including the longline fishery. Because longline trips extend over a long period, the 1977 data are still preliminary, but the reporting is now much more up to date.

*Korea:* Korea reported Task II catch and effort and biological data for the longline and baitboat fisheries. It was noted that the logbook coverage has improved very much in 1977. Also, similar data were presented for early 1978.

*Morocco:* Task I and Task II catch data were reported for the local fisheries, but the scientists still had some difficulties with biological sampling. The tropical purse seine fishery is now covered together with FIS statistics.

*Senegal:* Tasks were satisfactorily fulfilled for all fleets based at Dakar. Under a special contract with the I.E.O. the size sampling as well as logbook abstracts were conducted on the Spanish tropical fleet unloading at Dakar.

*Spain:* For the first time, all catch and effort and biological data accumulated at the I.E.O. for the Spanish tropical fleet were made available to the Secretariat in raw data form. These data cover the years 1973-1977. Also, data collection from fisheries based in the Canary Islands and on the Peninsula had been improved.

*South Africa:* All the Tasks were completed for all South African fisheries.

*United States:* All the Tasks had been satisfactorily completed for the U.S. tropical fleet. Some progress was observed in the collection of Task II catch and effort and biological data from the bluefin fisheries. Also, all the historical data collected on the size of billfishes were made available. Sampling from transshipments to Puerto Rico continued in 1978.

*U.S.S.R.:* The catch and effort data for 1976 and 1977 (as well as for early 1978) were reported by FAO area and month. Most of the catches were reported by species. Logbooks are now kept by all the vessels and ICCAT statistical areas will be adopted for reporting tunas and tuna-like species in the future.

*Taiwan:* All the Task I catch data had been reported for 1977 and for the first half of 1978. Task II catch and effort data were reported for 1977 during the meeting. Biological sampling was initiated in 1977 and a substantial number of albacore and big-eye were measured on-board longliners. The results are presently being processed. The method of raising sampled catch was improved using various coverage rates for small area-time strata instead of using one common annual rate for the entire Atlantic.

#### 4. Examination of the problems of the quality of statistics and promptness of reporting

##### 4.1. National problems

Attention was drawn to Table 5 of SCRS/78/12 which showed the evaluation of the completeness of Tasks by the national offices. It was noted that there have been significant improvements in coverage and adequacy of statistics for the tropical fishery as well as for the bluefin fishery. Also much more data became available for bigeye tuna. Promptness was also improved tremendously. The 1978 data are now being made available by many countries not only for the total catch but also for size and catch and effort.

The Assistant Executive Secretary reported that the following queries had been sent to the U.S.S.R. office concerning Soviet statistics:

- a) How were the tuna catches reported by mid-water and other trawls made?
- b) A large quantity of skipjack were reported to have been caught by Soviet longline. If they were indeed caught by longline, were the longlines especially designed for catching skipjack?
- c) The bluefin catches reported in FAO area 47 should be combined catch of various big tuna species. Are these species breakdowns available?

The U.S.S.R. delegate commented on these questions as follows:

The recompilation of statistics had been done particularly to clarify the confusion on fishing gears. All skipjack were caught by pole-and-line or trolling, although the vessels were longliners or trawlers. Yellowfin tuna were caught either by pole-and-line, longline or as by-catch of mid-water trawl. Bigeye and other large-size tunas were caught by longline. The bluefin reported off Angola were a combination of various tuna species and efforts are being made to classify them by species.

The Sub-Committee recognized the great improvements made on U.S.S.R. tuna statistics and congratulated the U.S.S.R. delegate.

The following points were mentioned specifically as future tasks:

1. Improve Mediterranean statistics in general.
2. Check discrepancies between Taiwanese official statistics and ICCAT port sampling statistics (particularly concerning albacore S-N distribution).
3. Discrepancies found in the data bases of various laboratories should be checked and corrected so that the scientists can work on common data bases (e.g. yellowfin East-West problem).

4. Improve statistics from some of the artisan fisheries of the western Atlantic.
5. Monitor development of the tuna fisheries off the African coast, particularly by Cape Verde, Congo, Benin, Gabon, etc.
6. Improve the timeliness of reporting current catch and effort statistics. This year it was found that some of the analyses carried out by national scientists just before the meeting were outdated as new data were presented during the SCRS sessions. Some close correspondence among the scientists concerned (before the analyses are made) in order to agree upon the basic data to be used, would be important.
7. The evaluation table (Table 6 of SCRS/78/12) should include other species such as billfishes.

#### *4.2. Organizational problems*

No comments were made.

#### *4.3. Problems of species identification in statistics*

Treatment of this problem is closely related to the assignments of the Working Group on Bigeye Size Regulation. Correct identification and accurate and honest reporting of yellowfin and bigeye catches are the biggest problems involved.

It is recommended that each national office review very critically their statistics for the current year as well as for past years, from the standpoint of separating yellowfin catches and bigeye catches. The estimated real catches and catch-per-unit-effort for bigeye and yellowfin for all past years should be reported by gear and flag to the Secretariat by March 31, 1979.

Also attempts should be continued to report yellowfin and bigeye catches and catch-per-unit-effort separately and accurately in the future. Probably some large-scale sampling should be initiated for estimating the correct proportion between these species on various important surface fisheries.

Correct reporting of billfish catches was also questioned. It was recommended that all the countries fishing billfishes, particularly longline countries, report billfish catch breakdowns by species. Also it was recommended that scientific names accompany the vernacular names when reporting to the Secretariat. This procedure would eliminate mix-ups and confusion in the common names.

### **5. Examination of progress made by the Secretariat**

#### *5.1. Data bank*

##### a) Progress made in the bases

The Assistant Executive Secretary reported on all the developments concerning the ICCAT data base established in 1977. He referred in particular to document COM-SCRS/78/16. The data bases were maintained and updated in 1978. All data processing

was carried out by the INFONET system. Those works included the processing of raw data from the Spanish tropical fleet, from the Tema-based baitboat fleet and from the Oriental longliners; compilation of the Statistical Bulletin; documentation of the catch and effort and size data bases; and presentation of a catalogue of all data available in the bases. The data exchange among the national offices and the Secretariat has been facilitated by the ICCAT system.

The Assistant Executive Secretary also referred to the cost of operating the data bases. Various measures were taken to minimize the operating cost including: A new contract with INFONET to make a 20 % discount, lower priority batch use, avoidance of the usage of ALADIN language, etc. In reality, the running cost was reduced to a level of less than one-fourth of the cost in 1977.

He further added that some delays were experienced in updating the bases due to general budgetary limitations, extra work assigned to the Secretariat, staff changes and sickness of various Secretariat members, etc.

The Assistant Executive Secretary also presented document COM-SCRS/78/17 which presented the results of the comparative study of the computer systems carried out by the Secretariat. Among the time-sharing remote service systems, INFONET still seemed to be the best for ICCAT needs.

The study presented included price quotations and specifications for four mini-computer systems which were available in Spain. It also compared the cost between the mini-computer systems and the INFONET system for the next six years. The advantages and disadvantages were also discussed. The Secretariat recommended that if the data processing work is more or less of the same nature as in 1978 (even if the amount of data increases) the INFONET system should be kept for another one or two years. In the meantime, the cost and performance should be carefully watched. If any new types of work are going to be assigned to the Secretariat, the purchase of a new mini-computer system is recommended as soon as possible.

The Sub-Committee felt that in general the progress on the data base has been satisfactory. Spain expressed its appreciation to the Secretariat for the assistance in processing the Spanish tropical fleet data.

While studying documents SCRS/78/16 and 17, the Sub-Committee recognized that the choice of the computer system is largely due to the nature of the data processing assigned to the Secretariat and also largely depends on the fate of the Skipjack Program. Considering all of these, the Sub-Committee recommended that a working group be established on this subject. The group should start working immediately and continue its work by correspondence during the coming year. The group should work very closely with the Secretariat and review the work to be done, systems being used, economical aspects of the work, etc.

#### b) Review of reporting

The Assistant Executive Secretary stated that the following reporting has been made during 1978, using the INFONET system:

- i) Task I data
- ii) Catch and effort and biological data for the Spanish tropical fleet, 1973-1977  
- Statistical Series-5 (SCRS/78/24)

- iii) Biological data for the Ghana-based baitboat fleet for 1973-1977 – Statistical Series-6 (SCRS/78/25).
- iv) ICCAT port sampling data – Statistical Series-4 (SCRS/78/23).

The Sub-Committee recognized that a large amount of work had been completed by the system and commended the Secretariat staff for their achievement.

The Assistant Executive Secretary also presented SCRS/78/29, which contained all 1977 data received by the Secretariat as of September 30, 1978, but after the issue of Data Record, Vol. 11. The data were compiled in a uniform format, but as closely as possible to the original. Those data were neither raised nor substituted by the Secretariat. He explained that a similar format will be adopted for future volumes of the Data Record. The data which have been published elsewhere were not included nor were voluminous data received on magnetic tape, unless they were in a summarized form.

The Sub-Committee approved the new format adopted for the Data Record in general and asked each scientist to review SCRS/78/29 and to send in their comments to the Secretariat by March 1, 1979.

In document SCRS/78/18, the estimations of yellowfin and bigeye catches by size were presented. These tables are very similar to those submitted in 1977 as SCRS/77/18, with some changes introduced after receiving comments and suggestions from the national scientists.

In this paper the raw data presented in document SCRS/78/29 as well as in various other publications were used. Substitutions of data and raising procedures were clearly documented. The Assistant Executive Secretary asked the scientists if they indeed wish the Secretariat to continue this type of work. The Sub-Committee again considered that this work is important and to be continued. Again, any comments should be made to the Secretariat by March 1, 1979.

The Assistant Executive Secretary also presented document SCRS/78/28. In 1977, the Sub-Committee on Statistics recommended that the national laboratories present the codings adopted in their data bases and the magnetic tape characteristics required. The Secretariat was asked to make a compendium of these. It was explained that only the United States and Japan responded to the Secretariat's request and reminders. Therefore, this document contained only those for the U.S.A., Japan and the Secretariat.

The Assistant Executive Secretary also presented document SCRS/78/27 and explained the difficulty encountered during 1978 in getting the scientists' agreement on the ICCAT sampling areas. He proposed that the maps presented in this document be approved by the scientists. He commented that these maps were already in the revised edition of the Field Manual and have been used in a lot of the Secretariat's data processing. The Sub-Committee recommended that the SCRS consider these areas final until such time that the biological evidence indicates that other areas should be adopted. (The maps and codings are attached as Addendum 2.)

He then presented document SCRS/78/26 which included sample catalogues of the ICCAT data bases. These catalogues or data inventory list were only for yellowfin and bigeye for 1977, but will be expanded to all the data bases and distributed among the scientists concerned. After this is done, only data newly updated will be catalogued and distributed periodically among the scientists.



c) Review of data exchange

The Sub-Committee recognized that many of the discussions under sub-chapter b) also refer to this subject. Besides, it recognized that the data exchange through the Secretariat has been slowed down this year partly due to the other duties assigned to the Secretariat and mainly because the Secretariat was still in a transition period from manual data management to automated data management. The Assistant Executive Secretary noted that the situation would be improved in 1979, but stressed the importance that the national scientists send a copy of data to other concerned scientists at the same time that they send them to the Secretariat. The Sub-Committee concurred with this recommendation.

*5.2. Compilation and publication of the data provided by the national offices*

There was considerable discussion of this subject under Item 5.1. The Sub-Committee reviewed Statistical Series-5 and 6 and congratulated the Spanish and Ghanaian scientists for collecting such good data. The Secretariat was also commended for its efforts in verifying, compiling and presenting these data in such a fine form. The Sub-Committee recommended that the work be continued and that the compilations be carried out in the future by the national scientists, if possible.

The Sub-Committee also recognized that the Secretariat intends to issue the Data Record in a new form. The following difficulties in the new form proposed are pointed out:

a) If the issue is an annual one, the documentation of data will be delayed until the last data for a certain year become available. For example, the majority of the 1977 data are now available but will not be complete until late 1978. Therefore, the volume will be either too delayed or there will be a mixture of data from various years.

b) The data have to be entered in the data bases first and then tabulated in a uniform format. In the past, they were just reproduced from the originals sent to the Secretariat and, therefore, were made available within a much shorter time.

c) As the data are presented in a uniform format, a lot of space is wasted in the tables (e.g. the catches of many species are left blank for many countries).

d) Some of the data are very voluminous (for example, FISM catch and effort) which then increases the publication cost.

The Sub-Committee recommended that the Secretariat try the new Data Record format for 1979 and intend to solve the above-mentioned problems on an experimental basis. The results should be reported at the next meeting for general discussion.

*5.3. Collection and publication of statistics by the Secretariat*

The port sampling program was reviewed. It was noted that, in the past, this project provided a lot of valuable information on a timely basis. On the other hand, the recent

marked improvement on statistics collection by Korean and Taiwanese scientists was also recognized, though the coverage rates had been still higher in the Secretariat port sampling program. Besides, the results of the Taiwanese biological sampling were not yet available for evaluation. The Sub-Committee recommended that the Secretariat continue the program one more year, while some assessment studies on the degree of reliability of both sets of reports should be made by the Secretariat and national scientists.

Next year, the Sub-Committee can review the results of those studies and the developments of national as well as ICCAT statistical programs, and should decide about continuing the port sampling program.

There were some suggestions made concerning the expansion of the ICCAT port sampling program to fish transferred and brought in to the ports where the sampling is conducted. According to the Convention, the Secretariat is conducting the current port sampling program on specific instructions from the Commission and with the authorizations of concerned governments. Besides, this may have some interrelation with port inspection. The Sub-Committee left the matter to be considered by the SCRS and the Commission.

Publication of results in Statistical Series-4 was somewhat delayed this year. It was explained that the work on the Spanish tropical fleet data and Ghanaian data caused this delay. It is hoped that the delay will be minimal next year.

#### *5.4. Biostatistician and Atlantic-wide sampling scheme*

Dr. Max Laurent (French national) was introduced as the new biostatistician hired by the Secretariat. Since his arrival at the office was delayed until September due to an organizational and personal conflict, substantial biostatistical work had to be left until 1979. Nevertheless, some of the evaluation of Atlantic-wide sampling and data coverage was reported in Table 6 of SCRS/78/12, as was done in 1977. The Secretariat proposed that the biostatistician work on the following subjects assigned to the Secretariat:

1. To prompt the data flow from the national offices to the Secretariat and verification of the data.
2. To facilitate data exchanges among scientists.
3. To update and keep the ICCAT data bases in good order.
4. To evaluate the overall Atlantic sampling scheme and, if necessary, give advice to national offices as to more adequate sampling schemes.
5. Assist national offices, when the necessity arises, for clarifying or improving the statistics of problem areas (e.g. Mediterranean Sea, bluefin statistics).
6. Monitoring and improving the port sampling program.
7. Compare the results of the port sampling program with those of national programs for evaluation of validity.

### 5.5. *Revision of the Field Manual*

The English version of the 2nd Edition of the Field Manual has been printed and was distributed during the meeting (SCRS/78/13). It was reported that the French and Spanish versions will be published in early 1979. The possibility of using the Field Manual for publicizing tags returned was mentioned.

### 5.6. *Other matters*

No other matters were discussed.

## 6. **Problems of quick compilation and dissemination of statistical data in standard format**

Table 4 summarizes the reporting as of September 30 of quick estimates of 1978 catches. The Assistant Executive Secretary reported that more countries reported catch, catch and effort and size data after the table was completed. They were available to the scientists for their work on the species sections of the SCRS Report during the earlier part of the SCRS meeting.

This year, the reporting was very timely, with a few exceptions. Besides, it was recognized that much more catch and effort data as well as size frequency data have been reported this year for the first half of 1978. The program should be continued in 1979 and the countries are encouraged to provide more information.

The quick estimates for the total catch by major species were circulated by the Secretariat in September, based on the first six months' report. The Sub-Committee recommended that in 1979, the national offices send in catch estimates for the first six months and nine months and that projected estimates of annual catches by that fishery be made by the national offices based on those six or nine months' data. The process of making such projections should also be documented. The Secretariat was asked to make those estimates available as soon as possible.

## 7. **Future plans to improve the statistics and recommendations to the SCRS**

Attention was drawn to section VII-1 of each of the species sections of the SCRS Report, which contains many SCRS recommendations relating to statistics. Since they are in such detail, they are not repeated here, but the Sub-Committee hoped that national scientists as well as the Secretariat would follow the recommendations.

Specific recommendations to the SCRS are also found in this report. These are summarized as follows:

Improvement of statistics — Section 4.1.

Species identification problems — Section 4.3.

Selection of data management systems — Section 5.1.a.

Reporting of statistical information – Sections 5.1.b and 5.2.

Port sampling program – Section 5.3.

This year rapporteurs were nominated prior to the meeting to prepare their respective reports ahead of the meeting. This procedure proved quite successful in the case of the Sub-Committee on Statistics and it was recommended that the same procedure should be used for future meetings.

**8. Other matters**

No other matters were discussed.

**9. Adoption of report**

The draft report was reviewed and adopted.

**10. Adjournment**

The meeting was adjourned.

**Table 1. Progress made during 1978 in the collection of Task I data for 1977**

<i>Country</i>	<i>Receipt of data</i>	<i>Catch</i>	<i>Landings</i>	<i>Effort</i>	<i>By Gear</i>	<i>By Species</i>	<i>Preliminary</i>	<i>Final</i>	<i>Remarks</i>
Angola	VII-7 (XI)	x		x	x	x		x	
Argentina	VII-26	x			x	x	x		
Benin									
Brazil	III-28 (VIII-2)	x		x	x	x		x	LL.
Canada	III-8 (II-1)	x		x	x	x		x	
China (Taiwan)	III-14 (III-23)		x		x	x	x		
	X-31		x	x	x	x		x	
Cuba	VI-8 (VI-3)	x		x	x	x		x	
France	V-29 (V-23)	x			x	x		x	Tropical fisheries only.
	VII-12 (II-16)	x			x	x	x		BF and ALB.
Gabon									
Ghana	VI-1 (V)		x	x	x	x		x	Only large commercial fisheries. Also reported foreign flag landings.
	VII-5 (VIII-22)		x	x	x	x		x	Local artisan fisheries.
Italy	V-8 (III-7)		x	x	x	x		x	
Ivory Coast	V-29 (V-23)	x			x	x		x	Combined with Senegal and France.
Japan	III-2 (IV-1)	x		x	x	x	x		
	VI-28 (VII-1)	x			x	x		x	BB.
	VII-18 (VII-1)	x			x	x	x		LL.
Korea	IV-21 (VI-7)		x		x	x		x	
Libya	XI-77		x			x		x	
Mexico	X-19 (VII-6)	x			x	x			
Morocco	IV-17 (V-19)		x		x	x		x	
	V-29	x			x	x		x	Tropical catches.
Norway	III-20	x			x	x	x		
Portugal									
Senegal	V-29 (V-23)	x			x	x		x	Combined with Ivory Coast and France.
South Africa	V-3 (V-4)	x		x	x	x		x	
Spain	V-8 (VII-6)	x			x	x		x	Does not include ALB and tropical.
	VI-22	x			x	x		x	Includes ALB and tropical catches.
Turkey									
U.S.A.	III-9 (III-14)	x	x	x	x	x	x	x	
U.S.S.R.	IX-14 (XI)	x			x	x		x	
Venezuela	VII-26 (IX-12)	x			x	x		x	

NOTE: Date in parentheses indicates when data were received in 1977.

**Table 2. Progress made in the collection of Task II catch and effort data during 1978**

<i>Fleet</i>	<i>Date received</i>	<i>Species</i>	<i>Gear</i>	<i>Area</i>	<i>Time</i>	<i>Effort</i>	<i>Weight</i>	<i>No. of fish</i>	<i>Years</i>	<i>Remarks</i>
Angola										
Argentina	VII-26	All	<sup>1</sup> LL	general	month		x		1977	
Benin										
Brazil	III-1 (VIII-2)	Various	LL	5° x 5°	month	x	x		1977	Domestic and foreign flag.
Canada	III-8 (II-1)	BF	SP, PS, TRAP	1° x 1°	month	x	x		1977	
China (Taiwan)*										
Cuba	VI-8 (VI-3)	All	LL	5° x 5°	month	x		x	1977	
France	VII-17 (IX-5)	ALB	BB, TRO	1° x 1°	month	x		x	1977	
	XII-1	BF	PS	Med.	month	x		x	1975-77	
Gabon										
Ghana	VI-1 (VIII-22)	All	BB	1° x 1°	month	x	x		1977	
FISM**	IV-11 (VI-3)	YF, SJ, BE	Surf	1° x 1°	month	x	x		1976, 1977	
				5° x 5°						
Italy	IV-11 (VI-3)	YF, SJ, BE	Surf	ICCAT area	quarter	x	x		1976, 1977	
	X-17	BF	All	5° x 10°	month	x	x		1977	
Japan	VI (VII-1)	All	BB	1° x 1°	month	x	x		1977	
	VIII-10 (VIII-26)	All	LL	5° x 5°	month	x		x	1976, 1977	
Korea*	VIII-23 (IX-1)	All	LL, BB	5° x 5°	month	x	x		1977	
Morocco	IV-17 (V-19)	Various	Surf	1° x 1°	month		x		1977	
Portugal										
S. Africa	V-3 (V-4)	Various	SP, PS, BB	1° x 1°	month	x	x		1977	
Spain	XI-77 (III-78)	YF, SJ, BE	PS	-----Raw log data----		x	x		1974-77	Compiled by Stat. Series-5.
	VI-7	BF	BB	1° x 1°	month	x		x	1977	Bay of Biscay.
	IX-7	Various	BB	5° x 5°	month	x	x		1977	Canary Islands.
U.S.A.	IV-7 (III-14)	BF	Various	no area	month	x	x		1977	Preliminary
	VII-4 (VIII-8)	Major	PS, SP	1° x 1°	month	x	x		1977	Final.
				5° x 5°	year					
U.S.S.R.	IX-14	All	All	FAO areas	month	x	x		1976, 1977	LL catch -species unclassified.
Venezuela										

NOTE: Date in parentheses indicates when data were received in 1977.

\* 1977 data from Secretariat Port Sampling Program are also available in Statistical Series-4.

\*\* Tropical fleet of France, Ivory Coast, Senegal and Morocco.

**Table 3. Progress made in the collection of biological data during 1978**

<i>Fleet</i>	<i>Date received</i>	<i>Species</i>	<i>Gear</i>	<i>Area</i>	<i>Time</i>	<i>Year</i>	<i>Remarks</i>
Angola	IX-77	All	BB	no area	month	1977	
Benin							
Brazil							
Canada	IV (VI-17)	BF	Various	Specific	month	1977	
China (Taiwan)		YF, BE, ALB	LL	ICCAT area	quarter	1977	ICCAT Port Sampling Program.
Cuba							
France	XII-1	ALB	Tro, BB	Specific	month	1976	Magnetic tape.
		BF	PS	Med.	month	1975-77	
FISM*	V-29 (V)	YF, SJ, BE	Various	ICCAT area	month	1976	
					quarter		
	V-29 (V)	YF, SJ, BE	Various	entire	quarter	1977	
Gabon							
Ghana	IX-77	YF, SJ	BB	ICCAT area	month	1st half 1977	
	VII	YF, SJ, BE	BB	-----Raw data-----		1977	Compiled by ICCAT Stat. Series-6.
Italy	X-17	BF	PS	Med.	month	1977	
Japan	II-15 (IV-4)	All	LL	5° x 10°	month	1976-77	
				10 x 20	quarter		
Korea	VI-26 (IX-21)	YF, BE, ALB	LL	ICCAT area	quarter	1977	
		YF, BE, ALB	LL	ICCAT area	quarter	1977	ICCAP Port Sampling Program.
Morocco							
Portugal							
S. Africa	V-3	YF, SJ	PS	1° x 1°	month	1977	
Spain	XI-77 -III-78	YF, SJ, BE	PS	-----Raw data-----		1974-77	Compiled by ICCAT Stat. Series-5.
	VI-7 (XI)	BF	BB	1° x 1°	1/2 mo	1977	
	VIII	ALB	BB, Tro	No area	month	1977	
	VII	BE, ALB, SJ, BF	BB	ICCAT area	month	1977	Canary Islands.
	VIII-18	BF	LL	1° x 1°	month	1977	
	IX	BE, ALB, SJ, BF	BB	ICCAT area	month	1977	Canary Islands (weighted).
U.S.A.	III-2 (III-14)	All	PS	ICCAT area	month	1977	
	III-30 (III-14)	BF	Various	no area	various	1977	
	VII-4 (VIII-8)	All	PS, BB, UNCL	Regions	quarter	1977	Final. Foreign landings trans- shipped to Puerto Rico.
		SF, Bill	Sp, UNCL	Specific	month	1935-77	Magnetic tape.
U.S.S.R.							
Venezuela							

NOTE: Date in parentheses indicates when data were received in 1977.

\* Tropical fleet of France, Ivory Coast, Senegal and Morocco.

**Table 4. Progress made in the collection of data for the first 6 months of 1978**

	<i>Total Catch (Task I)</i>	<i>Catch &amp; Effort (Task II)</i>	<i>Biological Data (Task II)</i>
Angola	BB	BB	All
Benin			
Brazil	LL, UNCL		All
Canada	-----Reported no fishing-----		
China (Taiwan)	LL		
Cuba			
France	TROL, BB		
FIS*			
Gabon			
Ghana	BB		
Japan	LL, BB		
Korea	LL, BB	LL	YF, BE, ALB
Morocco	All		
Panama	LL**		
Portugal			
South Africa	All	All	YF, SJ
Spain	BB (Canary Islands)		BB (Canary Islands)
U.S.A.	All		YF, BE, BF
U.S.S.R.	All		

\* Tropical fleet of France, Ivory Coast and Senegal.

\*\* Reported together with Korea.



*Addendum 1 to Appendix 5 to Annex 6***Agenda for the Sub-Committee on Statistics**

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Examination of progress made by national offices
4. Examination of the problems of the quality of statistics and promptness of reporting
  - 4.1. National problems
  - 4.2. Organizational problems
  - 4.3. Problems of species identification in statistics
5. Examination of progress made by the Secretariat
  - 5.1. Data bank
    - a) Progress made in the bases
    - b) Review of reporting
    - c) Review of data exchange
  - 5.2. Compilation and publication of the data provided by the national offices
  - 5.3. Collection and publication of statistics by the Secretariat
  - 5.4. Biostatistician and Atlantic-wide sampling scheme
  - 5.5. Revision of the "Field Manual"
  - 5.6. Other matters
6. Problems of quick compilation and dissemination of statistical data in a standard format (rapid estimates of 1977 data and the first three quarters of 1978)
7. Future plans to improve the statistics and recommendations to the SCRS
8. Other matters
9. Adoption of Report
10. Adjournment

Addendum 2 to Appendix 5 to Annex 6

ICCAT Sampling Areas and Codings

<i>ICCAT data base</i>				
<i>New ICCAT regions (areas)</i>	<i>Map area</i>	<i>Alph. num.</i>	<i>Num.</i>	<i>Remarks</i>
Yellowfin --- longline	10	LLYF10	110	Newly revised area
" " "	11	LLYF11	111	" " "
" " "	12	LLYF12	112	" " "
" " "	13	LLYF13	113	" " "
" " "	14	LLYF14	114	" " "
" " "	15	LLYF15	115	" " "
" " "	16	LLYF16	116	" " "
" " "	17	LLYF17	117	" " "
" " "	18	LLYF18	118	" " "
" " "	19	LLYF19	119	" " "
" --- surface	1	SBY1	12**	Old ICCAT YF surf. area 1
" " "	2	SBY2	13	" " " " " 2
" " "	3	SBY3	14	" " " " " 3
" " "	4	SBY4	49	" " " " " 4
" " "	5	SBY5	50	" " " " " 5
" " "	21	SBY21	121	" " " " " 6
" " "	22	SBY22	122	" " " " " "
" " "	23	SBY23	123	" " " " " "
" " "	24	SBY24	124	" " " " " "
" " "	25	SBY25	125	" " " " " "
" " "	26	SBY26	126	" " " " " "
" --- LL+surface *	210	YF210	210	LL areas+surf. areas
" " "	211	YF211	211	LLYF10
" " "	212	YF212	212	LLYF11+SBY4+21
" " "	213	YF213	213	LLYF12+SBY24
" " "	214	YF214	214	LLYF13+SBY26
" " "	215	YF215	215	LLYF14+SBY1, 2, 3 & 5
" " "	216	YF216	216	LLYF15+SBY22
" " "	217	YF217	217	LLYF16+SBY25
" " "	218	YF218	218	LLYF17
" " "	219	YF219	219	LLYF18+SBY23
" " "				LLYF19
Bigeye --- longline	40	LLBE40	140	
" " "	41	LLBE41	141	Old ICCAT areas 1
" " "	42	LLBE42	142	" " " " 2
" " "	43	LLBE43	143	" " " " 3
" " "	44	LLBE44	144	" " " " 4
" " "	45	LLBE45	145	" " " " 5
" " "	46	LLBE46	146	" " " " 6
" " "	47	LLBE47	147	" " " " 7
" " "	48	LLBE48	148	" " " " 8
" " "	49	LLBE49	149	
" " "	50	LLBE50	150	
Bigeye --- surface	See Yellowfin --- surface.			

SAMPLING AREAS

<i>ICCAT data base</i>				
<i>New ICCAT regions (areas)</i>	<i>area</i>	<i>Alph. num.</i>	<i>Num.</i>	<i>Remarks</i>
				LL areas + surf. areas
Bigeye -- LL + surface *	240	BE240	240	LLBE40
" "	241	BE241	241	LLBE41 + SBY24
" "	242	BE242	242	LLBE42 + SBY 3 & 4
" "	243	BE243	243	LLBE43 + SBY21
" "	244	BE244	244	LLBE44 & SBY22
" "	245	BE245	245	LLBE45 + SBY1, 2 & 5
" "	246	BE246	246	LLBE46 + SBY23
" "	247	BE247	247	LLBE47
" "	248	BE248	248	LLBE48
" "	249	BE249	249	LLBE49 + SBY26
" "	250	BE250	250	LLBE50 + SBY25
				Old SJ areas
Skipjack	71	SJ71	69 **	1 -- Cape Verde
" "	72	SJ72	70	2 -- Sherbro
" "	73	SJ73	71	3 -- Annobon
" "	74	SJ74	72	4 -- Angola
" "	75	SJ75	73	5 -- Canary Islands
" "	76	SJ76	74	
" "	77	SJ77	75	
" "	78	SJ78	76	8 -- Ascension
" "	79	SJ79	77	
" "	80	SJ80	78	10 -- At. Central
" "	81	SJ81	79	11 -- U.S. Coast
" "	82	SJ82	80	12 -- Gulf of Mexico
" "	83	SJ83	81	13 -- Caribbean
" "	84	SJ84	82	14 -- S. Brazil
				Old BF areas
Bluefin	51	BF51	151	1
" "	52	BF52	152	" " " 2
" "	53	BF53	153	" " " 3
" "	54	BF54	154	" " " 4
" "	55	BF55	155	" " " 5
" "	56	BF56	156	" " " 6
" "	57	BF57	157	" " " 7
" "	58	BF58	158	" " " 8
" "	59	BF59	159	" " " 9
" "	60	BF60	160	" " " 10
" "	61	BF61	161	" " " 11
" "	62	BF62	162	" " " 12
" "	63	BF63	163	" " " 13
" "	64	BF64	164	" " " 14
" "	65	BF65	165	" " " 15
" "	66	BF66	166	" " " 16
" "	67	BF67	167	" " " 17
				Old ALB areas
Albacore	31	AL31	31 **	1
" "	32	AL32	32	" " " 2
" "	33	AL33	33	" " " 3
" "	34	AL34	34	" " " 4

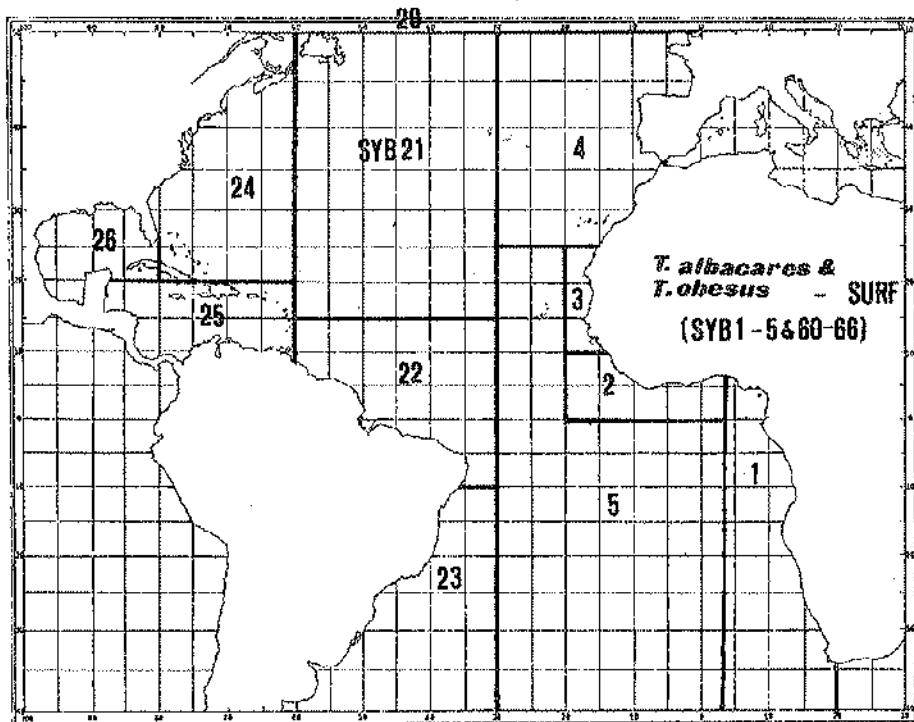
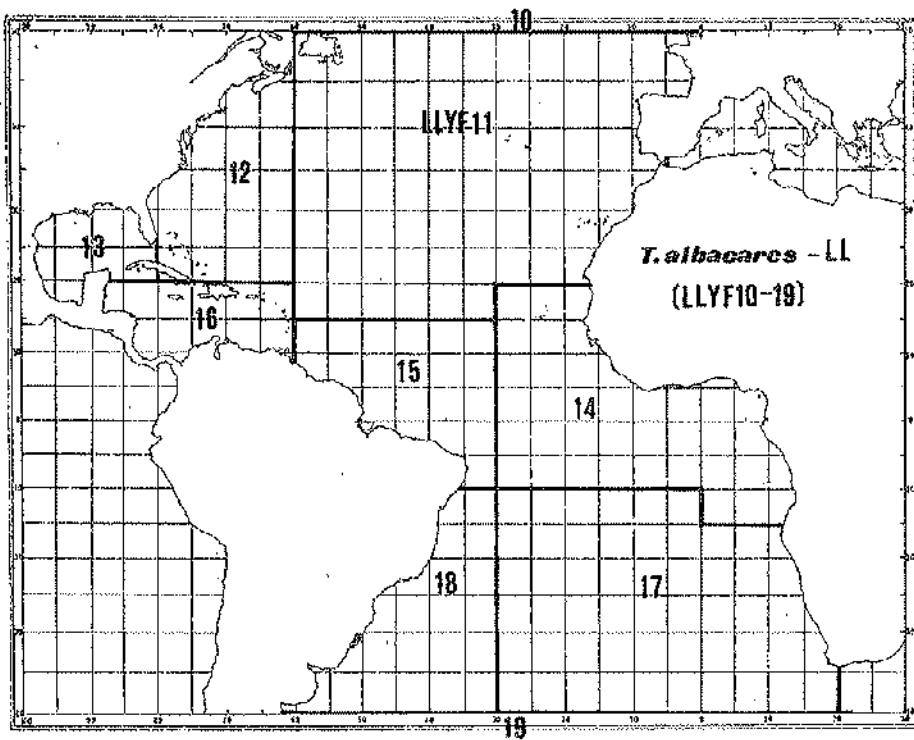
ICCAT REPORT 1978-79 (I)

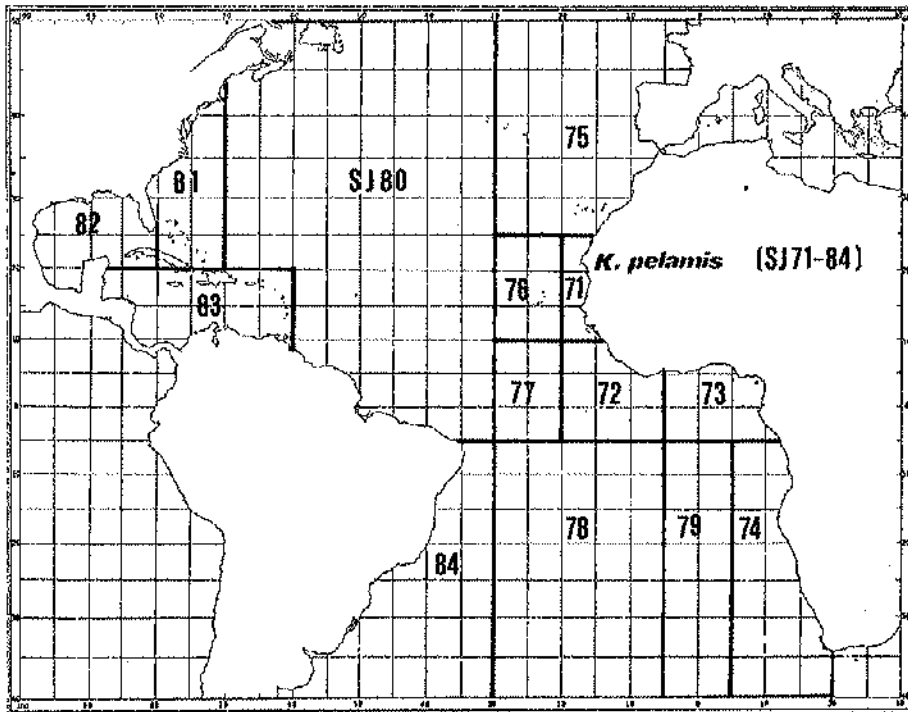
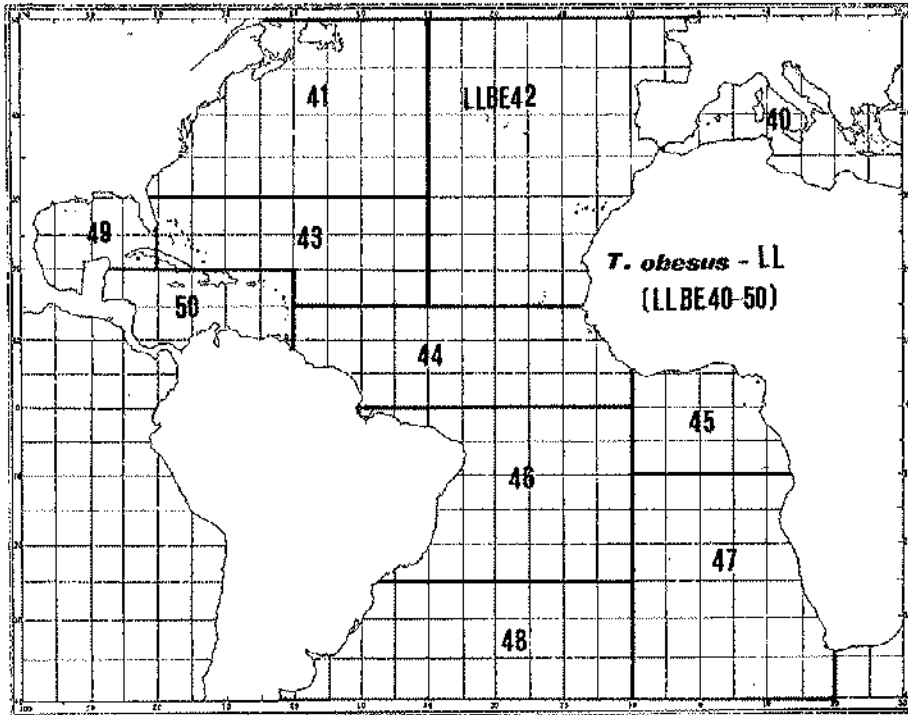
<i>ICCAT data base</i>				
<i>New ICCAT regions (areas)</i>	<i>Map arcu</i>	<i>Alph. num.</i>	<i>Num.</i>	<i>Remarks</i>
Billfish	91	BIL91	91	
"	92	BIL92	92	
"	93	BIL93	93	
"	94	BIL94	94	
"	95	BIL95	95	
"	96	BIL96	96	
"	97	BIL97	97	

\* These areas are to be used only when longline and surface fishery data are combined together. The combinations of areas are explained in the remarks column.

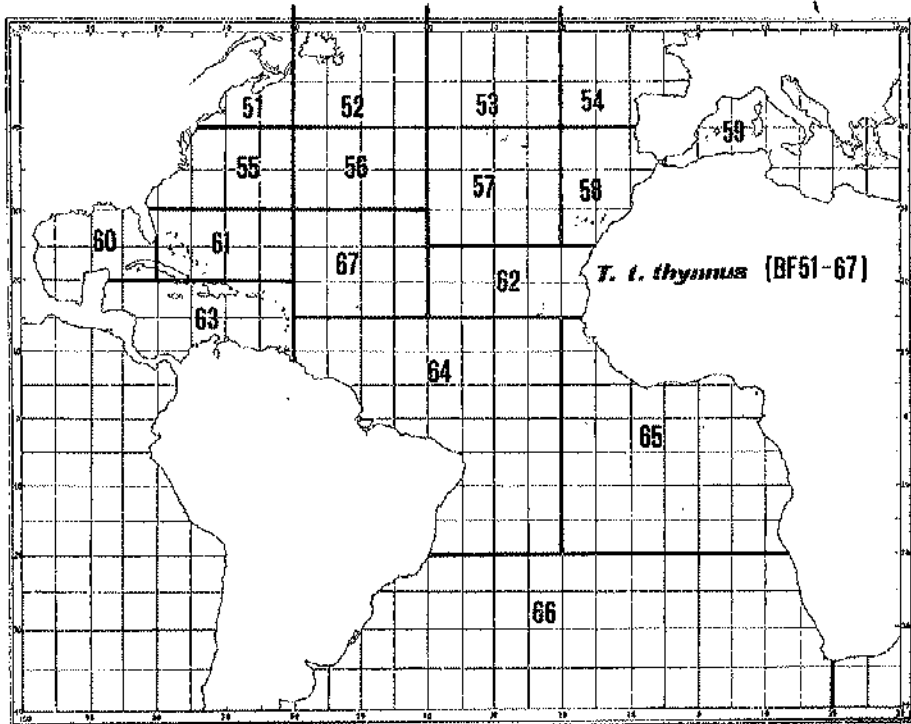
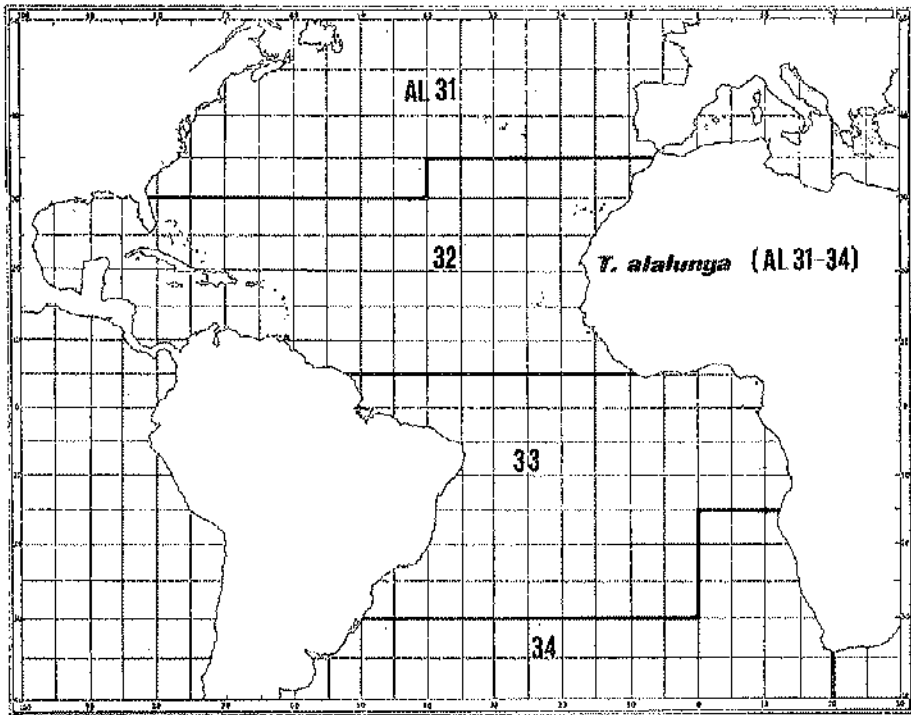
\*\* Old codes remain.

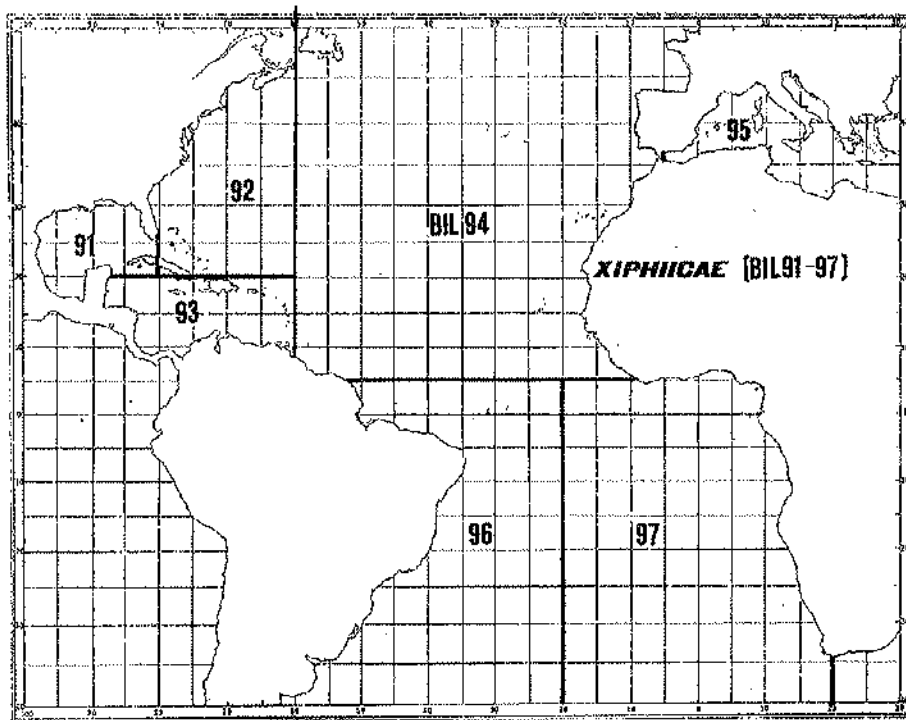
SAMPLING AREAS





SAMPLING AREAS







*Appendix 6 to Annex 6***REPORT OF THE SUB-COMMITTEE ON SKIPJACK**

The Sub-Committee on Skipjack met on November 13, at the Hotel Castellana, Madrid, under the Convenership of Dr. G. T. Sakagawa (U.S.A.). Dr. P. M. Miyake (Secretariat) served as Rapporteur.

The Report of the previous meeting of the Sub-Committee on Skipjack, held on July 17-22, 1978, in Madrid, was presented and reviewed by the Sub-Committee. The Convener noted the objectives of the Skipjack Program and mentioned that it was scheduled for 1979-82. The Sub-Committee approved the report for submission to the SCRS for its consideration.

Delegates of each member country were requested to comment on their position concerning the acceptance of the four-year International Skipjack Year Program. Delegates from all countries present (Brazil, Canada, Cuba, France, Ghana, Ivory Coast, Japan, Korea, Portugal, Senegal, Spain, United States and the U.S.S.R.) stated that they would be accepting the Program and would provide support not only in terms of budgetary contributions to the Commission but also in terms of matching research support.

Table 6 of SCRS/78/14 was then reviewed. Each country described activities that they will be involved in and the table was updated (attached herewith as Addendum 1).

It was noted that the Sub-Committee, at the last meeting held in July, 1978, nominated members for the Activity Teams. Since the Teams must start their work as soon as the Program is approved by the Commission in November, 1978. The Secretariat had contacted the nominated members and had asked their cooperation and availability to serve on the Teams. Additional members for the Teams were solicited by the Convener. The updated list is attached herewith as Addendum 2.

It seems that the work of the Activity Teams would be mostly done through correspondence but some Teams might find it necessary to hold a meeting. It was noted that the budget proposed by the Sub-Committee on Skipjack (COM-SCRS/78/14) includes only those costs projected for the Secretariat with the understanding that all the travelling expenses for scientists included in the Teams should be borne by their respective national offices.

Since Activity Teams 1 and 3 have major tasks to be completed within a limited time, the Convener of the Sub-Committee requested that the members of these two Teams start their work immediately, even during the SCRS and Commission meetings.

Contributions by countries (SCRS/78/14 - Revised Table 6)

	<i>Ocean.</i>		<i>Fish.</i>		<i>Tagging/dart tags</i>	<i>Tagging/sonic tags</i>	<i>Port Sampling</i>	<i>Intens. Sampling</i>	<i>Phys. Oceanography</i>	<i>Fish. Environment</i>	<i>Maturity-Fecundity</i>	<i>Genetics</i>	<i>Ageing</i>	<i>Stomach Analysis</i>	<i>Larval Survey</i>	<i>Expl. Fishing</i>	<i>Aerial Survey</i>	<i>Area</i>
	80	81	80	81														
Angola																		
Benin																		
Brazil*	4	4	4	4	A,B		A,B		A,B	A,B	A	A		A,B	A,B	A,B	A,B	W. Atlantic
Canada				Maybe		B	A,B			A,B								W & E Atl.
Cuba							A				A,B			A	A,B	A,B		W. Atlantic
France	--	4-6	2	4-6	A,B	A	A,B	A,B	A,B	A,B	A,B	A	A,B		?	?	A,B	W.Atl.?, E.Atl.
Gabon																		
Ghana	--	--	--	--			A				A,B			A				E. Atlantic
Ivory Coast	--	--	--	--	A		A,B	A,B	A,B	A,B	A	A	A	A				
Japan	--	--	3	3	A,B		A,B	B		A,B	A,B	A,B	A	A,B				E. Atlantic
Korea	--	--	--	--	A,B		A,B							A,B				E. Atlantic
Morocco																		
Portugal					A		A			?	?		?					E. Atlantic
Senegal			?	?	A,B	?	A,B	A,B	A,B	A,B	A	A	A,B					E. Atlantic
South Africa																		
Spain			2	2	A,B		A,B	A,B	A,B		A	A	A		A			E. Atl. & Canary Is.
U.S.A.	3		4		A,B	?	A,B	A,B	A,B	A,B	A	A	A,B		A	A,B		W. Atl.
U.S.S.R.	6	6			A,B				A,B	A,B	A,B	A,B	A,B	A,B	A,B	A		E. Atl. ? E. Atlantic

\* Tentative.

A = Field activities.

B = Analyses.

*Addendum 2 to Appendix 6 to Annex 6*

<i>ACTIVITY TEAM</i> (as of the time of the November meeting)	<i>MEMBERS</i>
1. Tagging	S. Kikawa R. H. Pianet* H. Yuen W. Bayliff L. A. Zavala T. D. Iles B. Y. Kim F. Carey C. Bercy
2. Improved Fishery Statistics	S. Kume* A. Laurec R. H. Pianet K. Arnon M. A. Mensah A. G. Garcés U.S.S.R.-(Dr. Yu. Vialov) (to be nominated)
3. Fishery Oceanography	M. Laurs R. Evans M. Merle* U.S.S.R.-(Dr. Yu. Vialov) (to be nominated) R. Molina Y. Matsuura F. Williams
4. Maturity-Fecundity	S. Kikawa A. Fontana L. A. Zavala M. A. Mensah P. Cayré*
5. Genetics	G. Sharp* K. Fujino
6. Ageing	U.S.S.R.-(Dr. Yu. Vialov) (to be nominated) A. Wild G. Sakagawa P. Cayré F. X. Bard*

7. Stomach Analysis

S. Kikawa  
U.S.S.R.-(Dr. Yu. Vialov) (to be nominated)  
L. A. Zavala\*  
Cuba - (R. Garcés) (to be nominated)  
B. Y. Kim

8. Larval Survey

Y. Matsuura\*  
A. Caverivière  
Cuba - (R. Garcés) (to be nominated)

9. Exploratory Fishing

Program Coordinator - Aerial Survey -  
ISTPM - Martinique  
J. A. Negreiros\*  
U.S.S.R.-(Dr. Yu. Vialov) (to be nominated)  
Cuba - (R. Garcés) (to be nominated)  
Mr. Stretta  
Mr. Squire  
WECAF - (L. Villegas)

\* Team Leader.

*Appendix 7 to Annex 6*

**REPORT OF THE WORKING GROUP ON BIGEYE SIZE REGULATION**

1. The Group held a very brief session on November 12, chaired by the SCRS Chairman in place of the Convener, Mr. M. Mensah (Ghana), who was not present.

2. The rapporteur of the Group, Mr. S. Kume (Japan), reviewed briefly the progress made by the Group. Attention was given to the interim meeting of the Group in conjunction with the Officers Meeting held in Madrid, during July (SCRS/78/6), in which the terms of reference of the Group were discussed along with the status of the collection of detailed statistics such as school-basis, daily logbooks, commercial size categories, etc.

3. Based on newly collected detailed statistics, some analyses were presented to the SCRS (e.g. SCRS/78/44, 72 and 102). They were incorporated in the bigeye section of the SCRS Report, but it seemed that no conclusive results could be obtained.

4. One suggestion was made that the Group should continue its activity with a wider participation of experts on such species as yellowfin and skipjack, since these species are closely concerned with the Group.

*Appendix 8 to Annex 6*

**REPORT OF THE WORKING GROUP ON DATA MANAGEMENT**

The Working Group on Data Management met for the first time on November 14, at the request of the SCRS. The Group noted that adequate information was not at hand to define the data processing needs of the SCRS which would lead to a choice among data processing systems discussed, as well as definition of expected outputs. The Group requested that a questionnaire be sent to each national correspondent to help determine the long-and short-term data processing to be performed by the Secretariat.

The questions to be answered are:

1. What are the expected inputs to the data system?
  - a) Form of input (tape or hardcopy)
  - b) Volume of input
2. What are the needed outputs from the data bank?
  - a) Form of output (tape or hardcopy)
  - b) Level of data processing, i.e. tape copies, data recombination, data analysis, etc.

- c) Volume of output needed
- 3. Would the users of the output be satisfied with:
  - a) A catalogue detailing available data
  - b) Published data, or data in the form it is now

Additionally, the Group asked the Sub-Committee on Skipjack to inform the Secretariat of:

1. The expected data volume to be generated by the Skipjack Program
2. The level of processing required to make the data available to users

With the inputs from the aforementioned survey the Secretariat is directed to perform a second comparative study between the mini-computer and conventional data processing systems. The results of the survey and study should be submitted to the SCRS Chairman to be presented at the 1979 SCRS Officers Meeting. At that time, the SCRS Officers should review the evidence and consider making a recommendation to the 1979 SCRS Meeting.

The Group asked that the Secretariat consider in its study the possibility of users paying for computer time and outputs beyond some minimal level as well as the possibility that in the future the SCRS may need to perform analysis during the SCRS Meeting.

*Appendix 9 to Annex 6*

### **REPORT OF THE AD HOC WORKING GROUP ON THE PROPOSAL FOR A BLUEFIN WORKSHOP**

An ad hoc Working Group met under the direction of the SCRS on November 14, to prepare a proposal for a specialized workshop on bluefin tuna to be held prior to the 1979 SCRS Meeting.

The Working Group considered the rationale for such a workshop and concluded that it should address specifically the needs of SCRS in evaluating the status of bluefin tuna in the Atlantic Ocean and adjacent seas. The Working Group considered that the essential requirement was agreement on the data base (catch, size composition, effort and age and length keys ) used in assessments.

Assuming that this would be the fundamental basis for such a workshop, its preparation and organization should be directed at achieving such agreement, and participants should be prepared to discuss and decide on the various elements of the data base. It was recognized that there might prove to be intractable problems in some areas but the Working Group believed that identification of such insolvable elements and agreement in all other areas would justify the holding of such a workshop, and would constitute a major step in the assessment of bluefin, at least in the Atlantic.

The Working Group considered that the workshop would not be able to prepare formal assessment in the time likely to be available to participants, and, therefore,

recommended that it be held for a period of one week, in early September, 1979. This would allow time for preparation of such assessments by national scientists for submission to SCRS. With respect to location, it was felt that computer facilities, although not essential, would be desirable.

With regard to attendance, it was considered that such a workshop should be as small as possible, but should be open to scientists of non-member countries. Invitations should, therefore, be sent to scientists involved in bluefin matters.

It was recommended that a steering committee be formed as soon as possible to organize the workshop and that the format of the meeting be as follows: No formal papers would be requested but rather participants should be prepared to discuss the data relevant to stock assessment for all fisheries, including relevant biological information (stock discrimination, age, growth, spawning, fecundity, etc.). However, in order to focus the discussions, all the likely participants should be sent, early in 1979, the data base used in SCRS/78/40, and be invited to send comments, modifications and discussion to the Secretariat by July 1, for dissemination to all other participants. In addition, descriptions of all fisheries should be prepared by national scientists and circulated beforehand.

## CHAPTER III

### National Reports

#### REPORT ON RESEARCH AND FISHERIES OF THE TUNA RESOURCES IN BRAZIL

by

JOSE AUGUSTO NEGREIROS ARAGAO\*

#### 1. Fishing activities

##### 1.1. *Evolution of the fleet*

Fishing of tunas and related species in Brazil was limited until 1976 to catches by artisanal fishermen made mainly in the northeast region, and the captures made by four small longliners operating in the southeast-south region. To increase the catches the Superintendency for Development of Fisheries (SUDEPE), the federal fisheries service, encouraged the lease of foreign vessels to fish in national waters, and the development of joint ventures.

By the end of 1976 three Korean vessels started to operate based in Recife, Pernambuco. They fished during 1977 with reasonable yields. During the same year the fleet was enlarged by two more vessels. The five vessels stopped operations in November 1977.

In September, 1977, three Japanese vessels initiated operations based in Rio Grande, State of Rio Grande do Sul.

In 1978, two more Japanese vessels and two Korean vessels started operations based in Sao Sebastiao and Santos, respectively, in the State of Sao Paulo.

At present the leased fleet consists of five Japanese vessels, three operating from Rio Grande and two from Sao Sebastiao, and two Korean vessels operating from Santos.

Five more leased longliners are expected to start operations during 1979 and the lease of purse seiners is under consideration.

##### 1.2. *State of the fisheries*

\* Research worker of the Fishery Research and Development Programme of Brazil-PDP. Original report in English.



In 1977, the total catch of tunas and related species in Brazilian waters was of 4,619.4 MT.

The artisanal fisheries, by trolling and gill-nets, contributed with about 1,704.1 MT, consisting mainly of 1,500 MT of king and spotted Spanish mackerels (*S. cavalla* and *S. maculatus*) and 204.1 MT of blackfin tuna (*T. atlanticus*). Other species were also caught by the artisanal fishermen. However, in view of the dispersion of the landing sites and the small amount caught, it is difficult to estimate the catches.

The catches of the national longliners remained at the same level of the previous years, with a total of 1,290.5 MT, consisting mainly of yellowfin tuna (*T. albacares*) 25.3 % and broadbill swordfish (*X. gladius*) 21.3 % of the total.

The catches of the leased longliners were 1,624.8 MT of which 1,207.4 MT were caught by the Korean fleet and 417.4 MT by the Japanese fleet. The species mainly caught were the yellowfin tuna, 30.5 % and the albacore (*T. alalunga*), 23.7 %.

The total catch by longliners (national and leased) was of 2,915.3 MT, consisting of yellowfin tuna, 28.2 %, albacore 18.6 %, bigeye tuna (*T. obesus*) 14.1 %, broadbill swordfish 11.1 %, marlins 12.4 % and other species, e.g. king mackerels, dolphin fish, sharks, etc. 15.6 %.

## 2. Research Activities

The biological and statistical studies of the fisheries are being done on a regional basis by PDP/SUDEPE.

In the northeast, the artisanal fisheries for king mackerel and blackfin tuna are being studied by the Laboratory of Sea Sciences (LABOMAR) and by the PDP and in the southeast-south the longline fishery by national boats is studied by the Fishery Institute of Sao Paulo.

The catches of the leased longline fleet have been studied by the PDP. A comprehensive biological and statistical programme has been planned but its implementation has been hampered by the irregularity of the operation of the leased vessels. Only in Sao Paulo has the programme been developed regarding the captures of the national fleet without difficulties.

In the northeast, a small scale tagging programme of blackfin tuna, yellowfin tuna and skipjack (*K. pelamis*) caught during exploratory fishing operations is being carried out by the PDP.

In the southeast-south region the Oceanographic Institute of Sao Paulo is carrying out a study of scombridae larvae, such as skipjack, little tunny, etc. to determine the spawning and relative abundance. Experimental fishing of bonito with purse seine and live bait is being planned. These studies could be expanded within the framework of the ICCAT Skipjack Programme and also to other species.

**Table 1. Catches of tunas and related species by national longliners in the southeast south region in the period 1975-1977 (MT)**

<i>YEARS</i>	<i>YF</i>	<i>ALB</i>	<i>BE</i>	<i>BLF</i>	<i>SF</i>	<i>BILL*</i>	<i>OTHERS</i>	<i>TOTAL</i>
1975	417.6	92.9	99.9	6.3	245.7	106.6	109.5	1,078.5
1976	375.5	156.8	99.9	0.4	309.8	138.1	195.6	1,276.1
1977	326.2	157.0	133.3	-	275.2	89.5	309.3	1,290.5
Total	1119.3	406.7	333.1	6.7	830.7	334.2	614.4	3,645.1
o/o	30.7	11.2	9.1	0.2	22.8	9.2	16.9	100.0

\* Istiophoridae

**Table 2. Total catches of tunas and related species during 1977 by the national and leased fleets in the northeast and southeast-south regions (MT)**

	<i>JAPAN</i>	<i>o/o</i>	<i>KOREA</i>	<i>o/o</i>	<i>SUB-TOTAL</i>	<i>o/o</i>	<i>NATIONAL</i>	<i>o/o</i>	<i>TOTAL</i>	<i>o/o</i>
BF	0.2	-	-	-	0.2	-	-	-	0.2	-
YF	40.5	9.7	455.5	37.7	496.0	30.5	326.2	25.3	822.2	28.2
ALB	55.3	13.3	329.9	27.3	385.2	23.7	157.0	12.2	542.2	18.6
BE	57.8	13.8	219.6	18.2	277.4	17.1	133.3	10.3	410.7	14.1
SF	8.5	2.0	41.2	3.4	49.7	3.1	275.2	21.3	324.9	11.1
Bill	188.9	45.3	82.8	6.9	271.7	16.7	89.5	6.9	361.2	12.4
Others*	66.2	15.9	78.4	6.5	144.6	8.9	309.3	24.0	453.9	15.6
Total	417.4	100.0	1,207.4	100.0	1,624.8	100.0	1,290.5	100.0	2,915.3	100.0

\* Mackerel, dolphin, shark, etc.

## CANADIAN RESEARCH REPORT, 1977-1978

by

C. D. BURNETT, P. C. F. HURLEY and T. D. ILES

### A. Status of the fisheries

#### 1. *Swordfish*

The landings of swordfish in Canada for 1977 amounted to 113 metric tons.

#### 2. *Tunas*

Canadian landings of bluefin by all methods in the west Atlantic yielded 972 MT (round weight) in 1977, an increase of 26 MT or 3 % over the previous year. The purse seine fishery for juveniles off the eastern coast of the United States accounted for 298 MT; the mackerel trap fishery accounted for 368 MT of giant bluefin in St. Margaret's Bay, N. S. and 4 MT east of Halifax, N. S.; and the sport (rod and reel) fishery yielded 302 MT.

There was no Canadian purse seine fishery for yellowfin or skipjack in the Gulf of Guinea in 1977.

The regulations for the 1977 giant bluefin tuna fishery remain somewhat the same except for a change in the fishing seasons. It was agreed in 1977 that the same regulations stay in force until 1980.

### B. Special research studies

#### 1. *Swordfish*

No experimental cruises were conducted this year for swordfish nor were any tagged swordfish recaptured.

A manuscript report examining alternative approaches to swordfish stock assessment and presenting a preliminary yield-per-recruit analysis was prepared (Caddy 1977).

#### 2. *Tunas*

Original report in English.

Weights were recorded for 1,577 giant bluefin tuna or 81 % of those caught in Canadian waters during 1977. Additional data were obtained for 346 fish. In the Gulf of St. Lawrence area, the mean weight of 645 fish was 395 kg, approximately the same as the previous year. However, the mean weight of 918 fish from the St. Margaret's Bay area was 388 kg, as compared to 332 kg in 1976 and 319 kg in 1975, continuing the trend of increasing mean weight.

Juvenile bluefin taken in the purse seine fishery were sampled and a total of 732 fork lengths recorded. Lengths ranged from 44.5 to 163.6 cm, with a mean length of 116.2 cm.

In 1977, tagging operations resulted in 9 giant bluefin tagged and released after capture by rod and reel in the Bay of Chaleur (Gulf of St. Lawrence) area and 1 tagged and released after capture by rod and reel east of Halifax, N. S. Five (5) tagged giant bluefin were recovered in 1977. Two (2) fish were recaptured in the Gulf of Mexico from fish released from St. Margaret's Bay and Bay of Chaleur in 1976. Three (3) fish tagged in the Bay of Chaleur area in 1973, 1975 and 1976 were recaptured in the same general area.

The otolith sampling program for age determination was continued and otoliths were collected from 270 giant bluefin and 50 juveniles. An ageing workshop was established on the recommendations of the Standing Committee on Research and Statistics (ICCAT) and the proceedings of such presented to the Secretariat for distribution.

In St. Margaret's Bay the number of commercial impoundments established was increased from 9 to 18 in 1977, with 717 giant bluefin successfully fattened for export to the Japanese "sashimi" market. Mean weight at harvest of the 717 impounded bluefin was 405 kg as compared to 335 kg for 231 fish killed immediately after capture in the mackerel traps (rather than being kept in pounds).

One impoundment in St. Margaret's Bay, containing 13 giant bluefin was established for experimental purposes. A cooperative research program was conducted by Canadian and American scientists and involved studies of bluefin physiology, behaviour, nutrition, hydrodynamics and ageing validation.

#### C. Preliminary information for 1978

The purse seine fishery for juvenile bluefin off the west Atlantic yielded 241 MT. Lengths have been recorded for 1,307 fish and 40 otoliths were extracted for age determination; a few vertebrae were also taken. In addition, 86 MT of skipjack and 318 MT of yellowfin were taken.

The trap fishery in St. Margaret's Bay, N. S. has taken approximately 537 giant bluefin this year. Preliminary figures show the rod and reel fishery in the Prince Edward Island area has taken 442 fish, approximately the same as last year. However, the rod and reel catch in the Bay of Chaleur area has declined sharply. Only 36 fish have been taken, 147 less than the previous year.

There were 6 bluefin tagged and released in 1978; 5 from traps in St. Margaret's Bay, N. S. and one from a rod and reel capture east of Halifax, N. S.

Four (4) tagged bluefin were recovered in 1978. Three (3) had been tagged and released from traps in St. Margaret's Bay, N. S. in 1975 and 1976; two (2) of these were captured by rod and reel in the Prince Edward Island area and the other was taken

by a Japanese longline in the Gulf of Mexico. The fourth recapture had been released in the Bay of Chaleur area in 1977 and was recaptured in the same general area.

An impoundment was established again in St. Margaret's Bay for experimental purposes in 1978. A cooperative research program involved studies of aspects of bluefin physiology, behaviour and nutrition. Studies of tag retention and ageing validation were also conducted.

A swordfish, tagged by harpoon and released in 1970 on Georges Bank, was recaptured in the same general area in 1978 after 2,965 days at large. It is believed that this return may represent a record for days at large for a swordfish tag.

#### *Publications*

#### CADDY, J. F.

1977. Some approaches to elucidation of the dynamics of swordfish (*Xiphias gladius*) populations. Fish. Mar. Serv. MS Rep. 1439, 10 p.

#### HUNT, J. J.

1977. Proceedings of the Atlantic bluefin tuna ageing workshop. Amer. Mus. (ed.) Nat. Hist., New York, N. Y. March 28-31, 1977.

## NATIONAL REPORT - CUBAN TUNA FISHERIES IN THE ATLANTIC IN 1977

by

CUBAN DELEGATION TO 1978 ICCAT MEETING

### The tuna fleet

The Cuban tuna fleet which operated in the central and eastern Atlantic comprised 19 longliners and one purse seiner. Forty-six baitboats made up the Cuban flat tuna fleet which operated in the western Atlantic.

### The fishing zone

This year the fleet was distributed in the eastern Atlantic from 10°S to 28°N latitude and 50°W longitude to the African coasts. The fleet also fished in the central West Atlantic in the area corresponding to the Cuban flat and its surroundings.

### The catches

The Cuban catch reached 10,100 MT; the species composition in the last six years' catch can be seen in the following table:

<i>Species</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
Bluefin	--	--	--	--	--	--
Yellowfin	3.6	4.9	3.8	2.6	3.6	3.9
Albacore	0.1	--	--	0.1	0.2	0.1
Bigeye	2.0	2.6	2.4	1.9	1.3	1.8
Skipjack	0.1	1.5	1.9	2.6	3.0	2.5
Marlins	0.3	1.0	2.3	1.4	1.3	1.3
Carrita-Sierra	--	0.7	0.6	0.6	0.5	0.4
Other species	0.6	1.1	0.3	1.0	0.4	0.1
Total	6.7	11.8	11.3	10.2	10.2	10.1

Original report in Spanish.

## Research

During 1977 research continued on yellowfin and bigeye caught by the longline fleet in the Atlantic.

In the central West Atlantic, in the area of the Cuban flat, monthly biological samplings were conducted in all the skipjack fishing zones. Besides, catch and effort data were compiled from all the boats dedicated to this fishery.

A preliminary evaluation of the skipjack spawning stock was conducted, based on the abundance of eggs and larvae while the sampling of eggs and larvae from the western Atlantic area continued.

Yellowfin and bigeye research was increased and as a result, the following documents, prepared by the "Centro de Investigaciones Pesqueras", were distributed among the participants at the SCRS meeting.

RODRIGUEZ, A., S. VALLE and R. VALDES

Composición por largo y proporción entre los sexos del atún aleta amarilla (*Thunnus albacares*) en el Atlántico Centro Oriental.

VALLE, S., N. MEZENTSEVA and A. RODRIGUEZ

- a) Nota sobre el contenido estomacal del atún ojo grande (*Thunnus obesus*) en el Atlántico Centro Oriental.
- b) Contenido estomacal del atún de aleta amarilla (*Thunnus albacares*) en el Atlántico Centro Oriental.

VALLE, S. and A. RODRIGUEZ

- a) Intensidad total de pesca de la pesquería con palangre de Cuba para el atún aleta amarilla (*Thunnus albacares*) en el Océano Atlántico, 1973-1977.
- b) Analisis de cohortes de la pesquería del atún grande (*Thunnus obesus*) en el Océano Atlántico.

## STATUS OF THE FISHERY IN FRANCE

by  
H. ALONCLE<sup>1</sup>

### Status of fishing in France

In 1977, it is estimated that 77,000 MT of tunas were caught off the coasts of France and in high seas<sup>2</sup>

### Development of the catches

	1971	1972	1973	1974	1975	1976	1977
Albacore	9.8	9.8	6.0	7.5	5.6	6.1	5.9
Yellowfin	25.9	35.6	32.3	31.5	38.0	48.0	37.9
Skipjack	19.5	20.5	12.7	24.5	11.4	18.4	24.8
Bigeye	0.5	0.3	2.5	0.5	0.04	1.0	3.0
Bluefin	3.4	2.8	1.5	2.3	2.3	3.8	3.7
Thousand tons	59.1	69.0	55.0	66.3	57.34	77.3	75.3

### *Albacore*

In 1977, 5,961 MT of albacore were landed by 167 vessels registered at French Atlantic ports, as opposed to 189 vessels in 1976. In the regions of Brittany and Vendée, 549 trips were made, as opposed to 624 in 1976.

### *Bluefin*

During 1977, 3,181.8 MT of bluefin tunas were landed by French Mediterranean purse seiners. Sampling was carried out on 102,357 fish with a total weight of 2,036.757 MT, or 64 % of the total bluefin catch.

1 "Institut Scientifique et Technique des Pêches Maritimes", B. P. 1049 - 44037-Nantes, France.

2 Statistics from the Merchant Marine.

Original report in French.



A total of 104 days produced catches of bluefin, of which 75 days were in the Gulf of Lyon and 29 in the Gulf of Gênes. Twenty-five purse seiners participated in the bluefin trips in the Mediterranean.

*Tropical tunas (yellowfin, skipjack, bigeye)*

The total catch is estimated at approximately 66,000 MT, between 25 ice baitboats, 4 freezer baitboats, 7 purse seiners and 22 large purse seiners.

**Research carried out by ISTPM**

Three cruises were carried out by the oceanographic vessel "La Pélagia", from May 26 to June 29 in the area of the Azores Islands; from July 7-28 northwest of the Cape Finisterre and from September 23 to October 19. This last cruise was primarily directed towards research on young albacore off the west coast of the Iberian Peninsula. During these three cruises, 577 albacore, 26 bigeye and 2 bluefin were tagged in order to study the migration and heterogeneity of the albacore stock.

From September 1 to October 14, an exploratory cruise carried out by the oceanographic vessel "Thalassa" studied the area comprised between Azores, Madeira and the Canary Islands and 35°W. During this last cruise 191 bigeye from 5 to 35 kg were tagged.

During the past year, 6 tags from albacore and 1 from bigeye were returned to ISTPM.

A technological study on tuna seines was undertaken.

For the Mediterranean statistical updating was continued and a growth study of the first six age classes was made based on data collected during fishing cruises from 1975 to 1977. With the collaboration of the Association des Pêcheurs Sportifs Méditerranéens (A.G.F.A.), a network of biometric data collection and biological samples was established for studies on growth, food or biochemistry of bluefin tunas.

**Research carried out by ORSTOM**

Research was carried out on yellowfin, skipjack and bigeye. These studies were carried out in coordination with national research programs of Senegal and Ivory Coast. The research conducted by ORSTOM is shown in the national reports of Senegal and Ivory Coast.

**Research carried out by CNEXO**

Research was carried out on albacore and bluefin tuna based on national data from the surface fishery and oriental longline data for albacore. This allowed for the completion or revision of basic data for each fishery. A special effort was made for the following: recruitment analysis, studies between the relationship of the spawning stock and apparent recruitment for the surface fisheries, the effect of a change in fishing strategy on the whole stock production and yield per fishery (surface, trolling and live bait, winter and summer longline).

## GHANAIAN NATIONAL REPORT - TUNA FISHERY - 1977

### 1. Tuna fleet

In the year under review, sixty-two tuna vessels were registered, out of which forty-one operated. These were made up of thirty-six foreign and five Ghanaian boats.

The Ghanaian fleet consisted of the following:

<i>Vessel</i>	<i>Type</i>	<i>GT</i>
Mary Radine	Baitboat	283.88
No Catch No Pay	"	284.73
Joy	"	253.88
Leader	"	251.90
Fernada Marisa	"	282.94

The foreign fleet comprised the following:

<i>Flag</i>	<i>Type</i>	<i>Number</i>	<i>Range in GT</i>
Japanese	Baitboat	18	253.76-299.96
Korean	"	5	188.84-269.09
Panamanian	"	11	235 -457
"	Motherboat	1	1,319
Netherland	Baitboat	1	254

Furthermore, the Ghanaian artisanal fleet continued to catch tunas and related species in 1977.

### 2. Landings

The following are the landings in metric tons by the foreign and Ghanaian flag vessels during the year 1977.

Original report in English.

<i>Species</i>	<i>Foreign flag</i>	<i>Ghanaian Industrial</i>	<i>Ghanaian Artisanal</i>	<i>Total</i>
Yellowfin	4,351.302	615.686	5.000	4,971.988
Skipjack	22,840.906	3,492.483	3,928.000	30,261.389
Bigeye	2,086.996	230.066	78.000	2,395.062
Little tuna	468.391	53.742	13.000	535.133
Frigate tuna	--	--	19,189.000	19,189.000
Others	258.265	1,037.263	6,883.000	8,178.528
Total	30,005.935	5,429.240	30,096.000	65,531.175

For the past three years there have been significant increases in the total landings (foreign, Ghanaian industrialised and artisanal) of the tunas. These were 30,530.667 MT, 42,552.209 MT and 65,531.165 MT for the years 1975, 1976 and 1977, respectively. Landings by the Ghanaian fleet also showed significant increase in 1977; the figure rose from 14,350.751 MT in 1976 to 35,525.240 MT in 1977. This increase was due to the performance by the artisanal fleet.

There were increases in the landings of yellowfin and skipjack from 2,667.052 MT and 27,031.657 MT in 1976 to 4,971.988 MT and 30,261.389 MT, respectively, in 1977. However, there was a decrease in the landing of bigeye from 6,890.056 MT in 1976 to 2,395.062 MT in 1977.

Like the previous year, landings by the industrial fleet during the first and second quarters were low (7,541.114 MT and 5,038.304 MT) while the landings during the third and fourth quarters were high (11,297.992 MT and 11,557.765 MT).

### 3. Research

The biennial (1977-78) research programme outlined in the 1976 Country Report was followed as much as possible. Thus, research into the biology and the population dynamics of the tunas continued during the year under review.

#### *Biological sampling*

Sampling of yellowfin, skipjack and bigeye tunas continued. The sampling was carried out for studies into the length frequency distributions, maturity and feeding of these tunas. A total number of 7,880 yellowfin, 8,450 skipjack and 4,400 bigeye were measured during the year.

The length frequency distribution continued to demonstrate the predominance of young tunas off Ghana.

The Research and Utilisation Branch of the Fisheries Department continued to assist the tuna fleet in identifying the young yellowfin and the bigeye tunas.

#### *Discards*

The problem of discards of undersize yellowfin at sea continued to engage the attention of the Research and Utilisation Branch. Forms were designed and distributed to all tuna fishing companies and captains to fill in information regarding the magnitude and the rate at which immature yellowfin were discarded at sea. Unfortunately, the response from the fleet has not been encouraging as most of the fleet have not been filling in the forms.

*Co-operation in Research*

Ghana continued her co-operation in tuna research with the "Centre de Recherches Océanographiques" of Abidjan. The co-operation involved exchange of scientific data.

# JAPANESE TUNA FISHERIES AND RESEARCH IN THE ATLANTIC, 1977-1978

by

SUSUMU KUME

Far Seas Fisheries Research Laboratory

## 1. Fishing activities

In 1977, Japanese tuna fisheries in the Atlantic harvested about 44,000 MT (preliminary figure) of tunas and tuna-like fishes, which was the same level of the last two years (Table 1 and Fig. 1). Activities of the longline and pole-and-line fleets were very similar to the preceding year (Table 2), and the respective catches by both fisheries were almost the same. The Japanese purse seine fleet ceased its operation in early 1975.

In the earlier half of 1978, the Atlantic longline fleet remained about the same size, two thirds of which (more than usual) engaged in southern bluefin fishing. The number of pole-and-line boats based in Atlantic ports was 18, of which 13 boats actually participated in the fishing.

### 1.1 Longline fishery

The 1977 catch of the longline fishery was 23,000 MT, which amounted to almost the same as the previous year's catch. The recent main pursuit of the Japanese longline fleet has been bigeye, bluefin and southern bluefin tunas, the combined catch of which was 18,300 MT, more than two-thirds of the total longline catch, whereas the catches of albacore and yellowfin tuna, 2,400 MT, were further decreased and were only one-tenth of the total (Table 3). All 179 longline boats, which operated in the Atlantic in 1977 were based exclusively in Japan. One-third of them engaged solely in southern bluefin fishing in the area off southern Africa. The duration of each trip for most of the vessels exceeded more than one year and some of them operated in the Pacific and Indian Oceans, besides the Atlantic, to complete their trips.

In the first half of 1978, the monthly number of the longliners in the Atlantic ranged from 75 to 150, two-thirds of which concentrated on southern bluefin fishing. Except for the southern bluefin fishing, the extent of the longline activity has declined compared with the previous year.

Original report in English.

In compliance with the ICCAT regulation on bluefin tuna, Japanese fishermen have been under internal regulatory measures since April, 1975. The enforcement is made up of a combination of the closure of a certain fishing area and a catch quota. The 1977 catch of bluefin tunas was estimated to be about 5,400 MT, including the Mediterranean catch, which was almost similar to the catch of the preceding three years. In May and June of 1978, the Fishery Agency dispatched a patrol boat to monitor the longline fleet for implementing the bluefin regulatory measures.

## 1.2 Pole-and-line fishery

The Japanese pole-and-line fleet based at Tema, Ghana, consisted of 18 boats in 1977 and harvested 21,000 MT of tunas, almost the same as that of the previous year. The species which predominated in the 1977 catch was skipjack, which made up about 80 % of the total pole-and-line catch (Table 4). The second and the third important species were yellowfin and bigeye tunas, representing 12 % and 6 % of the catch, respectively.

During the period from January to June, 1978, 13 boats out of 18 based at Tema actively fished in the Gulf of Guinea and unloaded about 5,520 MT: 4,900 MT of skipjack, 240 MT yellowfin tuna, 240 MT bigeye tuna and 140 MT other species.

Concerning the yellowfin minimum size regulation, continuous effort has been given by the Tema-based fleet to avoiding the capture of very small-sized yellowfin tuna and to strengthening the identification of species between young yellowfin and bigeye tunas. A government official was sent to Tema to inspect the implementation of the yellowfin size regulation and to give direct guidance to the fishermen.

## 2. Research activities

The research on Atlantic tunas and billfishes was continued extensively during the period 1977 to 1978.

### 2.1 Catch and effort statistics

#### *General catch statistics (Task I)*

The 1976 final figures of the official catch statistics for the longline and pole-and-line fisheries were provided by the Statistics and Information Department of the Ministry of Agriculture and Forestry. The data pertinent to the Atlantic tunas and billfishes were reported to the ICCAT as final figures. The catches by species in 1977 and in the first half of 1978 were estimated by the Far Seas Fisheries Research Laboratory (FSFRL), as preliminary figures as of September, 1978.

#### *Detailed statistics (Task II)*

The Fishery Agency has been continuously collecting fishing logbooks from major tuna fisheries. These data are adequate enough to compile Task II statistics. The annual report of the 1976 catch and effort statistics by area was published in March, 1978

(Fishery Agency 1978). The final data compilation for the longline fishery for 1977 is now under way and the provisional statistics were prepared for submission to the ICCAT, as of August, 1978. The 1977 Task II statistics for the pole-and-line fishery were completed in June, 1978.

## 2.2 Length statistics (Biological sampling)

An on-board survey program for length measurement has been carried out by most of the tuna fleet in the Atlantic. Because of this intensified sampling scheme, Japanese biological data have been remarkably improved. In 1977, length data obtained in 1976 and reported to the FSFRL by September were compiled for tunas and billfishes. The results for the Atlantic were tabulated and submitted to the ICCAT in February, 1978. Provisional tabulations for the 1977 size data were made available for the data collected up to June, 1978, and were immediately sent to the ICCAT.

## 2.3 Stock Assessment

To evaluate the effective effort of the longline fishery by species, the FSFRL estimated it with the overall fishing intensity based on the Japanese and Taiwanese longline fisheries for the years up to 1976.

Studies on biology and population dynamics of the Atlantic tuna and billfish resources were continued in 1978 to elucidate the stock structure, estimate various population parameters and assess recent stock conditions. The results were presented to the SCRS at the 1978 ICCAT meeting and are indicated in the document list as shown in the references below.

## 3. References

### FISHERY AGENCY

- 1978 "Annual Report of Effort and Catch Statistics by Area on Japanese Tuna Longline Fishery, 1976." 264 p.

### DOCUMENTS PRESENTED AT THE 1978 SCRS MEETING

#### HISADA, K., C. SHINGU and T. YONEMORI

Recent status of the southern bluefin tuna stock.

#### HONMA, M.

Overall fishing intensity, catch, catch in number by size class and spawning indices of yellowfin tuna in the Atlantic tuna longline fishery, 1956-1976.

KIKAWA, S. and N. HIGASKI

Distribution and apparent relative abundance of skipjack tuna by the Japanese surface fisheries in the Gulf of Guinea.

KIKAWA, S. and M. HONMA

Status of the white and blue marlins caught by the longline fisheries in the North Atlantic Ocean, 1956-76.

KUME, S.

- a) Age composition of the bigeye tuna caught by Atlantic longline fishery, 1976.
- b) A note on the present status of the Atlantic bigeye tuna.
- c) Analysis on the catch of the Japanese pole-and-line fishery in 1977.
- d) Overall fishing intensity of Atlantic longline fishery for bigeye tuna, 1956-1976.

SHINGU, C. and K. HISADA

Analysis on the Atlantic bluefin tuna caught by longline fishery, based on the data up to 1978.

SHIOHAMA, T.

- a) Estimation of overall fishing intensity of Atlantic longline albacore, 1956-1976.
- b) Production model analysis on albacore stock in the South Atlantic, 1956-1976.

SUZUKI, Z.

Yield of Atlantic yellowfin tuna under different hypotheses on the stock structure.



**Table 1. Japanese catch (in metric tons) of tunas and tuna-like fishes  
by types of fisheries, Atlantic and Mediterranean, 1972-1977**

<i>Type of fishery</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977*</i>
Total . . . . .	67,831	64,303	75,048	42,024	42,288	43,637
Longline						
Sub-total . . . . .	45,122	38,008	42,454	35,843	20,678	22,650
Deckloaded						
motherboat . . . . .	3,847	450	—	276	—	—
Homeland-based						
boat . . . . .	39,262	37,059	42,454	35,567	20,678	22,650
Foreign-based						
boat . . . . .	2,013	499	—	—	—	—
Purse seine						
Sub-total . . . . .	7,750	3,348	1,918	291	—	—
Single-boat seiner . . . . .	2,399	2,751	1,918	291	—	—
Double-boat seiner . . . . .	5,351	597	—	—	—	—
Pole-and-line . . . . .	14,959	22,947	30,676	5,890	21,610	20,987

\* Preliminary.

**Table 2. Number of Japanese tuna boats which operated in the Atlantic Ocean and Mediterranean Sea, 1972-1977**

<i>Type of Fishery</i>	<i>Size-class*</i>	1972	1973	1974	1975	1976	1977
Longline	Total	8	1	—	1	—	—
Deckloaded motherboat	210- 500	2	1	—	1	—	—
	501- 1,000	5	—	—	—	—	—
	1,001-	1	—	—	—	—	—
	Total	186	199	221	228	146	179
Homeland-based boat	51- 200	1	—	—	—	—	—
	201- 500	181	199	221	228	146	179
	501- 1,000	4	—	—	—	—	—
	Total	11	2	—	—	—	—
Foreign-based boat	51- 200	2	—	—	—	—	—
	201- 500	9	2	—	—	—	—
Purse seine	Total	2	2	2	1	—	—
Single-boat seiner	101 200	—	—	—	—	—	—
	201- 400	1	1	1	1	—	—
	401-	1	1	1	—	—	—
Double-boat seiner**	Total	3	3	—	—	—	—
	51- 150	3	3	—	—	—	—
Pole-and-line	Total	14	22	24	24	15	18
	151-	14	22	24	24	15	18

\* Size for single-boat seiner is expressed in carrying capacity, while that for others is given in gross tonnages.

\*\* Number of double-boat seiners is given in terms of a fishing unit that comprises two net-boats and several carriers.

NATIONAL REPORTS

**Table 3. Catch (in MT) of tunas and tuna-like fishes taken by the Japanese Atlantic longline fishery, 1972-1977**

<i>Years</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
<b>TOTAL</b>	45,122	38,008	42,454	35,843	20,678	22,650
<b>ATLANTIC</b>						
Sub-total	45,009	37,762	40,259	34,583	19,707	22,050
Albacore	3,892	2,154	2,448	1,766	1,418	800
Bigeye tuna	18,525	20,243	21,356	17,664	7,297	10,300
Bluefin tuna	562	1,141	3,100	4,413	4,875	4,800
Southern bluefin tuna	10,775	7,533	6,397	1,690	692	3,200
Yellowfin tuna	7,527	4,189	4,296	5,958	3,366	1,600
Skipjack	3	0	0	1	0	0
Swordfish	2,023	1,186	1,486	1,626	808	670
Blue and black marlin	444	368	310	641	264	200
White marlin	456	366	441	449	543	120
Sailfish	222	144	138	152	137	60
Others	580	438	287	223	307	300
<b>MEDITERRANEAN</b>						
Sub-total	113	246	2,195	1,260	971	600
Albacore	1	0	0	0	1	0
Bluefin tuna	112	246	2,195	1,260	968	600
Bigeye tuna	0	0	0	0	1	0
Swordfish	0	0	0	0	1	0

\*Preliminary.

**Table 4. Catch (in MT) of tunas and tuna-like fishes taken by the Japanese Atlantic pole-and-line fishery, 1972-1977**

<i>Years</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
<b>TOTAL</b>	14,959	22,947	30,676	5,890	21,610	20,987
Albacore	0	0	0	0	0	2
Bigeye tuna	0	190	606	328	3,588	1,144
Yellowfin tuna	4,425	8,068	9,518	1,270	2,225	2,451
Skipjack	10,149	13,401	19,798	4,100	15,042	16,845
Frigate tuna	25	1,237	461	17	14	89
Others	360	51	293	175	741	456

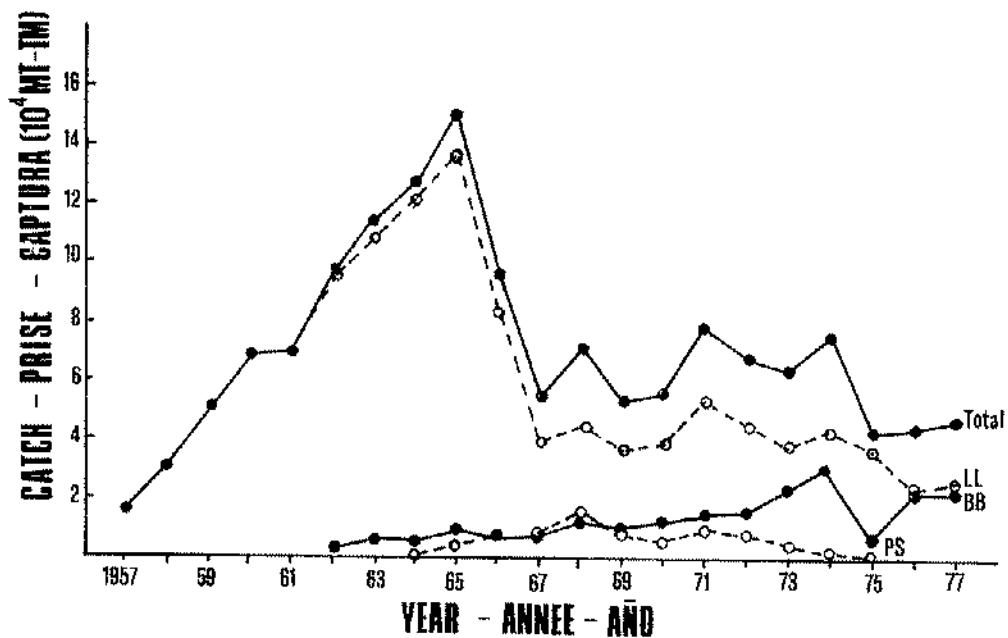


Fig. 1. Annual yield of the Japanese tuna fisheries in the Atlantic Ocean, 1957-1977.

## KOREAN FISHERIES AND RESEARCH ACTIVITIES ON TUNAS AND TUNA-LIKE FISHES IN THE ATLANTIC OCEAN IN 1977

### 1. Fishing activities

The Korean commercial catch of tuna and tuna-like fishes in the Atlantic Ocean increased to 45,051 MT in 1977 from 34,914 MT in 1976 (Table 1). This is about 29 % more than that of the previous year, and 4 % less than that of 1975 (46,949 MT).

A breakdown of the total catch by type of gear is as follows: 120 longliners caught 38,849 MT, which is about 23 % more than that of 1976 and 15 baitboats caught 6,202 MT, about 86 % more than that of the previous year.

#### 1.1 Longline fishery

The catch of the longline fishery in 1977 was recorded to be about 38,849 MT which is 23 % more than the previous year and corresponds to 86 % of the total catch in 1977. The catch of this fishery by species (Table 2) consisted of 16,347 MT yellowfin (42 % of the longline catch), 9,345 MT albacore (24 %), 7,610 MT bigeye (20 %), 1,240 MT billfishes (3 %). Yellowfin and albacore catches showed a slight increasing trend from 1974, but the bigeye catch decreased. The bluefin catch has decreased continuously. However, the albacore catch continued to maintain its increasing trend since 1974. Owing to the increase in the catch of yellowfin and bigeye tuna, the total catch increased in 1977 and returned to the high recorded in 1975.

#### 1.2 Pole-and-line fishery

In 1977, 15 Korean baitboats participated in the tropical tuna fishery of the east Atlantic Ocean. The fleet caught 3,600 MT of skipjack tuna, 640 MT of bigeye tuna, 1,074 MT of yellowfin tuna and 887 MT of unclassified species (Table 3), which totaled 6,202 MT. This is about 86 % more than that of the previous year, corresponding to 14 % of the total Korean catch in 1977. This was due to the increase in the number of fishing boats.

Original report in English.

## 2. Research activities

Korean research activities on tuna and tuna-like fishes of the Atlantic Ocean has been carried out by the Fisheries Research and Development Agency in Pusan, Korea (KFRDA). Since two scientists were dispatched in 1975, one in 1976 and 1977 to the Korean fishing bases in the Atlantic, noticeable progress has been made, especially in statistical accomplishments. As a result of the trips, scientists presented documents to the SCRS meeting for the last two years. In 1978, KFRDA initiated tagging of big tunas and skipjack by Korean longliners throughout all the oceans in which they operate, and we expect that valuable information will be collected on tuna resources.

Since the previous year, according to the governmental measures, fishing information should be submitted by firms and captains of the boats and those data are being collected gradually. The fishermen have been taught to avoid very small size tunas in the catch in conformity with the regulations.

**Table 1. Korean catch (in metric tons) and number of boats of tunas and tuna-like fishes in the Atlantic Ocean, since 1964**

Year	Number of boats			Catch (MT)		
	Longline	Baitboat	Total	Longline	Baitboat	Total
1964	1	—	1	167	—	167
1965	9	—	9	520	—	520
1966	54	—	54	7,114	—	7,114
1967	56	—	56	12,836	—	12,836
1968	49	—	49	12,624	—	12,624
1969	67	—	67	12,594	—	12,594
1970	105	—	105	34,865	—	34,865
1971	117	—	117	37,142	—	37,142
1972	105	2	107	36,345	—	36,345
1973	106	3	109	32,638	1,822	34,460
1974	124	8	132	33,910	4,416	38,326
1975	118	8	126	39,296	7,653	46,949
1976	121	6	127	31,575	3,339	34,914
1977	120	15	135	38,849	6,202	45,051

**Table 2. Catch (MT and % in *italics*) by species of tunas and tuna-like fishes taken by the Korean longline fishery in the Atlantic Ocean, 1971-1977**

Year	Bluefin	Yellow-fin	Albacore	Bigeye	Skip-jack	Sword-fish	Unclassified and others	Total
1971	3,039	9,901	11,539	7,353	47		5,263	37,142
	<i>8.2</i>	<i>26.6</i>	<i>31.1</i>	<i>19.8</i>	<i>0.1</i>		<i>14.2</i>	
1972	30	11,078	13,577	5,730	45		5,885	36,345
	<i>0.1</i>	<i>30.5</i>	<i>37.4</i>	<i>15.8</i>	<i>0.1</i>		<i>16.2</i>	
1973	66	12,844	8,525	5,829	—		5,374	32,638
	<i>0.2</i>	<i>39.3</i>	<i>26.1</i>	<i>17.9</i>			<i>16.5</i>	
1974	56	15,518	5,216	7,372	116		5,632	33,910
	<i>0.2</i>	<i>45.8</i>	<i>15.4</i>	<i>21.7</i>	<i>0.3</i>		<i>16.6</i>	
1975	23	15,344	6,073	10,162	196		7,498	39,296
	<i>0.1</i>	<i>39.0</i>	<i>15.5</i>	<i>25.9</i>	<i>0.5</i>		<i>19.1</i>	
1976	10	11,211	8,755	6,747	26	1,147	3,679	31,575
	<i>0.0</i>	<i>35.5</i>	<i>27.7</i>	<i>21.4</i>	<i>0.1</i>	<i>3.6</i>	<i>11.7</i>	
1977	3	16,347	9,345	7,610	9	1,240	4,295	38,849
	<i>0.0</i>	<i>42.1</i>	<i>24.1</i>	<i>19.6</i>	<i>0.0</i>	<i>3.2</i>	<i>11.1</i>	

**Table 3. Catch (MT and %o in italics) by species of tunas and tuna-like fishes taken by Korean baitboats in the Atlantic Ocean, 1973-1977**

<i>Year</i>	<i>Yellowfin</i>	<i>Bigeye</i>	<i>Skipjack</i>	<i>Unclassified and others</i>	<i>Total</i>
1973	900 <i>49.4</i>	—	922 <i>50.6</i>	—	1,822
1974	2,169 <i>49.1</i>	4 <i>0.1</i>	2,123 <i>48.1</i>	120 <i>2.7</i>	4,416
1975	1,259 <i>16.5</i>	1,750 <i>22.9</i>	4,469 <i>58.4</i>	175 <i>2.3</i>	7,653
1976	365 <i>10.9</i>	810 <i>24.3</i>	1,948 <i>58.3</i>	216 <i>6.5</i>	3,339
1977	1,075 <i>17.3</i>	640 <i>10.3</i>	3,600 <i>58.1</i>	887 <i>14.3</i>	6,202

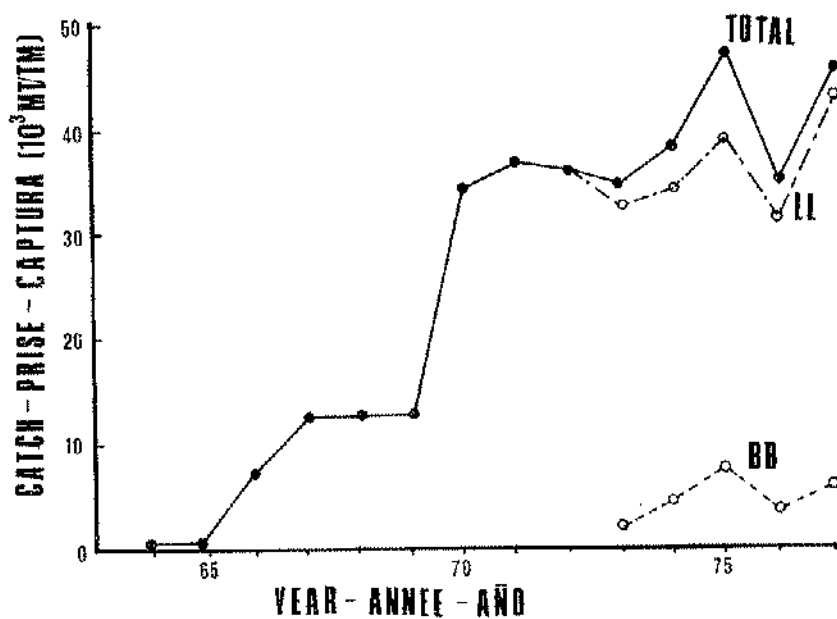


Fig. 1. Annual yield of Korean tuna fisheries in the Atlantic Ocean, 1964-1977.



## NATIONAL REPORT OF PORTUGAL

In 1977, Portuguese landings amounted to 9,277 MT. This total represents a 60 % increase as compared to 1976 (Table 1).

Baitboat landings composed 65 % of the total landings (which indicates that it is the most used gear) as in the previous years.

Table 1 indicates that skipjack has become the most important landed species - 4,662 MT, more than 50 % of the total landings. These fish came mostly from the Azores Islands.

Concerning the breakdown of catch by regions (Table 2), it can be noted that 45 % of the landings took place in Madeira, 23 % in Horta, 20 % in Angro do Heroismo and 14 % in Ponta Delgada.

Tunas are caught throughout the year but the majority of the catches, about 88 %, were recorded from May to September.

Table 1. Breakdown of Portuguese landings by species, 1974-1977 (MT)

<i>Species</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>
TOTAL	12,320	6,790	5,786	9,227
Bluefin	1	321	628	233
Yellowfin	1,253	54	313	224
Albacore	1,246	1,034	504	108
Bigeye	9,079	4,906	2,107	3,960
Skipjack	0	475	2,223	4,662
Others	741	0	11	40

Table 2. Landings by areas and by species - 1977 (MT)

	<i>TOTAL</i>	<i>Bluefin</i>	<i>Yellowfin</i>	<i>Albacore</i>	<i>Bigeye</i>	<i>Skipjack</i>	<i>Others</i>
	9,227	233	224	108	3,960	4,662	40
Madeira	3,923	9	—	68	3,405	435	6
Açores	5,304	224	224	40	555	4,227	34
P. Delgada	1,308	22	7	—	108	1,142	29
A. Heroismo	1,831	43	64	36	226	1,457	5
Horta	2,165	159	153	4	221	1,628	—

## REPORT ON TUNA FISHING AND RESEARCH IN SENEGAL IN 1976-1977

### 1. Tuna fishing

Tuna landings and transshipments in Dakar in 1977 and 1978 are shown in the attached table.

In 1977, the fleet based at Dakar was comprised of 27 baitboats (23 ice and 4 freezer) and 4 purse seiners. Landings (indicating a 20 % increase since 1976) amounted to 11,500 MT (4,400 MT of yellowfin, 4,400 MT of skipjack and 2,600 MT of bigeye). The CPUE for yellowfin remained constant, while CPUE for bigeye and skipjack showed a large increase.

In 1978, 13,400 MT of tunas (18 % more than in 1977: 4,250 MT of yellowfin, 6,250 MT of skipjack, 2,900 MT of bigeye) were landed by 28 baitboats and 6 purse seiners. This increase is due to the purse seine landings. The CPUE increased 10 % for baitboats (essentially for skipjack), and decreased 14 % for purse seiners.

However, transshipments decreased sharply: in 1978, 18,500 MT were transshipped this is less than the 1976 level (29,600 MT) and indicates a 57 % decrease from 1977. The catches are from the large purse seiners of the Spanish and French-Ivorian fleets.

### 2. Research

Sampling activities and the collection of statistics as well as population dynamic studies were continued. The agreement made with the "Instituto Español de Oceanografía", allowing the "Centre de Recherches Océanographiques" of Dakar-Thiaroye to sample the Spanish transshipments in Dakar has been extended. This allowed for 117 samples of the three species from 27 landings in 1978. This total, less than the previous years (250 samples in 1976, and 320 in 1977) is due to fewer tuna landings from the Spanish fleet at Dakar, as well as an increase of transshipments in mid-harbor.

Research activities were still mainly directed to skipjack problems:

-- The development of studies on skipjack fecundity in the Dakar area, CRODT now has a complete one-year series available.

-- Skipjack growth study, in particular from the analysis of cross section of skip-

Original report in French.

jack dorsal spines. Preliminary results, presented in 1978 to the SCRS confirmed the hypothesis of slow growth. This analysis will be continued in 1979.

-- Exploratory tuna larvac cruises, by the oceanographic vessel "Capricorn" were carried out by CRODT, the synthesis report of these cruises is being prepared and will be published in conjunction with CRO of Abidjan in 1979.

-- A tagging cruise in June, 1978, off the Senegalese-Mauritanian coast tagged approximately 1,100 tunas of three species (140 yellowfin, 120 skipjack and 840 bigeye). At the end of 1978, approximately 120 tunas had been recaptured.

-- At the last SCRS meeting, CRODT was assigned various tasks for the International Skipjack Year Program. Two scientists of the center are in charge of tagging and fecundity studies.

### 3. Work presented by CRODT to the ICCAT meeting

CAYRE, P.

Détermination de l'âge des listaos, *Katsuwonus pelamis* L., débarqués à Dakar - Note préliminaire (SCRS/78/50).

PIANET, R. and E. YANEZ

Les prises de listao de la flottille palangrière commerciale japonaise, 1956-1976 - (SCRS/78/79).

PIANET, R.

Etat des stocks de listao (*Katsuwonus pelamis*) de l'Atlantique est au 31 Décembre, 1977 (SCRS/78/68).

**The tuna fishery at Dakar - 1977-1978**

<i>Fishery</i>	<i>1 9 7 7</i>						<i>1 9 7 8</i>					
	<i>Number boats</i>	<i>Effort</i>	<i>Yellowfin</i>	<i>Skipjack</i>	<i>Bigeye</i>	<i>Total</i>	<i>Number boats</i>	<i>Effort</i>	<i>Yellowfin</i>	<i>Skipjack</i>	<i>Bigeye</i>	<i>Total</i>
<b>Dakar-based (landings)</b>												
- Baitboats	27	3,200	3,600	2,800	2,500	8,900	28	3,150	3,050	3,450	2,600	9,100
- Purse seiners <sup>1</sup>	4	450	800	1,600	100	2,500	6	850	1,200	2,800	300	4,300
- Total	31	3,650	4,400	4,400	2,600	11,400	34	4,000	4,250	6,250	2,900	13,400
<b>Foreign-based (transshipments)</b>												
- FIS	22	2,150	13,700	7,000	500	21,200	18	1,100	8,700	2,350	—	11,050
- Spanish <sup>2</sup>	28	2,750	7,400	13,500	1,100	22,000	20	1,100	2,600	4,500	400	7,500
- Total	50	4,900	21,100	20,500	1,600	43,200	38	2,200	11,300	6,850	400	18,550
<b>Total transit</b>	<b>81</b>	<b>8,550</b>	<b>25,500</b>	<b>24,900</b>	<b>4,200</b>	<b>54,600</b>	<b>72</b>	<b>6,200</b>	<b>15,550</b>	<b>13,100</b>	<b>3,300</b>	<b>31,950</b>

1 Dakar-based purse seiners (ex SOSAP)+Vendôme+Irrintzina.

2 Estimates based on surveys made by CRODT for the I.E.O.

Catch in MT (rounded out), effort in days at sea.

## NATIONAL REPORT - SOUTH AFRICA

### 1. The fishery

The fishery was conducted by four vessels equipped with purse seine nets and 40 sport fishing boats with commercial licences.

There was an increase in the catch compared to that of the previous year, but it was still well below 1,000 MT. Yellowfin was more in evidence than usual and the total catch consisted of approximately 59 % yellowfin, 26 % albacore, 14 % skipjack and 1 % bonito.

### 2. Biological sampling

Because of higher priority given to other areas of research, work on tuna has been limited to sampling some of the purse seine catches. Measurements of 378 skipjack and 228 yellowfin were taken.

A total of 5,852 albacore were measured from tuna transhipped by foreign boats in Table Bay Harbour.

### 3. Environment

Monthly biological and hydrographic surveys were carried out from August, 1977, at a series of stations between 31°40'S on the South African west coast and 21°30'E on the south-east coast.

Original report in English.

## NATIONAL REPORT OF SPAIN - 1977-78

by

A. GONZALEZ-GARCES  
Spanish Oceanographic Institute

In 1977, Spain caught the following amounts of major tuna species in the Atlantic.

Gulf of Guinea	
Yellowfin	37,276 MT
Skipjack	29,067 MT
Others	2,664 MT

Canary Islands	
Bigeye	3,561 MT
Bluefin	1,250 MT
Yellowfin	273 MT
Albacore	975 MT
Skipjack	728 MT

Other areas of Spain	
Albacore	24,180 MT
Bluefin	957 MT
Swordfish	4,000 MT

The effort trend during 1977 differed according to the fishing zone. In the Gulf of Guinea it tended to increase while effort of the Canary Islands and the rest of the fishing zones decreased. For some species, such as bluefin, this decrease in effort was almost 50 %.

In 1977 various tuna tagging cruises and larval research cruises were carried out. Two tagging cruises were conducted in the Mediterranean Sea and one in the Bay of Biscay. The "Commedoc II" cruise was conducted in the western Mediterranean to study spawning and the spawning stock of bluefin and other tunas

Original report in Spanish.

(*T. alalunga* and *A. thazard*) . In the last quarter of the year, Spain participated with the ISTPM of France in a tuna research and tagging cruise in the Atlantic between the Azores and the Canary Islands.

In 1978, tuna research continued in Spain, and at the moment we can only give a preview of what has been done up to now (October, 1978).

During this time, albacore, bluefin and swordfish catches have been maintained at levels similar to those in 1977, but fishing effort has decreased for the three species. Yellowfin and skipjack catches in the Gulf of Guinea during the first 6 months of this year have been inferior to those of the same period last year. However, it is hoped that the situation will become normal during the last 6 months.

Following the recommendations made by ICCAT concerning the tagging of bluefin, a tagging cruise on this species was conducted in the Bay of Biscay. This cruise had very satisfactory results and 308 fish were tagged (see SCRS/78/46). It is hoped that this type of cruise will be continued in the future and that the number of fish tagged per cruise will increase.

Experimental tuna tagging was developed in a trap in order to study the possibilities of tagging in this gear type and whether or not to use this method in the future.

In July, a cruise was conducted in the waters off northern Sicily on-board an Italian fishing vessel. The purpose of the cruise was to study spawning and, in particular, to study the mortality curve of the egg-larvae phase of bluefin and other tuna species.

During the summer, short cruises were conducted in the Mediterranean for the study of the extent of the spawning period of tunas in this zone.



REVIEW OF UNITED STATES FISHERIES AND RESEARCH  
ACTIVITIES ON TUNAS AND TUNA-LIKE FISHES  
OF THE ATLANTIC OCEAN FOR 1977-1978

by

NATIONAL MARINE FISHERIES SERVICE<sup>1</sup>

**United States fisheries**

U. S. commercial fisheries for tunas and tuna-like fishes in the Atlantic Ocean improved in 1977 (Table 1). The total catch was 7,000 MT (metric tons) greater than that for 1976. Sharply higher catches were recorded for yellowfin tuna, *Thunnus albacares*, and skipjack tuna, *Katsuwonus pelamis*, due to increased participation of American purse seiners in the tropical tuna fisheries.

**Tropical tunas**

A total of 12 American purse seiners participated in the Atlantic tropical tuna (yellowfin and skipjack) fishery in 1977, an increase of 5 seiners over 1976. Their total catch was 7,207 MT of yellowfin tuna, 5,931 MT of skipjack tuna, and 447 MT of incidental species including bigeye tuna, *T. obesus*, albacore, *T. alalunga*, little tunny, *Euthynnus alletteratus*, and unclassified species.

Most of the U.S. fishing was concentrated in the eastern tropical Atlantic where approximately 1,700 days of fishing were expended by the American fleet. The catch rates were 4.4 MT of yellowfin tuna per day's fishing and 3.8 MT of skipjack tuna per day's fishing. These catch rates are lower than those experienced by the fleet in 1976 (Table 2).

The U.S. tropical tuna fishery operated under a minimum size regulation of 3.2 kg for yellowfin tuna with a 2 % by weight incidental catch allowance of undersized fish per boat landing. The overall fleet's catch of undersized yellowfin tuna in 1977 was approximately 5 % of the total yellowfin catch.

This year, 1978, a greater number of American vessels will participate in the

<sup>1</sup> Prepared by staff members of the Southwest Fisheries Center, La Jolla, California, and the Southeast Fisheries Center, Miami, Florida.

Original report in English.

fishery. An estimated 23 American purse seiners are expected to fish in the eastern Atlantic. As of October 1, the average catch was 16,000 MT of tuna.

#### Temperate tunas

The bluefin tuna, *T. thynnus*, fishery of the northwestern Atlantic Ocean is an important fishery for the United States. In 1977, as in 1976, the fishery operated under strict size, catch and season regulations. This resulted in a total catch of 1,956 MT, which is about the same level as in 1976 (Table 3).

Similar regulations are in effect for the 1978 fishery. As of October 12, estimated total catch is 1,823 MT. The year's total catch is expected to be about the same as recorded in 1977.

#### Miscellaneous tuna-like species

The United States commercial fishery for Spanish mackerel, *Scomberomorus maculatus*, and king mackerel, *S. cavalla*, is centered primarily off Florida. Landings in 1977 were slightly lower than those of 1976. For the past 11 years, the trend in landings for this fishery has been fairly stable.

#### Research activities

United States research responsibilities for Atlantic tuna and tuna-like fishes are divided between the Miami Laboratory of the Southeast Fisheries Center (SEFC) and the La Jolla Laboratory of the Southwest Fisheries Center (SWFC). Studies in 1977-1978 involved life history, stock assessment, fishery evaluation and related topics in support of domestic management requirements and in response to recommendations of the SCRS of ICCAT. Research on Atlantic bluefin tuna and billfishes (Istiophoridae and Xiphiidae) were conducted by the SEFC, and research on tropical tunas and albacore were conducted by the SWFC. The results of the research are contained in documents submitted to the 1978 SCRS.

#### Tropical tunas

During 1977-1978, research continued on stock assessment and fishery evaluation of the Atlantic tropical tunas. The U.S. fishery was closely monitored and biological and fishery data collected. Import landings of Atlantic-caught tunas were sampled for biological information in Puerto Rico. A data management system for tuna fishery data was revised and plans for United States participation in ICCAT's International Skipjack Year Program finalized.

Analysis of fishery and biological data were also performed. Major emphasis was on assessing the condition of the yellowfin tuna stocks, evaluating the effects of alternative stock structure hypotheses on assessment results and adjusting the reported ICCAT catches of yellowfin and bigeye tunas for misidentification of young of both species.

### Temperate tunas

Research continued on the status of stocks, fecundity, spawning, larvae abundance, age and growth, and stock identification of bluefin tuna. An analysis of the status of stocks by the method of cohort or virtual population analysis was completed. The analysis is based on a revised bluefin tuna data base for all bluefin tuna fisheries and includes the most recent information available on the relationships between age, length, weight, sex and growth from tag returns and from analysis of otoliths, vertebral centra and gonads. Special efforts were made during the 1978 fishing season to sample extensively the U.S. sport and commercial catch of small and giant bluefin tuna and the catch of other nations fishing within the 200-mile jurisdiction of the U.S. Length and weight measurements and sex determinations were emphasized. Sufficient biological samples taken during the main course of the bluefin tuna fishing season are now on hand awaiting final analysis. Otoliths, vertebrae, and gonads continue to be studied for age, growth, maturity and fecundity. Tagging of small and giant bluefin tuna was conducted in cooperation with the New England purse seine fleet and with recreational fishermen.

Research on albacore continued in 1977-1978. Fishery and biological data on albacore from the north and south Atlantic were compiled and analyzed to determine the condition of the stocks. Major emphasis was on verifying 1976 SCRS results of yield per recruit, recruitment strength and maximum sustainable yield for the fisheries.

### Billfishes

Research on billfishes in 1977 concentrated on sampling of catch and effort at sport fishing tournaments throughout the western North Atlantic and on daily sampling of non-tournament rod-and-reel catches in the Gulf of Mexico. Over 42,000 fishing hours were recorded. Catch per unit of effort in most areas increased for sailfish, *Istiophorus platypterus*, and blue marlin, *Makaira nigricans*, but declined for white marlin, *Tetrapturus albidus*, over that of 1976. Research was completed on the distribution of spawning white marlin in the western North Atlantic and was started on the spawning behavior of blue marlin. Work continued on refining estimates of maximum equilibrium yield for blue marlin and white marlin. Research was initiated on swordfish with collection of data on size, sex, hard parts, and gonads from specimens caught by the rod-and-reel fishery off Florida.

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BAKUN, A.

1978            Guinea current upwelling. *Nature* 271 (5641): 147-150.

BARTOO, N. W.

MS a)            The status of the North Atlantic albacore (*Thunnus alabunga*) stock.

ICCAT REPORT 1978-79 (I)

- MS b) An examination of the harvest status of South Atlantic albacore (*Thunnus alalunga*).

BARTOO, N. W. and A. L. COAN

- MS Changes in yield-per-recruit of yellowfin tuna (*Thunnus albacares*) under the ICCAT minimum size regulation.

BEARDSLEY, G. L. and R. J. CONSER

- MS Length and weight data for western Atlantic swordfish, *Xiphias gladius*.

COAN, A. L. and W. W. FOX, JR.

- MS A production model analysis of yellowfin tuna (*Thunnus albacares*) stocks in the Atlantic ocean, 1964-1977.

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- MS Status of stocks of blue marlin, *Makaira nigricans*, and white marlin, *Tetrapturus albidus*, in the Atlantic Ocean.

PARRACK, M. L. and P. L. PHARES

- MS Aspects of the growth of Atlantic bluefin tuna determined from mark-recapture data.

PARRACK, M. L., S. K. BRUNENMEISTER and S. NICHOLS

- MS An analysis of Atlantic bluefin tuna catches, 1960-1976.

RINALDO, R. G. and A. L. COAN

- MS Effects of Atlantic yellowfin tuna (*Thunnus albacares*) stock structure hypotheses on production model analysis.

RIVAS, L. R. and F. J. MATHER, III

- MS Proposed terminology for size groups of the North Atlantic bluefin tuna (*Thunnus thynnus*).

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- 1977 A review of the yellowfin-skipjack tuna fishery of the Atlantic Ocean and American participation, 1956-75. Marine Fish. Rev.39 (12):1-10.

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MS            Adjusted catches of yellowfin and bigeye tunas for the 1976 Atlantic fishery.

TYLER, J. C., R. E. BAGLIN, JR., M. I. FARBER, F. H. BERRY and L. R. RIVAS

MS            A review of the Southeast Fisheries Center biological and statistical research on the structure and the status of Atlantic bluefin tuna stocks.

**Table 1. Catch and landing (metric tons) of Atlantic tunas and tuna-like fishes by American fishermen, 1967-77<sup>1</sup>**

<i>Year</i>	<i>Blue- fin</i> <sup>2,3</sup>	<i>Yellow- fin</i>	<i>Albacore</i>	<i>Big- eye</i> <sup>2</sup>	<i>Little tunny</i>	<i>Skip- jack</i> <sup>2</sup>	<i>Bonito</i>	<i>Sword- fish</i>	<i>Spanish mackerel</i>	<i>King mackerel</i>	<i>Unclasi- fied</i>	<i>Total</i>
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	-	33,387
1971	3,179	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	-	34,550
1973	1,294	3,590	0	113	20	21,246	261	406	4,437	2,710	-	34,077
1974	1,857	5,621	13	865	51	19,973	92	1,125	4,990	4,747	1	39,335
1975	2,823	14,335	1	67	67	7,567	117	1,700	5,288	3,095	19	35,079
1976	1,931	2,184	0	28	5	2,285	23	1,429	6,385	4,053	30	18,353
1977 <sup>4</sup>	1,956	7,207	2	331	43	5,931	-	-	5,453	3,837	71	24,831

1 Estimated catch is for bluefin tuna, yellowfin tuna, albacore, bigeye tuna, skipjack tuna and little tunny. Landing is for all other species.

Sport catches are not included, except for bluefin tuna.

2 Includes catches of purse seiners flying the flags of Bermuda, Netherlands Antilles, Nicaragua and Panama.

3 Includes small quantities of bigeye tuna prior to 1975.

4 Preliminary, except for the bluefin tuna catch.

**Table 2. Summary of logbook estimates of catch and catch rate of yellowfin and skipjack tunas caught by American seiners<sup>1</sup> in the eastern tropical Atlantic**

Year	Number of seiners	Yellowfin		Skipjack	
		Catch (MT)	Catch rate (metric tons/ days fishing)	Catch (MT)	Catch rate (metric tons/ days fishing)
1967	3	1,000	7.8	500	3.8
1968	8	6,200	23.8	3,200	12.0
1969	25	19,800	10.9	4,400	2.4
1970	23	9,100	4.0	11,400	5.1
1971	24	4,400	2.7	16,100	10.0
1972	33	10,900	3.3	12,200	3.7
1973	24	2,600	2.2		
1973	8	2,600	2.2	20,400	17.0
1974	26	5,600	2.8	20,000	8.7
1975	32	14,000	5.6	7,400	2.7
1976	7	1,706	5.2	1,766	5.1
1977	12	6,400	4.4	5,859	3.8

<sup>1</sup> Purse seiners flying the flags of Bermuda, Canada, Netherlands Antilles, Panama and U.S.A. are included. Data were collected by the Inter-American Tropical Tuna Commission through contract.

**Table 3. Catch (metric tons) and fishing season by size of fish for the United States fishery for Atlantic bluefin tuna**

	1976		1977		1978	
	<i>Catch</i>	<i>Season</i>	<i>Catch</i>	<i>Season</i>	<i>Catch</i>	<i>Season</i>
Small (ages 1-5)						
Purse seine	1,079	10 June - 29 June; 8 July - 18 July	1,058	15 June - 20 June; 1 July - 15 July	912	12 June - 30 22 Aug - 30 Aug.
Sport <sup>1</sup>	29	1 Jan.- 31 Dec.	56	1 Jan. - 31 Dec.	54	1 Jan. - 4 Sep.
Giant (ages 7+)						
Purse seine	169	1 Sep. - 21 Sep.	168	1 Sep. - 18 Sep.	69 <sup>2</sup>	5 Sep. 12 Oct <sup>3</sup>
Hand gear	654	18 May - 31 Dec.	674	1 Jan. - 31 Dec.	788	1 Jan. - 12 Oct. <sup>3</sup>
<b>TOTAL</b>	<b>1,931</b>		<b>1,956</b>		<b>1,823</b>	

1 Sport fishing is with rod-and-reel.

2 Preliminary data. Fishing is still in progress.

3 Includes 3 MT medium-sized fish (ages 5, 6 and 7) caught under special scientific quota.