INTERNATIONAL COMMISSION
for the
CONSERVATION of ATLANTIC TUNAS

R E P O R T
for biennial period, 1974-75
PART I (1974)
English version

MADRID, SPAIN 1975

INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS

Member Countries (as of July 1, 1975)

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

Chairman of Commission

Dr. I. MALICK DIA, Senegal
(from December 4, 1973)

First Vice-Chairman of Commission

Dr. M. P. PAIVA, Brasil
(from December 7, 1971)

Second Vice-Chairman of Commission

Mr. D. S. KIM, Korea
(from December 4, 1973)

Panel Membership (as of July 1, 1975)

Panel	Contracting Parties	Chairman
1	Brazil, Canada, France, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, Spain, U.S.A.	U.S.A.
2	Canada, France, Japan, Korea, Morocco, Portugal, Spain, U.S.A.	Morocco
3	Brazil, Japan, Korea, South Africa, U.S.A.	Japan
4	Canada, Japan, Korea, Portugal, Spain, U.S.A.	Spain

Council (from December 4, 1973)

Chairman: SENEGAL
First Vice-Chairman: BRAZIL
Second Vice-Chairman: KOREA
Countries: CANADA, FRANCE, IVORY COAST, JAPAN, MOROCCO, PORTUGAL, SPAIN, U.S.A.

Standing Committees

Committees:	Chairman
Committee on Finance and Administration (STACFAD)	Dr. B. J. ROTHSCHILD, U.S.A. (from December 4, 1973)
Committee on Research and Statistics (SCRS)	Mr. K. YONEZAWA, Japan (from December 4, 1973)

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, 1974-75, Part I (1974)"***, describing the activities of the Commission during the first half of said biennial period.

The volume contains reports of the Third Regular Meeting of the Council, held in November, 1974, 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.

I. Malick Dia
Commission Chairman

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CHAPTER I

Secretariat Reports

ADMINISTRATIVE REPORT 1974*

CON/74/9 (Amended)

1. Member Countries

The Food and Agriculture Organization of the United Nations (F.A.O.) advised the Secretariat on December 6, 1973, that they had received official notification, dated October 24, 1973, of the decision of the Government of the Republic of Gabon to become a member of ICCAT. FAO sent a detailed reply to the Government of Gabon, indicating that as that country had already signed the Convention (9-VIII-1967), it need only present an instrument of ratification, in accordance with Article XIV of the Convention.

FAO later informed us, on May 10, 1974, that no instrument of ratification had been received and therefore Gabon was not yet a member of the Commission. The Secretariat has written directly to the «Ministère des Eaux et Forêts» requesting information but to date has received no reply. Therefore there has been no change in membership since the last Commission meeting.**

2. Meetings

i) *Meetings in which ICCAT was directly involved during 1974*

a) *Workshop on Tuna Population Dynamics*

The meeting was held at the Institut Scientifique et Technique des Pêches Maritimes (ISTPM), Nantes, France, from September 2-14 under the chairmanship of Dr. B. J. Rothschild. The report of the meetings and relevant documents are being presented at the SCRS meeting (SCRS/74/4 and 7 — Appendix IV to Annex 9 to the Proceedings). The attendance of 5 scientists was financed by the

* Revised version of Administrative Report presented at Council Meeting.

** Cuba became a new member when the country adhered to the Convention on Jan. 15, 1975.

Commission. The Executive, and Assistant Executive Secretaries and two secretaries assisted the group for either the whole, or part of the period of the meetings.

b) *Joint Meeting of ICES/ICCAT Bluefin Tuna Working Groups*

The meeting was called by the chairmen of both working groups on September 29 at Charlottenlund, Denmark. The report of the meeting is presented at these SCRS and Council meetings as Document SCRS/74/8. The Assistant Executive Secretary represented the Secretariat at the meeting.

c) *Coordinating Working Party on Atlantic Fishery Statistics (CWP-FAO)*

The Eighth Session of the CWP was held at OECD Headquarters, Paris, September 12-20. ICCAT was represented by the Convener of the Sub-Committee on Statistics and by the Assistant Executive Secretary. The preliminary report of the session is presented as Document SCRS/74/9.

ii) *Meetings at which ICCAT was represented*

a) *International Commission for the Southeast Atlantic Fisheries (ICSEAF)*

ICSEAF's Annual Meeting held in Madrid in December 1973 was attended by the Executive Secretary and the Assistant Executive Secretary.

b) *International Commission for the Northwest Atlantic Fisheries (ICNAF)*

The Executive Secretary attended the 24th Annual Meeting of ICNAF, held in Halifax from June 4-14, as an observer. He was especially interested in ICNAF's regulatory systems and how they are put into effect, particularly in the way overall quotas by subareas and species are established and then distributed, by the Commission itself, among the various countries.

c) *International Council for the Exploration of the Sea (ICES)*

After attending the Joint Meeting of the ICCAT/ICES Bluefin Tuna Working Groups, the Assistant Executive Secretary attended the scientific sessions (September 30-October 4) of the 62nd Statutory Meeting of ICES, held in Copenhagen.

d) *IPFC/IOFC Ad Hoc Working Party on Stock Assessment of Tuna*

The Working Party was held in Nantes, France, September 16-18, and the Assistant Executive Secretary attended the meetings. At the request of FAO, ICCAT cooperated by providing a secretary for the meeting, which took place immediately following the ICCAT Workshop.

e) *FAO Committee on Fisheries (COFI)*

The Executive Secretary attended the COFI meetings in Rome in October.

f) *Inter-American Tropical Tuna Commission (IATTC)*

The Executive Secretary attended the IATTC Annual Meeting, which was held in Ottawa (Canada) from October 28 to November 2.

g) *First International Mercury Congress*

The First International Mercury Congress was held in Barcelona, Spain, from May 6-10. The Executive Secretary attended in representation of ICCAT. Several very interesting papers were presented covering aspects of contamination and the biological effects resulting from the toxicity of mercury. The predominant idea was that an excessive amount of publicity had been given to the toxicity of mercury and its effects had been exaggerated. The present picture is much less pessimistic.

h) *Advanced Technical Course on Tuna*

The Executive Secretary and the Assistant Executive Secretary of ICCAT were invited to participate in this course, held at the «Universidad Laboral» of La Coruña, Spain, in August, with all travel and accommodation expenses paid by the University.

Since the course was directed at experts from Central and South American countries who work in national fishery administrations, the invitation was accepted. They attended for 3 days, during which time they discussed matters related to ICCAT's research activities, giving special attention to the subject of statistics.

i) *FAO/UNDP Fisheries Workshop*

The Executive Secretary accepted an invitation to a Fisheries Workshop held in Vigo, Spain, in September, and attended for 2 days. This Workshop, organized by FAO and sponsored by the Spanish Government through the «Dirección General de Pesca Marítima» and «UNDP», was for high-ranking administratives and technologists responsible for the planning, organization and operation of fishing industries in several Latin American countries.

3. Cooperation with other Organizations

i) *FAO*

Good working relations with FAO have continued and there has been close cooperation in the collection and comparison of statistical data. Officers of FAO have made valuable contributions during ICCAT meetings. In particular, it should be mentioned that the ICCAT Workshop on Tuna Population Dynamics and the IPFC/IOFC *Ad Hoc* Working Party of FAO, were arranged to take place at the same place and consecutively so that some participants could attend both meetings.

ii) *Inter-American Tropical Tuna Commission (IATTC)*

Working relations with IATTC have been maintained with an exchange of scientific information on various matters of mutual interest. ICCAT also appreciates the contributions made by IATTC scientists at the Tuna Workshop in Nantes.

Many tags released during ICCAT tagging programs have been returned by IATTC.

iii) *International Commission for the Southeast Atlantic Fisheries (ICSEAF)*

Formal working relations between ICCAT and ICSEAF, which were approved at ICCAT's Third Regular Meeting of the Commission held in Paris in November, 1973, were also approved by the First Regular Meeting of ICSEAF, held in Madrid in December, 1973.

iv) *International Council for the Exploration of the Sea (ICES)*

There has been close collaboration between the Bluefin Tuna Working Groups of ICES and ICCAT. Both Secretariat's have been assisting in this work, and have distributed documents to members of the other Commission, as well as to their own members.

v) *International Commission for the Northwest Atlantic Fisheries (ICNAF)*

This year closer collaboration has been maintained with ICNAF, and ICCAT will be receiving more information on biological data and regulations adopted by that Commission.

4. Status of the Minimum Size Regulation for Yellowfin

A commission regulation prohibiting the taking and landing of yellowfin under 3.2 kg. has been in force since July 1, 1973.

Most countries have taken the necessary legal action to implement this recommendation, and the Secretariat will present a document (CON/74/11) to the Council explaining the present status in each member country.

5. Coordination of Research

i) *Statistics*

All activities relating to statistics are reported in the Section «Secretariat Report on Statistics».

A few countries have speeded up their data reporting. As a result of the direct contacts established by the Secretariat at several ports of transshipment, together with the assistance received from local scientists, our statistical coverage is now

almost complete for the fleets for which we previously lacked data. But the inadequacy of much of the data and, in particular, the lack of proper biological sampling is still a major problem.

ii) *Tagging*

The Secretariat assisted as much as possible in the ICCAT cooperative tagging program:

a) Two U.S. $ 300 awards were given in the annual drawing of recovered tuna tags. This lottery also serves to inform the public of our tagging project.

b) The Secretariat pays U. S. $ 2 rewards for recovered tags returned to the Secretariat, and forwards the tags to the releasing agencies.

c) The Secretariat has helped arrange joint programs between agencies interested in tagging. At present, the following projects are being planned:
Ghana - Japan. For tropical tuna in the Gulf of Guinea.
ORSTOM (Abidjan) - NMFS (Miami) - WHOI (Woods Hole). For billfishes in the Gulf of Guinea.
Morocco - NMFS (Miami). For bluefin tuna in the Mediterranean and the eastern Atlantic.

d) Tagging material was supplied to the countries starting projects.

iii) *Field Practice Course*

Following approval of the Secretariat's recommendation at the 1973 SCRS meetings, we held a 10-day field practice course from August 30-September 7 in Madrid and the Canary Islands. This course was planned to enable national scientists working directly in the collection of statistics to become familiarized with the statistical methodology used by ICCAT. Eight scientists attended the course — 2 days in Madrid, 3 days in Las Palmas and 3 days in Tenerife. Three of the scientists were invited at the Commission's expense (including their attendance at the Nantes Workshop).

6. Publications

i) *Biennial Report*

Part II of the Report for the Biennial Period 1972-73 was printed in the three official languages of the Commission. The English version was distributed in August, and the French and Spanish versions in October. This Report covers the Commission's activities during the last half of the biennial period 1972-73.

ii) *Statistical Bulletin*

A preliminary issue covering data up to and including 1973 was prepared in July; the completed version of Volume 4 (1974) was sent out in early September, and the final in January, 1975.

iii) *Collective Volume of Scientific Papers*

Volume 2 was prepared and distributed in May, 1974. This included selected papers presented at the 1973 SCRS meeting. Volume 3 is being prepared for distribution at the 1974 SCRS meeting and will contain most of the papers presented at the Nantes Workshop on Tuna Population Dynamics. We have received approval from the writers for the inclusion of these papers, and the volumes are to be used as working documents only — with no citation permitted.

iv) *Data Record*

The Secretariat prepared Data Record, Vol. 3 in February, 1974, and Vol. 4 in October, 1974.

v) *Newsletter*

Newsletters have been sent out with information on Commission activities in general.

7. Secretariat Administration

i) *Staff*

During 1974 there have been no changes in the staff. The vacant position of Administrative Assistant has not been filled. We have, instead, hired several people during the year on a temporary basis to assist in the statistical work.

ii) *Travel*

a) In February, the Executive Secretary visited Santa Cruz de Tenerife (Canary Islands) to meet with the Director of the Spanish Oceanographic Institute and discuss statistical problems with him.

b) In March, the Assistant Executive Secretary visited Tenerife and Las Palmas (Canary Islands) to review ICCAT's statistical project with Mr. de Boisset. He also visited transshipment agencies and requested that they continue to cooperate with us.

c) The Assistant Executive Secretary, during his home leave in Japan, visited the Korean and Japanese Administrations, and also met with scientists. The main object of these visits was to improve Atlantic tuna fishery statistics.

d) The Commission's statistical expert, Arnaud de Boisset, traveled along the West African coast in April-May. A detailed report of this trip appears in the Secretariat Report (CON/74/13 - SCRS/74/20).

e) In April, the Executive Secretary spent two days in Lisbon meeting with the Portuguese fisheries authorities.

f) After attending the ICNAF Meeting, the Executive Secretary went to Washington to meet with persons in the U.S. Fisheries Administration. Dr. Brian Rothschild, Chairman of the Standing Committee on Research and Statistics (SCRS) had prearranged the visits and traveled to Washington from La Jolla to accompany him in the interviews, which was an invaluable help.

g) In July, the Assistant Executive Secretary made an extended trip to Central and South America. The details are reported in the Secretariat Report on Statistics (CON/74/13 - SCRS/74/20).

h) Other trips. Members of the Secretariat staff also undertook trips in order to attend the various meetings mentioned previously in Section 3.

O. Rodríguez Martín
Executive Secretary

FINANCIAL REPORT*

CON/74/10 (Amended)

1. Auditor's Report for Fiscal Year 1973

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, 1973. In compliance with Article 9-3 of the Financial Regulations and in accordance with the recommendation of the Council at its Second Regular Meeting, the Secretariat sent a copy of the Auditor's Report to all the member country Governments in April, 1974. An extract of the same has been included in Part II of the 1972-73 Biennial Report.

2. Current status of Commission accounts

Statement 1 shows the status of accounts at the end of the 1973 fiscal year, including the outstanding contributions which were met in 1974.

In *Statement 2* can be seen the state of each member country's contributions. Outstanding contributions corresponding to 1974 amount to U.S. $ 10,851.04. However, an excess in previous contributions of $ 1,530.53 will be applied to the 1975 budget.

Statement 3 shows the budget and expenditures up to the end of the fiscal year — which actually closed on January 28, 1975, as until that date all the expenses met corresponded to fiscal year 1974.

There is an unused balance of $ 5,465.32. Moreover, $ 8,890 which appeared under the heading «Contingencies» did not have to be utilized. Therefore, the unused balance of $ 5,465.32 plus the unused $ 8,890 under «Contingencies» total $ 14,355.32.

* Updated to the end of fiscal year 1974. Some modifications have been made, in accordance with the Council's decision.

In accordance with the decision of the Council, this sum should be allocated as follows:

a) To the 1975 budget (see Statement 5)	$ 10,000.00
b) To the Working Capital Fund	$ 4,355.32

Statement 4 gives the total of income and expenditures at the end of fiscal year 1974.

Statement 5 shows the state of accounts at the end of fiscal year 1974. The amount in Cash and Bank is $ 35,211.14.

3. Review of Working Capital Fund

The Working Capital Fund amounted to $ 22,974.93 at the close of fiscal year 1973. After adding the non-budgeted income for 1974, the Fund now amounts to $ 34,351.65.

4. Second half of Biennial Budget (1975)

The 1975 budget, approved at the Third Regular Meeting of the Commission (Paris, December 1973), appears in Part II of the Biennial Report for 1972-73. $ 10,000.00 from the unused balance of the 1974 budget has been allocated to the 1975 budget. This budget, as revised by the Council, appears as Appendix 1 to Annex 8 (page 69) of this Biennial Report.

STATEMENT 1

Statement at close of Fiscal Year 1973

ASSETS	$	LIABILITIES	$
Cash and Bank (at 31-XII-73)	9,498.99	Balance in favor of U.S.A. .	512.00
Contribution Brazil 1974 (paid in 1974)	6,314.00	Balance in favor of Morocco.	863.64
Contribution Ghana 1972-73 (paid in 1974)	8,537.58	Working Capital Fund . .	22,974.93
TOTAL	24,350.57	TOTAL	24,350.57

STATEMENT 2

Status of member country contributions in 1974

	Balance 1973	*Contributions for 1974 Budget, approved by the Commission*	*Contributions paid in at 31-XII-74 for the 1974 Budget*	*Other Contributions*	*Balance 1974 (at 31-XII-74)*
Brazil		7,146.00	7,146.00 (25-IX)		
				180.00 (1975)	+ 180.00
Canada		10,008.00	10,008.00 (11-II)		
France		30,578.00	30,578.00 (8-IV)		
Ghana		5,251.00	345.96 (4-XII)		— 4,905.04
Ivory Coast		5,526.00	—		— 5,526.00
Japan		32,265.00	32,265.00 (1-III)		
Korea		21,992.00	21,992.00 (1-III)		
Morocco	+863.64	5,587.00	5,587.00 (3-VI)	486.89 (1975)	+ 1,350.53
Portugal		14,018.00	14,018.00 (29-IV)		
Senegal		6,597.00	6,177.00 (24-X)		— 420.00
South Africa		4,523.00	4,523.00 (23-III)		
Spain		39,718.00	39,718.00 (14-VI)		
U.S.A.	+512.00*	26,791.00	26,279.00 (14-II)*		
		210,000.00	198,636.96		—10,851.04
					+ 1,530.53

* $ 26,279 + $ 512 = $ 26,791.

STATEMENT 3

Budget, Expenditures and Balance ($) of Fiscal Year 1974

	I	II	III
	1974 Budget	*Total Expenditures Fiscal Year 1974*	*Balance*
1. Salaries	114,110.00	104,558.57	+9,551.43
2. Travel	14,000.00	13,967.17	+ 32.83
3. Meetings	20,000.00	22,689.65	—2,689.65
4. Publications	16,000.00	16,030.56	— 30.56
5. Office equipment	2,000.00	2,477.21	— 477.21
6. Operating expenses	17,000.00	17,723.28	— 723.28
7. Miscellaneous	3,000.00	3,120.44	— 120.44
8. Coord. Research	15,000.00	15,077.80	— 77.80
Subtotal	201,110.00	195,644.68	+5,465.32
9. Contingencies	8,890.00		+8,890.00
TOTAL	210,000.00		

STATEMENT 4

Income and Expeditures ($)

INCOME		EXPENDITURES	
Cash & Bank at 1-I-74	9,498.99	Regular budget 1974	195,644.68
Brazil, contribution 1973	6,314.00	Cash and Bank	35,211.14
Ghana, contribution 1972-73	8,537.58		
Corresponding to 1974 Budget	198,636.96		
Interest from Bank	6,187.22*		
Sale of Field Manuals	228.32*		
Morocco 1975	486.89		
Brazil, contribution 1975	180.00		
Reimbursement Invoices	746.81*		
Difference in exchange rates	39.05*		
TOTAL	230,855.82		230,855.82

* To Working Capital Fund.

STATEMENT 5

Balance Sheet at Close of Fiscal Year*

ASSETS		$	LIABILITIES	$
Banco Exterior de España:			To 1975 Budget	10,000.00
Deposit account		15,000.00	Working Capital Fund	34,531.65
Checking account		19,260.22	In favor of Brazil	180.00
C/A domestic	Ptas. 16,928.75		In favor of Morocco	1,350.53
C/A convertible	Ptas. 13,903.35			
Cash on hand	Ptas. 22,524.16			
	Ptas. 53,356.26	950.92		
		35,211.14		
(US $ 1 = Ptas. 56.11)				
1974 contributions pending payment		10,851.04		
TOTAL		46,062.18	TOTAL	46,062.18

* As of January 28, 1975.

5. Auditor's Report for Fiscal Year 1974

An extract from the Auditor's Certification and the Balance Sheet at the close of Fiscal Year 1974 are given below. The original Report, in its entirety, was sent to all Delegates in March, 1975.

DON ALEJANDRO OLIVER Y TRUJILLO, Member of the Instituto de Censores Jurados de Cuentas de España

CERTIFIES:

FIRST: That the Balance Sheet at the close of Fiscal Year 1974, the Statements on Liquidation of Income and Expenditures for Fiscal Year 1974, and the Treasury Statement, all of which are attached, truly reflect the economical and financial activity of the INTERNATIONAL COMMISSION FOR THE CONSERVATION OF ATLANTIC TUNAS, and concur absolutely with the Accounting Records and supporting paper of said COMMISSION.

SECOND: That upon finalizing payment of expenditures for Fiscal Year 1974, the funds deposited with the Banco Exterior de España in the COMMISSION's name have been checked against documents issued by the same depository Bank, and that the amount of cash on hand has been checked and verified.

International Commission for the Conservation of Atlantic Tunas
Balance Sheet at Close of Fiscal Year 1974

ASSETS				LIABILITIES			
Available:				*Payments in advance of 1975 Fiscal Year:*			
BANCO EXTERIOR DE ESPAÑA				Brazil		$ 180.00	
C/A 30-31279Q			$ 19,260.22	Morocco		$ 1,350.53	1,530.53
In time deposit			$ 15,000.00				
C/A 30-17329	Ptas.	13,903.35					
C/A 30-17672	Ptas.	16,928.75		*Acquired holdings:*			
TOTAL	Ptas.	30,832.10		From previous Fiscal Years		$ 21,307.47	
Cash on hand	Ptas.	22,524.16		During Fiscal Year 1974		$ 2,460.69	23,768.16
TOTAL	Ptas.	53,356.26					
At 56.11 Ptas. per $			$ 950.92	*Working Capital Fund:*			
			$ 35,211.14	As shown in attachment			$ 34,531.65
Receivables:				*1975 Budget:*			
GHANA		$ 4,905.04		Transfer approved by the Council			$ 10,000.00
IVORY COAST		$ 5,526.00					
SENEGAL		$ 420.00	10,851.04				
Equipment:							
Before 1974		$ 21,155.91					
During 1974		$ 2,460.69					
TOTAL		$ 23,616.60					
DEPOSITS		$ 151.56	23,768.16				
			$ 69,830.34				$ 69,830.34
Furniture ceded by Undersecretariat of Merchant Marine of Spain			$ 3,365.38	Undersecretariat of Merchant Marine of Spain, furniture ceded			$ 3,365.38

Madrid, February 28, 1975

The Executive Secretary:
O. RODRÍGUEZ MARTÍN

Certified:
A. OLIVER Y TRUJILLO

SECRETARIAT REPORT ON STATISTICS

CON/74/13 — SCRS/74/20 (Amended)

I. Collection of 1973 statistics through national offices

1. Task 1 data — Total catch by species

Table 1 (contained in Appendix III to the SCRS Report) shows the types of data submitted by each national office, with the date. There have been some improvements in quality (more details and greater accuracy), although delays in reporting on the part of some of the major fishing countries held up our estimating the total catch figure for the whole Atlantic.

2. Task 2 data — Catch and effort and biological data, by area and period

Tables 2 and 3 (contained in Appendix III to the SCRS Report) show the types of data and when they were received by the Secretariat. There has been no obvious improvement in the quality or timing of reporting, except for biological data for the surface fishery operating off Ghana. These latter became available for the first time thanks to the efforts of the Ghanaian scientists.

II. Statistical work in which the Secretariat has been directly involved during 1974

1. Assistance given to countries developing statistical systems

i) *Canary Islands Project*

During 1973, Mr. de Boisset of the Secretariat staff cooperated with the Spanish Oceanographic Institute (SOI), Tenerife, in establishing a statistical system for local fleets in the Canary Islands. This year, SOI completely took over the project. As a result, Mr. de Boisset has moved his base from Tenerife to Las Palmas, which has allowed him to devote most of his time to collecting statistics for international fleets.

ii) *Others*

Most of the projects involving Secretariat assistance and reported previously (i. e. in northern Spain, and some African countries) have been successfully completed. These statistical and biological sampling systems have now been taken over by national scientists, and it has become unnecessary for the Secretariat to continue its assistance except for some occasional consultation.

2. Establishment of a statistical monitoring system for international fleets

In 1972, the Secretariat started collecting statistics for the international fleets not covered by any national offices. Details of the plan were given in last year's Secretariat Report on Coordination of Research (included in the ICCAT Biennial Report, 1972-73, Part II).

In 1974, the Secretariat was able to dedicate more time to this project than in previous years as less effort was needed for assisting national offices.

Among the fleets unloading at foreign ports, the U. S. and French (FIS) vessels are well monitored by their own countries on a current basis. Korean longliners and the Japanese and Spanish surface fleets are also monitored by the respective national offices and reported to the Commission, though not on a current basis. Japanese longliners make very few landings at Atlantic ports. Therefore, at present, ICCAT's difficulty in obtaining statistics lies chiefly with the Taiwanese longliners, and with fleets flying foreign flags which do not correspond with the nationality of the owners — hereafter called «foreign flag fleets» (Panamanian, Dutch, Ecuadorian and Italian flag vessels). For this reason, we gave first priority to foreign flag vessels and secondary attention to Taiwanese and Korean longliners, and Japanese surface fleets.

Our statistical expert, Mr. de Boisset, made an extensive trip along part of the African coast visiting Freetown, Dakar, Abidjan and Tema. In Freetown he obtained landing statistics for international fleets for the past 10 years, and made arrangements in other places for establishing cooperative statistical systems for monitoring the landings of such fleets. As a result, it was agreed that ORSTOM would provide the data we are missing for oriental and foreign flag fleets at Dakar and Abidjan, while Ghanaian scientists would cover the fleets at Tema.

Dr. Miyake, Assistant Executive Secretary, also made an extensive trip to the Americas and visited all the major ports where international fleets unload (Saint Maarten, Port of Spain, Cumana (Venezuela), Santos, Río de Janeiro, Montevideo and Buenos Aires). He secured the cooperation of the agencies holding unloading statistics for these fleets, and established data reporting channels between the agents and the Secretariat.

Besides the above mentioned ports, unloadings in the Canary Islands are, of course, completely monitored by Mr. de Boisset from Las Palmas. Records of unloadings in Sao Vicente are also secured by the Secretariat. We keep record of the landing data thus accumulated by individual boats (see Table 1).

As at the time of writing this report, about 80 % of the Taiwanese and Korean

longliners are monitored, 100 % of Japanese and Korean surface vessels and 90-100 % of foreign flag vessels. Data coverage, however, is actually lower than the percentage indicated above since not necessarily all the data for monitored boats have been collected, particularly in those cases when vessels unload on occassion at different ports.

It should be emphasized that the establishment of such systems has only become possible through the cooperation of local scientists, commercial fish traders, transshipment agencies and boat owners.

3. Biological sampling

This year the Secretariat intended to undertake biological sampling of fish transshipped at Las Palmas by foreign flag vessels. The following factors, however, made it difficult to carry out this project:

(1) The shortage of time available for biological sampling
(2) The need to be on the spot when the fish are unloaded
(3) The unsuitable condition of most of the fish for measuring (broken snout, frozen in a bad shape, etc.)
(4) Failure of persons unloading the fish to cooperate with us
(5) Origin of fish unknown
(6) Access to fish impossible in most cases (e. g. direct transshippent from boat to boat or from boat to refrigerator)
(7) Fish too large to handle.

III. Dissemination of information and publications

1. *Quick estimate*

A rapid preliminary estimation of Atlantic catches during 1973 was made in March, 1974, for yellowfin, skipjack and bigeye tuna, and circulated among scientists directly involved in Atlantic tuna population studies. The Secretariat was able to do this following the establishment of the monitoring system for unloadings, discussed in Section II-2, and ORSTOM, U.S. and Japanese scientists provided the Secretariat with estimates for their fisheries. The estimates proved to be very close to the final figures for skipjack and bigeye, but were 15 % off for yellowfin tuna as catch estimates for the latter species were too high for the Japanese and Korean longliners, and the FIS surface fleet.

No comments have been received regarding the usefulness of such estimates but if this type of information is indeed desired in the future, the Secretariat is prepared to include two other major species in 1975 — bluefin tuna and albacore.

2. *Statistical Bulletin*

i) Preliminary statistics covering available data for 1973 were circulated in July among a limited number of scientists.

ii) The first formal issue of Statistical Bulletin, Vol. 4, was fully circulated in mid-September.

3. *Data Records*

Volume 3 containing all Task 2 data presented at the 1973 SCRS meetings, and some information received later, was issued in March of this year.

Volume 4 including all the statistics received by the Secretariat between March and October, 1974, appeared in October.

4. *Collective Volume of Scientific Papers*

Volume 2 containing all the papers submitted at the 1973 SCRS meetings whose inclusion was approved by the authors, was issued in March 1974.

Volume 3, consisting of almost all the papers presented at the Workshop on Tuna Population Dynamics, held in Nantes, September 1974, was issued in October 1974.

IV. Problems treated in the Secretariat Report presented at the last SCRS meetings

The problems involving statistics remain more or less the same. However, those relating to important fleets of non-member countries as well as to foreign flag fleets, have almost been solved. Delay in the reporting of total catches by the national offices of member countries is still the major barrier to making quick estimates of total Atlantic catches.

The Secretariat experienced some difficulty in assisting some countries in developing their own systems (government administrations are not always willing to accept help from the Secretariat, although the scientists themselves may be very cooperative). As a result, the Secretariat had to withdraw its efforts before the systems were completed, and we can still expect some difficulty in obtaining adequate information on these fisheries.

Table 4. Summary of the International Tuna fishing fleet monitored in the Atlantic by ICCAT

	LONGLINERS				SURFACE		*Total*	*Responsible Agency*
	Japan	*Korea*	*Taiwan*	*Panama etc.*	*BB JA-GH-KO*	*PS Spain*		
Capetown (South Africa)	40 500 (5)		10-50 0-5000 (5)				50-90 500-5000 (5)	
Sao Vicente (Cape Verde)			5 1000 (100)	2 500 (100)			7 1500 (100)	Portuguese Gov. & Secretariat
Tema (Ghana)		4 1-2000 (100)		2 500 (100)	28 20-24000 (100)	6 4000 (100)	40 25-30000 (100)	Ghana Fisheries Unit
Abidjan (Ivory Coast)		25 5-7000 (90)	26 6000 (90)	30 6-9000 (90)			81 17-22000 (90)	ORSTOM & Secretariat
Freetown (Sierra Leone)		7 2-4000 (100)			2 500 (100)	5 1-4000 (100)	14 4-9000 (100)	Secretariat
Dakar (Senegal)						23 13-18000 (80)	23 13-18000 (80)	ORSTOM & Spanish Oc. Inst. & Secretariat

Tenerife (Spain)		16 1-3000 (100)					16 1-3000 (100)	Secretariat
Las Palmas (Spain)	12 500 (5)	18 1-3000 (90)	52 5-9000 (100)	22 2-4000 (90)			104 9-17000 (95)	Secretariat
St. Maarten (Antilles)		13 4-5000 (100)	4 1000 (100)	3 .5-1000 (100)			20 6-7000 (100)	Secretariat
Port of Spain (Trinidad)		5 2-3000 (20)	1 500 (100)				6 3-4000 (20)	Secretariat
Cumana (Venezuela)					2-5 1-2000 (100)		2-5 1-2000 (100)	Venezuela Inst. Pesq.
Montevideo (Uruguay)			20-70 3-7000 (60)				20-70 3-7000 (60)	Secretariat
Buenos Aires (Argentina)	40 500 (0)		30 6-8000 (100)				70 7-9000 (100)	Secretariat
TOTAL	92	88 30-35000	150-220 30-35000	59 10-13000	32-35 20-26000	34 20-30000		

1st line — No. of boats.
2nd line — Annual landings (MT).
3rd line — Rate of Coverage (%) for landing statistics as of October, 1974.

V. Future plans concerning statistics

Table 4 shows the ports of landing, by fleet, and coverage of different statistical information.

1. *Catch statistics*

In 1975, the Secretariat will continue its work to complete the monitoring system for the foreign flag fleets not covered by national offices. We have had 2 years experience with the system in eastern Atlantic ports and it has started to function well.

During 1975, it may be necessary for a member of the Secretariat to visit Angolan and South African ports in order to extend the system more effectively to these areas.

On the other hand, it is early yet to evaluate the system which has just been started in western Atlantic ports. Generally it requires a number of visits with repeated requests to secure the close collaboration of industries and national scientists. If this is also the case with western Atlantic ports, it will be necessary for one of our staff to visit the area once or twice more. In this case, the present Secretariat staff would be insufficient to handle this.

2. *Samplings*

The Secretariat is aware that biological sampling is not being carried out for some of the important fleets operating in the Atlantic. We are trying to encourage national offices to improve the situation, and are attempting to do some sampling ourselves at ports of transshipment, as mentioned previously.

Tables 1-3 are now contained in Appendix III to the SCRS Report.

CHAPTER II

Records of Meetings

PROCEEDINGS OF THE THIRD REGULAR MEETING OF THE COUNCIL

Madrid, Spain, November 20-26, 1974

Table of Contents

Opening Plenary Session — November 20, 1974

Item 1. *Opening of the meeting*

1.1. The Council held its Third Regular Meeting at the Hotel Don Quijote, Madrid. The Opening Session was chaired by the First Vice-Chairman, Prof. M. Pinto Paiva (Brazil), in the absence of the Chairman, Dr. I. Malick Dia (Senegal).

1.2. In his opening address, Prof. Paiva welcomed all the delegates, advisors and observers. He commended the excellent work done by scientists of the Standing Committee on Research and Statistics, which was essential for the Council's deliberations.

1.3. The Senegalese Delegate presented regrets on behalf of the Chairman Dr. Dia, for his not being able to chair the meeting because of an unavoidable clash in his official time-table. He commended the high capability of Prof. Paiva to chair the Session.

Item 2. *Adoption of agenda and arrangements for the meeting*

2.1. The Tentative Agenda was presented by the Executive Secretary and fully explained. The Council adopted the Agenda without change (attached as Annex 1).

2.2. The Delegations of member countries to the Council were introduced. All member countries were represented (List of Participants, attached as Annex 2).

Item 3. *Admission of observers*

3.1. The Executive Secretary explained the criteria by which observers were invited to attend. All the observers present were admitted (see Annex 2 for list).

Item 4. *Appointment of subsidiary bodies for the meeting*

4.1. The Council decided to form a Working Group on Finance and Administration to review Council Agenda Items 5, 6, 7, 8, 9, 10, 22, 24 and 25, and any other points which concerned financial or administrative matters. The following countries indicated their interest in participating in the Working Group: Brazil (M. F. de Almeida), Canada (S. N. Tibbo), France (B. Labrousse), Ivory Coast (M. Mané), Japan (K. Yonezawa), Korea (S. C. Kim), Morocco (M. M'Chachti), Portugal (A. dos Santos Gaspar), Senegal (N'Baye Ba), Spain (V. Bermejo) and U.S.A. (B. Hallman). It was agreed, however, that the Group was open to further participants.

4.2. The Council recognized that the following groups were scheduled to meet during the week:

a. Working Group on Yellowfin Tuna Regulations — Chairman, E. B. Young (Canada). Membership open.

b. Working Group on International Inspection — Chairman to be chosen when the Group met due to the absence of the previous chairman, V. Valdez (Portugal). Membership open.

c. Panel 1 — Chairman, U.S.A.
Panel 2 — » Morocco
Panel 4 — » Spain

4.3. The Council decided to form a drafting committee to review the proceedings of each session in the three official languages:

— for English, U.S.A.
— for French, France
— for Spanish, Spain.

Second Plenary Session — November 21, 1974

Item 17. *Report of the Standing Committee on Research and Statistics (SCRS)*

17.1 Dr. B. Rothschild, Chairman of the Standing Committee on Research and Statistics, presented the SCRS Report (Annex 9) and summarized its scientific findings. He drew the Council's attention to the plans recommended by the Committee to improve statistics, and in particular to the action proposed if national offices failed to carry out their commitments (SCRS Report Sect. 6.3). He also expressed the hope that the Council would give this matter proper consideration.

17.2 In concluding his presentation, he stressed that it is essential that commissioners and administrators give adequate support to their scientists in the collection of statistics. He also emphasized that all member countries should present scientific papers to the SCRS, attend the meetings and participate in the scientific discussions. The French Delegate supported the idea that all commissioners and administrators should collaborate as much as possible on the latter points.

17.3 The Delegate of Korea indicated his country's difficulty in collecting statistics from the national fleet which operates in areas remote from the home country, and explained a plan started this year to improve statistical coverage. In addition, Korea intends during 1975 to send 2 or 3 national scientists to important foreign ports where the Korean fleet unloads its catches in order to collect basic catch and effort statistics as well as to carry out biological samplings. The results will be presented at the next SCRS meetings and, if the program is a success, scientists will be stationed in the areas permanently. He asked for cooperation from the countries concerned and from the Secretariat in these projects.

17.4 Some delegations commented that members of the Council or Commission should have more time to read and digest the SCRS Report before starting deliberation on the various matters. However, it was recognized that the following facts make it difficult to have the Report available sooner:

— the length of the Report and the fact that it has to be prepared in the three official languages of the Commission,
— the shortage of time, as the SCRS concludes its meetings just before the Commission or Council sessions are opened.

On the other hand, it was suggested that, in the future, the meeting schedule might be arranged so that delegates have at least one night to study the Report before any discussion is held. It was also suggested that the national scientists keep close contact with the commissioners so as to inform them of the results of the SCRS Meeting. It was thought that the preparation of a summary of the SCRS Report might be useful for this.

17.5. The Council, leaving most of the discussion on the Report for the pertinent Agenda Items, agreed to accept it. The SCRS Chairman and all the scientists were thanked for the excellent and efficient studies made.

Third Plenary Session — November 25, 1974

Item 18. *Reports of Panels 1, 2 and 4*

18.1. The Report of the Meeting of Panel 1 was presented and summarized by its Chairman, Mr. C. J. Blondin (U.S.A.). The Report was reviewed and some slight modification made. It was then adopted by the Council, and is attached as Annex 3 to the Proceedings.

18.2. The Report of the Meeting of Panel 2 was presented by its Chairman, Mr. M. M'Chachti (Morocco). After some slight modification, the Report was adopted and is attached as Annex 4 to the Proceedings. Canada stressed again the importance of intensifying research on bluefin tuna and in particular, of obtaining more accurate statistics on a timely basis.

18.3. The Report of the Meeting of Panel 4 was presented by the Chairman, Mr. V. Bermejo Martínez (Spain). After review, the Report was adopted and is attached as Annex 5 to the Proceedings.

Item 19. *Report of the Working Group on Yellowfin Tuna Regulations*

19.1. The Report was presented by the Chairman, Mr. E. B. Young (Canada). After his presentantion he said he was of the opinion that the work carried out by the Group had reached the point where a continuation would not be productive. He suggested discontinuation of the Working Group as the work could be continued under Panel 1. On the other hand if other problems arose not directly involving yellowfin tuna, these could be handled by a more permanent group such as a new standing committee.

19.2. This opinion was generally supported and for the purpose of formal action, the Canadian Delegate stated that he intended to circulate a formal proposal 90 days in advance of the next Commission meeting.

19.3. The Report was adopted and is attached as Annex 6 to the Proceedings.

Item 20. *Report of the Working Group on International Inspection*

20.1. The Report was presented by the Chairman, Mr. A. dos Santos Gaspar (Portugal). The Portuguese Delegate posed the question of whether Items 10, 11 and 12 are needed since no regulation has yet been made regarding fishing gear.

However, the Council felt that these items should be kept in the Draft Text, bearing in mind that the Working Group must consider all the possibilities that such a regulation might entail in the future.

20.2. It was agreed that the Executive Secretary, in consultation with the Chairman of the Group, request the comments and opinions of member countries, and in particular, prepare a «Form of Questionnaire for the Inspector».

20.3. With the above understanding, the Report was adopted and is attached as Annex 7 to the Proceedings.

Item 11. *Status of yellowfin tuna minimum size regulation*

11.1. Document CON/74/11 was presented by the Executive Secretary. It was noted that Canada, France, Korea and Spain had informed the Commission that they had adopted a 15 % tolerance in the number of fish as part of their yellowfin tuna minimum size regulations, while South Africa made no mention of a tolerance.

11.2. The following also informed the Council on the present status of the yellowfin tuna regulations in their countries:

Senegal. — A regulation is in force specifying the size limit recommended by ICCAT. A clause to cover the 15 % tolerance in number (but converted into weight) is in preparation.

U.S.A. — Is in full agreement with the recommendation. The necessary steps are being taken to enforce the regulation but this has not yet passed through Congress. It is expected that legislation will be brought into effect early in 1975. A tolerance of 3 % on a basis of weight will be permitted. This figure was obtained by taking an average of the size composition of catches over the past few years.

Ivory Coast. — Initially adopted a 15 % tolerance by number, but in practice allows only 2 % in weight of undersized fish. In 1973 there were no catches or landings of undersized fish.

Portugal. — As stated in December 1973, legislation is in force and a 15 % tolerance in number of fish has been adopted.

Observers. — Cuba stated that, in July 1973, the captains of Cuban vessels received an order to observe the ICCAT yellowfin minimum size regulations although, in actual fact, Cuban longliners do not capture small yellowfin. Taiwan mentioned that its longline boats do not catch any meaningful quantities of undersized fish. Venezuela stated that the regulation will be enforced when the country joins the Commission.

Item 12. *Other regulatory measures for yellowfin*

The Report of Panel 1 (Annex 3) and the Report of the Working Group on Yellowfin Tuna Regulations (Annex 6), were studied but no other measures were discussed.

Item. 13. *Consideration of regulatory measures for skipjack*

The Report of Panel 1 (Annex 3) was referred to but no comment was made regarding skipjack.

Item. 15. *Measures for enforcing the provisions of the Convention (International Inspection)*

The Report of the Working Group on International Inspection (Annex 7) was referred to and the Council *decided* to take no action on this item at this time. However it *recommended* that the Group continue its studies as proposed in its Report.

Final Plenary Session — November 26, 1974

Item 21. *Reports of subsidiary bodies appointed by the Council for the meeting*

21.1. The Report of the Working Group on Finance and Administration (Annex 8) was presented by the Chairman of the Group, Mr. K. Yonezawa (Japan). The Report was reviewed with particular attention to the following items on the Council Agenda:

Item 5. Review of Panel members
» 6. Administrative Report
» 7. Auditor's Report
» 8. Review of financial status
» 9. Review of the second half of Biennial Budget (1975)
» 10. Working Capital Fund
» 22. Review of Commission publications
» 24. Date and place of the next Commission meeting
» 25. Date and place of the next Council meeting.

21.2. The Report was adopted together with all the pertinent recommendations.

Item 16. *Measures for promoting activity in research and statistics*

16.1. The Chairman of SCRS, Dr. B. Rothschild, reviewed the recommendations made by the Committee (Section 9 of the SCRS Report) in respect of this

Agenda Item. He drew the Council's attention to the following sections of the Report:

"... the Committee felt it important that commissioners and administrators pay adequate attention and understanding to the work of the SCRS. It was also observed that several countries do not participate in the scientific deliberations of the SCRS. It was requested that national scientists pursue these points in their own country, and that the Chairman of SCRS should also stress its importance at the Council and Commission meetings." (Sect. 9.2)

"The Committee wished to *call the attention* of the Council to the following points:

- The privilege of catching fish accompanies the duty to collect adequate and accurate statistics and appropriate management plans can only be considered when such information is taken into account.
- National offices should take immediate action to remedy the deficiencies in statistics by fulfilling their obligation to collect and disseminate statistics from their own fleets.
- The cost of improving statistics would be relatively far less than the benefit that administrators and fishing industries would gain from the improvements, since a proper management of fisheries can only be achieved with adequate statistics." (Sect. 9.3)

"The importance of interchange between scientists and commissioners was specially stressed. It was noted that scientists should seek better communications with commissioners of their own national section. At the same time it was *recommended* that the Council note this problem area.» (Sect. 9.7)

The above points were duly noted by the Council members.

16.2. The SCRS Chairman also drew the Council's attention to Section 6.3 of the SCRS Report which "... recommended to the Council that commitments made by national offices in respect of improving their national statistics in 1975 (Table 2 - Addendum III to Appendix III to Annex 9) should be constantly reviewed by the SCRS Chairman and that the Commission or Council should authorize the Secretariat to start direct sampling from fleets, if such commitments are not being carried out." He asked the opinion of the Council on this subject.

16.3. The legal basis on which the Secretariat can collect data directly at ports was questioned. Article IV of the Convention was referred to and it was noted that this gives the basis on which the Secretariat may carry out such duties. At the same time, it was requested that the following points be observed by the Secretariat before undertaking such action:

i) Specific instructions should be given to the Secretariat by the Commission or Council.
ii) The Secretariat should make contact with the government concerned.
iii) The Secretariat should act only with the prior agreement of the local or national authorities.

16.4. With the above understanding, the Council was in agreement with Sect 6.3 of the SCRS Report.

Item 23. *Relations with other organizations*

23.1. The Executive Secretary informed the Council on this subject, referring to the pertinent section of the Administrative Report (CON/74/9). The close relationships maintained with FAO, IATTC, ICES, ICSEAF and ICNAF were noted with satisfaction by the Council.

23.2 The Representative of FAO expressed FAO's good wishes for the Commission and referred to the present ICCAT-FAO relationship, which is of mutual advantage. He also observed that this year there has been a closer relationship between ICCAT and both IOFC and IPFC, these latter having somewhat similar responsibilities to ICCAT. He stated that it was the desire of IOFC/IPFC to strengthen these relations. He also referred to the possibility of ICCAT cooperating in the Regional Programs organized by UNDP in West Africa and the Caribbean Sea.

23.3. Canada suggested that a formal relationship might be established between ICCAT and IATTC as both Commissions have similar objectives though in different geographical areas. It was *agreed* that the Secretariat should study how this could be achieved and present the results at the next Commission meeting.

Item 14. *Consideration of regulatory measures for bluefin and albacore*

14.1. The Report of Panel 2 (Annex 4) was reviewed. The U.S. Delegate again expressed his country's concern over northern bluefin stocks, and urged that the Commission take appropriate conservation measures.

14.2. There was considerable discussion regarding the second proposal included in the recommendation originally made by the U.S. delegation and, as a consequence, the U.S. proposed some modification to the wording. Again the interpretation of the text was questioned, and a second modification was proposed by the Spanish Delegate. The final wording of the recommendation reads as follows:

"*FIRST.* That the Contracting Parties take the necessary measure to prohibit any taking and landing of bluefin tuna *(Thunnus thynnus thynnus)* weighing less than 6.4 kg.
Notwithstanding the above regulation, the Contracting Parties may grant tolerances to boats which have incidentally captured bluefin weighing less than 6.4 kg., with the condition that this incidental catch should not exceed 15 % of the number of fish per landing of the total bluefin catch of said boats or its equivalent in percentage by weight.

"*SECOND.* That as a preliminary step, the Contracting Parties that are actively fishing for bluefin tuna *(Thunnus thynnus thynnus)* or those that incidentally catch it in significant quantities shall take the necessary measures to limit the fishing mortality of bluefin tuna to recent levels for a period of one year."

14.3. The Brazilian Delegate stated that his country has asserted at various times its standing against any decision which might limit the growth of fisheries in coastal countries and, particularly, would prevent the development of fisheries in Brazil. Brazil has therefore opposed, and will continue to oppose, any system which may involve, whatever the reason, the establishment of quotas based on the present levels of fishing in each country. In the present instance, Brazil is in agreement with the general idea of the U.S. proposal concerning the conservation of northern bluefin tuna *(Thunnus thynnus thynnus)*. But since the proposal is aimed specifically at countries which actively fish this species, the Brazilian delegation preferred to abstain as Brazil is not one of those countries. This abstention is also in keeping with the position of Brazil, as mentioned previously, of not accepting the establishment of quotas which do not take into consideration the interests of Atlantic coastal countries.

14.4. Canada stressed the need for prompt action to be taken since bluefin stocks are in danger of being overfished.

14.5. The Japanese delegation also supported the U.S. proposals, and stressed its particular concern over pre-spawning stock conditions.

14.6. Spain supported the U.S. proposals.

14.7. The French delegation supported the U.S. proposals, though commenting on the social and economical difficulties it foresees in relation to small local fishing boats.

14.8. Korea supported the proposals.

14.9. Portugal also was in agreement with the U.S. proposals on the condition that the second proposal was only for one year, and would be revised at the next Commission meeting in accordance with new scientific findings.

14.10. The Moroccan Delegate agreed with the opinion expressed by the Brazilian delegation in that the second recommendation might limit the development of the fisheries of coastal countries, particularly in the case of developing countries. He further stated that Moroccan fisheries catch bluefin tuna incidentally, and that he could not go along with the second proposal.

14.11. The Council recognized that decision on the proposals should be made by the Commission, and it was *agreed* to make them subject to a mail vote by member countries of the Commission, in accordance with Rule 9, paragraph 8 of

the Rules of Procedure. According to Rule 9, paragraph 2 of the Rules of Procedure, "Decisions of the Commission shall be taken by a majority of the member countries of the Commision...". It was also noted that, if and when the recommendations are approved by the Commission, the provisions laid down by Article VIII (2) - (5) of the Convention should be observed.

Item 26. *Other matters*

No other matters were discussed.

Item 27. *Adoption of Report*

The Council adopted the Proceedings of the First through Third Plenary Sessions. It was *decided* that the Proceedings of the Final Plenary Session, as well as the Council Report in its entirety, should be approved at a later date by mail.

Item 28. *Adjournment*

At the time of adjourning the meeting, the Chairman, Dr. M. Dia, thanked the attendants and the various Working Groups for their contributions, and the French ISTPM for hosting the Tuna Workshop in Nantes. He also thanked the Executive Secretary, Secretariat staff, interpreters, and the Spanish administration for all they had done and expressed appreciation of the hospitality extended by the "Grupo de Atuneros Congeladores", Bermeo, Spain. The Delegate of France congratulated Dr. Dia on behalf of the participants for his excellent chairmanship.

Annex 1

AGENDA

Procedure of the Meeting

1. Opening of the meeting
2. Adoption of agenda and arrangements for the meeting
3. Admission of Observers
4. Appointment of subsidiary bodies for the meeting

Administration

5. Review of Panel members
6. Administrative Report

Finance

7. Auditor's Report
8. Review of financial status
9. Review of the second half of Biennial Budget (1975)
10. Working Capital Fund

Measures for the Conservation of Tuna Stocks

11. Status of yellowfin tuna minimum size regulation
12. Other regulatory measures for yellowfin
13. Consideration of regulatory measures for skipjack
14. Consideration of regulatory measures for bluefin and albacore
15. Measures for enforcing the provisions of the Convention (International Inspection)
16. Measures for promoting activity in research and statistics

Reports to the Council

17. Report of the Standing Committee on Research and Statistics
18. Reports of Panels 1, 2 and 4
19. Report of the Working Group on Yellowfin Tuna Regulations
20. Report of the Working Group on International Inspection
21. Reports of subsidiary bodies appointed by the Council for the meeting

Publications

22. Review of Commission publications

International Cooperation

23. Relations with other organizations

Other Matters

24. Date and place of the next Commission Meeting
25. Date and place of the next Council Meeting
26. Other matters
27. Adoption of Report
28. Adjournment

Annex 2

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Annex 3

REPORT OF THE MEETING OF PANEL 1

Madrid, November 21, 1974

1. *Opening*

The meeting was called to order by the Chairman, Mr. C. J. Blondin (United States).

2. *Adoption of Agenda*

The provisional agenda was adopted without change (Appendix I).

3. *Election of Rapporteur*

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

4. *Review of Panel membership*

The Chairman noted the 12 members of the panel, namely: Brazil, Canada, France, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, Spain and the U.S.A.

5. *Review of SCRS Report*

The Chairman of SCRS, Dr. B. J. Rothschild, summarized the relevant sections of the SCRS report (Annex 9). Discussion centered on the report that 56.2 % of the 9,000 tons of yellowfin taken by the Tema-based baitboat fleet (mostly Japanese) in 1973 consisted of fish under 3.2 kg. Senegal noted the effect that such catches would have on future catches, particularly by those near-shore vessels.

The Ivory Coast noted that the catch by baitboats represented 10 % of the total Atlantic catches and could result in a 25 % reduction in total yield. France commented on the need for all nations to observe the regulations. Senegal, Ivory Coast and Portugal all enquired of the measures being taken to prevent the capture of fish below 3.2 kg. Japan assured the Panel members that steps were in hand to ensure the observance of the minimum size regulation. Violations of this

regulation would be punishable, either by administrative or legal actions. Boats are also being encouraged to avoid concentrations of small fish by moving further offshore or to other areas. Japan also mentioned that some of the baitboats would be returning to Japan before the end of the year. Canada, Portugal and Spain all expressed confidence in the Japanese statement that the required measures were in hand.

Spain asked for comment on the desirability of introducing other conservation measures, such as limiting further increases in the catch. Senegal, Ivory Coast and Brazil stated they would be unable to accept any measure that limited the growth of developing fleets while the latter also commented on the disparity between the size of national fleets. Spain agreed that it would be unjust to limit catches on a country basis but reiterated that the question of protecting the stocks must be considered.

6. *Review of possible measures for the conservation of stocks*

a) *Yellowfin*

Japan, in noting the problem of developing fleets, proposed an annual quota of 90,000 MT of yellowfin, and that studies should be undertaken on the practicability of national allocation with exemption for those countries taking less than 2,000 tons of yellowfin. The U.S.A. suggested that no additional conservation measures were needed at the present time since the scientific assessment showed catches could still be increased if effort was increased. Senegal stated that any national allocation that did not include economic factors and the interests of the coastal states would be totally unacceptable.

b) *Skipjack*

No comments were made.

7. *Research needed to be carried out*

The Chairman of SCRS described three items that the Committee wished to bring to the attention of the Panel:

1. The need to improve data collection and the commitments made by delegations with regard to eliminating deficiencies in 1975 (Table II, Report of the Working Group on Sampling and Statistics - Addendum III to Appendix III to Annex 9).
2. The need for further studies on biology and population dynamics, and Table 8 of the SCRS Report which showed national research plans.
3. The great importance attached to efforts to encourage all nations fishing tuna to participate in collecting statistical data and to carry out research.

The Convener of the Sub-Committee on Statistics emphasized the need for accurate and prompt statistical reporting and it was *agreed* that the above concerns would be carried forward to the Council.

8. *Date and place of next meeting*

The Panel *agreed* that the next meeting would be held at the same time and in the same place as the next Commission meeting.

9. *Other matters*

The Report was adopted.

10. *Adjournment*

The meeting was adjourned at 16:15 on November 22, 1974.

Appendix I to Annex 3

Agenda for Panel 1

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of Panel membership
5. Review of Report of the Standing Committee on Research and Statistics
6. Review of possible measures for the conservation of stocks:
   a) Yellowfin
   b) Skipjack
7. Research needed to be carried out
8. Date and place of next Panel meeting
9. Other matters
10. Adjournment

Annex 4

REPORT OF THE MEETING OF PANEL 2

Madrid, November 22, 1974

1. *Opening*

The Chairman, Mr. M. M'Chachti (Morocco) called the meeting to order.

2. *Adoption of Agenda*

The provisional agenda was adopted without change (Appendix I).

3. *Election of Rapporteur*

Dr. P. M. Miyake (Secretariat) was designated rapporteur.

4. *Review of Panel membership*

The Chairman noted that Panel 2 now consists of eight countries: Canada, France, Japan, Korea, Morocco, Portugal, Spain and U.S.A. Delegates from all member countries to the Panel attended the meeting. Brazil, Ivory Coast and Senegal, as well as some observer countries to the Council, attended the meeting in an observer capacity.

5. *Review of SCRS Report*

The Chairman of SCRS, Dr. B. J. Rothschild, presented a summary of the relevant sections of the SCRS Report (Sections 5.c. for bluefin tuna, and 5.d. for albacore). These set out the present status of the stocks, and gave estimates of the effects of possible management measures including those considered at the ICES/ICCAT Working Group Meeting.

6. *Review of possible measures for the conservation of stocks*

a) *Bluefin tuna (Thunnus thynnus thynnus)*

At the opening of discussion, the Canadian Delegate made a statement regarding Canada's concern over the present status of bluefin tuna stocks, empha-

sizing the need for prompt action in this matter. The statement is attached as Appendix II.

It was noted that the U.S.A. circulated a «note» 60 days in advance of the meeting, according to Rule 8 of the Rules of Procedure, indicating its intention to propose, during this Council Session, recommendations concerning the conservation of bluefin tuna (CON/74/20). The U.S. Delegate shared the view of Canada, but recognized that this is difficult to solve by any one proposal. This is because the problem is complex and many biological, economical and social problems are involved. He requested that Panel members explore the mechanisms that could most effectively and with least economic impact to active fisheries, achieve the goal of reducing fishing mortality to levels that might be agreed upon by all parties. He asked that the other delegates give their countries' opinions on the matter.

The Delegates of France, Spain, Morocco, Japan and Portugal all expressed their concern over bluefin stock conditions, at the same time recognizing the social and economical implications involved, particularly in respect of small-boat local fishermen. The French Delegate underlined the difficulty in taking measures with the present state of uncertainty in scientific knowledge. He indicated, moreover, that if measures were taken, all countries which have been fishing recently in the area should take due note of these. As for the French fishermen, steps had already been taken for domestic fisheries. In addition, the Japanese Delegate stated his concern, particularly in regard to small fish and pre-recruits to the spawning stock.

After noting the general expression of concern in regard to present stock conditions, the U.S. Delegate proposed that two actions be taken. The text of these proposals, after some slight modification, is attached to this Report as Appendix III.

On presenting the proposal, the U.S. Delegate explained that the second action is proposed for a one-year period only, and hoped that further studies would be made in due course so that the Commission could take more permanent action at its next meeting.

It was also clarified that interpretation of "the recent levels (of fishing mortality of bluefin tuna)", referred to in the second proposal, should be left to each member state. It was also suggested that each country should be free to choose whether to limit catch or effort. This flexibility is particularly necessary because bluefin statistics for some countries are presently very inadequate.

The Canadian Delegate made the following statement concerning the U.S. proposals:

"Given the weight of evidence, the Canadian delegation is of the opinion that measures are necessary to greatly increase the survival of juveniles through the small fish fisheries and to preserve the spawning stock until such increased escapement forms a significant portion of that spawning stock. As such, while it is true that the first of the measures proposed by the U.S.A., particularly as it affects the sports fishery, will have some small effect on the survival through the juvenile fishery, the measures as a whole are inadequate.

"In summary, we could agree with the first proposal. The second proposal

does not go far enough we are convinced that fishing mortality on all sizes should be reduced substantially."

Portugal, Spain, France, Japan and Korea were in agreement with the U.S. proposals, and the Canadian Delegate expressed that Canada would go along with them. The Panel *recommended* that the Council take the necessary steps to put them into effect.

b) *Albacore (Thunnus alalunga)*

No comments were made.

7. *Research needed to be carried out*

The SRCS Chairman summarized the Committee's future plans regarding bluefin and albacore stock studies (Sect. 5.c.7, 5.d.7 and Table 8 of the SCRS Report).

The following points were particularly emphasized: —

As in most other fisheries, there is a serious problem with respect to statistics. Additional work is needed, as well as more people to carry out this work. The necessity of presenting documents to the SCRS Meeting was stressed, as well as the importance of more people attending and actually participating in discussions.

8. *Date and place of next Panel meeting*

The Panel *agreed* that the next meeting should be held at the same time and place as the next Commission meeting in 1975.

9. *Other matters*

The Report was adopted.

10. *Adjournment*

The meeting was adjourned.

Appendix I to Annex 4

Agenda for Panel 2

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of Panel Membership
5. Review of Report of the Standing Committee on Research and Statistics
6. Review of possible measures for the conservation of stocks:
   a) Bluefin
   b) Albacore
7. Research needed to be carried out
8. Date and place of next Panel meeting
9. Other matters
10. Adjournment

Appendix II to Annex 4

Canadian Statement for Panel 2.

Madrid, November 22, 1974

At the meeting of the Commission in Paris last year, there was a statement on bluefin tuna expressing concern about the stocks. Few of us could hope to deliver an expression of our own concern with the eloquence and fine choice of words we heard from the then U.S.A. Delegate, Mr. Wilvan Van Campen. However, the concern remains, perhaps accelerated by the effort in the last year to obtain better information on the stocks through increased research activity.

At the SCRS Meeting, Canada has already expressed serious reservations about the status of the bluefin stocks. Domestic regulations have been implemented this year, which include limitations on the numbers of tuna fishing licenses, seasons, and gear to be used. Directed fisheries for bluefin in coastal waters have been permitted only by means of rod and reel, and with a line strength not exceeding 59 kg.

Canadians catch both tropical and temperate tunas. The former are taken by a small fleet of purse seiners which operate for the most part in the Pacific. They do not enter the eastern Atlantic fishery every year, but do so fairly frequently. The temperate tunas taken are now mainly bluefin. Prior to 1971 some bigeye as well as bluefin and yellowfin was taken in the swordfish longline fishery. The sword-

fish fishery has been suspended due to the level of mercury in these fish, but we have hopes for its revival before long.

It is the bluefin, however, that we wish to concentrate on at this time. Larger individuals of the species are regular summer visitors to the Canadian Atlantic coast and have been taken commercially for many years. Incidental capture by gear set for other species is inevitable, and where this has happened regularly, a market has been established for bluefin. The most important incidental fishery is by trap nets which are set for mackerel in St. Margaret's Bay, Nova Scotia. Landings for this particular incidental bluefin fishery have been recorded since 1918, but the fishery predates the statistical systems established at that time.

These catches have been substantial enough on a regular basis to form an integral part of the income of the local fishermen. The annual catches have ranged as high as 1,500 large fish although landings have been in the order of 400 fish per year. There was also a second later run of much smaller size, in the 20-70 kg. range. None of the small fish are now seen and the average weight of the larger fish has been increasing considerably, that of 865 fish in 1974 being 295 kg.

Other local sporadic fisheries for large bluefin have existed based upon incidental captures in nets and traps or by harpooning. These localized sporadic fisheries are of little importance compared with the sport fishery. The large size of the bluefin reaching Canada's coastal waters has attracted the attention of sport fishermen. Since 1935 a number of different areas have become famous fishing grounds. The original area of development was southwestern Nova Scotia, where catches exceeded 1,400 fish in 1949. The size of the fish was quite variable, ranging from 25 to 300 kg. In recent years the catch has declined considerably, and now only approximately 25 large fish are taken each year. However, the average size of the fish taken in that area has been increasing, and is now 345 kg.

A giant bluefin sport fishery developed along the east coast of Newfoundland in 1957 with catches peaking at 388 fish in 1968. Since that time, catches have declined drastically, again with an increase in average size (28 fish averaged 293 kg in 1974).

Recently the Gulf of St. Lawrence, and particularly near Prince Edward Island, has become an area of substantial activity with catches having risen to 1,130 fish in only seven years. This particular growth has been largely encouraged by the development of a lucrative market for the fish themselves rather than as a quarry for sport fishermen. The market demand has been so strong that effort in this particular area has probably quadrupled during the past year, despite restrictive legislation, and may, without control, expand even further in the future. We should like to emphasize that all the boats used are local vessels that traditionally fish for other species which have been declining, and accordingly diminishing the incomes of the fishermen. The bluefin are now providing an important source of alternative income for these fishermen.

As in other Canadian coastal waters, the average size of the bluefin taken in the Gulf of St. Lawrence has been increasing. It reached 340 kg in 1974.

Canada's fishermen are not only interested in the giant bluefin tuna, however, and have carried on a fishery for juveniles since 1963 when two small seiners with

multi-fishing capability were constructed, primarily for use during the summer season. Since that time the catch and effort has varied with up to six boats (including super-seiners) active in any one season with the catch ranging up to 1,200 metric tons. The size of the fish has in this case declined. Few 4 and 5 years olds are now being caught. In the past three or four years the fishery has concentrated on two-year old fish with one and three-year old as small components.

Our concern has not been concentrated only on Canadian catches but for the catches of northern Atlantic bluefin as a whole. We have noted that total catches for the Atlantic and adjacent seas have declined from 38,000 metric tons in 1964 to 12,000 metric tons now. This decline applies to all parts of the Atlantic area with the Atlantic Ocean catch declining from 33,000 tons in 1964 to less than 9,000 tons in 1973, and the Mediterranean catch declining from 10,000 tons in 1967 to a little more than 3,000 tons in 1973. Furthermore, these declines apply to all parts of the fishery — the longline catch has declined from 13,000 to 1,000 tons; the baitboat catch from 10,000 to 2,000 tons, the purse-seine catch from 7,000 to 2,000 tons, and the trap catch from 5,000 to less than 1,000 tons. The only fishery that has remained reasonably stable is the sport fishery, which takes only a very small proportion of the total catch. All of these data may be found in Table 3 of the SCRS Report.

We have further noted the Report of the Joint Meeting of the ICES-ICCAT Bluefin Tuna Working Groups, where reference is made to «the alarming state of bluefin tuna fisheries in the east Atlantic». Some fisheries in the east Atlantic have disappeared altogether and others are at a very low level.

All of this convinces us that conservation measures on Atlantic bluefin tuna are required on an urgent basis.

The choice of any particular management scheme is, of course, difficult. Nearly all criteria suggest a move in the same direction, a long-term cut in the fishing intensity on juveniles (age 1-5) and, over the next 4 to 5 years, a reduction in catches of mature bluefin.

Two general points can be made:

1. Whatever we do, the effect will not make itself evident for a long time, 4-5 years for young fish, 10-15 years for old fish.

2. If we do nothing, we will almost certainly see future declines in our coastal fisheries for large fish and in the longline catches. In any case, the likely eventuality is that giant-fish fisheries will drop to a very low level over the next 5 years, whatever management measures may be adopted, and will only increase again 8-12 years later, after adequate escapement through the juvenile fisheries is regulated. In this event we are likely to see a decline in recruitment to the small-fish fisheries as the spawning stock size falls off. This it will certainly do, even at very low levels of effort on the large fish, simply because of deaths due to natural causes in these very old fish.

The Canadian delegation sees a need for a determined effort to be made to allow a substantial proportion of the current year classes to escape through the

juvenile fisheries, particularly if these are as strong as has been suggested. This would involve considerable cuts in the catch/effort for small fish, followed in the long run (provided recruitment holds up) by less severe restrictions. This action will have several other effects:

1. A long-term increase in the overall yield,
2. A long-term increase in the spawning stock size,
3. A survival of the fisheries on medium sized fish.

Failure to implement effective management measures in juvenile fisheries in 1975 will offer the Canadian Government little choice but to leave the fisheries on large fish open to unrestricted fishing in 1975 and perhaps onward. Regulation of these fisheries without the improvement of escapement through juvenile fisheries will only contribute to the decline in catch because of natural mortality.

The Canadian delegation threrefore recommends that this Panel give serious consideration to a substantial reduction in small-fish fisheries and a moratorium on any expansion of fisheries for medium and large size bluefin, or perhaps even a reduction in the catches of these sizes.

Appendix III to Annex 4

Proposal* of the United States Concerning Atlantic Bluefin Tuna

In view of the Report of the Standing Committee on Research and Statistics (SCRS/74/2 — Annex 9 to the Proceedings), and the expression of concern by several members of the Commission, it is proposed that the Council be requested to take the necessary action to propose to the members of the Commission, as is provided in Rule 9, paragraph 8 of the Rules of Procedure, the following:

First — That the Contracting Parties take the necessary measures to prohibit any taking and landing of bluefin tuna *(Thunnus thynnus thynnus)* weighing less than 6.4 kg.

Notwithstanding the above regulation, the Contracting Parties may grant tolerances to boats which have incidentally captured bluefin weighing less than 6.4 kg., with the condition that this incidental catch should not exceed 15 % of the number of fish per landing of the total bluefin catch of said boats or its equivalent in percentage by weight.

Second — That as a preliminary step, the Contracting Parties that are actively fishing for bluefin tuna *(Thunnus thynnus thynnus)* of those that incidentally catch it in significant quantities shall take the necessary measures to limit the fishing mortality of bluefin tuna to recent levels for a period of one year.

* Some modifications made at the Council Meeting have been incorporated.

Annex 5

REPORT OF THE MEETING OF PANEL 4

Madrid, November 22, 1974

1. *Opening*

The meeting was called to order by the Chairman, Mr. V. Bermejo Martínez (Spain).

2. *Adoption of Agenda*

The provisional agenda was adopted without change (Appendix I).

3. *Election of Rapporteur*

The Secretariat was designated rapporteur.

4. *Review of Panel members*

Panel 4 membership was noted as now being: Canada, Japan, Korea, Portugal, Spain and U.S.A.

5. *Review of SCRS Report*

The Chairman of SCRS, Dr. B. J. Rothschild, summarized the pertinent sections of the Report on bigeye and billfishes. He commented that no substantial studies had been conducted on Atlantic bonito.

6. *Review of possible measures for the conservation of stocks*

No comments were made.

7. *Research needed to be carried out*

The SCRS Chairman presented the Committee's future plans for research on bigeye and billfishes. Again the need for catch/effort statistics and biological data for bigeye and billfishes on a timely basis was emphasized.

He also referred to the need for collecting statistics on blackfin tuna, pointing out that the general tendency has been to neglect studies on small-size tuna species. It was generally noted that studies on such species should be intensified as these fisheries are quite important, and could be more so in the future.

The Canadian Delegate mentioned that past data for the swordfish fishery, which has been discontinued since 1971, will be analyzed and the results presented at the next SCRS meeting. He asked that other countries which are continuing this fishery provide statistical data. Such information would be extremely valuable, as scientists could advise up to what level fishing should be allowed before the fisheries are resumed by some countries.

8. *Date and place of next meeting*

The Panel *agreed* that the next meeting be held at the same time and place as the next Commission meeting.

9. *Other matters*

The Report was adopted.

10. *Adjournment*

The meeting was adjourned.

Appendix 1 to Annex 5

Agenda for Panel 4

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

Annex 6

REPORT OF THE MEETING OF THE WORKING GROUP ON YELLOWFIN TUNA REGULATIONS

Madrid, November 22, 1974

1. *Opening of the meeting*

The meeting was opened by the Chairman, Mr. E. B. Young (Canada), who summarized the sequence of events resulting in the Commission's adoption of a minimum size limit on the taking of yellowfin tuna, and reviewed the terms of reference of this Working Group. Mr. B. Hallman (United States) was designated Rapporteur.

2. *Adoption of agenda*

The provisional agenda was adopted without change and is attached as Appendix I.

3. *Review of the status of the stocks and fishery*

The Chairman of the SCRS, Dr. B. J. Rothschild, summarized the relevant sections of the SCRS Report, noting that the best analysis of the situation, with respect to the yellowfin fishery at this time, indicates that with increasing effort the catch would most probably increase slightly. He also remarked on the large number of small fish taken during 1973 by some fleets.

Mr. A. Fonteneau, Convener of the Sub-Committee on Statistics, noted that fishing effort has increased considerably in the past five years without a significant increase in catch, and that this might be reason for some concern. Dr. J. Gulland of FAO endorsed this comment, remarking that while the present situation is not an urgent one, in several years' time it may be less favorable and the Commission should be thinking of this possibility.

4. *General consideration of methods of controlling the amount of fishing*
and
5. *Problems of regulating the amount of fishing by controlling the fishing effort*

The Chairman suggested that Agenda Items 4 and 5 be considered together. He referred to document YF Reg. W.G./74/1, (CON/74/21) *Further Notes on Yellowfin Regulations*, and asked its author, Dr. Gulland, to comment on the paper.

Dr. Gulland noted that there were two general ways of measuring the amount

of fishing for the purpose of control, either by the amount of catch or the amount of nominal fishing effort. He remarked that whatever measure was used, the two basic choices were an overall limit or separate limits for each country.

Senegal noted that the problem of possible overfishing was a serious one and that while Senegal was not opposed to the idea of a catch restriction in principle, less developed countries were faced with special problems which must be considered and which were related to the problem of the redistribution of activities linked to fishing.

Dr. Gulland remarked that with respect to problems of regulating the amount of fishing by controlling the fishing effort (Agenda Item 5), there were serious technical and political difficulties associated with effort control in such a multi-national, multi-gear fishery. He also noted that with respect to the comment by Senegal, FAO was anxious to assist developing countries to increase their capabilities and so ensure a more equitable participation in the fisheries.

6. *Catch quotas, for 1975 and later years, required to reach specific limits on the amount of fishing*

The Chairman noted that this item had been discussed earlier in Panel 1 and that no agreement was reached on a proposal by Japan on limiting yellowfin fishing. Japan referred to its proposal in Panel 1, reminding the delegates of its specific recommendation.

The Ivory Coast remarked that it could not agree to a quota proposal which did not take into account the special interests of the coastal countries. The Ivory Coast also noted that it would be difficult to go along with a quota proposal until the Commission's minimum size limit measure was more fully adhered to.

Senegal asked Japan what criteria would be used in dividing up a quota and what privileges would accrue to the coastal states. Japan said that it did not have a specific proposal in this respect, but that its intention was not to prevent the small fishing nations from developing their fisheries. It also noted that every country had a right to participate in the fishing of the resource and that the interest of all countries should be fairly considered. Senegal asked Japan to consider making a more specific proposal on this issue.

Brazil remarked that coastal states which have not yet developed their fisheries had difficulty with an overall quota system, and that national quotas were the only way that the interest of these coastal states could be properly taken into account. Brazil noted that such decisions were difficult to make during the meetings without notice being given to the Secretariat, as much in advance before the meeting as possible, of any definite proposal for regulatory measures, so that this could be notified to member countries.

Senegal noted that, while the idea of a quota was unacceptable at the present time, many African coastal states were nonetheless interested in establishing other arrangements with respect to tuna. These arrangements could be set up in cooperation with tuna interests of developed countries and could take into account not only catches but the whole range of industrial activities associated with fishing.

7. *Methods of implementing a catch quota system*

On this subject, Dr. Gulland remarked that if an overall quota were established it would be necessary to have a system for rapidly reporting catches, whereas, if a national quota system were instituted the need would be for improved catch statistics. If statistics are to be used in adherring to regulations they must be reliable and have the full confidence of other countries. He noted that if ICCAT was to become heavily involved in tuna management, reliable statistics were of critical importance.

8. *Effects of other possible regulations such as control on the sizes of fish caught*

The Chairman noted that the Commission has in effect a minimum size limit on yellowfin tuna and asked Dr. Rothschild to comment as to the effects of such measures.

Dr. Rothschild spoke on the problem of large catches of undersized yellowfin and the effect of these on the tuna stocks. He also noted that in previous years the SCRS has considered the various effects of minimum size regulations on the fisheries.

9. *Data requirements for different regulatory systems*

The Chairman noted that Dr. Gulland had already spoken on this subject. Dr. Rothschild remarked that at the present time there were problems with the statistics and that if the Commission becomes more heavily involved in management, the data requirements will be much more taxing. He commented that the scientists had done all they could with respect to data problems and that it was up to the administrators to give further support in this area.

10. *Methods of enforcement*

The Chairman commented on the problems of enforcement which had arisen with respect to the minimum size regulation, noting that the countries with enforcement problems had assured the Commission that the situation would be rectified.

11. *Recommendations*

No specific recommendations were made by the Working Group.

12. *Other matters*

No discussion of other matters took place.

13. *Adoption of the Report*

The Report was adopted.

14. *Adjournment*

The meeting was adjourned.

Appendix 1 to Annex 6

Agenda for the Working Group on Yellowfin Tuna Regulations

1. Opening of the Meeting
2. Adoption of Agenda
3. Review of the status of the stocks and fishery
4. General consideration of methods of controlling the amount of fishing
5. Problems of regulating the amount of fishing by controlling the fishing effort
6. Catch quotas for 1975 and later years required to reach specific limits on the amount of fishing
7. Methods of implementing a catch quota system
8. Effects of other possible regulations such as control on the sizes of fish caught
9. Data requirements for different regulatory systems
10. Methods of enforcement
11. Recommendations
12. Other matters
13. Adoption of Report
14. Adjournment

Annex 7

REPORT OF THE WORKING GROUP ON INTERNATIONAL INSPECTION

November 21 and 22, 1974

1. *Opening*

The meeting was opened by the Vice-Chairman of the Commission, Prof. Paiva (Brazil). Mr. A. dos Santos Gaspar of Portugal was elected Chairman of the Working Group. The following countries were represented on the Working Group: Brazil, Canada, France, Ivory Coast, Japan, Korea, Morocco, Senegal, Portugal, Spain and U.S.A.

2. *Adoption of Agenda*

The tentative agenda was adopted without modification (Appendix I).

3. *Election of Rapporteur*

Mr. D. A. MacLean (Canada) was nominated rapporteur.

4. *Review of ICCAT's scheme of international inspection*

The Chairman referred to CON/74/12 which contained the draft ICCAT Scheme of Joint International Enforcement. It was decided to review the scheme, as drafted, item by item.

After considerable discussion on most points, it was *decided* to make alterations to the Preamble and four of the 13 points contained in the proposed joint enforcement scheme. It was *decided* that the Preamble should be worded as follows:

> «Pursuant to paragraph 3 of Article IX of the Convention, the Commission recommends the establishment of the following arrangements for international control outside the waters under national jurisdiction for the purpose of ensuring the application of the Convention and the measures in force thereunder.»

Items 1, 3, 5, 6, 7, 8, 9, 10 (i), 12 and 13 were approved by members of the Working Group. Item 2 was approved with the addition of the phrase, «as soon as may be practical». Item 4 was approved subject to the addition of a phrase which altered the beginning segment of the item as follows: «Subject to the arrangements agreed under paragraph (9), a vessel employed for the time being in fishing for tuna or tuna-like fishes in the Convention Area outside the waters under national jurisdiction shall stop when given the appropriate signal...».

Item 10 (ii) was altered to read as follows: «Inspectors shall have the authority to inspect all fishing gear in use or that fishing gear on deck ready for use.» Item 11 was approved as follows: «The inspector shall affix an identification mark approved by the Commission to any fishing gear inspected which appears to be in contravention of the Commission's recommendations in force in relation to the flag state of the vessel concerned and shall record this fact in his report.»

The text thus amended and *agreed* is attached as Appendix II.

5. *Model of flag or pennant for vessels*

6. *Model of identity cards*

7. *Model of reporting forms*

8. *Model of identification tag*

The Executive Secretary reviewed CON/74/12 with respect to Agenda Items 5 to 8. It was *agreed* that all member countries should communicate directly with the Secretariat on matters with respect to Items 5 through 8. It was requested that those members which have not named correspondents for International Inspection do so at their earliest convenience.

9. *Review of national legislations presently in force relating to inspection and inspectors*

It was *requested* that all members effect national legislation as soon as possible. It was noted that the U.S.A. would be passing national legislation during the current year to have the necessary regulations by the beginning of 1975.

It was *decided* that this item, referring in general to national legislation for all international inspection schemes, would be discussed further at the next meeting.

10. *Suggestions for ensuring effective control at ports*

The Chairman asked for suggestions and requested that delegates review this matter. He requested that members make suggestions to the Secretariat, or at least be prepared to bring their suggestions to the next meeting.

11. *Date of entry into effect of international inspection system*

It was *agreed* that entry into effect of the international inspection system must await further consideration of the subject.

12. *Date and place of next meeting*

The next meeting should be scheduled by the Secretariat to coincide with the next Commission meeting.

13. *Other matters*

There were no other matters to be discussed

14. *Adoption of report*

The report was adopted.

15. *Adjournment*

The meeting adjourned at 09:50 on November 22, 1974.

Appendix I to Annex 7

Agenda for the Working Group on International Inspection

1. Opening
2. Adoption of Agenda
3. Election of Rapporteur
4. Review of ICCAT's scheme of international inspection
5. Model of flag or pennant for vessels carrying on board inspectors conducting international control (2)
6. Model of identity card for the inspectors (3)
7. Model of reporting form for the inspection (5)
8. Model of identification tag for attachment to non-reglamentary fishing gears (11)
9. Review of national legislations presently in force relating to inspection and inspectors
10. Suggestions as to the most effective way of insuring control at the ports
11. Date of entry into effect of the international inspection system
12. Date and place of next meeting
13. Other matters
14. Adoption of report
15. Adjournment

Note: The numbers in parentheses refer to the paragraphs of the ICCAT Scheme of Joint International Enforcement which deal with these points.

Appendix II to Annex 7

ICCAT Scheme of Joint International Enforcement (Revised Draft)

Recommendation

Pursuant to paragraph 3 of Article IX of the Convention, the Commission recommends the establishment of the following arrangements for international control outside the waters under national jurisdiction for the purpose of ensuring the application of the Convention and the measures in force thereunder:

"(1) Control shall be carried out by inspectors of the fishery control services of Contracting Governments. The names of the inspectors appointed for that purpose by their respective governments shall be notified to the Commission.

"(2) Ships carrying inspectors shall fly a special flag or pennant approved by the Commission to indicate that the inspector is carrying out international inspection duties. The names of the ships so used for the time being, which may be either special inspection vessels or fishing vessels, shall be notified to the Commission, as soon as may be practical.

"(3) Each inspector shall carry a document of identity supplied by the authorities of the flag state in a form approved by the Commission and given him on appointment stating that he has authority to act under the arrangements approved by the Commission.

"(4) Subject to the arrangements agreed under paragraph (9), a vessel employed for the time being in fishing for tuna or tuna-like fishes in the Convention Area outside the waters under national jurisdiction shall stop when given the appropriate signal in the International Code of Signals by a ship carrying an inspector unless actually carrying out fishing operations, in which case it shall stop immediately once it has finished such operations. The master [1] of the vessel shall permit the inspector, who may be accompanied by a witness, to board it. The master shall enable the inspector to make such examination of catch or gear and any relevant documents as the inspector deems necessary to verify the observance of the Commission's recommendations in force in relation to the flag state of the vessel concerned and the inspector may ask for any explanations that he deems necessary.

1. Master refers to the individual in charge of the vessel.

"(5) On boarding the vessel an inspector shall produce the document described in (3) above. Inspections shall be made so that the vessel suffers the minimum interference and inconvenience and that degradation of the quality of the fish be avoided. An inspector shall limit his enquiries to the ascertainment of the fact in relation to the observance of the Commission's recommendations in force in relation to the flag state of the vessel concerned. In making his examination an inspector may ask the master for any assistance he may require. He shall draw up a report of this inspection in a form approved 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 may think suitable and must sign such observations. Copies of the report shall be given to the master of the vessel and to the inspector's government who shall transmit copies to the appropriate authorities of the flag state of the vessel and to the Commission. Where any infringement of the recommendations is discovered the inspector should, where possible, also inform the competent authorities of the flag state, as notified to the Commission, and any inspection ship of the flag state known to be in the vicinity.

"(6) Resistance to an inspector or failure to comply with his directions shall be treated by the flag state of the vessel in a manner similar to resistance to any inspector of that state or a failure to comply with his directions.

"(7) Inspectors shall carry out their duties under these arrangements in accordance with the rules set out in this recommendation but they shall remain under the operational control of their national authorities and shall be responsible to them.

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

"(9) (i) Contracting Governments shall inform the Commission by the 1st of March each year of their provisional plans for participation in these arrangements in the following year and the Commission may make suggestions to Contracting Governments for the coordination of national operations in this field including the number of inspectors and ships carrying inspectors.

(ii) The arrangements set out in this recommendation and the plans for participation shall apply between Contracting Governments unless otherwise agreed between them; and such agreement shall be notified to the Commission:
Provided, however, that implementation of the scheme shall be suspended between any two Contracting Governments if either of them has notified the Commission to that effect, pending completion of an agreement.

"(10) (i) The fishing gear shall be inspected in accordance with the regulations in force for the subarea in which the inspection takes place. The inspector will state the nature of the violation in his report.
(ii) Inspectors shall have the authority to inspect all fishing gear in use or that fishing gear on deck ready for use.

"(11) The inspector shall affix an identification mark approved by the Commission to any fishing gear inspected which appears to be in contravention of the Commission's recommendations in force in relation to the flag state of the vessel concerned and shall record this fact in his report.

"(12) The inspector may photograph the gear in such a way as to reveal those features which in his opinion are not in conformity with the regulation in force, in which case the subjects photographed should be listed in the report and copies of the photographs should be attached to the copy of the report to the flag state.

"(13) The inspector shall have authority, subject to any limitations imposed by the Commission, to examine the characteristics of catches, to establish whether the Commission's recommendations are being complied with. He shall report his findings to the authorities of the flag state of the inspected vessel as soon as possible."

Annex 8

REPORT OF THE WORKING GROUP ON FINANCE AND ADMINISTRATION

The Working Group met at the Hotel Don Quijote on November 20 and 25, 1974. The following member countries were present at the meetings: Brazil, Canada, France, Ivory Coast, Japan, Korea, Portugal, Senegal, Spain and U.S.A. Also present was an observer from Gabón.

Mr. K. Yonezawa (Japan) was elected Chairman and the Secretariat served as Rapporteur.

The Chairman confirmed that Council Agenda Items 5, 6, 7, 8, 9, 10, 22, 24 and 25 had been referred to this Group (see Council Agenda — Annex 1).

Item 5. *Review of Panel members*

Membership of the Panels (CON/74/8) was reviewed and no changes were observed.

Panel 1	Brazil, Canada, France, Ghana, Ivory Coast, Japan, Korea, Morocco, Portugal, Senegal, Spain, U.S.A.
Panel 2	Canada, France, Japan, Korea, Morocco, Portugal, Spain, U.S.A.
Panel 3	Brazil, Japan, Korea, South Africa, U.S.A.
Panel 4	Canada, Japan, Korea, Portugal, Spain, U.S.A.

Item 6. *Administrative Report*

The Administrative Report — 1974 (CON/74/9) was presented and explained fully by the Executive Secretary. It was pointed out that Gabón had indicated to the FAO, Depositary Body of the Commission, its intention of joining the Commission, but this had not been ratified yet. The Observer from Gabón clarified that his Government is now taking the necessary steps for the ratification, which will be realized in the very near future. The Working Group reviewed the Report and *recommended* that the Council adopt it.

Item 7. *Auditor's Report*

The Group noted that the Auditor's Report for fiscal year 1973 had been transmitted to the head of each delegation, and officially to the respective Ministries of Foreign Affairs in April, 1974, and had been approved.

Item 8. *Review of financial status*

The Financial Report (CON/74/10) was presented by the Executive Secretary and explained fully. The Group noted that an unused balance of $ 3,861.40 is expected in the budget at the end of 1974 which might be allocated to the Working Capital Fund. Besides, the amount under the heading «Contingencies» in the 1974 Budget had not been utilized. It was *decided* to consider the allocation of these funds when the budget for 1975 is discussed.

A point was raised concerning the variation in the exchange rate applied by different countries. Also the exchange rate can change between the time that funds are transmitted and received at the Secretariat, which can result in a positive or negative balance in country contributions.

Item 9. *Review of the second half Biennial Budget (1975)*
and
Item 10. *Working Capital Fund*

These two items were discussed together.

The Executive Secretary presented a proposal (attached as Appendix I) for revising the 1975 Budget, which included the following points:

a. A total of $ 10,000 consisting of the unused amount in the 1974 Budget under «Contingencies» (i.e. US $ 8,890), as well as US $ 1,110 from the unused balance of the 1974 Budget (approximately $ 3,800), to be allocated to the 1975 Budget.

b. The remainder of the unused balance from the 1974 Budget to be entered into the «Working Capital Fund» which would thus be increased to a little over US $ 30,000.

c. An increase of $ 10,000 in the 1975 Budget should be allocated to Chapter 8 — Coordination of Research. The amount previously allocated to «Contingencies» ($ 15,000) in the 1975 Budget to be reduced by $ 5,000, which should be re-allocated to Chapter 8.

d. The $ 15,000 increase in Chapter 8 should be used to start data collection and sampling programs at ports, as recommended by the SCRS. Besides, during the fiscal year, the Secretariat will keep reviewing the budget and expenditures. If it foresees that the amount under «Contingencies» will not be used and/or that any part of allocations under Charpters 1 and 8 would be left unused at the end of the year (1975), the Executive Secretary is authorized to hire one biostatistician, on a temporary basis, at the level of P 1, 2 or 3 (depending on his qualifications).

The urgency of hiring the proposed biostatistician was emphasized by the Group. It was *recommended* that the Council instruct the Executive Secretary to constantly review the financial situation during 1975 in order to contract the services of a biostatistician as soon as possible.

The Senegalese delegation was in agreement with the 1975 Budget revision proposed by the Secretariat, but drew the attention of members to the insufficient allocation for scientific research. It is the delegation's opinion that for the Commission's role in international regulation, it is necessary to have precise data on factors which influence the behavior of tuna. It is necessary, therefore, that all these factors be studied, and this would suppose an increase in the allocation for research. The delegation considers that, by reconsidering the budget figures, it is possible to find better financial means for our Commission, and will make proposals in this regard at the next regular meeting of the Commission.

The comments of the Senegalese Delegate were well noted by the Group, while it was also noted that it was difficult to increase the 1975 Budget by increasing country contributions in the middle of the Biennial Fiscal Period. It was hoped that these points would be further pursued at the next Commission meeting before deciding on the budget for the following biennial period.

On the other hand, it was noted that the proposed biostatistician would play an important role in: establishing clear standards for sampling, training people and collecting data, as well as coordinating research and statistics. Also it was noted that the equipment initially needed for such work is fairly inexpensive and the sum set aside for this would probably be adequate to initiate such a program.

With the above understanding, the Group *recommended* that the Council adopt without change the Revised Budget (Appendix I) proposed by the Secretariat.

Item 22. *Review of Commission publications*

The Executive Secretary explained the Commission's publication policy, referring to the section on «Publications» contained in the Administrative Report (CON/74/9). The Group *agreed* that the present policy was adequate.

Item 24. *Date and place of the next Commission Meeting*

The Group noted and reconfirmed that the Commission, at its Third Regular Meeting in Paris, 1973, decided to hold its next meeting in Madrid for approximately one week, commencing November 19, 1975.

Item 25. *Date and place of the next Council Meeting*

Recognizing that the Council should hold its next regular meeting in 1976, the Group decided that the Council would leave the decision regarding the exact date and place until the next Commission Meeting.

Adjournment

The report was adopted and the meeting was adjourned.

Proposal for revision of 1975 Budget

Chapter	*Approved by the Commission,1973 (US $)*	*Proposed Modification for 1975 (US $)*				*Changes*
		Admin.[2]	*Meetings*[2]	*Research & Statistics*[2]	*Total*	
Original Appropriation . .	230,000				230,000	0
Allocation of unused balance from 1974 Budget[1] . . .					10,000	
Total 1975	230,000				240,000	+10,000
1. Salaries	120,000	58,000		62,000	120,000[3]	0
2. Travel	12,000	2,000		10,000	12,000	0
3. Meetings	23,000		23,000		23,000	0
4. Publications	17,000	7,000		10,000	17,000	0
5. Office Equipment . . .	2,000	1,000		1,000	2,000	0
6. General Operating Exp. .	18,000	7,000		11,000	18,000	0
7. Miscellaneous Expenses .	3,000	3,000			3,000	0
8. Coordination of Research .	20,000			35,000	35,000[3]	+15,000
a. Temporary personnel .				10,000	10,000	
b. Travel				10,000	10,000	
c. Equipment				3,000	3,000	
d. Miscellaneous . . .				3,000	3,000	
e. Data Processing . .				9,000	9,000	
Sub-Total	215,000	78,000	23,000	129,000	230,000	+15,000
9. Contingencies	15,000				10,000[3]	- 5,000
TOTAL	230,000				240,000	+10,000

1. Unused amount in 1974 under «Contingencies» (8,890) + Part of unused balance of 1974 budget (1,110) = 10,000.
   The rest of unused balance left from 1974 budget, if any, can be put into the Working Capital Fund.
2. Breakdown by «Admin.», «Meetings», and «Research & Statistics» for information only.
3. During the fiscal year, the Secretariat will keep reviewing the budget and expenditures.
   If it foresees that the amount under «Contingencies» will not be used and/or that any part of allocations under Chapters 1 & 8 would be left unused at the end of the year (1975), the Executive Secretary is authorized to hire one biostatistician, on a temporary basis, at P1, 2 or 3 level (depending on his qualifications).

Annex 9

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

Madrid, November 13-19, 1974

Table of Contents

Item 1. **Opening of the meeting**

1.1. The meeting was opened by the Chairman, Dr. B. J. Rothschild. Delegates from all the member countries except Ghana, Morocco, Senegal and South Africa attended, and a representative from FAO was also present (see Annex 2 to the Proceedings). The Chairman welcomed all the participants and observers.

1.2. On opening the meeting, the Chairman, citing the terms of reference of the SCRS, emphasized the responsibility and obligation of scientists, administrators and industries to collect adequate and accurate fishery statistics and biological data. He also stressed the necessity of making all these data available on a timely basis. He proposed the establishment of a Working Group within the Sub-Committee on Statistics. The terms of reference of this Group would include: reviewing the present system of data collection and coverage, finding out its defects and formalizing a workable statistical system in order to complete programs.

Item 2. **Adoption of agenda and arrangements for the meeting**

The Tentative Agenda was adopted and is attached as Appendix I. Doctor J. Gulland was nominated rapporteur for Item 5 (Review of stocks) and Doctor P. Miyake was nominated general rapporteur for the rest of the Items. A list of the documents presented to the meeting is attached as Appendix II.

Item 3. **Admission of observers**

All the observers were admitted and appear in the List of Participants (Annex 2 to the Proceedings).

Item 4. **Review of national fisheries and research programs**

4.1. *Brazil*: In 1973, 3 Brazilian longliners operated off the Brazilian coast and catch 524 MT of tuna (176 MT less than in 1972) using 457,655 hooks (accumulative). The most important species caught were yellowfin and swordfish. Various analyses were carried out on the catch by species and effort data for Japanese longliners which operated in the waters off the Brazilian coast (1956-1971), in order to evaluate the potential tuna production in the area concerned. Biological sampling was made of the landings at São Paulo, and weight/length relationships were determined.

4.2. *Canada*: Canadian landings from the eastern Atlantic were 1,250 MT in 1973 but zero in 1974 (no effort), while those from the western Atlantic (bluefin) were 1,000 MT and 750 MT respectively. Effort in large bluefin fisheries increased, especially rod and reel (×4), and domestic conservation measures were adopted. Research mainly involves sampling and tagging with initial acoustic tag study of survival of large tuna after capture on hook and line. Small bluefin tag return rates for purse seine tagging may be higher (55 %) when allowance is made for initial mortality.

4.3. *France*: In 1973, more than 43,700 MT of tuna were caught in the Atlantic:

Albacore	6,100 MT	
Yellowfin	26,207 MT	
Skipjack	10,145 MT	
Bigeye	247 MT	
Bluefin	1,000 MT	(provisional figure)

Research activities have been aimed at a better knowledge of the albacore fishery by evaluating the fishing effort and catch by age classes, as well as by effecting biological studies on the population structure and migration of albacore. The program of statistics and population dynamics of inter-tropical yellowfin and skipjack has been continued.

4.4. *Ghana* (prepared by the Secretariat): The catch by Ghanaian flag vessels in 1973 amounted to 2,047 metric tons, 3,000 tons less than the previous year (purse seine catch). In 1973, for the first time, one Ghanaian baitboat started operation. The same year, the Fisheries Research Unit in Tema commenced extensive tuna research which included the collection of landing statistics for all

foreign-flag tuna boats at Tema, and biological sampling from their catches. 44 yellowfin samples (3,576 fish) and 56 skipjack samples (3,664 fish) were taken.

4.5. *Ivory Coast*: In 1973, the Ivory Coast tuna fleet comprised 4 purse seiners, which landed 2,500 tons of yellowfin and 1,000 tons of skipjack. Abidjan is, besides, an important port of transshipment for tunas caught by the surface (19,000 MT) and longline (15,000 MT) fisheries. Statistical and research activities are carried out in the Ivory Coast on all the species landed at Abidjan, and statistics are collected and data analyzed for the FIS fleet operating in the Atlantic.

4.6. *Japan*: Japanese catches in 1973, some 64,000 MT, were about 5 % less than in 1972. Half of the catches were taken by longliners, which showed a preference for bigeye and southern bluefin tunas. Skipjack and yellowfin catches by the pole-and-line fleet increased. Collection of statistical and biological data has been continued for all fisheries, and most of this information has been compiled for the years up to 1972.

4.7. *Korea*: In 1973, 106 tuna longliners (100-600 GT, majority 200-300 GT) and 3 pole-and-line boats operated in the Atlantic region. The total catch by this fishing fleet amounted to 34,460 metric tons, about 5 % less than that in 1972, mainly due to the decrease in the catch of albacore (13,577 MT in 1972; 8,525 MT in 1973). The major species in the 1973 catch were yellowfin, albacore and bigeye. These species constitute about 80 % of the total catch. In regard to tuna research activities, efforts are being continued to improve the collection of statistical data necessary for tuna studies, and better results are expected in the future.

4.8. *Morocco*:

Not available yet.

4.9. *Portugal:* The principal species of tuna caught in the Azores in 1973 were bigeye (approximately half of the total catch), albacore and skipjack. This fact was confirmed in 1974 by samplings made. Bluefin constitutes less than 10 % of the catches. Collection of catch and effort data was commenced in July, 1974, in Funchal (Madeira) and two ports in the Azores. Further data were supplied directly by Azorean canneries. All the fishing was carried out by baitboat. Biological sampling on principal species was started in July 1974.

4.10. *Senegal:* In 1973, the Senegalese tuna fleet was composed of 17 boats —one freezer baitboat and 16 purse seiners— and landed 9,478 MT (11,339 MT in 1972). Catches were mainly of yellowfin (72 %). Surveys and biological samplings were made on all landings, including those of foreign boats.

4.11. *Spain:* Both the Fishery Research Institute and the Spanish Oceanographic Institute have continued the programs initiated in previous years, at the same time improving their research systems. The Oceanographic Institute has started studies on catches of bluefin tuna *(Thunnus thynnus thynnus)* in the Basque region, and on the purse seine fishery off West Africa.

4.12. *South Africa:* In 1973, four purse seiners, 10 baitboats and 52 sport fishing boats (trollers) caught 150 MT of tuna, mainly albacore and yellowfin. 99 yellowfin caught by purse seiners were sampled for biological study. The tuna tagging project was suspended due to the fuel crisis, but regular hydrographic surveys were carried out on the southern part of the "Cape West" coast.

4.13. *U.S.A.:* United States catches decreased by 0.6 % in 1973. Effort in the major fishery, that by purse seiners for tropical tunas, mostly in the eastern Atlantic, was down considerably but the catch (23,770 tons) decreased by only 3 % from 1972. Skipjack tuna dominated the tropical catch. Preliminary results for 1974 indicate that the catch will again be dominated by skipjack tuna and will be about the same size as in 1973. Catches of bluefin tuna in the northwestern Atlantic continued to decline. The fishery was under voluntary regulations in 1974 and research has been intensified.

Item 5. **Review of stocks**

5.a. *Yellowfin*

5.a.1. The most recent statistics of Atlantic yellowfin catches are given in Table 1. This shows that the catches in 1973 in both longline and surface fisheries declined slightly from the peak in 1972 despite a slight increase in effort in the surface fisheries. There was also a decline in the catch per unit effort in the surface fisheries of the FIS fleet. As well as data for 1973, Table 1 gives updated estimates for catches in previous years. These include a number of minor amendments, and a noticeable revision upwards of the figure for 1971, due to the prevision of more detailed information concerning the Spanish tropical tuna fishery.

5.a.2. A number of papers were presented to the meeting which included valuable information on the yellowfin fisheries and on the sizes of fish caught, areas of fishing, etc. In particular, the Committee welcomed that more detailed and precise information on catches by area, species and quarter of the year was made available for the Spanish fishery. The analyses on the papers were mainly continuations and revisions of studies presented in early years and, in general terms, confirmed conclusions concerning the state of the stocks given in earlier reports of the Committee.

5.a.3. The results of applying the production model technique to the surface fishery in the eastern Atlantic, and to the whole Atlantic fishery, to include 1973 data, are shown in Figures 1 and 2 (Figures 3 and 4 of Doc. SCRS/74/32). These are very similar to the results given in previous reports, especially Figures 3 and 4 of the 1973 report. The differences arise from the inclusion of the 1973 data —high effort, and moderately high catch— and the revision upwards of the 1971 catch, which occurred at a moderately high level of effort. The chief result of these changes is to make it appear rather improbable that the true relation between catch and effort is the relatively sharply peaked parabola predicted by the simple

Schaefer model (m = 2 in the general production model). It appears more likely that the yield curve is relatively flat topped (e.g. m = 0 or m = 1) as suggested by the upper or middle curves in Figures 1 and 2.

5.a.4. Some of the observed variation about the lines in the Figures may be due to fluctuation in recruitment. Analyses of the c.p.u.e. of young fish off Pointe Noire show that the year-classes of 1964 and 1968 were poor, and those of 1967 and 1969 were good, the others being average. Since year-classes make their biggest contribution to the surface fisheries at two to three years old, the poor 1968 year-class might account for the low point for 1970, and the good year-classes for the relatively high 1969 and 1972 points. If some subjective allowance is made for this, it appears that the catch/effort curves, for average recruitment, would be very similar to those in Figures 1 and 2, but possibly slightly higher.

5.a.5. It must be again stressed that these curves will only describe the actual course of events in the fishery provided that there are no significant changes in the pattern of fishing (sizes of fish caught, areas fished, etc.). Their shape is critically affected by the nature of the stock-recruitment curve.

5.a.6. The possible relations between adult stock and subsequent recruitment, and their effect on the yield-effort curve were discussed in detail in the 1973 SCRS Report (paras 26-35). No new information on the stock/recruitment relation has been produced to enable that discussion to be carried forward, but the main conclusions concerning the effect on the total catch of increased fishing effort may be repeated here.

5.a.7. For the most favorable analysis (m = 0 in Figures 1 and 2), which probably would require some increase in recruitment at low stocks, increased fishing would produce some increase in catch, but this increase would be much less than proportional to the increase in effort. If recruitment is not affected by increased fishing, the catch/effort relation will probably approximate to the curves for m = 1. In this case, increased fishing will give no increase in catch, and large increases in effort will cause some fall in catch. However it is certain that if adult stock decreases, at some point recruitment will fall. This point has not been reached, but if it is reached in the future there may be a drastic fall in catch.

5.a.8. Over the years there have been large changes in the relative contributions to the fishery by different groups of vessels. Between 1963 and 1971, the catch of baitboats has decreased from 23,000 to 11,000 tons, while those of purse seiners increased from 600 to 42,000 tons. Unless natural mortality, growth, recruitment or catchability vectors have altered, these changes in the fishery will increase the yield to be expected from the present level of effort.

5.a.9. Of more significance at the present moment is the increase in catches of very small fish taken in the last two or three years. The fleet of baitboats based in Tema, mainly Japanese but flying a variety of flags, catches very small fish (over 80 % by numbers less than 3.2 kg), and the catches of these vessels have increased rapidly from 2,000 tons in 1971 to about 9,000 tons. In 1973 these vessels

took 10 % of the tonnage of yellowfin taken in the Atlantic, but almost 50 % of the numbers of fish.

5.a.10. Previous reports have pointed out that, at the present high fishing intensity, catching fish smaller than 3.2 kg will lead to a decrease in total yeild-per-recruit. Similar results have been obtained by simulation analyses, which examined the effects on catches over the next five years, of the presence or absence of these vessels catching very small fish (Tema-based fleet). The predicted catches (in MT) for 1977 (assuming an increase of 15 % per year in effort of purse seiners) are as follows:

Fleet	*1973 catch*	*No fishing by Tema-based fleet*	*Tema-based fleet fishing*
Tema-based fleet . . .	9,000	—	9,000
Other surface vessels . .	51,000	56,000	39,000
TOTAL	60,000	56,000	48,000

No estimates have been made of the effect on longliners, but to the extent that their catches are based on the same stock of fish as the baitboats, they will be reduced. The tabulation therefore underestimates the losses to the total Atlantic yellowfin fishery.

5.a.11. No great significance should be attached to the precise figures in this table. The actual catches in 1977 will be affected by many other factors, such as variations in recruitment and changes in fishing practices by other fleets. What is clear is that, if the catches of very small fish are maintained at the 1973 level, this will seriously reduce the total catches in future years. The fall in total catch may be of the order of 20 %, and catches by the other, non Tema-based fleets, may fall by some 30 %.

5.a.12. It was noted that during the previous SCRS meeting, the originals and duplicates of data collected by the ICCAT statistical expert on catches of small yellowfin were not available, as mentioned in the Secretariat Report (SCRS/73/7). Unfortunately, for this reason, they could not be used by the scientists at an opportune time.

5.a.13. *Data supply*. As already noted, improved catch and effrot data are now becoming available from the Spanish fleet. The most serious gaps in the catch/effort data now concern the longline fleets of Korea and China (Taiwan). Catch data are now being collected by the Commission at ports of transshipment, but effort data are lacking. Size data are satisfactory for most of the surface fleets, but are generally lacking for the longline fleets. However, it was reported that Japanese scientists are arranging for more extensive length sampling to be carried out on board their longline vessels. This will enable much improved data to be supplied, with good information on the time and place of capture.

5.b. *Skipjack*

5.b.1. Catch statistics for skipjack are shown in Table 2. The total catch in 1973 was almost identical to that in 1972, but trends were different in different fisheries. The U.S. fleet had very good fishing off Angola in 1973, though in the Gulf of Guinea the FIS fleet had poor skipjack catches in 1973. In 1974 both the U.S. and FIS fleets had good fishing off Angola.

5.b.2. Assessment of the state of the skipjack stocks is made difficult by the absence of any fishing effort directed specifically at skipjack (except for the U.S. fleet in 1973 and 1974). Most skipjack are caught by vessels whose primary interest is yellowfin, and the skipjack c.p.u.e. is affected as much by the yellowfin abundance as by that of skipjack.

5.b.3. Until 1971 the fairly steady increase in skipjack catches (up by four-fold between 1964 and 1971) was consistent with the belief that the skipjack in the Atlantic was a large resource, probably significantly bigger than that of other tuna species. The catches in 1972 and 1973 were both lower than in 1971, despite the fact that the surface effort taken as a whole (on yellowfin and skipjack combined) was higher. The Committee therefore repeats the view expressed in the 1973 report (para. 39) that the expansion of fishing for skipjack should proceed with caution, pending better information on the magnitude of the resource.

5.c. *Bluefin*

5.c.1. *Catches*

The catches of bluefin tuna in the Atlantic (including the Mediterranean) are given in Table 3. This shows that the total catch has declined from a peak of a little under 40,000 tons in 1964-65 to about 12,000 tons in 1973. The recent trends have varied between fisheries. The surface (purse seine and baitboat) fisheries on small fish have declined to about half their peak catches, while most fisheries on large fish (particularly the Norwegian purse seiners and the traps along the coast of the Iberian Peninsula and Morocco) have declined to a very low level. The catches of Japanese longliners in the Atlantic have declined by about 11,000 tons from the peak in 1964-65. However they took good catches of some 3,000 tons in the Mediterranean in 1973-74.

5.c.2. *Stock separation*

There is still uncertainty about the degree of separation between the tuna caught in the Mediterranean and the Atlantic, and between the eastern and western Atlantic. Recent tag returns have confirmed that trans-Atlantic migration of both large and small bluefin occurs, and may be appreciable in some years. However most tag returns, even after several years, occur on the same side of the Atlantic as the point of tagging. Therefore it may be convenient, and not incorrect, to treat the Atlantic bluefin as, in many ways, a single stock. However it is probable that

any management action (or failure to take action) will be most clearly felt among the fisheries on the same side of the Atlantic as the action is taken, but will also affect to some extent the fisheries on the other side.

5.c.3. *Status of stocks*

5.c.3.1. Because there are very marked differences in the distribution of different sizes of bluefin, and in the fisheries on different sizes, it is necessary to treat different size groups individually. Catch rates of younger fish (1 to 5 years old) taken in the surface fisheries have, over the past decade or more, fluctuated around the same levels. Estimates of the number of young fish recruiting into these fisheries have been made, and show some variation, with no consistent trend in all sets of estimates. In the western Atlantic, the 1973 year-class seems to have been good. The present estimates of recruitment are far from satisfactory, and better estimates are badly needed.

5.c.3.2. The older fish however have declined, although quantitative data, e.g. reliable measures of catch per unit effort, are generally lacking. The best c.p.u.e. data are probably from the Japanese longline fishery, but these can be seriously affected by the degree to which the vessels direct their attentions to bluefin or to other species. Counts from aircraft of giant bluefin passing the Bahamas suggest a decrease between 1951-53 and 1974, of a third. Catches in many fisheries have declined much more than this. It was pointed out that there are big variations in sex ratio, and some coastal fisheries in the northwest Atlantic on large fish take almost entirely males.

5.c.3.3. There have been changes in the composition of the catches of larger fish. The average size in nearly all fisheries has been increasing over a long period. Several of these fisheries are now based on very old fish (up to 20 years old or older), and the numbers of relatively young fish (6-8 years old) entering these fisheries have significantly declined. In one or two cases, e.g. the Norwegian purse seine fishery, the changes in length composition from year to year suggest that there has been virtually no recruitment to the fishery since 1960. In others, recruitment has been very low. It appears that the decline in the numbers of fish recruiting to these fisheries may be correlated, at least in the western Atlantic, with an earlier increase in the fisheries on small or medium fish —as would be expected in a qualitative sense. The quantitative links between the fisheries on different sizes of fish are examined in the following section.

5.c.4. *Yield-per-recruit*

5.c.4.1. The bluefin fishery is characterized by very different fishing mortality rates on different ages. The pattern of age-specific fishing mortality depends on the relative fishing effort exerted by different types of gears (purse seine, baitboats, longline, etc.) as well as the fishing tactics of each gear. This complicates the calculations of the yield that can be obtained from a given recruitment, which are normally made for a constant fishing mortality above some given age. Ideally the calcu-

lations should be made for the present pattern of age-specific F, and take into account likely changes in this pattern. This was difficult to do during the present meeting, because of uncertainty concerning the precise present situation, and likely changes in fishing tactics. Accordingly, calculations were made of an idealized fishery, with three distinct segments — 1-5 years, 6-10 years and 11 years onwards. The yields from different combinations of fishing mortality in each of these periods were calculated, and are shown in Table 4. Calculations were made for natural mortality M = 0.2 and 0.4, but the latter proved to be inconsistent with the observed history of the fisheries. With such a high natural mortality it would be impossible for fisheries on large fish (e.g. the Ibero-Moroccan trap fisheries) to have taken the large catches taken in past years. Ranges of F = 0.2, 0.4 and 0.6 were considered for large fish, but the results were insensitive to the values used, and therefore the results for F = 0.2 only are presented. The results have been expressed as the yield in weight (tons) per million recruits at one year old. This level of recruitment is within the range recently experienced, so the figures do provide some guidance to the actual catches that might be expected. Actual recent recruitment to the total Atlantic stock has been estimated, using virtual population analyses, to range between 0.4 and 1.5 million fish.

5.c.4.2. Examination of the bottom row of each part of Table 4 shows that increasing fishing mortality on the small fish causes a steady decrease in the total catch. This decrease is particularly marked for $F > 0.2$, where an extra 1,000 tons caught as small fish can cause a drop in total catch of several times as much. On the other hand for low values of F in all sectors of the fishery, a small increase in the catch of small fish causes a drop in the catch of larger fish that is not very much bigger. That is the critical factor in determining the fate of the medium and large fish in the *fishing mortality* on the small fish, rather than the actual weight caught.

5.c.4.3. This analysis confirms that the decline in the catches of older fish can be accounted for in a general way by the increase in catches of smaller fish, and that the observed drop in total catch, some two or three times the catch of small fish, is to be expected from the yield-per-recruit analyses. A more precise account requires estimates of the fishing mortality in the younger fish.

5.c.4.4. The most direct estimate of fishing mortality in bluefin comes from the results of tagging of small fish in the N.W. Atlantic. These gave estimates of F on 2 and 3 year old fish that ranged from 0.278 to 0.995, with a mean value of 0.575. These estimates imply fairly high emigration or other loss rate from this fishery. If the true loss rate is lower, then the estimate of F should be decreased. On the other hand, if correction is made for deaths at the time of tagging, the estimates of F may have to be increased.

5.c.4.5. In terms of the idealized stock, a value of 0.575 for F would imply that the fishing mortality on these small fish, if it is applied uniformly on ages 1 to 5, could be reduced to a third of its present value (i.e. to a little less than 0.2), with not much reduction in the catch by the small-fish fishery, and a very great

increase in the total catch. If the true present fishing mortality is lower (say 0.4), it could still be reduced appreciably without reducing the total catch, but there would be a reduction in catch in the small-fish fishery.

5.c.4.6. In practice, the situation does not correspond exactly to the idealized stock, nor does the same fishing mortality apply to all groups of small fish. The age-composition in the small fish fisheries on the two sides of the Atlantic appears to be similar, so that it is not unreasonable to assume the mortality rates are similar. Also there does not appear to be any unexploited groups of small bluefin on either side of the Atlantic. For the present, therefore, the fishing mortality is estimated to be in the range 0.4-0.6, and is assumed to apply to all groups of small fish.

5.c.4.7. It is less reasonable to assume that this rate applies (as in the idealized model) equally to all ages from 1 to 5. On the one hand the appearance of one year-old fish in the catches is variable, and they are usually much less well represented in the catches than older fish, though they seem to predominate in the catches off Morocco, and in the U.S. sports catch. On the other hand, 4 and 5 year old fish are not now common in the catches, though this may be because few survive the intense fishery on 2 and 3 year olds, rather than because they have moved out of the fishery.

5.c.4.8. If indeed the small-fish fisheries do not exploit fully the 5 or 4 year olds, this will not make much difference to the changes in *total* catch predicted to follow a change in fishing mortality on young fish. If the present mortality is reduced, the total catch will still increase by about the same extent, but less of the benefits will be felt in the small-fish fishery itself, e.g. a reduction from $F = 0.6$ to $F = 0.4$ would reduce the long-term catch in the small-fish fishery rather than slightly increase it. In the actual fishery on small fish in the eastern Atlantic, which appears to be based only on 2 and 3 year old fish, the losses within the small-fish fishery following a reduction in effort would be appreciable.

5.c.4.9. To the extent that one-year old fish are not exposed to the full fishing mortality, the results of a general reduction in fishing mortality on small fish will be less dramatic than suggested in Table 5. The general effects will however be similar — a reduction in mortality will increase the total catch, and if the fishing mortality is at the upper end of its likely range (0.6), a quite large reduction from the present level can be made without serious long-term reductions in the catches of the small-fish fisheries, at least if they catch fish up to age 5.

5.c.4.10. The fishing mortality coefficients on the larger fish are less well known. In the past they were probably low in the western Atlantic (indeed so low that the western stock, if separate from the eastern stock, was probably under-exploited until the development of the small-fish fishery). At present they may be low in the east Atlantic because the low level of adult abundance has caused a drop in effort in many of the large-fish fisheries. If the effort remained low, there might not be much increase in total catch following a reduction in mortality in the small-fish fishery, but it seems much more reasonable to expect that, once the abundance of

larger fish increases, the effort on larger fish will increase to take advantage of the larger stock.

5.c.4.11. The yield-per-recruit analyses can also be used to estimate the effect of changing the size at first capture, i.e. avoiding completely the capture of fish below a given size or age. These have shown that, unless the fishing mortality on medium and large fish is very low (which, as discussed above, will be unlikely if the adult abundance is allowed to increase) the total catch would be increased by increasing the size at first capture up to 8-10 years.

5.c.4.12. Simulation studies were also made using a more realistic vector of age-specific fishing mortalities, and estimates of the present age-composition. These confirmed the other yield-per-recruit calculations, and specifically showed that an overall reduction in fishing mortality on all sizes proportionally, will tend to increase the total catch if the present F on 2-3 year old fish is higher than about 0.35. At high levels of fishing effort, avoiding the capture of 1 and 2 year old fish would increase the total catch. The simulation studies also showed that it would take a long time (from about 5 years for the small-fish fisheries to about 15 years) for management actions to have their full effect on the fishery.

5.c.5. *Stock and recruitment*

5.c.5.1. Considerable concern has been expressed over the long-term situation of the bluefin stock, in the light of the low level of abundance of the adult stock, and the possible effect on recruitment. The determination of the relation between adult stock and subsequent recruitment is difficult for most fish, and tuna is no exception. Analyses of the recruitment during recent years have shown no consistent trend, with most data suggesting fluctuations about a steady level. In the western Atlantic sports fishery, one-year old fish were more abundant in 1974 than in several years previously. However no clear conclusions can yet be drawn concerning the relation between adult stock and subsequent recruitment.

5.c.5.2. It is clear, however, that adult stock cannot be reduced indefinitely without effect on recruitment and, though the evidence on this is inconclusive, in the bluefin tuna the adult abundance may be approaching the point at which recruitment could be affected. If this is the case, further declines in adult stock could seriously affect the long-term state of the whole north Atlantic bluefin fishery.

5.c.5.3. In the long-term, the abundance of the adult stock is determined by the fishing mortality rates at all ages. This is shown in Table 5, which gives the biomass in thousand tons, per million recruits, of large (10+) fish for the different combination of mortalities used in the earlier yield-per-recruit calculations.

5.c.5.4. The figures decline very greatly from the top left of the table to the bottom right, and a stock exposed to heavy fishing on all ages may have a biomass less than one per cent of that of a stock fished only when old. In the long term, if a moderately high level of adult stock is desired, this can only be done by ensuring a reasonably low level of fishing mortality on all ages.

5.c.5.5. For the short term, in reference to the present situation, restrictions on the catching of small fish will have no affect on the adult stock for at least five years, — until the fish involved have reached maturity. Serious concern has been expressed by some people about the level of adult stock over the next few years. The Committee, therefore, examined the likely trends in the adult stock. Clearly the biomass of the giant fish now dominating the large fish fisheries will decrease, even if not fished, as losses through natural mortality exceed growth increments. These losses normally will be countered by recruitment of fish now of medium age (5-8) to the adult stock. The magnitude of this recruitment is expected to be small, because these fish were exposed to heavy fishing when young. In recent years, these ages only appear in any numbers in the Spanish baitboat fishery and in the Japanese longline fishery in the eastern Atlantic. It is possible that they are so few that the adult stock will decline even further; on the other hand, it appears from some analyses that the fishing mortality on small fish in 1968-71 was somewhat lower than in the preceding period. In that case recruitment to the adult stock in 1975-78 might be expected to be rather better than earlier (though still low), and the adult stock could be maintained at its present level, or even increase slightly, if the fishing mortality on these fish does not change appreciably. However, it appears that higher prices are resulting in an increase in effort on large bluefin in the western Atlantic. On balance, therefore, unless action is taken to control the catches of large fish, it is likely that the abundance of large fish will decline over the next five years. The effect of such a decline on subsequent recruitment cannot be predicted with any confidence.

5.c.6. *Management actions*

5.c.6.1. Two actions have been considered by the ICES/ICCAT group, which were:

"*a*) short-term reduction of fishing intensity on giant fish, to protect spawning fish,

b) long-term reduction in purse seine fishing of young fish to permit escapement of maturing fish."

In discussing these proposals it was considered that examination should also be made of the effect of reducing fishing of small fish by other gears.

5.c.6.2. The consequences of the first are not entirely certain. In the short run, it is clear that because among these fish natural mortality exceeds growth, there will be some loss of catch. The long-term effects depend on the changes in adult stock and subsequent recruitment. If, even without such a measure, the adult stock would not fall below the 1973 level, recruitment would be likely to be maintained, and there would be no benefit. On the other hand, without controls, the adult stock might fall enough to have serious consequences on recruitment, which could take drastic controls in future years to remedy, and in that case a reduction in fishery on large fish, or at least a limit on effort to the present level, could be beneficial in avoiding serious losses. If the Commission takes the view that it should mini-

mize risk by insuring against possibly serious losses, it should consider such controls. It should also be noted that any action to protect the spawning stock would not be effective in the long term if the fishing mortality on juveniles is high.

5.c.6.3. The consequences of the second action depend on the ages of the fish affected. Long-term benefits, in terms of increased catches of larger fish, will be greatest if the reduction of effort applies mostly to one-year old, and to a lesser extent, 2 year old fish. It is technically possible in the commercial fishery to avoid one-year old fish, while still catching 2-5 year olds, and to do so would increase the total catch by several tons for each ton by which the catch of one-year old fish is reduced. The avoidance of these very small fish in the commercial fishery might be implemented by enforcing a size limit. An appropriate limit in the northwest Atlantic might be 6.4 kg.

5.c.6.4. However the present catch of one-year old fish in the commercial fisheries is not large though in some years U.S. sports fishermen make large catches of small (mostly one-year old) fish, which may total as many as 100,000 fish. Also it appears technically difficult to avoid 2-year old fish, while still fishing for the older groups of small fish. An appreciable increase in the escapement from the small-fish fishery, and in the recruitment to the mature stock, can only be achieved by a more general reduction in fishing mortality on the small fish.

5.c.6.5. The yield-per-recruit analysis suggests that if the current fishing mortality is as high as estimated from tagging, then the fishing mortality could be reduced by at least half, without a great long-term reduction in the catch of small fish, and with substantial increases in the catches of large fish. The reductions in the catch of small fish will be only minor if the fishery does now, or can in the future, exert a significant fishing mortality on the 4 and 5 year old fish.

5.c.6.6. The fishing mortality may be difficult to estimate and control directly, and the control may have to be effected by a catch limit. The limit that has to be imposed to achieve any desired reduction in mortality in the 1975 or later seasons will depend on the stock abundance in those seasons. If a catch limit is applied at a time of falling stocks, without taking account of the reduction in stock, it may be quite ineffective in limiting fishing mortality. Fortunately, it appears that in the northwest Atlantic, the 1973 year-class was relatively good, and the catch, and presumably the purse seine effort, was lower than the average of past years. Thus the abundance in 1975 is likely, if anything, to be higher than recent averages, and a catch limit set at say 25 % below the 1973 level would ensure that the fishing mortality would be reduced by at least 25 %. Similarly, any other reduction in effort that the Commission might adopt as a target could be achieved by an approximately proportional reduction in catch. If this were done, and provided recruitment is average or better, there should be some increase in abundance, so that the catch quota to achieve a 25 % effort reduction could be increased in future years, or a further reduction in effort achieved with little reduction in catch.

5.c.7. *Future activities*

5.c.7.1. Improved analyses of the state of bluefin stocks, and better advice on the results of management measures, are made very difficult by the absence of basic data from several important fisheries. The need for improved sampling was stressed by the ICES/ICCAT working group, which recommended a minimum standard of at least 500 fish/fishery/year of large and 1,000 fish/fishery/year for small fish. In view of observed differences in sex ratios, and the importance of age data, sampling should also include information on the sex of the fish, and collections of otoliths made. It was noted that a technique has been developed by U.S. scientists for the easy collection of otoliths from giant bluefin. It was also reported that Japan is arranging for direct sampling on board longliners, which will provide more reliable data, with better detail on the time and area of capture. The Committee therefore strongly *recommended* that all countries catching bluefin should implement a sampling scheme to at least the standard suggested by the ICES/ICCAT group.

5.c.7.2. Data on catches and effort are also partly unsatisfactory. Statistics of catch are incomplete for some fisheries and for nearly all fisheries improvements in effort data are needed, and for many it is still unclear what measure of c.p.u.e. provides the best index of abundance. The Committee therefore *recommended*:

a) that all countries not yet reporting full catch and effort data should do so as soon as possible, and
b) that studies should be made to determine the best indices of c.p.u.e to use, especially in the large-fish fisheries.

5.c.7.3. Better information is needed on the stock structure of Atlantic bluefin. Tagging has given good information on the movements of fish in the western Atlantic, and similar work is needed for the eastern Atlantic. In addition it appears that morphometric studies (on the size of the second dorsal fin) may be useful in separating stocks of groups of fish. The Committee, therefore, *recommended*:

a) that tagging of small (especially 0- and 1 to 2 group) fish in the eastern Atlantic and Mediterranean should be intensified,
b) that further studies should be made of the usefulness of morphometric measurements as a method of stock separation.

5.c.7.4. In addition to identifying the above actions to improve the supply of basic information, the Committee also noted that further analyses could be made of existing data, other than the analyses reported in documents presented to the meeting, and some made during the meeting. Specific studies that should be made, and reported to the next session of the Committee, include:

a) further studies using the method of cohort analysis for each side of the Atlantic,
b) better estimates of recruitment, at one-year old, using c.p.u.e. data, tag returns and cohort analyses,

c) further estimates of yield-per-recruit, using a more detailed breakdown of age-specific fishing mortality,
d) studies of the relation between adult stock and recruitment, using the recruitment estimates obtained under *b*),
e) estimation, from c.p.u.e. data and cohort analysis, of the trends in abundance of each age-group.

5.d. *Albacore*

5.d.1. The summary statistics of albacore catches are shown in Table 6. This shows that the 1973 catch was the same as in 1970, but otherwise lower than any year since 1963. The decrease has been most marked in the surface catch.

5.d.2. A number of analyses were made, relating catch, or c.p.u.e., and effort, using production models, or simple plots. In the longline fishery in the south Atlantic, the yield/effort curve has clearly flattened out, and the fishing intensity has passed the point at which further increases in fishing would give any appreciable increase in catch. It appears that the fishing intensity could be reduced by at least one-third from the 1972 level without significantly decreasing the catch.

5.d.3. In the north Atlantic fisheries there is no evidence that the stocks are over-fished, and the production model applied to the whole north Atlantic fishery, using a combination of French and longline c.p.u.e. data, suggested that the fishery is presently in the bottom left corner of the yield curve, and that catches could be very greatly increased by increased fishing. Doubts were expressed about the validity of the production model studies because of the nature of the c.p.u.e. data, and the fact that in the surface fishery, effort in one year can increase (mainly by boats fishing longer) when the c.p.u.e. is high. It is also doubtful whether the production model can be reliably applied to this fishery because it is pursued by two gears that have such large differences in size selectivity, and which have changed appreciably in the relative applications of fishing effort.

5.d.4. The results in the north and south Atlantic are not inconsistent. The intensity in the southern longline fishery has been in recent years more than twice as high as in the north Atlantic. In fact if the catches of the northern and southern longline fisheries are plotted in the same figure (see Figure 3), as functions of the fishing intensity, there is very close agreement, except that the catch from the south Atlantic is twice that from the north Atlantic for the same fishing intensity. This is presumably due to greater recruitment into the southern longline fishery, which may reflect the effects of the surface fishery in the north, as well as the slightly greater area in the south Atlantic.

5.d.5. If this comparison is correct, the present fishing intensity in the north Atlantic longline fishery may be approaching the level at which the catch/effort curve bends over, and beyond which further increases in effort will not give much increase in total catch.

5.d.6. Cohort analyses applied to the north Atlantic fishery did not produce conclusive results because convergence of F for young ages did not occur. It was possible to obtain vectors of F which indicate that either the fishery is achieving maximum yield-per-recruit, or is on the left-hand side of the maximum with respect to fishing effort. Yield-per-recruit analyses did not indicate that significant increases in yield-per-recruit could be obtained by increasing size at recruitment.

5.d.7. Tag returns (on the order of 3 %) would indicate a very low rate of exploitation. However, estimates of tag shedding, tagging mortality, and rate of reporting have not been made. We *recommend* a careful analysis of the tagging data as a potentially productive approach to obtaining a better assessment of the status of the fishery.

5.d.8. It was quoted that there is a very large surface (baitboat) fishery for albacore in the western Pacific. This fishery exploits fish at ages between those exploited by the eastern Pacific surface fishery and the Pacific longline. It could be possible that such a group exists in the western Atlantic. We suggest that exploratory surface fisheries in the western and central Atlantic, or other studies, should be done to verify this possibility.

5.e. *Others*

5.e.1. *Bigeye*

5.e.1.1. Statistics of bigeye catches are given in Table 7. This shows that catches in 1973 increased slightly compared with 1972, and though less than the peak catch in 1971, are the second highest recorded. Some doubts were expressed about possible misidentification of bigeye among the catches of smaller fish. Possibly up to 20 % of the fish recorded as yellowfin in some official statistics may in fact be bigeye. Misidentification may occur in transshipment manifests into the U.S., but probably not in logbook records.

5.e.1.2. Analysis of the catch and effort data of the Japanese longline fishery shows that up to the present, increased effort has given increased catches in numbers and weight. However, there is a significant decrease —to about 50 % of the unexploited level— in the hook-rate with increasing effort. This suggests that the effort may now be approaching the level where increased effort does not give a significant increase in catch.

5.e.1.3. The flattening out of the yield curve is clearer in terms of numbers than in terms of weight. That is, the average individual weight in the catches appears to be increasing, which is the reverse of what is to be expected in a moderately heavily exploited fishery. There are, however, doubts about the weight data, and better information on size composition is urgently needed, especially from the Chinese and Korean fleets. In addition there are differences in size composition in different areas, and the changes in sizes caught may not reflect changes in the true composition of the stock.

5.e.1.4. It was suggested that additional insight into the state of the stocks could be obtained by appliying cohort analysis. However, it was also pointed out that the progression of modes in the catches of small bigeye was much less clear than in the case of yellowfin. This would make the application of cohort analysis difficult, without better information on the growth and age-structure of bigeye.

5.e.2. *Billfish*

A report was presented giving the catch rates of blue and white marlin by Japanese longliners in the main billfish areas (in and near the Caribbean, and eastward of Brazil). The catch rates of blue marlin, particularly in the southern region, declined rapidly from a peak in the late nineteen fifties, to a low level in 1967, but have fluctuated since then without clear trend. Catch rates of white marlin have fluctuated, with no clear tendency to decrease. Preliminary analyses of the sports fishery in the western central Atlantic show no clear trends over the past 3 years.

Item 6. **Report of the Sub-Committee on Statistics**

6.1. The Report (Appendix III) was presented by the Convener of the Sub-Committee, Mr. A. Fontenеau.

6.2. The Korean delegate stated that Task II and Biological data for the Korean longline fleet are being collected and processed by the Research Institute concerned, and that the results will be made available in the near future. The Delegate of Japan commented that more extensive biological sampling aboard Japanese longline vessels will be initiated in 1975. Dr. R. T. Yang (China-Taiwan) presented all the available Task I and II statistics for the Taiwanese fleet for the years up to 1973.

6.3. The Committee *recommends* to the Council that commitments made by national offices in respect of improving their national statistics in 1975 (Table 2 — Addendum III to the Sub-Committee Report) should be constantly reviewed by the SCRS Chairman and that the Commission or Council should authorize the Secretariat to start direct sampling from fleets, if such commitments are not being carried out.

6.4. Concerning the proposal that a biostatistician be hired by the Commission, the advantage of his being based at ICCAT headquarters was emphasized, particularly in respect to his having access to the data accumulated there. At the same time it would be essential for him to travel widely to obtain data from various national laboratories.

6.5. Following the above clarifications, the Committee adopted the Report in its entirety.

Item 7. **Report of the Workshop on Tuna Population Dynamics**

The Report was presented by the Chairman, Dr. B. Rothschild, and is attached as Appendix IV.

Item 8. **Report of the Joint Meeting ICES-ICCAT Bluefin Tuna Working Groups**

The Report of the Joint Meeting was presented by its Rapporteur, Dr. J. F. Caddy (SCRS/74/8).

Item 9. **Review of SCRS research programs and consideration of future plans**

9.1. The Report of the Sub-Committee on Statistics (Appendix III) was presented and the pertinent recommendations considered. The Committee reviewed, item by item, the future plans proposed in the Chairman's Note circulated with the SCRS Agenda (Appendix I). The numbers in parentheses appearing in the paragraphs below refer to the item numbers in the Note. It was proposed to entrust the responsibility of achieving the plans thus proposed to individual persons or countries. It was also agreed that progress reports should be circulated by such people in June 1975.

9.2. *Rule 13.2, Rules of Procedure.* The terms of reference which apply to the Committee were reconfirmed and the Committee felt it important that commissioners and administrators give adequate attention and understanding to the work of the SCRS. It was also observed that several countries do not participate in the scientific deliberations of the SCRS. It was requested that national scientists pursue these points in their own country, and that the Chairman of SCRS should also stress its importance at the Council and Commission meetings.

9.3. *Annex II to the Convention* — Participation of all countries in research and statistics.

The Committee wished to *call the attention* of the Council to the following points:

a) The privilege of catching fish accompanies the duty to collect adequate and accurate statistics, and appropriate management plans can only be considered when such information is taken into account.

b) The Committee carefully reviewed the availability of data, and deficiencies are presented in Table 1 — Addendum III to the Report of the Sub-Committee on Statistics (Appendix III), which shows that a very important part of the tuna catch is not yet covered by statistics.

c) National offices should take immediate action to remedy the situation by fulfilling their obligation to collect and disseminate statistics from their own fleets.

d) The cost of improving statistics would be relatively far less than the benefit that administrators and fishing industries would gain from the improvements, since a proper management of fisheries can only be achieved with adequate statistics. For example, the expansion of fishing fleets to fish resources which would not stand an increased effort would be entirely wasteful, and vice-versa. The Committee

recommended carrying out studies on the relative cost of collecting statistics vs. the benefits to be gained.

9.4. *Definition of statistical targets*. This subject is already dealt with in the Report of the Sub-Committee on Statistics.

9.5. It was noted that collecting, verifying and processing adequate and accurate statistics is very costly in relation to the research cost, and demands a large scientific staff, which is a big burden for any research and statistical institute. It was felt that national office administrators should recognize the importance of statistics, as stated in paragraphs 9.2 and 9.3, and facilitate such work by ensuring that the collection of statistics receives adequate funding.

9.6. *Statistics* (SCRS activities).

9.6.a. *Explicit data collection system* (1). It was noted that explicit data requirements are generally issued to the national statistical offices by the Secretariat, with specific deadlines for each type of data. This should be continued, and it is *urged* that national statistical offices and scientists fulfill the requirements in terms of timing and adequacy of data.

9.6.b. *Establishment of such a system* (2). It was noted that the present statistical system could not cover certain areas of fisheries and the SCRS fully *agreed* with the Sub-Committee's recommendations concerning the establishment of a system by which the Commission can collect statistics and biological samples directly at the ports.

9.6.c. *Sampling priority chart* (3). The current statistical and sampling systems of each national office, as well as the systems proposed by the Commission itself, should be constantly reviewed, evaluated and coordinated in order that adequate and balanced sampling systems can be maintained. The Secretariat should at least initiate the program, and expand it when a biostatistician is added to the staff, as recommended by the Sub-Committee.

9.6.d. *Minimum level of sampling* (11). It was emphasized that minimum requirements for sample size, coverage, etc. should be established as early as possible. This could be assigned to the biostatistician referred to previously. However, until such a time, all agencies should try to sample to the best of their ability.

9.6.e. *Difficulties in obtaining statistics* (12). Again the Sub-Committee's *recommendation* of a plan for sampling and collecting statistics to be undertaken by the Commission itself was concurred and forwarded to the Council. Since the program requires flexibility, depending on the case, the direction of the system should be entrusted to the Secretariat.

9.6.f. *Fish handling* (4). The Secretariat was asked to prepare a general document laying out the procedures for handling fish for the relevant fisheries. Cooperation from national scientists working in the field was promised for this.

9.6.g. *National sampling plans* (5). The Secretariat reported that a request for information on national sampling plans had already been sent out and information had been made available for the fleets of Canada, FIS, Japan, South Africa and the U.S.A. It was *recommended* that the Secretariat continue its efforts to complete and update this task.

9.6.h. *Biostatistician* (6). This subject was discussed under Agenda Item 6.

9.6.i. *ICNAF experience* (7). The Secretariat stated that contact has been initiated with ICNAF regarding their experience in developing an overall sampling plan (SCRS/74/58). This should be further pursued and a synopsis of essential relevant ICNAF documents should be circulated among ICCAT scientists as soon as practicable.

9.6.j. *Landings at foreign ports* (8). Hopefully, part of the problem relating to this subject would be solved by the project proposed by the Sub-Committee on Statistics. However, the Council should note that for countries where there are large amounts of landings by foreign vessels, while the country itself has very little tuna fishery, collecting statistics would be a big burden. It was *recommended* that in such a case, either the flag state or the Commission should provide support for the landing state.

9.6.k. *Data publications* (9). It was *recommended* that all bodies that collect and compile tuna data should publish (or otherwise widely distribute) relatively detailed data (length-frequency, catch and effort data by species, month, small area, gear type and size, mode of fishing, flag, etc.) with the usual constraint of preserving the confidentiality of individual vessel operations as required. The Secretariat explained the present data publication policy. It was *recommended* that a very specific form should be developed by the Secretariat in consultation with the Convener of the Sub-Committee on Statistics, and that national scientists should provide their data in the standard form, so that standardized data can be published in the Data Record on a timely basis. The data thus published must be made available to world scientists including non-tuna researchers. Data of a confidential nature should be combined with those of other fisheries before being made available if such procedure protects the privacy of the industry. Otherwise, at least the existence of such data and where they can be obtained should be noted in the publication.

9.6.l. *Need to have all countries with major fisheries contributing data* (10). It was reported that the Secretariat has tried its best to keep good relations with the non-member countries and industries that have major tuna fleets. It was noted that Venezuela has provided all the data needed by ICCAT. The close cooperation by Cuba was also noted. On the other hand, the Committee's scientific work has been much hampered by the lack of certain data on the Chinese (Taiwan) fleet. It was, however, noted that some national scientists and the Secretariat staff have kept a good working relationship with Taiwanese fisheries representatives and have obtained important segments of data. The Committee wishes to *draw* the attention of the Council to the fact that data from the Taiwanese fleet are very essential in carrying out its assignment, and that the problem cannot be solved by the Commit-

tee because of its political implications. It was also stressed that the activities of the Commission should —in addition to bringing new members into the Commission— emphasize the need for fuller participation in the scientific work of the Commission by those members who do not now fully participate; such participation includes, 1) attending the SCRS meeting, 2) preparing background documents, and 3) taking part in the discussions. It *recommended* that the Council should identify these problem areas and seek any solution in its power.

9.7. *Interchange between scientists and commissioners* (25). The importance of this item was specially stressed. It was noted that scientists should seek better communications with commissioners of their own national section. At the same time it was *recommended* that the Council note this problem area.

9.8. *Biological and ecological studies.* Stock assessment work, the major assignment to the Committee, has often been hampered by the lack of such information. It was *recommended* that an attempt be made to obtain the information that is lacking.

9.9. Table 8 shows the specific research proposed, and the countries responsible for carrying out the work.

Item 10. **Recommendations**

10.1. The attention of *Panel 1* was drawn to sections 5.a. and 5.b. of this Report, which concern the status of yellowfin and skipjack stocks, respectively. For *Panel 2*, the status of albacore and bluefin is reviewed in sections 5.c. and 5.d.

10.2. Numerous recommendations to the Council are presented in the Report, but special attention is drawn to Chapter 9, and Appendix III.

Item 11. **Relations with other organizations**

The Committee noted that close and valuable collaboration and cooperation has been continued with FAO, IATTC and ICES. It also noted that some exchange of experience with ICNAF had been initiated. The SCRS Chairman reported that the IPFC, at its recent meeting, decided to maintain a closer relationship with ICCAT. This idea was generally supported by the Committee.

Item 12. **Other matters**

12.1. Problems were raised concerning the circulation of scientific documents and the limited time available for attendants to study meeting documents. The Committee adopted the following rules for SCRS documents:

a) All documents which the authors wish to be considered at the SCRS meeting must be delivered to the Secretariat at least one month before the meeting starts.

b) These documents should be distributed immediately among scientists actually involved in stock assessment studies. Distribution of documents through a national correspondent, to be named by each country, would probably speed up matters. However, the method of distribution should be studied by the Secretariat.

c) Any papers presented after the deadline stated above should be admitted by the SCRS as documents but in such cases, at least 60 copies should be provided by the national office responsible two days before the meeting. It was *recommended* that a summary of such documents be submitted 30 days in advance.

d) The only exception to rule "c" would be addenda prepared for documents delivered 30 days in advance, in order to update the information.

e) All documents should be written in a form as simple and condensed as possible, while containing all the basic data used for analysis.

12.2. It was pointed out that relatively very few scientists in the world are engaged in tuna stock assessment work, and it is very likely that these scientists also have research commitments in other fisheries. The Committee *recommended* that:

a) The Council consider this problem and urge member states to see that more scientists are involved in tuna research, and particularly in stock assessment.

b) All member countries place more importance on the work of the SCRS, and fully participate in scientific deliberations. In this regard the Executive Secretary should look into the problems which prevent some countries from participating, and seek effective solutions. The Field Practice Program conducted this year by the Secretariat in order to familiarize some of the field scientists with ICCAT's statistical problems was commended.

Item 13. **Date and place of next meeting**

The Committee should meet for approximately one week immediately prior to the 1975 Commission meeting, and at the same place.

Item 14. **Adoption of report**

The Report, with appendices, was adopted in its entirety.

Item 15. **Adjournment**

The meeting of the Committee was adjourned, though the Chairman noted that a further meeting might be necessary if the Council posed any specific questions to the Committee. On closing the meeting, the Chairman asked for the full participation of member countries in future Committee meetings. The Chairman's personal effort in directing the meetings was highly commended, and the efficient work of the scientists and the Secretariat staff was recognized.

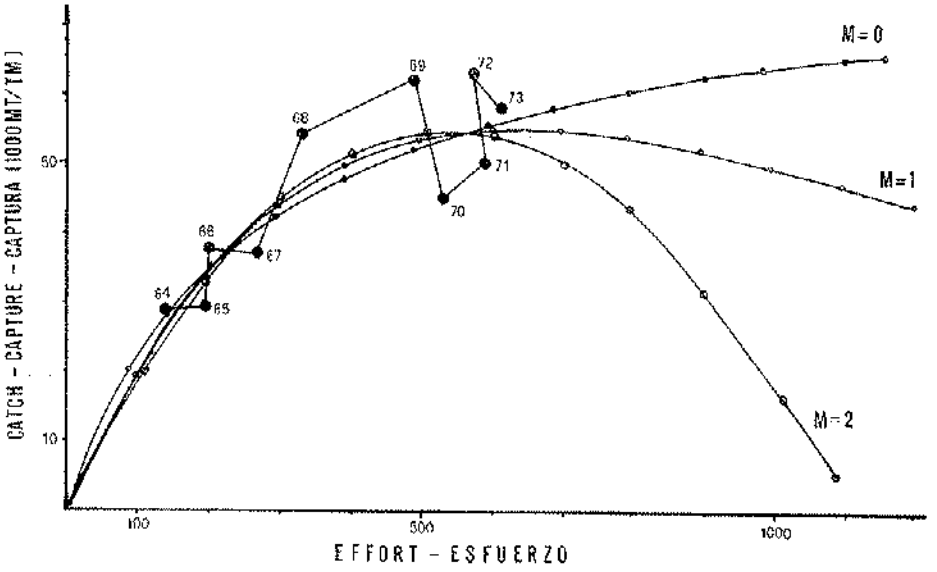


FIG. 1. Eastern Atlantic surface yellowfin fishery sustainable avarage yield curves and observed data, 1964-1973.

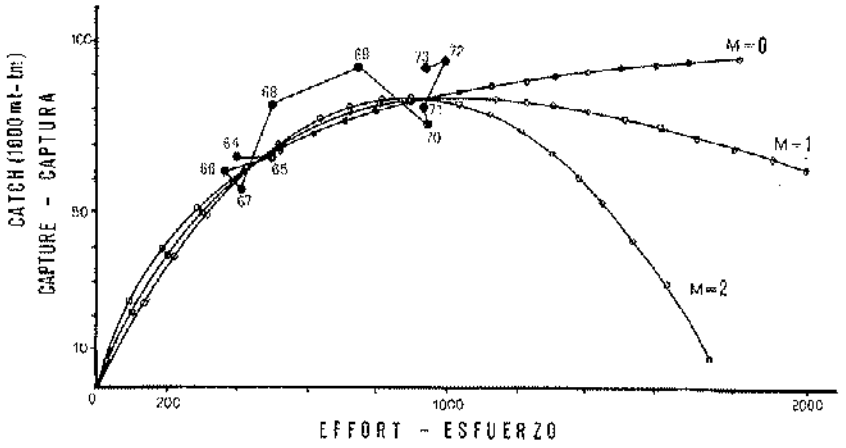


FIG. 2. Total Atlantic yellowfin fishery (surface & longline) sustainable average yield curves and observed data, 1964-1973.

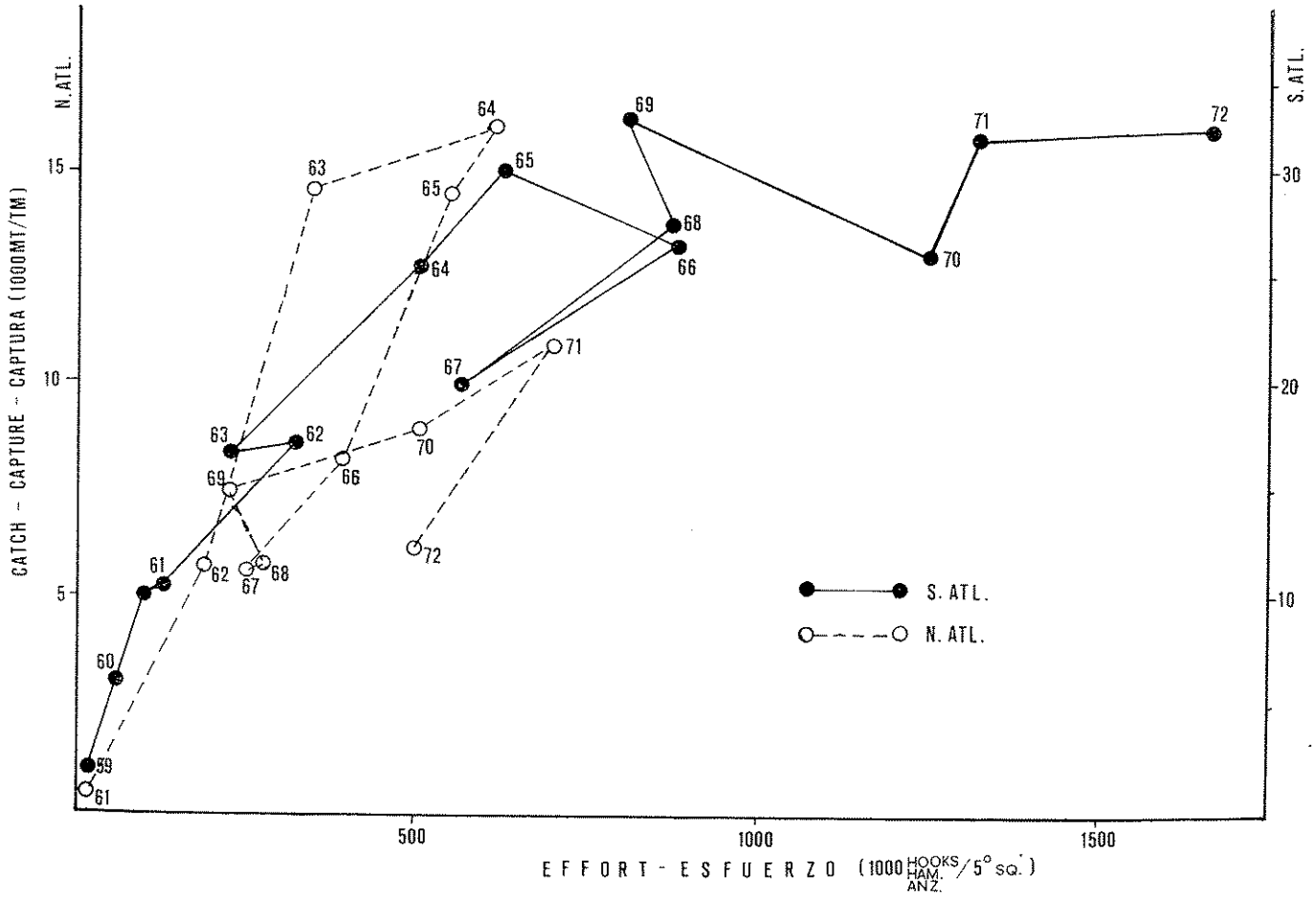


FIG. 3. Longline catch of albacore as functions of the fishing intensity, for northern and southern Atlantic areas, 1959-72.

Table 1. Yellowfin Tuna Catch (Thousand metric tons) in the Atlantic Ocean, 1963-73.

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
TOTAL	71.1	68.1	69.0	64.1	57.6	81.0	90.2	73.1	78.9	94.8	91.1
Subtotals[2]											
Longline	43.0	38.3	39.4	25.9	20.2	25.9	27.6	27.3	28.2	28.7	30.5
Japan	37.7	35.1	36.6	22.1	12.8	13.9	9.8	6.7	11.0	7.5	4.2
Korea - Panama[1]	—	...	...	—	—	2.0	5.2	11.5	9.9	11.2	17.6
China (Taiwan)[1]	0.4	0.3	0.1	0.9	2.3	6.8	9.3	6.1	3.8	4.1	2.3
Surface East Atlantic	25.7	28.2	29.0	37.8	36.7	54.4	62.2	45.1	50.4	61.3	58.7
—Purse Seiner											
FIS	0.4	4.3	5.4	7.5	8.9	12.6	14.7	18.0	18.0	24.6	25.0
Japan	—	0.5	1.1	4.8	5.2	7.5	5.8	1.3	2.2	2.8	1.5
Spain	0.5	1.0	1.0	3.0	3.0	3.6	5.3	6.4	15.2	8.0	12.8
U.S.A.	—	—	—	—	1.1	5.9	18.8	9.0	3.8	12.0	3.0
—Baitboat											
FIS	16.2	13.2	14.7	15.9	14.9	19.9	14.2	8.1	7.8	8.4	5.6
Japan	0.9	2.1	1.3	0.5	1.3	2.2	0.9	1.0	2.5	4.4	8.0
Portugal (Angola)	4.4	4.5	2.8	2.4	1.6	1.6	1.0	0.4	0.5	0.6	
Spain	3.3	2.6	2.7	3.1	...	0.4	0.6	0.7	0.4		0.8
Surface West Atlantic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.8

1. Gilled and gutted weight.
2. Breakdown consists of major fisheries only.

Table 2. Skipjack Catch (Thousand metric tons) in the Atlantic Ocean, 1963-73

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
TOTAL	22.7	18.7	33.0	40.2	37.9	63.9	43.4	64.6	87.2	76.5	77.2
Subtotals[1]											
Surface East Atlantic	17.1	17.6	31.5	38.5	35.3	61.5	41.8	61.4	84.9	75.5	73.0
—Purse Seiner											
FIS	0.0	0.4	0.7	1.9	1.6	5.1	3.8	9.2	13.8	16.7	8.7
Spain	0.2	0.4	1.0	2.3	2.9	8.9	4.3	6.9	15.0	18.6	17.8
U.S.A.	2.1	3.9	0.1	0.0	0.5	3.3	4.7	11.6	16.2	12.3	20.7
—Baitboat	11.5	10.7	21.2	26.9	22.7	28.1	28.1	28.5	32.4	24.3	22.8
FIS	3.3	1.8	3.5	4.5	3.9	7.9	4.6	4.8	5.7	3.8	3.7
Japan	4.6	3.1	6.3	4.4	3.7	7.3	4.9	7.5	11.7	10.1	13.0
Spain	3.6	4.1	8.5	16.2	10.7	10.2	14.0	15.3	13.0	8.2	4.3
Surface West Atlantic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.0

1. Breakdown consists of major fisheries only.

Table 3. Bluefin Tuna[4] Catch (Thousand metric tons) in the Atlantic Ocean, 1963-73

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973[5]
TOTAL[1]	30.1	38.5	35.0	24.9	32.3	22.1	21.1	18.3	23.4	13.5	12.5
Atlantic[3]	26.0	32.7	29.3	19.2	22.4	14.3	11.8	12.1	16.5	8.0	9.0
Mediterranean	4.1	5.8	5.7	5.7	9.9	7.8	9.3	6.2	6.8	5.5	3.5
Subtotals[7]											
Longline	8.1	12.8	9.8	3.1	3.3	1.8	0.7	0.4	4.6	0.7	1.6
Cuba	[2]	[2]	0.1	0.5	2.4	1.4	0.5	0.2	—	—	—
Japan	7.8	12.6	9.6	2.5	0.8	0.3	0.1	0.1	1.5	0.6	1.4
Baitboat[1]	5.2	6.0	7.4	9.6	9.1	9.1	6.8	5.0	4.5	2.2	1.9
France	1.6	2.8	1.9	2.8	2.2	1.9	1.8	1.7	2.6	1.9	1.0
Spain	3.1	2.7	5.2	6.8	6.9	7.0	4.9	3.3	1.7	0.3	0.9
Purse Seine	6.2	7.0	6.2	2.2	4.2	1.7	2.1	4.9	5.0	2.5	2.2
Canada	0.3	0.6	0.5	...	...	...	...	1.2	0.9	0.3	0.6
Norway	0.2	1.5	2.5	1.0	1.9	0.9	0.9	0.4	0.6	0.1	0.1
U.S.A.	5.7	4.9	3.2	1.2	2.3	0.8	1.2	3.3	3.2	2.1	1.5
Sports[6]											
Canada	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2
Traps	4.7	5.2	5.4	3.4	4.6	2.0	2.3	1.9	0.7	0.2	0.5

1. Portuguese Island catch is excluded.
2. Included in yellowfin.
3. Italian catch reported in Atl. excluded due to double counting.
4. Southern bluefin tuna *not included*.
5. Some minor countries' data still missing (Algeria, Greece, Libya, Malta, Turkey).
6. U.S. Sport catch data not available.
7. Breakdown consists of major fishery only.

Table 4. Catches of bluefin tuna, in tons per million recruits at 1 year old, under different fishing mortalities on small and medium fish (M = 0.2, F on large fish = 0.2)

(a) F on medium fish = 0

F on small fish		0	0.1	0.2	0.4	0.6
Catch	Small	—	4.062	6.086	7.195	6.903
	Medium	—	—	—	—	—
	Large	16.796	10.187	6.179	2.273	836
	Total	16.796	14.249	12.265	9.468	7.739

(b) F on medium fish = 0.2

F on small fish		0	0.1	0.2	0.4	0.6
Catch	Small	—	4.062	6.086	7.195	6.903
	Medium	14.763	8.954	5.431	1.998	735
	Large	6.179	3.748	2.273	836	308
	Total	20.942	16.764	13.790	10.029	7.946

(c) F on medium fish = 0.4

F on small fish		0	0.1	0.2	0.4	0.6
Catch	Small	—	4.062	6.086	7.195	6.903
	Medium	19.956	12.103	7.341	2.700	993
	Large	2.273	1.378	836	308	113
	Total	22.229	17.543	14.263	10.203	8.009

(d) F on medium fish = 0.6

F on small fish		0	0.1	0.2	0.4	0.6
Catch	Small	—	4.062	6.086	7.195	6.903
	Medium	21.680	13.149	7.976	2.934	1.079
	Large	836	507	308	113	42
	Total	22.516	17.718	14.370	10.242	8.024

Table 5. Biomass of large fish under different patterns of fishing mortality

	F (large fish) = 0.2				F (large fish) = 0.6			
	F on medium fish							
F on small fish	0	0.2	0.4	0.6	0	0.2	0.4	0.6
0	84.0	30.9	11.4	4.2	52.2	19.2	7.1	2.6
0.1	50.9	18.7	6.9	2.5	31.6	11.6	4.3	1.6
0.2	30.9	11.4	4.2	1.5	19.2	7.1	2.6	0.9
0.4	11.4	4.2	1.5	0.6	7.1	2.6	0.9	0.4
0.6	4.2	1.5	0.6	0.2	2.6	0.9	0.4	0.1

Table 6. Albacore Catch (Thousand metric tons) in the Atlantic Ocean, 1963-73

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
TOTAL	74.4	87.7	87.8	75.4	76.1	71.9	78.7	73.4	81.1	82.9	77.2
Subtotals[3]											
North Atlantic	57.3	61.7	57.8	48.8	56.3	44.0	44.0	43.5	49.3	41.0	
Surface											
—Baitboat											
French[1]	14.2	17.3	13.8	3.7	4.2	2.4	1.8	2.0	1.6	1.1	1.0
—Trolling											
French[1]				10.6	12.4	11.9	8.2	4.6	8.2	8.7	5.1
—UNCL											
Spain	28.5	28.5	29.6	26.4	34.1	24.6	25.4	26.9	27.9	24.2	24.3
Longline											
Japan	14.5	15.8	14.3	5.9	4.8	3.3	4.7	5.9	6.5	1.3	
Korea	...	0.0	0.0	2.0	0.6	0.1	1.6	1.3	1.5	0.1	
China (Taiwan)	0.0	0.0	0.0	0.1	0.1	1.1	1.5	2.2	2.7	4.1	
South Atlantic	17.1	26.0	30.0	26.6	19.8	27.9	34.5	29.8	31.8	41.7	
Longline											
Japan	15.2	23.7	28.3	21.0	7.7	11.9	6.3	5.9	3.6	2.6	2.2[2]
Korea	...	0.2	0.5	4.7	9.7	7.2	14.4	8.7	10.0	13.5	8.0[2]
China (Taiwan)	0.0	0.1	0.1	0.1	1.7	7.6	13.4	14.7	17.7	25.3	31.7[2]
Mediterranean	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2	0.0

1. Please note 1963-65 gear classified as Surf-UNCL but here listed under «Baitboat».
2. Total catch placed in South Atlantic. No breakdown.
3. Breakdown consists of major fisheries only.

Table 7. Bigeye Tuna Catch (Thousand metric tons) in the Atlantic Ocean, 1963-73

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
TOTAL	17.6	20.5	29.1	18.8	11.6	17.3	24.3	26.5	44.3	34.5	40.9
Subtotals[1]											
Longline	14.7	17.5	29.0	18.8	11.1	16.3	21.0	23.8	36.1	30.6	33.7
Japan	14.5	17.3	28.5	17.6	8.5	10.3	10.3	9.0	20.8	18.5	20.2
Korea	...	...	...	0.2	0.3	0.2	1.6	4.1	7.4	5.7	5.2
China (Taiwan)	0.0	0.0	—	0.5	1.9	4.6	6.5	6.5	4.7	4.3	3.3
Surface	2.9	3.0	0.1	0.0	0.5	1.0	2.2	1.5	8.2	3.9	7.2

1. Breakdown consists of major fishery only.

Table 8

Research Items	*YF*	*BF*	*BE*	*ALB.*	*SJ*	*Billfish*	*Others*
1. Fishing effort							
a. Pilot studies on relation between fishing time and searching time	..... USA (no species specification)						
b. Validity of units of fishing effort and catchability (14, 15)	..... USA, FAO - ACMRR are studying the same problem in broader aspects - Mutual cooperation is requested (no species specification)						
2. Production models (new or update) (16)	USA	Canada USA	Japan USA	France	USA	Canada (swordfish) Japan (white & blue marlins)	
3. Natural mortality (17)	..... USA (no species specification)						
4. Yield-per-recruit analysis (18)	Ivory Coast* USA		Canada USA	Japan	France Japan		
5. Paper on application of cohort analysis to the fisheries (19)	..... USA (no species specification)						
6. Table on age structure** (19e)	Ivory Coast USA		Canada USA	Japan	France Japan	Ivory Coast USA	Japan USA
7. Cohort analysis (new or update) (19)	USA		Canada USA	Japan	France	ORSTOM - Dakar	
8. Stocks structure paper (20)	ORSTOM - Dakar		USA	Japan	France		

9. Papers on methods of estimating yield from multiple species fishery (20b)	..... USA (no species specification)		
10. Correspondence with ICNAF by Secretariat (21a)	..... Secretariat (no species specification)		
11. Relation between CPUE and E in skipjack (21b)		USA	
12. Size distribution of skipjack (21c)		Canada, Ghana, Japan, ORSTOM, Spain, USA collaborate. Should be organized by the Secretariat	
13. Correspondence on small fish by the Secretariat (21d)			Secretariat to request experience of field workers (ORSTOM, Japan, etc.) & observations of taxonomists
14. Simulation to investigate increased recruitment (22a)	Ivory Coast USA		
15. Effects on fisheries of management actions (e.g. reducing effort, increasing effort, etc.) (23)	Canada, Ivory Coast, Japan, USA (Japan will conduct studies on YF assuming as single stock & multi-stocks)		
16. Feasibility of regulations (24)	Canada USA		

* Simulation studies will be conducted.
** Secretariat to coordinate the work. For billfishes, structure by size may be substituted.

Appendix I to Annex 9

AGENDA FOR THE STANDING COMMITTEE ON RESEARCH AND STATISTICS (SCRS)

1. Opening of the meeting
2. Adoption of the Agenda and arrangements for the meeting
3. Admission of observers
4. Review of national fisheries and research programs [1]
5. Review of the following stocks:
   a) Yellowfin
   b) Skipjack
   c) Bluefin
   d) Albacore
   e) Others
6. Report of Sub-Committee on Statistics
7. Report of the Workshop on Tuna Population Dynamics
8. Report of the Joint Meeting ICES-ICCAT Bluefin Tuna Working Groups
9. Review of SCRS research programs and consideration of future plans [2]
10. Recommendations [3]
11. Relations with other organizations
12. Other matters
13. Date and place of next meeting
14. Adoption of Report
15. Adjournment

Chairman's Note

October 7, 1974

Dear Colleague:

I look forward to meeting with each of you at the next SCRS meeting in Madrid. In thinking about the conduct of the meeting there are a number of thoughts that have surfaced and I would like to share these with you. These thoughts cover the conduct of our SCRS meeting; measures of performance of SCRS; and directions for the future.

With respect to conduct of the meeting, several of us have been concerned with the time available to digest papers and documents and to organize points of view around various documents that are presented. This problem is intensified, of course,

1. The submission of written summaries for inclusion in the SCRS Report would be adequate.
2. See Chairman's Note attached.
3. The Council, Panels 1, 2 and 4, and the Working Group on Yellowfin Tuna Regulations are meeting this year.

by the increasing number of documents that are being presented to SCRS. I will be discussing with you possible solutions to this problem.

Apropos of measuring the performance of SCRS, it is important to compare our activities with what we said we were going to do. In this respect, a number of recommendations were made by SCRS last year. These include not only the specific recommendations in the body of the report, but also special activities which are listed in the last report of the Commission and which include,

1) Statistics (Addendum 3 to Appendix 3 to Annex 8)
2) Bluefin Tuna (Appendix 4 to Annex 8)
3) Albacore (Appendix 5 to Annex 8).

In order to facilitate comparison of our plans and our year's work we will try and put together a table identifying each task indicated in the 1974 SCRS report and the work that has been accomplished on the tasks. We will only be able to complete the table identifying each task now but will have to wait until the meeting to finish the accomplishments portion of the table.

In reviewing our progress it might be well to review the terms of reference of SCRS which are contained in the Basic Text of the Commission (Rule 13.2).

> "There shall be a Standing Committee on Research and Statistics on which each member country of the Commission may be represented. The Committee shall develop and recommend to the Commission such policies and procedures in the collection, compilation, analysis and dissemination of fishery statistics as may be necessary to ensure that the Commission has available at all times complete, current and equivalent statistics on fishery activities in the Convention Area. The *Committee shall keep under continuous review the research programmes in progress in the Convention Area, and shall develop and recommend to the Commission from time to time such changes in existing programmes, or such new programmes as may be deemed desirable. The Committee shall also advise the Commission on such other scientific matters as may be referred to it.* The Committee shall choose its own Chairman." (Italics mine.)

We must ask to what extent our work conforms to this rule. In addition it is important to recognize that the Basic Text outlines some rather clear guidelines with respect to fishery statistics, viz Annex II of the Basic Text which says,

> "Taking note of documents FID: AT/66/4, Annex 6, and FID: AT/66/INF-5 relating to the collection and publication of statistics on Atlantic tuna fisheries; and
> "Agreeing that it is essential that all countries fishing these Atlantic tuna resources should collect adequate statistics on catch and fishing effort and the necessary biological data, and make available for publication the statistical and related economic data with a view to enabling the International Commission for the Conservation of Atlantic Tunas to fulfill its functions adequately as soon as it is established;

"Urges all countries to take steps without delay to create, where they do not already exist, offices within their fisheries administrations suitably staffed and having appropriate financial and legislative support to undertake the collection and the processing of the data to be used by the Commission; and
"Suggest that all countries faced with the tasks of establishing and operating such offices, give priority to requests for assistance in this connection through the United Nations Development Programme and through the regular programme of the Food and Agriculture Organization of the United Nations."

Indeed, discussions of this problem at the Nantes workshop reflected that the individual scientists and the Secretariat have done about as much as they can do and now it is up to the administrators to take whatever steps are necessary to maintain a minimal program in the Atlantic. *It is still up to the scientists, however, to adequately define this minimal program and in this connection it is worth reviewing Item 3 in the minutes of the Nantes meeting.*

It might also be mentioned that discussions after the Nantes meeting suggested that it might be useful to emphasize to administrators the costs involved to each country's research program in terms of maintaining tuna statistics in the Atlantic.

Directions for the future are of course among the most important considerations for ICCAT. The direction that we take will of course be in part identified in the agenda for our forthcoming meeting. While the agenda has not yet been considered in appropriate detail, it is quite clear that emphasis this year will be on the status of the various stocks for which ICCAT has responsibility as well as the extremely important subject of statistics. In addition, a number of items were raised at the Nantes meeting and these should somehow be aired at our next meeting. These items quoted more or less directly from the Nantes report are as follows:

1) The group *recommends* that ICCAT immediately address itself to the establishment of an explicit data collection system encompassing all of its fisheries.

2) The establishment of such a system should be initiated at the annual meeting in Madrid in November, 1974.

3) A sampling priority chart such as that presented in Addendum IV must be completed in order to establish sampling priorities by species, gear and port of landing.

4) The Secretariat should provide a general document which describes the way in which fish are handled from the time that they are caught until they are processed for each of the relevant fisheries in order to provide a background for determining optimum times, methods and locations of sampling.

5) It is the responsibility of SCRS to examine the problem of sampling from the point of both accuracy and precision, and that to help facilitate this, the group recommends that at its next meeting of SCRS detailed descriptions of all existing national sampling programs be provided to the Secretariat.

6) It was further recommended that the Secretariat should employ a qualified biostatistician on its staff to oversee the development and insure the validity of a comprehensive ICCAT statistical data system, and to implement new statistical programs.

7) It was suggested that the Secretariat look at the ICNAF experience in developing an overall sampling plan and provide relevant ICNAF and other documents at the next SCRS meeting as background material.

8) It is difficult for national governments to meet their responsibilities for required statistical data when landings take place outside of their countries. In these cases, the flag state, or ICCAT, should provide authority and support for the landing state to obtain the data.

9) There is a need for both IATTC and ICCAT, as well as any other bodies who collect and compile tuna data, to publish (or otherwise widely distribute) relatively detailed data (length-frequency, catch and effort data by species, month, small area, gear type and size, mode of fishing, flag, etc.) with the usual constraint of preserving the confidentiality of individual vessel operations as required.

10) The group therefore *recommends* that every effort should be made to obtain these data. Clearly this general problem would be eliminated if all countries with significant Atlantic tuna fisheries were members of the Commission.

11) A minimum acceptable level of sampling should be defined and implemented as soon as possible.

12) We feel that if this responsibility (of providing statistics) cannot be met by individual countries, then it must be undertaken by the Commission itself.

13) It was suggested that pilot studies be initiated to examine the relationship between fishing time and searching time in purse seine fisheries, both tuna and non-tuna, in order to determine if these two statistics measure fishing effort in equivalent manners.

14) It was suggested that the various measures of fishing effort given in Addendum VI (of the Nantes report) be examined as to their validities as measures of fishing mortality.

15) This points out the need for carefully examining a fishery for signs of increasing catchability of the stock (other than through technological advances) such as decreasing areal range of the stock, and/or decreasing average size of schools in a purse seine fishery.

16) It was *recommended* that:

   a) Production model analyses need to be performed on all tuna stocks presently being exploited in the Atlantic.

   b) Studies be performed concerning the effects of density dependent population processes on the form of stock production.

   c) Estimates of model sensitivity to systematic changes in parameter values around the optimum be given (WTPD/74/17).

17) While it was not pointed out explicitly in the Report of the Nantes meeting, several of us discussed the need to review the question of natural mortality estimates for all the species of tuna.

18) It was *recommended* that:

a) Yield-per-recruit analyses should be done for each species of tuna being exploited in the Atlantic.

b) Estimates of natural mortality for all species should be made and validated. This includes a reexamination of past estimates and the determination of new estimates from more recent data.

c) Age-specific models provide an extremely useful vehicle for the investigation of the interaction between various gear types (for example, longline and surface gear).

d) Estimates of model sensitivity to systematic changes in parameter values be given in the results of any analysis.

19) It was *recommended* that:

a) Cohort analyses be performed for each species of tuna being exploited in the Atlantic.

b) Monte Carlo studies of the cohort analysis procedure be undertaken in order to study its robustness to the breakdown of various assumptions.

c) The sensitivity of the cohort analysis procedure to changes in time scale be studied.

d) A generalized study of age and gear-dependent catchability be undertaken.

e) A table of Atlantic yellowfin catch in numbers by quarter, gear, age and location be prepared for presentation at the next ICCAT meeting.

20) It was *recommended* that:

a) A paper be written on the present state of knowledge of the stock structure of each species of tuna being exploited in the Atlantic.

b) A study be performed on methods for estimating production in a multiple stock fishery.

21) It was *recommended* that:

a) The Secretariat should correspond with ICNAF in order to be able to provide more information to ICCAT scientists on mixed species problems.

b) Serious studies should be undertaken on the relationship between abundance, CPUE and E in skipjack.

c) In order to facilitate the studies mentioned in *b*) for the eastern Atlantic, skipjack size distribution samples must be obtained from landings in Angola and Senegal.

d) The Secretariat should correspond with Dr. Bruce Collette (USA), Dr. S. Hayasi (Japan) and Dr. Izumi Nakamura (Japan) in order to be able to present a synopsis on the identification of small tuna which would be helpful in the implementation of an ICCAT sampling program.

22) It was *recommended* that:
   a) Simulation studies be performed to investigate the effect of increased recruitment variability on resultant fishery dynamics.
   b) Biological studies be performed on:
      i) spawning habits and egg maturity rates
      ii) larval ecology and behavior
      iii) trophic relationships between adults and juveniles of the same species and between species.

23) It was recommended that SCRS should initiate detailed studies of the likely effects on the stocks, and on the individual fisheries (particularly catch and catch per unit effort) of different possible management actions, including the effects of taking no action to control the amount of fishing.

24) With respect to the technological problem, the SCRS needs to determine whether there are any components in the regulations which are infeasible to enforce and whether there are any solutions to them.

25) It was recommended that the problem of interchange between scientists and commissioners be addressed at the next meeting.

I know that this is an impressively long list, but at the same time, even in its length, it reflects the work before us in SCRS. It now remains to place all of this material in an agenda that enables us to handle the items in the most efficient way possible.

Sincerely yours,

(signed:
Brian J. Rothschild
Chairman, SCRS)

Appendix II to Annex 9

LIST OF DOCUMENTS

SCRS/74/1 Tentative agenda of the SCRS / Ordre du jour provisoire du SCRS / Orden del día provisional del SCRS.

2 Report of the Standing Committee on Research and Statistics / Rapport du Comité Permanent pour la Recherche et les Statistiques / Informe del Comité Permanente de Investigaciones y Estadísticas (CON/74/16).

3 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.

SCRS/74/4 Collective Volume of Scientific Papers Vol. 3 / Recueil de Documents Scientifiques Vol. 3 / Colección de Documentos Científicos Vol. 3.

5 Data Record Vol. 4 / Recueil de Données Vol. 4 / Colección de Datos Vol. 4.

6 Statistical Bulletin Vol. 4 / Bulletin Statistique Vol. 4 / Boletín Estadístico Vol. 4 (CON/74/14).

7 Report of the Workshop on Tuna Population Dynamics / Rapport du Séminaire sur la Dynamique de Populations des Thonidés / Informe del Seminario sobre Dinámica de Poblaciones de Túnidos.

8 Report of the joint meeting of ICCAT-ICES Bluefin Tuna Working Groups / Rapport de la réunion conjointe des Groupes de Travail ICCAT-CIEM sur le Thon Rouge / Informe de la reunión conjunta de los Grupos de Trabajo ICCAT-ICES sobre el Atún.

9 Draft report of the Eighth Session of the CWP on Atlantic Fishery Statistics.

10 La pêche thonière internationale à Abidjan de 1965 à 1973. — A. Caverivière.

11 Traitement numérique et cartographique des données sur l'effort et les prises de la pêcherie palangrière thonière de l'Océan Atlantique. — J. Y. Le Gall (sous presse, série «FAO Fisheries Technical Papers»).

12 Exposé synoptique des données biologiques sur le germon, *Thunnus alalunga* (Bonnaterre, 1788), de l'Océan Atlantique. — J. Y. Le Gall (sous presse, série «Synopsis FAO sur les Pêches», n.° 109).

13 Cartographie mensuelle des données sur l'effort et les prises de la pêcherie palangrière thonière japonaise de l'Océan Atlantique, 1956-1971. — J. Y. Le Gall.

14 La pêche thonière de surface dans le Golfe de Guinée en 1973 (diffusé antérieurement).

15 Données complètes concernant les marquages et les retours de marques au centre Orstom de Pointe-Noire, au 31-XII-73. — R. H. Planet (diffusé antérieurement).

16 Review of national fisheries and research activities of South Africa / Rapport national de l'Afrique du Sud / Examen de las pesquerías nacionales y de los programas de investigación de África del Sur.

17 Japanese fisheries and research activities on tunas and tuna-like fishes in the Atlantic Ocean, 1972-1974. — S. Kume.

18 Sample length composition of the tunas caught by Japanese Atlantic tuna purse seine fishery, 1972. — M. Honma, Z. Suzuki.

SCRS/74/19 Catch statistics of Japanese Atlantic tuna purse seine fishery, 1973. — M. Honma, Z. Suzuki.

20 Secretariat report on statistics / Rapport du Secrétariat sur les statistiques / Informe de la Secretaría sobre estadísticas (CON/74/13).

21 Observations on the size composition of bluefin tuna catches from 1970 to 1972 (ICES Cooperative Research Report n.º 40). — H. Aloncle, J. Hamre, J. Rodríguez-Roda, K. Tiews.

22 Observations on the size composition of bluefin tuna catches from 1973 (ICES ref. CM 1974/J : 7). — H. Aloncle, J. Hamre, J. Rodríguez-Roda, K. Tiews.

23 Overall fishing intensity of Japanese Atlantic longline fishery for bigeye tuna, 1956-1972. — S. Kume.

24 Overall fishing intensity and catch by length class of yellowfin tuna in Japanese Atlantic longline fishery, 1956-1972. — M. Honma.

25 Overall fishing intensity and catch by length class of albacore in Japanese Atlantic longline fishery, 1956-1972. — T. Shiohama, S. Morita.

26 La pesca de túnidos en Venezuela durante el año 1973 y primer semestre del 74. — F. Ramos S.

27 A theoretical examination of some aspects of the interaction between longline and surface fisheries for tunas. — W. H. Lenarz, J. Zweifel.

28 Canadian research report 1973-1974. — J. F. Caddy, J. S. Beckett.

29 Contribution à la connaisance des migration des jeunes thons rouges à partir du Maroc. — M. Lambœuf.

30 Analysis of length and weight data on three species of billfish from the Western Atlantic Ocean. — W. H. Lenarz, E. L. Nakamura.

31 Assessment of the condition of the North Atlantic albacore fishery. — W. H. Lenarz, A. Coan.

32 Production model analysis of Atlantic yellowfin tuna fishery, 1964-1973. — W. H. Lenarz, W. W. Fox.

33 Estimation de la production de germon *(Thunnus alalunga)* des thoniers-ligneurs français en 1973. — F. X. Bard, J. C. Dao, A. Laurec.

34 Étude de l'état du stock nord-atlantique de germon *(Thunnus alalunga)* par l'analyse des cohortes. — J. Y. Le Gall, A. Laurec, F. X. Bard, J. C. Dao.

35 Trends in bluefin tuna catches in the Atlantic Ocean and the Mediterranean Sea. — F. J. Mather.

36 U. S. Atlantic bluefin tuna tagging, October 1971 through October 1974. — J. M. Mason.

SCRS/74/37 Biological information on Atlantic bluefin tuna caught by longline fishery and some views on the management of the resources — C. Shingu, K. Hisada, S. Kume, M. Honma.

38 Biological views for conservation of yellowfin tuna in the Atlantic Ocean, based on information up to September 1974. — M. Honma, S. Kume, Z. Suzuki.

39 Overall fishing intensity of Japanese Atlantic longline fishery for blue marlin, 1972 edition, with additional information on relative abundance of white marlin. — S. Kikawa, M. Honma, Y. Nishikawa.

40 United States report on fisheries and research of Atlantic tuna and tuna-like fishes, 1973.

41 Remarques sur un plan global d'échantillonnage des thonidés de l'Atlantique. — A. Fontenеau, P. Soisson.

42 Rapport de la Côte d'Ivoire concernant les pêcheries et les recherches sur les thonidés pour 1973-1974.

43 La pêche palangrière atlantique à Abidjan. — P. Soisson.

44 Estadísticas de captura de túnidos del año 1973 en el archipiélago canario.

45 Resultados preliminares de la costera de albacora (*Thunnus alalunga* Bonn.) en 1974. — J. L. Cort, O. Cendrero, A. Garcés.

46 Algunos datos sobre la pesquería española de superficie en el golfo de Guinea. — J. A. Pereiro, A. Fernández, O. Cendrero, J. L. Cort.

47 La pesca del atún rojo (*Thunnus thynnus* L.) en el golfo de Vizcaya (1974). — J. L. Cort, O. Cendrero.

48 A review of the status of the stocks of Atlantic bluefin tuna. — G. L. Beardsley.

49 A summary of U.S. studies on status of stocks of Atlantic billfishes. G. L. Beardsley, C. C. Buchanan, E. L. Scott, E. H. Hyman.

50 Atún blanco: la temporada de 1973 en la región cántabro-galaica. A. Garcés, J. L. Cort, O. Cendrero, A. Fernández.

51 Le recrutement des albacores dans la région de Pointe-Noire, 1964-1972. — R. H. Pianet.

52 Cohort analysis of Atlantic bluefin tuna and estimates of escapement through the juvenile fisheries under two hypotheses of catch age structure. — J. F. Caddy.

53 Resultados preliminares de la pesca de la albacora *(Thunnus alalunga)* durante 1974. — J. M. Alonso-Allende, G. Pérez-Gándaras.

54 Pesquerías cubanas de túnidos con palangre en el Atlántico (Atlántico Oriental) durante el año 1973. — E. A. Carrillo, M. Alvarez.

SCRS/74/55 Portugal. — O. M. Moura.

56 Recent data on the investigation and fishery of tunas and tuna-like species in Brazil. — M. P. Paiva.

57 Frecuencia real de tallas de los atunes: rabil *(Thunnus albacares)*, atún blanco *(Thunnus alalunga)* y patudo *(Thunnus obesus)*. — L. A. Zavala C.

58 ICNAF sampling program.

59 Projected effects of different levels of overall mortality on long-term yield from Atlantic bluefin tuna fisheries.

60 Korean fisheries for Atlantic tuna in 1973.

61 Rapport de recherches pour 1973, France. — R. Letaconnoux.

Appendix III to Annex 9

REPORT OF THE SUB-COMMITTEE ON STATISTICS

1. Opening of the meeting

The meeting was opened by the Convener, Mr. A. Fonteneau. A moment of silence was held in memory of Prof. E. Postel. Prof. Postel was a very well-known and very productive French scientist, who studied albacore and tropical tuna fisheries and was a teacher of many of the French fishery scientists.

2. Adoption of agenda

The tentative agenda was adopted without modification (Addendum I). Dr. W. Lenarz (U.S.A.) was nominated rapporteur.

3. Review of progress made by national offices

The Convener referred to Article IX (2) of the Convention which spells out the responsibilities of each member country collecting adequate statistics from their tuna fisheries and providing these statistics to ICCAT. The Article further requires that ICCAT take action to collect adequate statistics from fleets of countries that are not able to provide statistics themselves. Each country was asked to

report on the progress made during 1974 on the collection and distribution of statistics. The following replies were obtained:

Brazil: Biological data [1] were collected from the Brazilian longline fishery and presented to the Secretariat.

Canada: Statistics are adequate for all but effort in the sport fishery for bluefin. Attempts are being made to obtain Task II data from this fishery.

France: No notable progress has been made and work is continuing.

Ivory Coast: A program was initiated for the collection and compilation of Task II and biological statistics from the longline fleets of Korea, Taiwan, and Panama. A new logbook that follows the recommendations of the Nantes meeting is being developed for the FIS purse seine fleet.

Japan: Biological sampling was improved for the longline fleet and initiated for the baitboat fleet. Plans for a computerized data system have been made for improving the timeliness of statistics for the baitboat and purse seine fleets, but fulfillment of the plans awaits a budget increase.

Korea: A biological sampling program was assigned to 23 longline vessels fishing in the Atlantic Ocean. Task II data are being processed by the Pusan laboratory. It is hoped that these data will be presented to the Secretariat during 1975.

Morocco: No delegate was present. However it was noted that statistics have been collected from the sole Moroccan tuna purse seiner and will be included in the statistics for the FIS fleets.

Portugal: Species composition and some Task II data are being collected in some ports of Azores and Madeira.

Senegal: Not present, but statistics are included with FIS, which are adequate.

Spain: Progress was made in the collecting of Task II and biological statistics from the Bay of Biscay bluefin fishery. Task I statistics from the tropical tuna fishery were improved for earlier years. A logbook system was started for the tropical tuna fishery.

U.S.A.: There was an increased coverage of sampling from transshipments to Puerto Rico for species composition and biological statistics. Progress was made for obtaining Task I, Task II and biological data from the sport fisheries for

1. See Addendum II for definitions of Tasks I & II and biological data.

bluefin. Single set information was obtained from the purse seine fishery for bluefin and will be presented next year. Considerable morphometric data were collected from the bluefin fishery.

Non-Members

Cuba: Biological sampling of the longline fishery was initiated. The data will be presented in 1975.

Venezuela: Task I, Task II and biological data are being collected from the baitboat fleet which has recently begun fishing. A logbook system is being prepared for the purse seine fleet which began fishing in 1974. Results are expected in 1975.

4. Examination of present major problems with statistics

It was noted that most countries reported progress during 1974, but that the progress was minor compared to what is needed to provide an adequate data base for assessment of the tuna fisheries. A working group was assigned the task of defining the major statistical problems and recommending procedures for correcting the problems.

5. Examination of overall sampling program for Atlantic tunas (Report of the Working Group on Sampling and Statistics)

5.1. The Report of the Working Group on Sampling and Statistics is attached as Addendum III.

5.2. Delegates present at the Sub-Committee Meeting were asked to fill in the fourth column of Table 2. It was stressed that a «yes» answer was to be considered as a commitment by that nation to eliminate the nation's statistical deficiencies during 1975.

6. Examination of the Secretariat's statistical programs in 1974

6.1. The Secretariat presented a report on its statistical program during 1974 (SCRS/74/20). Good progress was made by the Secretariat in collecting landing statistics of «foreign flag» longliners at transshipment ports, and it was *recommended* to strengthen this data monitoring system. It was also noted that the Secretariat has ceased its efforts to assist in the development of national statistical systems.

6.2. The Secretariat's program for early estimation of the previous year's catch of yellowfin, skipjack and bigeye was discussed. Such a program was carried out in 1974 following the establishment of a data monitoring system, and with cooperation from national scientists. The Sub-Committee was pleased with this progress and *recommended* that the program be expanded in 1975 by including albacore and, if possible, bluefin, and by making a very preliminary estimate of the 1975 yellowfin catch and catch per effort for the 1975 meeting of the SCRS. The Secretariat replied that it would be possible to make the recommended expansions if the major fishing nations cooperated. Delegates from these nations promised their cooperation.

6.3. The Secretariat was asked if it had followed the recommendation of the ICES-ICCAT bluefin meeting to sample the Bay of Biscay and Moroccan small bluefin fisheries. The Secretariat replied that it could not intervene in national statistical systems without direction from the Commission or Council. Delegates from France and Spain noted that their fisheries were beginning to be sampled. It was noted that the Moroccan fishery for small bluefin as well as the Italian fishery in the Mediterranean was still not being adequately sampled. The FAO representative promised to assist the Secretariat in making contact with the proper authorities in the above-mentioned countries.

7. Examination of Activities I-III [2]

A progress report for Activities I-III was provided by the Secretariat, Tables 1-3.

8. Examination of problems regarding compiling and disseminating data

8.1. It was noted that some statistics were still not being properly described. Several examples were pointed out and the responsible delegates provided clarifications.

8.2. One of the major problems with submitted data was that size composition data were often not weighted, and were presented in graphic rather than tabular form. Since some important stock assessment techniques require weighted size composition data and it is difficult to use the data when it is presented in graphical form, the Sub-Committee *recommended* that size composition data be presented in weighted and tabular form. The procedures for weighted size composition data are contained in the Report of the 1972 Meeting of the Sub-Committee (Chapter IV). It was noted that size composition data should be weighted by the catch made by the sampled vessel (or by the catch contained in the sampled well of larger vessels) and then weighted by the catch in the sampled time-area stratum.

2. See ICCAT Biennial Rept. 1970-71, III - SCRS Rept. Table 1.

8.3. The desirability of having a summary of the composition of the Atlantic tuna fleet by gear, size, and flag was discussed and the Sub-Committee *recommended* that such a summary be included in the next volume of the Statistical Bulletin.

9. Recommendations to SCRS and plans for 1975

9.1. The problem of some catches being reported in dressed weight rather than round weight was discussed. Factors for converting dressed weight to round weight have been estimated for most species. The Sub-Committee *recommended* that all nations should report their catches in round weight and when nations must convert their catches from dressed to round weight, that the conversion procedure be attached to the statistics. It was also *recommended* that the Council authorize the Secretariat to convert all the catch figures into round weight before including them in the Statistical Bulletin (using the most appropriate factors), if any national office fails to present them in round-live weight. This rule should also apply to past data.

9.2. It was noted that significant catches of some «minor» species, in particular blackfin tuna *(Thunnus atanticus)* and little tuna *(Euthynnus alletteratus)*, were being made, but very few countries were presenting even Task I statistics for these species. Several of these species have established historical fisheries (e.g. the blackfin fishery in Cuba) and many are the targets of artisanal fisheries. Also it was observed that some of these «minor» species were being captured incidentally to «major» species, and then being discarded because of a lack of a market. The Sub-Committee *recommended* that the collection and distribution of statistics from the fisheries on the minor species be improved.

9.3. In some fisheries (e.g. French albacore fishery), fishermen record catches in number by size category. This information has been used to convert catches in number to weight, but it also is a very large sample of the size composition of the catch. Since it is difficult and costly to obtain adequate size composition samples, the Sub-Committee *recommended* that catch by size information recorded by fishermen be collected, compiled, and presented to the Secretariat.

9.4. Because of their great importance, the *recommendations* made by the Working Group on Sampling and Statistics in connection with Item 4 are repeated here:

1) The SCRS should recommend to the Council or the Commission that attempts be made to eliminate the deficiencies in statistics noted in Table 2 of the Working Group's Report (for catches landed in foreign ports) by instructing the Secretariat to collect the needed data, and that the Council or Commission should appropriate the funds to do so.

2) The additional personnel and funds needed for travelling and processing the statistics required under 1) should be considered.

Table 1. Progress made during 1974 in the collecting of Task 1[1] data for 1973

Country	*Receipt of Data*	*Type of Data*							*Remarks*
		Catch	*Landings*	*Effort*	*By Gear*	*By Species*	*Preliminary*	*Final*	*Confidential*	
Argentina	Aug. 1	×			×	×		×		
Brazil	May 10	×		×	×	×		×		LL data only.
	Sept. 9	×		×		×		×		Other fisheries.
Canada	May 6	×		×	×	×		×		By area.
China (Taiwan)			×	×	×	×	×			Data collected by Secretariat. Not 100 % coverage. Presented officially.
	Nov. 20		×	×	×	×		×		
Cuba	Nov. 12	×			×	×		×		
France	June 3	×			×	×		×		Tropical fisheries only. Senegal-Ivory Coast fisheries combined.
	July 22			×	×			×		
	Sept. 10		×	×	×	×		×		By area. For all species.
Ghana	Feb. 26	×			×	×		×		Foreign flag vessels landing in Ghana also reported.
Ivory Coast	June 3	×			×	×				By area. Reported with France & Senegal.
	July 22			×	×			×		
Japan	June 7	×		×	×	×	×			By area for surface fishery.

Korea	May 3			×		×		×		Including some foreign flag vessels catch. Not 100 % coverage.
	July 29			×	×	×	×	×		
Mexico	July 17			×			×	×		
Morocco	Sept. 3			×		×	×		×	By area.
	Nov.									
Norway	July 1	×			×	×	×			Temperate species.
	Sept. 2	×			×	×	×			Tropical species.
Panama				×	×	×	×	×		Collected by Secretariat. Not 100 % coverage.
Portugal	Feb. 25	×				×				
Angola		NO DATA								
Senegal	June 3	×				×	×		×	By area. Reported with France & Ivory Coast.
	July 22			×		×			×	
South Africa	Apr. 22	×			×	×	×		×	
Spain	March 15	×			×	×	×		×	African catches. W/ Secretariat's assistance.
	June	×			×	×	×	×		Canaries. W/ Secretariat's assistance.
	Aug. 7	×				×	×			Peninisula. W/ Secretariat's assistance.
Turkey	Aug. 21	×					×		×	
U.S.A.	May 6	×	×			×	×	×		Received both landing and catch statistics, and landing figure was preferred. On July 24 changed to catch statistics.
Venezuela	Apr. 29	×			×	×	×			By area. Also reported foreign flag catches.

1. See Addendum II.

3) The Sub-Committee *recommended* that funds be appropriated for the Secretariat to hire or contract a competent biostatistician for a period of at least one year to solve some serious theoretical sampling problems facing the Commission. This person should work at a location with adequate library and computer facilities, and should spend some time in the field in order to become familiar with the physical sampling problems.

4) Background documents on the use of several morphometrics for size compositions should be prepared for the 1975 SCRS meeting, and discussion of this subject should be on the 1975 agenda for the SCRS meeting.

5) Samplers should make an effort to collect samples with multiple morphometrics (particularly pre-dorsal and fork-length) for a wide range of species and sizes in 1975 in order to establish conversion factors and provide data for analysis of spatial variability.

10. Other matters

The Assistant Executive Secretary and the Convener of the Sub-Committee attended the 1974 meeting of the Coordinating Working Party on Atlantic Fisheries Statistics (CWP), Paris, September 12-20, 1974. A draft report of the meeting was presented (SCRS/74/9).

11. Adoption of report

The report was adopted.

12. Adjournment

The meeting was adjourned

Table 2. Progress made in the collecting of Task 2[1] data during 1974

Country	*Date Received*	*Species*	*By Gear*	*By Month*	*By 1° × 1° Area*	*By 5° × 5° Area*	*By Larger Area*	*Effort*	*Weight*	*No. of Fish*	*Confidential*	*Years*	*Remarks*
Brazil	May 10	All	×	×				×	×			1973	LL only.
	July 29	»	×		×			×	×			1973	LL only.
Canada	May 6	All	×	×	×			×	×			1973	
China (Taiwan)	Dec. 10	All	×	×		×		×		×		1972-73	
France	Sept. 16	Temperate	×	×			×	×	×			1973	By FAO Zone.
FIS	Aug. 20	YF, SJ	×	×	×			×	×			1973	ORSTOM Publication.
Ghana			NO DATA										
Japan	July 22	All	×	×		×		×		×		1972	LL only.
Korea			NO DATA										
Morocco	Sept. 16	All	×	×	×			×	×			1973	
Portugal			NO DATA										
South Africa	Apr. 22	All	×	×	×	×		×	×			1973	
Spain	Nov. 13	Alb, BF	×	×		×		×		×		1973	
U.S.A.	Apr. 15	YF, SJ, BF, BE	×	×	×	×		×	×			1973	Including some foreign flag vessels.
Venezuela	Aug. 1	All	×	×	×			×		×	×	1973	Including foreign flag vessels.

1. See Addendum II.

Table 3. Progress made in the collecting of Biological[1] data during 1974

Country	*Date Received*	*Species*	*By Gear*	*By Area*	*By Months*	*Actual Size Frequency*	*Weighted Size Frequency*	*Year*	*Remarks*
Brazil	Nov.	ALB, YF, BE	×	×		×		1973	LL only.
Canada	June 27	SJ, BF	×	×	×	×		1973	
France	Dec. (1973)	ALB	×		×	×		1973	SCRS/73/70 France
FIS	Sept.	YF	×				×	1969-73	WTPD - Nantes 74/26.
Ghana	Monthly	YF, SJ, BE	×	×	×	×	×	1974 (Jan-Aug)	Data for foreign flag vessels. Reported monthy with only a month delay.
Japan	April	All	×	×	×	×		1972	Data for LL only.
		BE, YF	×	×	×	×		1971	
Korea			NO DATA						
Morocco			NO DATA						
Portugal			NO DATA						
South Africa	Apr. 22	YF	×	×	×	×		1973	
Spain	March 1	ALB	×	×	×	×		1973	
		BE	×		×	×		1973 Sept.	Collected by Secretariat at Canaries.
U.S.A.	Apr. 15	YF, SJ, BF	×	×	×	×	×	1973	Including foreign flag vessels.
Venezuela	Aug. 1	YF, SJ	×	×	×	×		1973	

1. See Addendum II.

Addendum I to Appendix III to Annex 9

Agenda for the Sub-Committee on Statistics

1. Opening of the meeting
2. Adoption of Agenda and arrangements for the meeting
3. Review of progress made by national offices (in accordance with the system of Activities I-III)
4. Examination of present major problems with statistics (in regard to *quality* of statistics and *speed* in disseminating them)
5. Examination of overall sampling program for Atlantic tunas
6. Examination of the Secretariat's statistical programs in 1974:
   — Longline statistics
   — Mission in the Canary Islands
   — Mission in Africa
   — Mission in Central and South America
   — Others
7. Examination of Activities I-III
8. Examination of problems regarding compiling data in a standardized form and disseminating them
9. Recommendations to SCRS and plans for 1975
10. Other matters
11. Adoption of Report
12. Adjournment

Addendum II to Appendix III to Annex 9

Definitions of ICCAT Statistics

Task I — total annual catch by gear, species and flag country, and number of tuna boats by size classes, and gear.

Task II — catch and effort by month — 1° × 1° area for surface, and quarter 5° × 5° area for longline.

Biological size frequencies.

Addendum III to Appendix III to Annex 9

Report of the Working Group on Sampling and Statistics

Participants of a Working Group on Samping and Statistics were: A. Fonteneau (Convener of Sub-Committee on Statistics), S. Kume (Japan), P. Miyake (Secretariat), A. de Boisset (Secretariat), W. Lenarz (USA), J. A. Pereiro (Spain), F. Bard (France), J. Beckett (Canada) and R. Francis (IATTC).

According to Gulland, "... the right to fish implies the duty to conserve the resource. We need to point out that conservation is hardly possible without an appropriate data base."

The Working Group attempted to isolate the major existing statistical and sampling deficiencies in the Atlantic tuna fisheries in Table 1. Data are assumed to be "timely" if obtained by the Secretariat by June 30 of the year after they were generated. Data are assumed to be "complete" if Task I, Task II and Biological information (see Addendum II to the Sub-Committee Report) is provided.

Table 2 takes the statistical and sampling deficiencies from Table 1 and categorizes them in the following way:

a) *can be done* — the problem could be corrected in 1975 under the existing ICCAT framework by national members.

b) *no solution* — there appears to be no solution to the problem under the existing ICCAT framework without action from either SCRS, Council, or Commission.

The table also shows the response of the delegations as to what actions will be undertaken in 1975 with regard to the indicated deficiencies.

The deficiencies for which there are presently "no solutions" can be divided into two parts. *Firstly*, the deficiencies associated with domestic fleets of coastal countries (e.g. Angola) result from problems within the national offices. The Secretariat cannot act unless the Council or Commission so directs it to. *Secondly*, the balance of the most important "no solution" deficiencies in Table 2 are associated with the collection of Task II and Biological information from fleets unloading in foreign ports (e.g. the longline fleets of Taiwan, Korea, Panama and the purse seine fleet of Spain). In such cases the SCRS should recommend to the Council or the Commission that the Secretariat be instructed to collect the required catch-effort data and biological samples, and that the Council or the Commission should appropriate the funds to do so. In order to facilitate such a decision, Table 3 was prepared. In it are the major ports of landing, approximate catches and major species being landed for the longline fleets of concern. It is the opinion of the Working Group that at least four ports should be sampled annually by the Secretariat: one each for the northern and southern albacore fisheries, and

Abidjan and the Canary Islands for the yellowfin fishery. The sampling scheme must be flexible since the fleets of concern do not always land in the same ports. It is the feeling of the Working Group that immediate action must be taken on these matters.

At present, the most economical way to achieve this objective might be to hire local personnel at each port to work at the waterfront on a temporary basis. At the same time, maximum collaboration with existent local laboratories and institutions should be sought. When this program is realized, it will be essential to subject the data to an automated data processing system. Thus, funds and personnel for such a program should also be considered.

The Working Group recognizes that the statistical problems associated with the implementation of an overall biological (length-frequency) sampling program cannot be solved by the national offices. The Group therefore *recommended* that funds be appropriated for the Secretariat to hire or contract a competent *biostatistician* for a period of at least one year in order that statistical problems be solved, examples of which follow:

1) time-area stratification for biological sampling
2) accuracy criteria for biological data
3) sample sizes for biological data
4) the use of photographic techniques to obtain measurements.

It was noted that the biostatistician must work at a location with adequate library and computer facilities and must spend some time in the field in order to become fully familiar with the physical sampling problems. It is emphasized that this program must be undertaken on an *urgent basis*.

The Working Group realizes that several morphometrics (pre-dorsal length, fork length) are presently being used as measures for the biological data. The Group *recommended* that:

a) background documents on the relative merits and demerits of the use of these morphometrics be prepared for the 1975 SCRS meeting, and that this item be included on the agenda.

b) samplers make an effort to collect samples with multiple morphometrics (pre-dorsal and fork length) for a wide range of species and sizes in 1975, in order to establish conversion factors and provide data for analysis of spatial variability.

Finally, the Working Group recognizes that the problems associated with bluefin sampling and statistics are of a special nature and are associated with the fisheries of many countries not covered by Tables 1 and 2. It therefore *recommended* that these problems, as well as the problems associated with bluefin stock assessment, be addressed by an *ad hoc* committee in a special meeting to be held as soon as possible. The report by the *Ad Hoc* Committee is attached as Addendum IV.

Table 1. 1973 Atlantic Catch (Thousand MT)

	BF	*Alb*	*YF*	*SJ*	*BE*	*Total*	*Statistical and Sampling: Deficiencies*
USA	1.5		3.1	20.7		25.3	BF: sport fishery - Task I, Task II, Biological
China (Taiwan)		24.4	3.1		3.1	30.6	Task I no official/Task II & Biological: *no data*
France	1.0	6.1	32.3*	12.7*	2.5*	54.6	Alb & BF: Timeliness/Medit. BF: *no data*
Japan: Total	1.0	1.2	14.9	16.9	14.0	48.0	
— Tema-based BB			9.1	15.7	0.2	25.0	Task II: Timeliness/no official Biological
— LL	1.0**	1.2	4.6		13.8	20.6	Task II & Biological: Timeliness/Biol. insufficient
— PS			1.2	1.2		2.4	Task II & Biological: Timeliness/Biol. not weighted
Korea (LL)		8.0	11.2		5.5	24.7	Task II & Biological: *no data*
Panama (LL)		4.2	4.8		2.3	11.3	Task I estimated by Secretariat/Task II & Biol.: *no data*
Spain: Total	4.1	24.3	13.6	22.1	4.4	68.5	
— PS			12.8	17.8		30.6	Task II & Biological: *no data*
— Canary I. BB	0.9	1.8	0.8	4.3	4.4	12.2	Task I: rough estimate/Task II & Biol.: *no data*
— Peninsula	3.2	22.5				25.7	BF: inadequate Task II & Biological
Portugal				2.0		8.6***	Task I: no species breakdown/Task II & Biol.: *no data*
Angola			(0.6)++	(1.6)++			Task I: accuracy doubtful/Task II & Biol.: *no data*
Subtotal	7.6	68.2	83.0	74.4	31.8	271.6+	
Complete Coverage	3.5	29.8	50.3	50.3	14.0	147.9	
Complete Timely Coverage	2.5	28.6	35.4	33.4	2.5	102.4	
Total Atlantic (Approx.).	15	70	85	80	35	285 +	

* Includes Ivory Coast and Senegal.
** Also caught 9.75 Southern Bluefin.
*** No species breakdown for tunas - suspected to be BF, Alb, BE.
\+ Portugal tuna catch included.
++ Estimate not included in totals.

Table 2.

Country	*Deficiency*	*Prognosis*	*Will be done in 1975?*
USA	BF: Sport fishery, all data	Can be done	Yes
China (Taiwan)	(Task II) Biological	*No solution*	No
France	Alb-BF-Timeliness	Can be done	Yes
»	Med. BF	*No solution*	No
Tema-based BB	Task II Timeliness	Can be done	No[1]
»	Official Biological	Can be done	No[2]
Japan - LL	Task II - Biol. - Timeliness	*No solution*	No[2/3]
»	Biological - insufficient	Can be done	Yes
Japan - PS	Timeliness, Biol. weighting	Can be done	Yes
Korea - LL	Task II, Biological	*Partial solution*[4]	No
Panama - LL	Task II, Biological	*No solution*	No
Spain - PS	Task II	Can be done	Yes
»	Biological	*No solution*	No
Spain - Canary I	Task II, Biological	Can be done	Yes
Spain-Peninsula	Med. BF, all data	Can be done	Yes
Portugal	All data	Can be done	Yes
Angola	No data	*No solution*	No

1. Timeliness depends on development of computerized system, which is dependent on a budget increase.
2. Data are being collected and will be presented, but there will be a timeliness problem until computerized system is developed, which is dependent on a budget increase.
3. Very preliminary estimates of Task II data will be attempted in a timely fashion.
4. Good cooperation with ICCAT, but minimal results expected because of distance between fishing grounds and home ports.

Table 3. Major Landings of the Longline Fleets of China (Taiwan), Korea & Panama

Port	*Catch (thousand MT)*	*Major species*
Cape Town	10	Alb
Tema	<2	YF, BE
Abidjan	15	YF, Alb, BE
Freetown	4	YF, BE
Canary I.	15	Alb, YF, BE
St. Maarten	7	Alb
Port of Spain	4	YF, BE
Montevideo	7	Alb
Buenos Aires	9	Alb

Addendum IV to Appendix III to Annex 9

Report of the Ad Hoc Committee on Bluefin Tuna Sampling and Statistics

The *Ad Hoc* Committee on Bluefin Tuna Sampling and Statistics reviewed the availability of Task I, Task II and Biological statistics from countries that reported catches of bluefin in 1973. These data are presented in Table I. Table II presents the Committee's analysis of the deficiencies in the data and its estimate of the possibility of correcting these deficiencies in the future.

In view of recent developments in the bluefin tuna situation, the Committee felt that immediate steps should be taken to correct these data deficiencies by the countries fishing for bluefin. It must be pointed out that the sampling responsibility of countries regarding bluefin is much more related to their catches in numbers than in weight, which emphasizes the duties of countries operating small-fish fisheries. The Committee also concurred with the Working Group on Sampling and Statistics that funds be appropriated for the Secretariat to assist in obtaining the necessary statistical and biological data from ports in the Atlantic where bluefin are landed. It noted that *recommendations* were made to sample the North Atlantic albacore longline area as well as the Canary Islands. These areas also are areas where bluefin are taken and biological data in particular are lacking. This is especially true for the Canary Islands, both for the international and local fleets. Because of the significance to population dynamic calculations of inadequate data on the catches of juvenile fish, particular emphasis should be placed on comprehensive sampling of the juvenile sport catch in the western Atlantic, including measures of effort as well as catch and biological data.

The Committee noted that differential distribution by sex was evident in the western North Atlantic in the coastal large-fish fisheries and urges that sex data be obtained, particularly from the large-fish fisheries on both sides of the Atlantic as well as from the longline fishery.

The Committee also concurred with the recommendation of the Working Group on Sampling and Statistics that certain morphometric measurements should be included in regular sampling including, for the bluefin, both the distance between the first and second dorsal fin and the length of the second dorsal fin. There is some indication in the western Atlantic that there is significant variation in the length of the 2nd dorsal among large bluefin.

The group noted that increasing concern has been expressed over the apparent reduced abundance of medium-sized bluefin (ages 6-10) and *recommended* that increased effort be directed to obtaining size information from the longline fishery.

The Committee also *recommended* that some effort be made to obtain catch, effort and biological data from the small-fish fisheries off Morocco and in the Mediterranean, and that the Secretariat examine the possibility of providing a sampler in the area during the fishing season.

Table 1. Availability of Task I, II, and Biological Data from Various Countries and the 1973 Catch of Bluefin Tuna

Country	*Task I*	*Task II*	*Biological*	*1973 Catch (1,000 MT)*
Argentina	Yes	No	No	0.0
Canada	Yes	Yes (some Sport)	Yes	0.9
China (Taiwan)	Estimated	No	No	0.2
Dominican Republic	Total catch only	No	No	0.1
France - Med.	No	No	No	0.5
Atl.	Yes	Yes	Yes	0.5
Italy	Total catch only	No	No	1.7
Japan	Yes	Yes	Yes	1.0
Korea	Yes	No	No	0.0
Morocco	Yes	No	No	0.5
Norway	Yes	No	No	0.1
Portugal	No	No	No	0.6?
Spain - Med.	Yes	No	No	0.6
Atl.	Yes	Yes (Except Canaries)	Yes (Except Canaries)	4.1
Tunisia	Yes	No	No	0.2
U.S.A.	Yes (No Sport)	Yes (No Sport)	Yes (Some Sport)	1.5
Yugoslavia	Total catch	No	No	0.2

Table 2. Deficiencies

Country	*Task I*	*Task II*	*Biological*	*Prognosis*
Argentina	× × × (Effort)	× × ×	× × ×	Poor
Canada		× × × (Sport)		Good
China (Taiwan)	× × × (Incomplete)	× × ×	× × ×	Poor
Dominican Republic	× × × (Incomplete)	× × ×	× × ×	Poor
France - Med. Atl.		× × ×	× × ×	Good
Italy	× × × (Incomplete)	× × ×	× × ×	Poor
Japan			× × × (Incomplete)	Excellent
Korea	× × × (Incomplete)	× × ×	× × ×	Fair
Morocco	× × × (Effort)	× × ×	× × ×	Poor
Norway		× × ×	× × ×	Poor
Portugal	× × × (Effort)	× × ×	× × ×	Fair
Spain - Med.		× × ×	× × ×	Good
Atl.		× × × (Canaries)	× × × (Canaries)	Good
Tunisia		× × ×	× × ×	Poor
U.S.A.	× × × (Sports)	× × × (Sports)		Excellent
Yugoslavia		× × ×	× × ×	Poor

Appendix IV to Annex 9

WORKSHOP ON TUNA POPULATION DYNAMICS

Nantes, France, Sept. 2-14, 1974

REPORT OF SESSION 1

(Sept. 2-9)

Item 1. **Opening of the meeting**

1. The meeting was opened by the Chairman, B. J. Rothschild. Welcoming remarks were given by R. Letaconnoux on behalf of the Institut Scientifique et Technique des Pêches Maritimes (ISTPM) and O. Rodríguez Martín on behalf of the International Commission for the Conservation of Atlantic Tunas (ICCAT). The list of participants is attached as Addendum I.

Item 2. **Adoption of Agenda**

2. The Agenda set out in Addendum II was adopted. A list of documents presented to the meeting is given in Addendum III. R. C. Francis (IATTC), with the assistance of A. Laurec (CNEXO), was appointed Rapporteur by the Chairman.

Item 3. **Sampling and Statistics** — A. Fonteneau, discussion leader.

3.a. The inadequacies of present day fisheries statistics (measures of catch, measures of effort, and measures of size composition) were discussed and attributed to three principal causes (WTPD/74/20). First, in a number of instances, there is a lack of accountability and responsibility among those organizations commercially involved or otherwise associated with fisheries to provide good statistics. Second, modern information management systems including hardware and software are not utilized effectively to transmit statistics from their source to the scientists for utilization. Third, there is, in a number of instances, a lack of commitment, either due to policy decisions or lack of technical ability, on the part of fishery administrators to collect adequate statistics for fisheries management.

3.b. The statistical requirements for assessment and management within an international commission necessitate a *common data base*, which must be formed from standard, continuous sampling and reporting (WTPD/74/22). It was decided

that the independent programs of sampling by individual member and non-member countries were inadequate with respect to completeness, accuracy and timeliness.

(i) *Completeness* — for some fisheries the statistics are collected at a very comprehensive level, whereas for other fisheries not even total catch and effort statistics (Task I statistics in ICCAT terminology) are being provided.

(ii) *Accuracy* — for some fisheries the statistics being provided are incorrect.

(iii) *Timeliness* — some statistics cannot be appropriately utilized for stock assessment problems owing to excessive slowness of collection and processing. This is primarily due to a lack of real cooperation from some fishery administrators with regard to rapid circulation of the statistics. Time lags are particularly evident in longline statistics.

Because of its paramount importance, the group *recommends* that ICCAT immediately address itself to the establishment of an explicit data collection system encompassing all of its fisheries. The most pressing problem relative to stock assessment and management is to establish a high quality data base with which population dynamics analyses may be performed and upon which decisions can be based. The establishment of such a system should be initiated at the annual meeting in Madrid in November, 1974. In order to facilitate the above, two things must be done before the next annual meeting:

1) A sampling priority chart such as that presented in Addendum IV must be completed in order to establish sampling priorities by species, gear and port of landing.

2) The Secretariat should provide a general document which describes the way in which fish are handled from the time that they are caught until they are processed for each of the relevant fisheries in order to provide a background for determining optimum times, methods and locations of sampling.

3.c. In the development of an overall ICCAT sampling plan, care must be taken not to destroy effective existing sampling programs (WTPD/74/9). Effective sampling programs are those which provide sufficiently complete, accurate and timely data to assess the status of stocks satisfactorily as determined by SCRS.

3.d. Any fishery sampling scheme must be based upon statistical theory (WTPD/74/2, 22). Emphasis should be placed on design *and* analysis. The methods of sampling must relate to proposed analyses. We feel that it is the responsibility of SCRS to examine the problem of sampling from the point of both accuracy and precision, and that to help facilitate this, the group *recommends* that at the next meeting of SCRS, detailed descriptions of all existing national sampling programs be provided to the Secretariat. It was further *recommended* that the Secretariat should employ a qualified biostatistician on its staff to oversee the development and insure the validity of a comprehensive ICCAT statistical data system, and to implement new statistical programs. Finally it was suggested that the Secretariat look at the ICNAF experience in developing an overall sampling

plan and provide relevant ICNAF and other documents at the next SCRS meeting as background material.

3.e. It is difficult for national governments to meet their responsibilities for required statistical data when landings take place outside of their countries. In these cases, the flag state, or ICCAT, should provide authority and support for the landing state to obtain the data.

3.f. The significant problems in tuna population dynamics and stock assessment methodology are, in general, common to each of the world's tuna fisheries. Additionally, there are many non-tuna population dynamicists throughout the world who might be encouraged to address tuna problems if adequate data were available. We therefore feel the need for both IATTC and ICCAT, as well as any other bodies who collect and compile tuna data, to publish (or otherwise widely distribute) relatively detailed data (length-frequency, catch and effort data by species, month, small area, gear type and size, mode of fishing, flag, etc.) with the usual constraint of preserving the confidentiality of individual vessel operations as required.

3.g. The group noted that no detailed data are available for the Chinese longline fishery, which now probably accounts for 30-40 % of the total Atlantic longline catch. The absence of these data makes certain analyses (e.g. the general status of the albacore stocks and the study of yellowfin stock structure in the eastern and western Atlantic) very difficult. The group therefore *recommends* that every effort should be made to obtain these data. Clearly this general problem would be eliminated if all countries with significant Atlantic tuna fisheries were members of the Commission.

3.h. We reiterate that a minimum acceptable level of sampling should be defined and implemented as soon as possible. Until this is done, proper assessment and management of the tuna stocks of the Atlantic will be very difficult to achieve. If this cannot be accomplished within the framework of ICCAT, then perhaps a conference on sampling and statistics, with a wider trend of reference than merely Atlantic tuna, would be in order. An outline of major topics for such a meeting is given in Addendum V. We, as scientists, see a commitment on the part of member nations to provide certain statistics. This commitment is not being fulfilled by all members. We feel that if this responsibility cannot be met by individual countries, then it must be undertaken by the Commission itself.

Item 4. **CPUE and Effort as Measures of Abundance** — R. Francis, discussion leader.

4.a. Several ways of measuring effort were discussed and evaluated relative to their utility in indexing population abundance both within and between years (WTPD/74/4, 14, 20). Longline effort is traditionally defined by the number of

hooks set in the water per unit time. Purse seining consists of a complex mixture of activities involving both searching for and capturing schools of tuna. Purse seine fishing (operational) time (effort) can be defined in several manners, three of which are:

(*i*) days absence from port
(*ii*) days fished
(*iii*) hours searched (WTPD/74/20, p. 9).

The latter two measures require that accurate logbook records be kept by the fishermen. The relationship between catch per days absence and catch per days fished was examined for four classes of boats in the FIS fleet (WTPD/74/14). It was determined that only for large purse seiners was there a significant linear relationship. It was suggested that pilot studies be initiated to examine the relationship between fishing time and searching time in purse seine fisheries, both tuna and non-tuna, in order to determine if these two statistics measure fishing effort in equivalent manners. Finally, it was suggested that the various measures of fishing effort given in Addendum VI be examined as to their validities as mesaures of fishing mortality.

4.b. Fishing power studies can be divided into two segments: fishing power between different classes of vessels within years (WTPD/74/14, 19) and fishing power of the same class of vessels between years (WTPD/74/1, 18). It was noted that there are logical difficulties in developing a method of standardization between years, but perhaps some new measures of effort involving a more detailed examination of the purse seining process will improve the possibility of attaining this goal. It was demonstrated (WTPD/74/19) that within a year, relative fishing power varies as a function of the predominant modes of fishing employed in a tuna purse seine fishery. It was noted that in the eastern Atlantic, different modes might be employed by different national fleets as a function of the principal species of tuna being pursued.

4.c. It was noted that in a purse seine fishery, the proper measure of effort necessary to index abundance probably depends on three factors:

(*i*) the number of fish in a school
(*ii*) the density of schools
(*iii*) the fraction of a school removed per set.

For example, it was noted that if (*i*) decreases and (*ii*) and (*iii*) remain constant as population biomass decreases, then catch per set would be an appropriate index of relative stock abundance whereas if (*ii*) decreases and (*i*) and (*iii*) remain constant as biomass decreases, then catch per day searched would be a better index of relative stock abundance. The possibility of using analysis of variance models (WTPD/74/19, p. 3) to index age class abundance over time was discussed.

Independent estimates would then be made to compare these relative age-specific estimates. The utilization of longline data (WTPD/74/3) to estimate rela-

tive stock abundance was discussed. It was noted that in some cases analyses of longline and purse seine fisheries on the same grounds do not give similar results. Finally, the effects of environmental parameters (WTPD/74/3, 18) on apparent abundance were mentioned. It was noted that temperature may have an important influence on the availability of various species of tuna to both surface and longline gear and may have a pronounced effect on short term estimates of relative abundance, and that data on this subject are lacking.

4.d. The possibility of utilizing aerial surveys, larval surveys and research vessel sightings as indices of population abundances independent of catch and effort statistics was discussed. It was felt that none of these methods can be recommended for general use at the present moment. However, it would be useful if reviews could be made of existing collections of data of material such as larval abundance, or sightings from aircraft or research vessels. These reviews should examine the magnitude of year-to-year variation in these observations, correlations with other possible indices of abundance, and the order of magnitude of the costs involved in the regular use of such observations.

Item 5. **Production Models** — W. Fox, discussion leader.

5.a. Production models are very simple and their main benefit is that the status of the fishery can be assessed with very limited data. In utilizing the production model approach numerous assumptions are made, several of which are usually known *a priori* not to be satisfied fully. A discussion of the major assumptions was presented (WTPD/74/13), which are: (1) the concept of equilibrium conditions holds, (2) the model is applied to a single population or stock, (3) that part of the population which is fishable (available) remains constant, (4) the catchability coefficient is constant, (5) there are no significant effects of time lags in age structure adjustment, reproduction, growth, or natural mortality, (6) there are no changes in the relative distribution of fishing mortality between ages, and (7) population production is independent of age structure at a fixed level of population biomass.

5.b. The effects of fishing multiple stocks on the derived shape of the yield-effort curve was presented (WTPD/74/13). It was shown that the amount of mixing between stocks and the relative distribution of fishing effort between stocks can have very pronounced effects on the observed relation between yield and fishing effort and that yield can either increase or decrease with a re-distribution of the same amount of effort among the stocks (Figure 1).

5.c. The effects of the fishable population not remaining constant were presented in theory (WTPD/74/13) and from a simulation analysis of the eastern Pacific yellowfin tuna fishery (WTPD/74/19). It was shown how the level of equilibrium yield in the eastern Pacific yellowfin tuna fishery could change as the

availability of fish in surface schools and fish associated with porpoise change and how this affects the fitting of a production model (Figure 2).

5.d. The effects of the catchability coefficient being density dependent were presented (WTPD/74/13). Of particular interest is when catchability varies inversely to population density such that the yield curve when plotted against fishing effort bends back to the origin (Figure 3). The significance of this relationship is that in order to restore a stock to a more productive level following overfishing, relatively large reductions in fishing effort must be undertaken rather than a program of slowly reducing fishing effort. This points out the need for carefully examining a fishery for signs of increasing catchability of the stock (other than through technological advances) such as decreasing areal range of the stock, and/or decreasing average size of schools in a purse seine fishery.

5.e. The two major methods of fitting production models to catch and effort data —the transition prediction approach and the equilibrium approximation approach— were discussed (WTPD/74/7).

Since the production model is a relatively crude approximation to population dynamics, it likely will not, with the same parameter values, be both the best representation of transitional catches and best representation of the equilibrium relationships.

5.f. It was pointed out that since the production model assumes a constant set of parameters, if recruitment goes up at a given population size, then one or more of the other components (individual growth or natural mortality) must change (WTPD/74/20). If this is the case, then there must be data to test this.

5.g. It was noted that the shape of the right hand side of the production model yield curve, given fulfillment of the basic assumptions, must depend mostly upon the recruitment relationship. If recruitment depends mostly upon the size of the parental stock then, because of the lag effect, care must be taken when exploring the right hand side of the yield curve. If, on the other hand, there is strong competition between year classes, then the lag effect may be significantly dampened.

5.h. The perspective of the production model approach agreed upon was that while the approach is little more than a simple regression problem and should not be continued as the *sole* means of stock assessment, production modeling, because of the nature of tuna fishery data and aging problems, will continue to be a mainstay in assessing the status of many stocks. It is, therefore, imperative that the assumptions and the effects be fully understood and kept in mind when making management decisions on the advice from production modeling efforts.

5.i. It was *recommended* that:

a) Production model analyses need to be performed on all tuna stocks presently being exploited in the Atlantic.

b) Studies be performed concerning the effects of density dependent population processes on the form of stock production.

c) Estimates of model sensitivity to systematic changes in parameter values around the optimum be given (WTPD/74/27).

Item 6. **Age-Dependent Yield Models** — A. Suda, discussion leader.

6.a. Practical uses of equilibrium yield per recruit theory in tuna research were discussed (WTPD/74/5). In order to be useful, yield per recruit models must generally take into account deviations from the basic assumption. Analyses were discussed where:

a) size-dependent changes in sex ratio indicate differences in growth, mortality or availability.

b) age-dependent fishing mortality was employed (for instance the amount of fishing on one segment of the population (immature albacore) affects recruitment to another segment (mature albacore)).

c) age-dependent fecundity affected recruitment and therefore the validity of yield per recruit.

d) dumping of illegal sized fish had an effect on yield per recruitment.

It was further pointed out that one must be careful that estimates of natural mortality (M) employed in a yield per recruit analysis do not reflect a combination of natural mortality and dispersion if fishing mortality (F) is subsequently being directed on the dispersed segment of the population.

6.b. An age-specific simulation model of the eastern Atlantic yellowfin tuna fishery was discussed (WTPD/74/6). The model simulates a multiple gear fishery, each gear applying a vector of age-specific fishing mortalities to the population. As input, the model uses quarterly values of age-specific catchability coefficients (q) (Figure 4) and estimates of recruitment, all of which are computed from a cohort analysis. As output, the model gives annual estimates of catch per unit of effort and catch by each gear type as well as estimates of equilibrium yield if the effort of all gears remains constant. The main assumptions of the model are equivalent to those used in the cohort analysis. In addition it is assumed that the age-specific catchability of each gear does not change with time, effort or the abundance of the stock. Predictions of equilibrium yield per recruitment and fecundity under several hypothetical distributions of effort between gear types were presented and discussed. It was pointed out that, with a simulation model such as this, one can examine both equilibrium and non-equilibrium yield conditions, as well as the effects of variable annual recruitment patterns. It is impossible to determine the validity of the analytic structure of a simulation model when the analytic structure of the estimation model is identical. It appears that the validity of advice derived from simulation models, such as the one presented, rests partially upon the sensitivity of its output to the systematic variation of its parameters due

to possible errors in estimation, and partially upon the validity of its functional relationships.

6.c. In summary, it was pointed out that age-dependent models have several advantages over non-age-dependent models in that:

a) they are more realistic in their representation of a multiple gear fishery and the effects of the relative distribution of effort on the population age-structure.

b) they are useful in demonstrating time lag effects when those lags are related to age dependent fishing.

c) they are useful in integrating gear-dependent differences in population production.

However, any model is only as good as the assumptions upon which it is based. Age-dependent models only give more detailed insight into population processes if the assumptions on which they are based actually hold true.

6.d. It was *recommended* that:

a) Yield per recruit analyses should be done for each species of tuna being exploited in the Atlantic.

b) Estimates of natural mortality for all species should be made and validated. This includes a re-examination of past estimates and the determination of new estimates from more recent data.

c) Age-specific models provide an extremely useful vehicle for the investigation of the interaction between various gear types (for example, longline and surface gear).

d) Estimates of model sensitivity to systematic changes in parameter values be given in the results of any analysis.

Item 7. **Age-Specific F and Cohort Analysis** — Le Guen, discussion leader.

7.a. The necessity of utilizing age-specific fishing mortality in studies of most tuna fisheries was pointed out (WTPD/74/5) and attributed to such causes as migration, sequential recruitment and gear-specific characteristics.

7.b. The drawbacks of the standard cohort analysis techniques were discussed:

a) cascading errors,
b) non-uniqueness of solutions
c) dependence on guesses of critical parameters.

It was pointed out that changes in fishing effort as well as in the partitioning of this effort among gears may also significantly affect the validity of a cohort analysis (WTPD/74/25).

7.c. The obvious necessity of distinguishable cohorts to perform age-dependent studies in the present state of the art was recalled, and the importance of growth studies underlined. But it was pointed out that the existence of unique and constant (from year to year) year-class modes is not a necessary condition for a cohort analysis.

7.d. It was noted that studies of the cohort analysis and related techniques are being carried out by a number of scientists not directly concerned with tuna (e.g. J. Pope at Lowestoft). These scientists should be encouraged to apply their ideas to tuna, and this application would be facilitated by the publication of comprehensive and readily accessible data in a form suitable for direct application of cohort analysis techniques.

7.e. It was *recommended* that:

a) Cohort analyses be performed for each species of tuna being exploited in the Atlantic.

b) Monte Carlo studies of the cohort analysis procedure be undertaken in order to study its robustness to the breakdown of various assumptions.

c) The sensitivity of the cohort analysis procedure to changes in time scale be studied.

d) A generalized study of age and gear-dependent catchability be undertaken.

e) A table of Atlantic yellowfin catch in numbers by quarter, gear, age and location be prepared for presentation at the next ICCAT meeting.

Item 8. **Using Length Distributions to Estimate Age Structure** — A. Laurec, discussion leader.

8.a. There is a recognition of the difficulties inherent in the utilization of modal length distributions in the catch of tunas to estimate either growth rates or absolute age. A stochastic simulation of an underlying birth and mortality (fishing and natural) structure was discussed (WTPD/74/15). It was pointed out that:

(*i*) simulations such as this, which result in modal distributions of length, could be used to reveal the basic underlying time distribution of the successful spawning process.

(*ii*) the more intensively a species is fished, the better the agreement is between age and the distinguishability of size-related modes because of the decline of the older year classes.

A basic question is whether or not certain species of tuna can be aged adequately using modal distribution of morphometrics to permit unbiased cohort analyses.

8.b. The possibility of looking at new morphometrics which give more accurate estimates of age was discussed. The possibility of using bone or other hard part measurement was mentioned.

8.c. It has been observed that the between sample variance of longline length samples is considerably smaller than for surface fishery samples of the same sized fish. For this reason, longline length samples may provide a good sampling unit for the modal estimation of growth of large fish.

8.d. Several recommendations were made relative to the use of length distributions to estimate age structure in tuna:

a) Heavy exploitation of tunas should show changes in size distribution. Therefore length-frequency sampling of the catch should be sufficiently stratified (by gear, area, mode of fishing, time of year) so as to be best able to detect this effect.

b) Tagging might be used in conjunction with length data for growth and age-determination purposes. Studies should be initiated to determine the magnitude and cost of tagging efforts necessary in order to identify significant changes in growth over time-area strata.

c) Analyses which utilize growth curves derived from distributions of modal lengths (for example, simulations which utilize cohort analyses) should be performed over a range of values which might result from errors in the aging process in order that their sensitivity to errors in estimation of age be examined.

d) It may be useful to pool older age classes for which clear modal separations cannot be made. However the errors inherent in pooling relative to not pooling should be examined.

e) The effects of lengths of apparent prolonged spawning periods on cohort analysis and other population dynamics techniques should be examined.

f) An examination of sex-linked modal segregation should be studied.

Item 9. **Mixing of Stocks**

9.a. The basic concept of stock and mixing of stocks was discussed. It was mentioned that one must consider mixing and dispersion of fish relative to the fisheries applied to them rather than simply genetic heterogeneity as a basic criterion of mixing. Thus stock heterogeneity must have some impact on the fishery in order to have any meaning in population assessment and management. The stock structure of yellowfin tuna in the Atlantic was discussed. It was decided that adequate size distribution data from the eastern and western Atlantic longline fishery would be useful in further assessing this topic. The question of how to treat a population (single or multiple stock), when in doubt of the stock structure, was discussed. It was decided that the relationship between estimates of production for a whole population and sums of independent estimates of production for its

separate stocks is not clear and needs further investigation. However, it is clear that one should always try to make estimates of population production invariant to the form of the underlying stock structure. Finally it was noted that, from the mammalian literature (e.g. Krebs), it appears that the genetic structure of certain stocks changes over a very short time with population abundance.

9.b. It was *recommended* that:

a) a paper be written on the present state of knowledge of the stock structure of each species of tuna being exploited in the Atlantic,

b) a study be performed on methods for estimating production in a multiple stock fishery.

Item 10. **Mixing of Species** — D. Garrod, discussion leader.

10.a. It was suggested that mixed species fisheries can create management problems (WTPD/74/24) because, in situations where one species is caught as the result of a fishery directed at another species, it may not be possible to attain the MSY for the directed species without going beyond the point of MSY for the by-catch species. It was shown that in a multiple species fishery, the magnitude of the overall MSY is dependent upon the magnitude of the by-catch between the species, and that the overall MSY is less than or equal to the sum of the individual MSY's, given that no biological interactions are present. The effects of regulation of effort and catch in a hypothetical mixed species fishery were discussed.

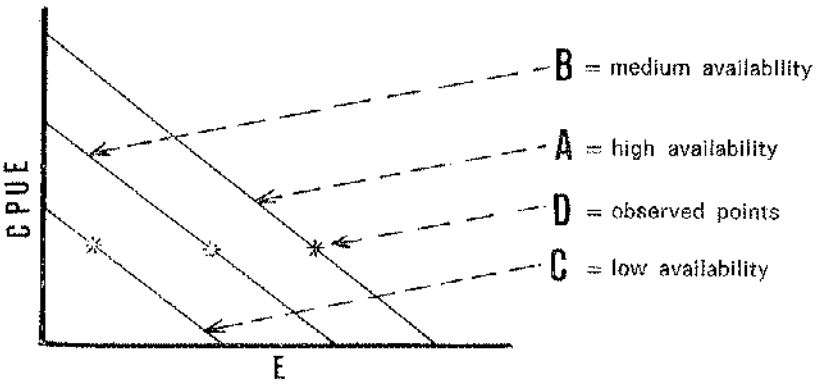
10.b. The problem of estimating relative yellowfin and skipjack abundance when the two species appear simultaneously in a surface fishery was discussed. It was mentioned that perhaps catch per hours searched would provide estimates of the abundance of one species that would be less affected by changes in the abundance of the other species than catch per days fished. It was further mentioned that since small yellowfin and skipjack are sometimes caught in the same school, perhaps there is a relationship between the availability of skipjack and the abundance of small post-recruit yellowfin. It was suggested that the appearance of a large year class of one species in the fishery may inhibit the recruitment of the other to the fishery.

10.c. The problem of assessment of skipjack population production in both the eastern Atlantic and eastern Pacific was discussed. It was decided that the absence of a statistically significant correlation between CPUE and E did not necessarily imply that there was not a biologically significant effect of fishing on relative stock abundance. Two important things occur in both skipjack fisheries:

a) the availability of the stock to the gear changes significantly from year to year due to migration behavior.

b) the proportion of the total surface fishery which is directed towards skipjack can vary greatly depending on the availability.

Thus, if there were three distinct relationships between CPUE and E dependent upon stock availability, as in the following graph, the fact that effort is directly correlated with availability could produce a statistically non-significant overall correlation between CPUE and E.



This example relates directly to the problem of the analyses of population production in the case when there is a different population production relationship occurring each year.

10.d. The problem of misclassifying one species into the catch of another species was discussed. It was pointed out that a significant amount of small bigeye tuna may be reported as yellowfin in the eastern Atlantic surface fishery.

10.e. It was *recommended* that:

a) the Secretariat should correspond with ICNAF in order to be able to provide more information to ICCAT scientists on mixed species problems,

b) serious studies should be undertaken on the relationship between abundance, CPUE and E in skipjack,

c) in order to facilitate the studies mentioned in *b*) for the eastern Atlantic, skipjack size distribution samples must be obtained from landings in Angola and Senegal,

d) the Secretariat should correspond with Dr. Bruce Collette (USA), Dr. S. Hayasi (Japan) and Dr. Izumi Nakamura (Japan) in order to be able to present a synopsis on the identification of small tuna which would be helpful in the implementation of an ICCAT sampling program.

Item 11. **Stock Recruitment Relationships** — A. Suda, discussion leader.

11.a. The relationship of recruitment to the form of the generalized stock production model was emphasized. Thus, even though recruitment has proven difficult to study in the past it is of paramount importance to the assessment and management of tuna stocks that we find ways of studying it as soon as possible.

11.b. A review of past studies of stock recruitment relationships for major tuna stocks was presented (WTPD/74/4). Generally speaking, the size of the parent stock does not appear to be a major factor in explaining the magnitude of recruitment of tunas over the observed ranges of exploitation rates. However, since parent stock size may be one, of several, important factors that are involved in determining the magnitude of recruitment, future studies should include this factor with the others being investigated.

11.c. It was mentioned that the use of fecundity indices does not seem to improve the relationship of parent stock size to apparent recruitment of tuna, largely because it involves multiplying the mature stock in weight by a factor that is approximately constant.

11.d. The necessity of getting reliable estimates of year-class strength as early as possible in the life history was emphasized. This is one of the drawbacks of utilizing existing cohort analysis techniques to estimate recruitment. The possibility of using CPUE on partially recruited younger year classes as an early index of recruitment (WTPD/74/16) was discussed.

11.e. The low variability in apparent recruitment for most tuna species was pointed out (WTPD/74/4). It was suggested that a systematic increase in recruitment variability may be an indication of the breakdown of equilibrium conditions.

11.f. It was *recommended* that:

a) simulation studies be performed to investigate the effect of increased recruitment variability on resultant fishery dynamics.

b) biological studies be performed on:

i) spawning habits and egg maturity rates
ii) larval ecology and behavior
iii) trophic relationships between adults and juveniles of the same species and between species.

c) such studies as are recommended in *b*) require a general priority framework be developed by SCRS and the cooperation of scientists from other fields.

d) an analysis of the existing data on bluefin tuna larvae in the Mediterranean would serve as a useful pilot study.

Item 12. **The Role of Population Dynamics in Management** — J. Gulland, discussion leader.

12.a. It was mentioned that an overriding constraint on scientists in giving advice on the harvesting of renewable resources is to ensure that any stock is always maintained greater that, or equal to some minimum level so as to ensure its preservation for utilization in the future.

12.b. Tuna stocks have historically been managed by two methods: limiting the size of fish taken by the fishery and the establishment of limits (quotas) on either catch or effort. It was noted that, with regard to quotas, the role of the scientist is not only to provide estimates of what those quotas should be. The scientist must also provide advice on alternative ways of obtaining quotas as well as their consequences. It is not the role of the scientist to recommend political action, rather to predict what will happen under various management alternatives. It was *recommended* that SCRS should initiate detailed studies of the likely effects on the stocks, and on the individual fisheries (particularly catch and catch per unit effort) of different possible management actions, including the effects of taking no action to control the amount of fishing.

12.c. It was noted that the management responsibilities of the Commission (and of other similar bodies) were towards the fishery as a whole, rather than in respect of one particular species or stock. The studies of the effect of different actions referred to in the previous section, which would probably be initiated with respect to the yellowfin fishery, should also take into account the likely effects on the Atlantic skipjack and its fishery, as well as other fisheries inside and outside the Atlantic. These additional studies should not however be used as an excuse for failing to take prompt action to manage yellowfin, if this action is shown to be needed.

12.d. The problem of regulations not being adhered to by certain participants in a fishery was discussed. For example, it was noted that the number of undersized yellowfin taken in the eastern Atlantic has greatly increased since the minimum size limit was adopted by the Commission. It was decided that the subject was both political and technological in nature. With respect to the technological problem, the SCRS needs to determine whether there are any components in the regulations which are infeasible to enforce and whether there are any solutions to them. Secondly, non-adherence to regulations may lead to poorer data being obtained from the fisheries, which in turn decreases the quality of advice given to the Commission.

12.e. The subject of the optimum structure of international commissions such as ICCAT was discussed in the context of providing the best scientific advice to facilitate management decisions. Several points were developed. First, the scienti-

fic integrity of the scientific committees needs to be ensured. Secondly, there needs to be ample input and participation from national scientists in the scientific work of the commissions. Third, commissions also need to have a scientific staff to maintain the data base and to provide continuity. Fourth, a staff or a co-opted group of experts could provide an independent view in the resolution of difficult problems. In addition, the publication of results and the dissemination of data were strongly emphasized as prerequisites for the maintenance of the quality of the scientific work of commissions.

12.f. In commissions such as ICCAT, it is the duty of the commissioners to be knowledgeable about the stocks, the conservation problem, and the activities of the scientists. In these duties, the commissioners will want to pose appropriate questions to the scientists. The scientists in turn will want to point out appropriate conservation principles to the commissioners and also to advise on the various technical aspects associated with the conservation and utilization of the stocks. In order for such an arrangement to work there must be considerable interaction between the scientists and the commissioners. Such interaction needs to be reflected in considerable dialogue between the two groups — a give and take of questioning and answering. Unfortunately, the structure of the ICCAT meetings is not conducive to such a give and take, the primary reason being that questions formulated by commissioners are posed only after the scientists meet. We *recommended* that this problem be addressed during the next Commission meeting.

13. The working group thanked the Institute for their hospitality and assistance and also noted the important contribution of the Secretariat toward facilitating the meeting.

14. The Chairman thanked the Rapporteurs for their diligence and hard work.

Chairman's Comments

It is evident that the primary function of the science of fishery management is to improve our capability for making better resource decisions. This capability depends to a large extent on the utility of population dynamics models. The utility of the existing models, however, is limited by inadequate fishery data. Furthermore, the development of new or materially improved models is made difficult because there is an inadequate formulation of concepts upon which these improved models can be based. Such concepts relate to causes of variability in recruitment; dealing with non-equilibrium stock conditions; the strategy for harvesting stocks, population, or sub-populations that consist of individuals with heterogeneous growth and mortality rates; the problem of allocating the catch among various fleets, countries, etc., and the economic valuation of various fishery strategies; and finally the relation of the environment to the abundance and behaviour of fish.

With respect to the adequacy of fishery data or fishery statistics, there are basically two problems. The first is technical and the second might be termed socio-political. The technical problem involves the question of whether the right kinds of statistics are being collected (this is particularly important for effort measurement) and if the right kinds of data are being collected, then what is the best methodology for assembling these data in an appropriate format for timely analysis. The socio-political problem stems from the realization that better fishery statistics will require a positive commitment of all parties in industry and government toward collecting better statistics. In many instances the scientists have done as much as possible toward the improvement of fishery statistics and now an added push is needed from the administrators and the industries.

With respect to concept formulation as a constraint to building better fishery models, it is interesting to place the problem in a historical context. In this regard, until the mid 1950's many fishery scientists were concerned with the biology of fish — studies concentrated on a wide variety of biological studies, ranging from, for example, fecundity estimates to food habits. Then in the mid 1950's as quantitative models became more prevalent, emphasis shifted from the biological studies to studies which would estimate those parameters of the quantitative models which were estimable. A symptom of this shift might have been a decrease in interest in the processes effecting recruitment because the question of recruitment «seemed» unimportant when placed in the context of a yield per recruit model and when the populations being actively studied did not evidence significant changes in recruitment. The development of these models was furthered in the early 1960's by the application of computer technology which basically allowed for better mathematical bookkeeping but did not facilitate the employment of new and more responsive concepts. The application of computer technology was evident in the discussions and in the advances in the generalization of production models, yield per recruit, and cohort models discussed at the workshops. But still, as indicated earlier, new concepts in the fields of recruitment, non-equilibrium behavior, multiple species harvesting, catch allocation, and environmental effects need to be developed for a furtherance of the utility of population dynamics theory to fishery decision processes.

The development of new concepts, however, will not simply derive from correlative studies. Indeed, these correlative studies, except from the point of view of an initial survey are likely to be wasteful. What is needed is a return to the literature to search out and formulate the problems, in a fishery context, of multiple species interaction, of the effect of trophic-dynamic processes on production; of the energetic and population dynamics of the larval-fish ecosystem; of the behavioral and dynamic response of fish to its multivariable environment; and of studies of the economics of allocation.

Thus, returning to our historical context, we must now move into an area of problem formulation which will provide us with insight to develop new models more responsive to contemporary fishery problems. Hopefully the move toward problem formulation can perhaps move ahead more efficiently using as a base the existing models. It must be emphasized, however, that the concept development and

the problem formulation will require considerable dialogue and direction. Otherwise the limited funding available to fishery research will be diffused among many biological endeavors making it impossible to focus a critical mass of energy on the right problems.

Brian J. Rothschild

A NOTE ON SESSION 2

(Sept. 10-14, 1974)

Subsequent to the meeting reported above, a second session of the Workshop was held under the chairmanship of B. J. Rothschild from September 10-14, 1974, also in Nantes, France. The names of the persons who attended Session 2 can be found in the List of Participants attached as Addendum I. The Agenda for the session appears as Addendum VII.

Several experience papers were presented and the outcome of discussions during the first session was reported by the various discussion leaders; there was a general consensus regarding the conclusions arrived at during Session 1.

Following are some of the most significant points:

1) The need for much more contact between scientists in ICCAT was emphasized. In this connection, meetings such as Session 2 were considered to be useful.

2) It was generally agreed that many administrators do not recognize the difficulties that scientists have to face in their work. Often a limited number of scientists have to handle various problems, including fishery statistics, and this can consume a great deal of their time. There was also discussion on the need to obtain statistics from non-members.

3) Ways of improving the quality of statistics was also discussed. An important point was made involving actually training people to do field work in terms of collecting basic statistics, measuring fish, and making other routine statistical records.

4) It was suggested that documentation be provided for various computer programs on compiling tuna statistics.

5) There was considerable concern on developing practical participation of all the countries involved in the fisheries and trying to determine ways in which this practical participation could be undertaken.

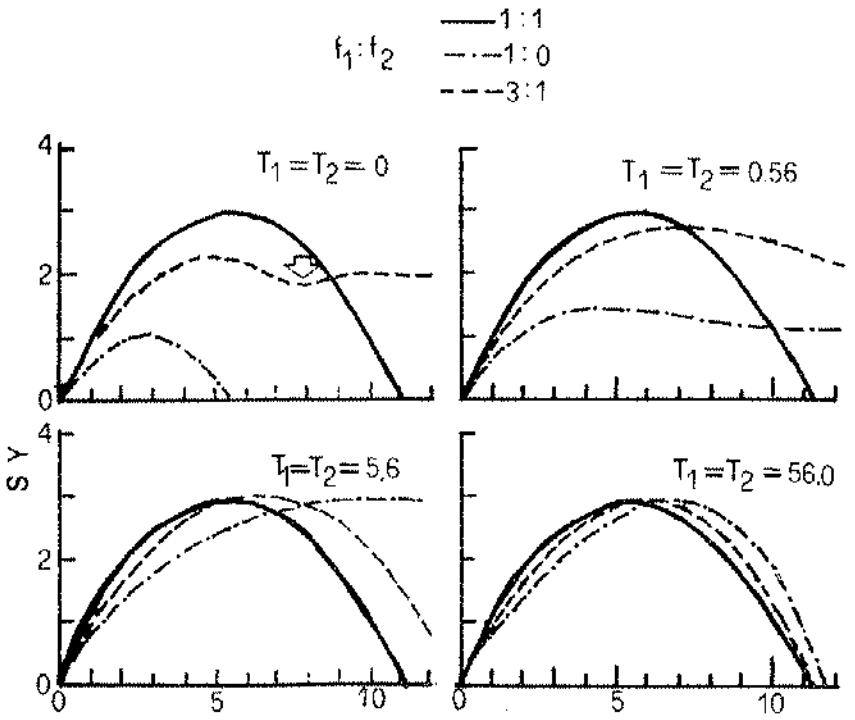


FIG. 1. Total equilibrium yield - total fishing effort curves for the production model with mixing of two species at four rates of mixing. (WTPD-Nantes/74/13).

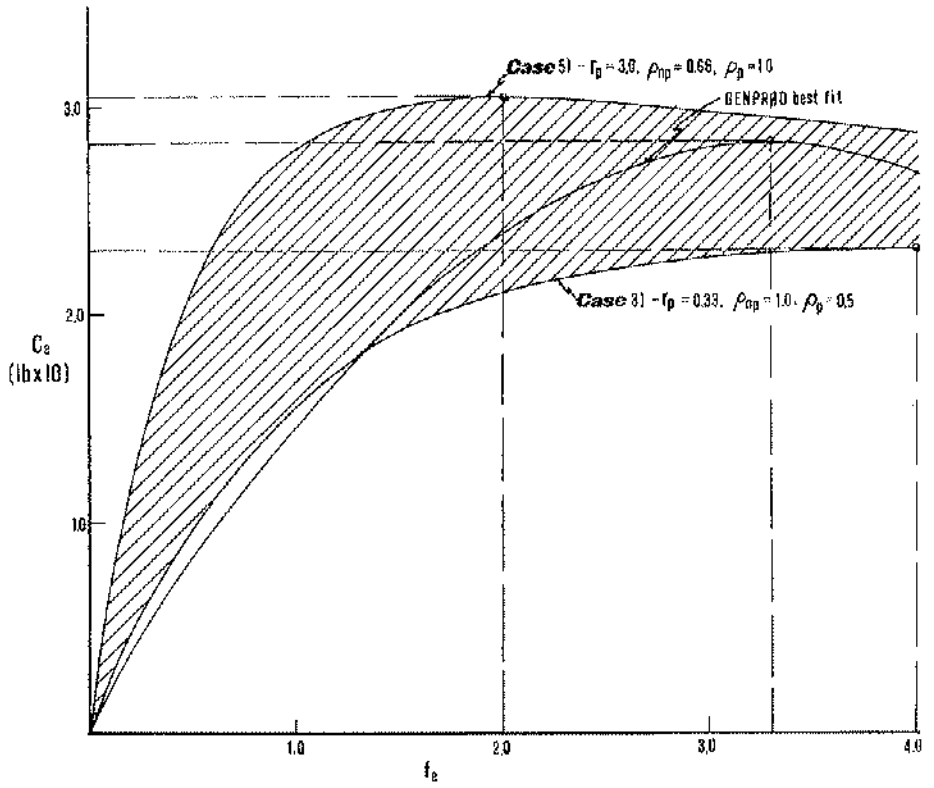


FIG. 2. Estimates of equilibrium catch against equilibrium effort for GENPRØD fit to 30 year simulation. (WTPD-Nantes/74/19).

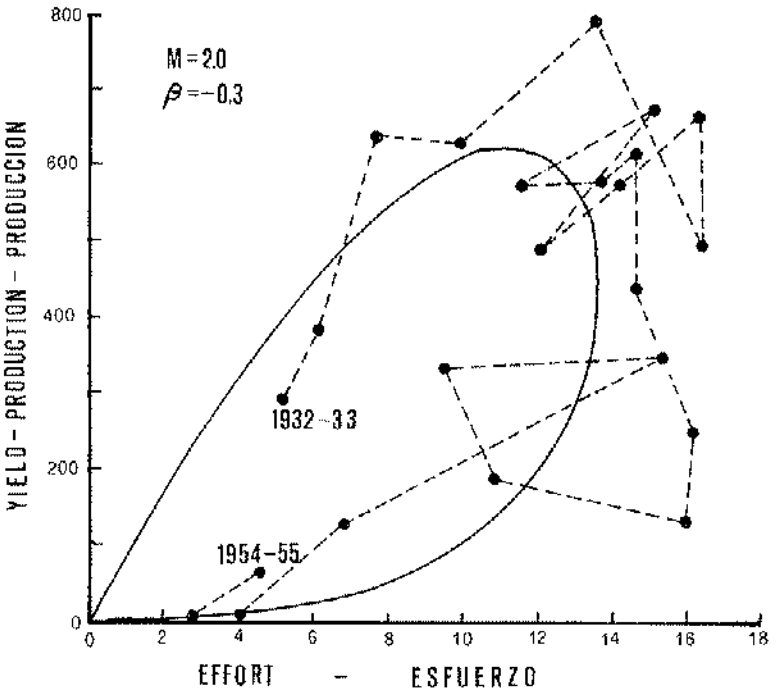


FIG. 3. Density-dependent catchability production model fit to the California sardine fishery for the 1932-33 through 1954-55 fishing seasons. (WTPD-Nantes 74/13).

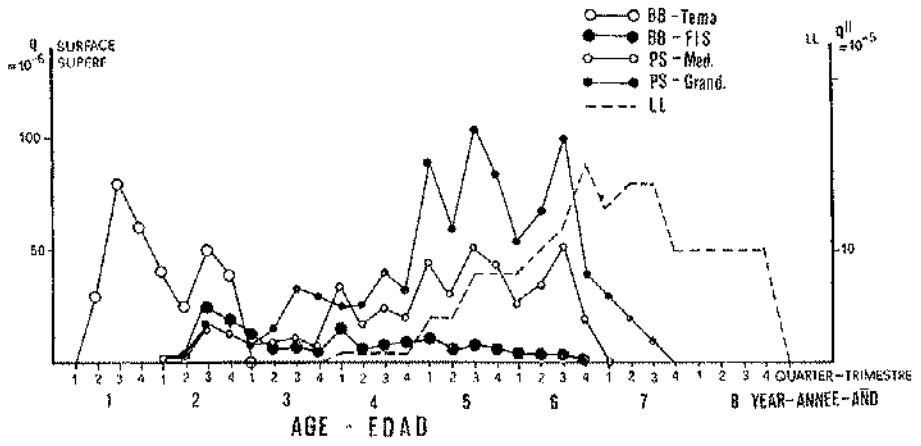


FIG. 4. «q» factors plotted against age of fish - for five different types of fleets. (WTPD-Nantes/74/6).

Addendum 1 to Appendix IV to Annex 9

Workshop on Tuna population dynamics

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2, etc., denotes sessions attended.

Addendum II to Appendix IV to Annex 9

Workshop on Tuna Population Dynamics

Agenda — 1st Session

Monday, September 2

Welcoming remarks on behalf of ISTPM and ICCAT.
Administrative details; purpose of Workshop; amendments to agenda.
Discussion of «sampling» (Fonteneau) and «effort, CPUE, as measures of abundance» (Francis).

Tuesday, September 3

Discussion of «production models» (Fox) and «yield per recruit» (Suda).

Wednesday, September 4

Discussion of «age-specific F including cohort analysis» (Le Guen) and «use of length as an estimate of age» (Laurec).

Thursday, September 5

Discussion of «stock and recruitment» (Suda) and «mixing of stocks» (Garrod).

Friday, September 6

«Mixed species» (Garrod) and «role of population dynamics in management» (Gulland).

Monday, September 9

Discussion of report and focus on necessary actions and recommendations.

Addendum III to Appendix IV to Annex 9

List of Documents

WTPD/74/1 *Catch per unit effort as measure of abundance* (La prise par unité d'effort comme moyen d'évaluer l'abondance) (Captura por unidad de esfuerzo como medida de abundancia). — J. A. Gulland

2 *Sampling, experience from fishery investigations in Japan* (Echantillonnage, expérience acquise par la recherche océanographique au Japon) (Muestreo, experiencias de la investigación pesquera en Japón). — S. Hayasi.

3 *Effort and CPUE as measure of abundance* (L'effort et le CPUE comme mesures de l'abondance) (Esfuerzo y captura por unidad de esfuerzo como medida de abundancia). — S. Hayasi.

4 *Stock recruitment relation in tuna populations.* — S. Hayasi.

5 *Some comments on the Y/R study.* — A. Suda.

6 *Modèle de simulation de la pêcherie d'albacores (Thunnus albacares) de l'Atlantique.* — A. Fonteneau.

7 *Fitting the generalized stock production model by least squares and equilibrium approximation.* — W. W. Fox.

8 *A note on the use of length frequency as an estimate of age.* — A. Suda.

9 *Utilisation d'un histogramme des longueurs pour l'estimation d'une structure démographique.* — A. Laurec.

10 *Working paper on southern bluefin tuna population dynamics.* — C. Lucas.

11 *ICCAT's statistical program and its problems.* — P. M. Miyake.

12 *Commentaires sur l'ordre du jour du Groupe de Travail de Nantes* (Annotations to agenda of the Nantes Working Group). — A. Fonteneau, J. C. Le Guen.

13 *An overview of production modeling.* — W. W. Fox.

14 *Effort et prise par unité d'effort dans la flottille thonière franco-ivoiro-sénégalaise.* — A. Fonteneau, P. Soisson.

WTPD/74/15 *Simulation des structures démographiques. Application aux populations d'albacores.* — A. Fonteneau.

16 *Évaluation des variations de récrutement dans la pêcherie d'albacores du Golfe de Guinée de 1969 à 1973.* — A. Caverivière, A. Fonteneau.

17 *A memorandum on mixed species problems.* — S. Hayasi.

18 *Effort and CPUE as measures of abundance.* — R. C. Francis.

19 *Effects of fishing modes on estimates of fishing power, relative abundance and surplus production in the eastern Pacific yellowfin tuna fishery.* — R. C. Francis.

20 *Issues in population dynamics of tunas — Draft working paper prepared for — ICCAT workshop on the population dynamics of tunas.* — B. J. Rothschild.

21 *A note on age specific F including cohort analysis.* — A. Suda.

22 *Sampling.* — R. C. Hennemuth.

23 Duplication of WTPD/74/13.

24 *Note on the mixed species problems.* — J. G. Pope.

25 *Note on cohort analysis and age-specific fishing mortality.* — J. G. Pope.

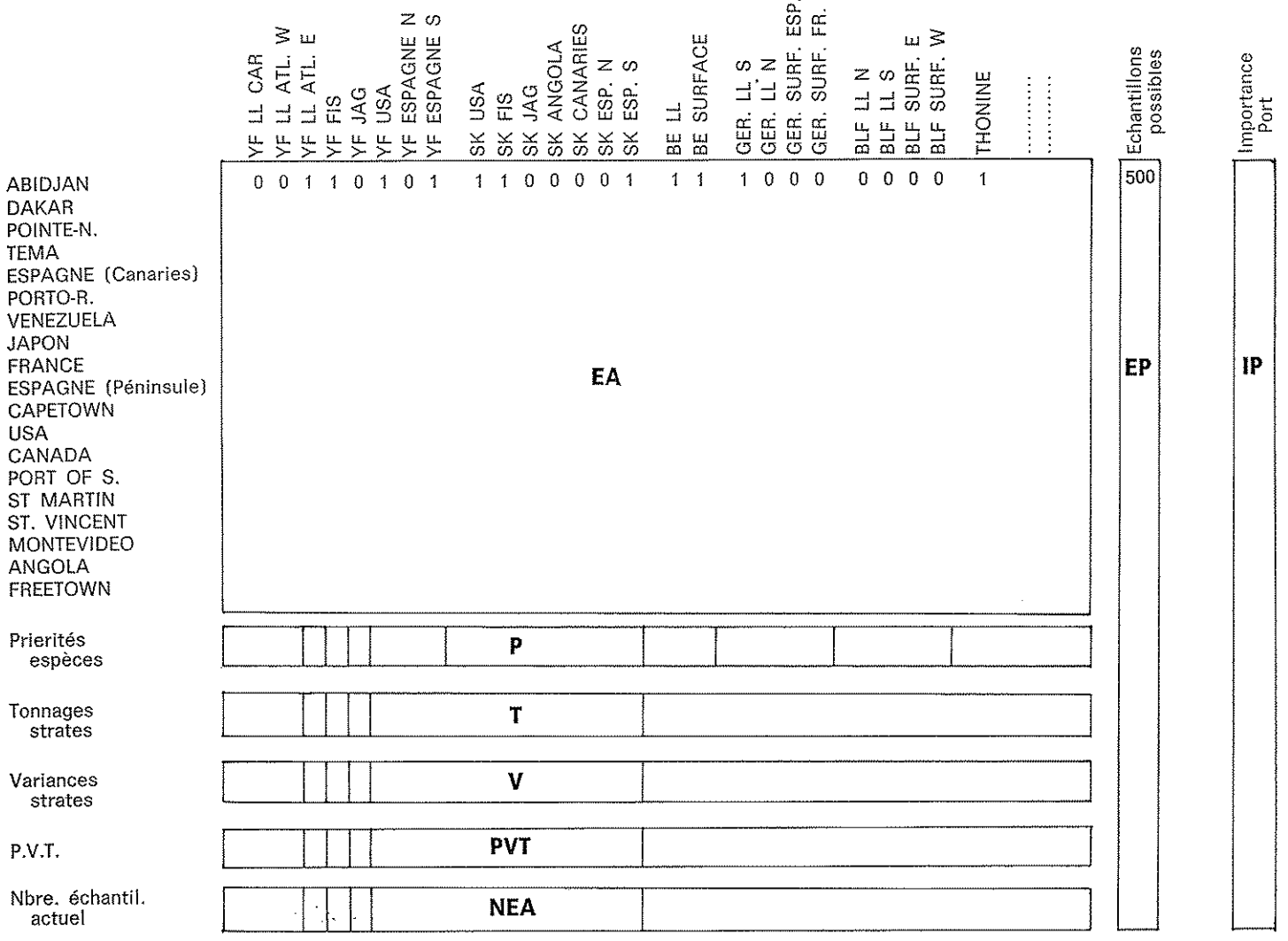
26 *Echantillonnage de l'albacore Atlantique.* — J. B. Amon, A. Fonteneau.

27 *Remarques sur les modèles de production et leur utilisation en dynamique des thonidés.* — A. Laurec.

28 *Note sur l'échantillonnage.* — A. Laurec.

29 *Application des méthodes d'analyse multivariable à l'étude d'une pêcherie plurispecifique: la pêcherie palangrière thonière en Atlantique.*

Matrix for determining Atlantic sampling priorities and deficiencies. — Provisional



Addendum V to Appendix IV to Annex 9

Meeting on fishery data

Outline of Major Topics

1. *Policy*

   Relevance of data to analysis and policy making.
   Results (losses) to be expected from wrong decision making in the absence of adequate and reliable data.
   Need for commitment by all participants to supply a defined minimal set of data.

2. *Data requirements*

   Users of fishery data — stock assessments, economics studies, etc.
   Types of data

   — Catch, with details of species/area/time
   — Fishing effort (fleet size, days fishing, etc.)
   — Composition of catch (size/age, etc.)
   — Other data.

   Details and precision required at each stage of fishery development.
   Standardization. Definitions of species groups, area divisions, etc.

3. *Collection of data*

   Practical problems of collecting data from different fisheries.

   — Industrial fisheries, including those processing fish at sea
   — Small scale fisheries and sport fisheries.

   Statistical aspects of collecting data by sampling methods.

4. *Processing and compilation of data*

   Use of ADP methods; comparison of hardware and interchange of software.
   Reporting of data in international/regional fisheries.

5. Alternatives to the present way of doing things. Alternative systems?

Addendum VI to Appendix IV to Annex 9

Recommended variables to be recorded for estimation of effort:

A. For all fleets for each trip:

No. days absent
No. days fished.

B. For each day at sea:

Baitboats and trollers

No. lines/poles fished
Time baiting
Time searching
Time chumming
Time fishing
Time down (unable to fish even if fish sighted)
No. schools sighted
No. schools fished
No. schools fished successfully.

Purse Seine

No. schools sighted
Time searching — hours
Time setting — hours
No. sets
No. successful sets
Time down (unable to fish even if fish sighted)
Number and type of boats cooperating.

Longline

No. of hooks per basket
No. hooks per sets
Type of bait
Night or day sets.

Addendum VII to Appendix IV to Annex 9

Workshop on Tuna Population Dynamics

Agenda — 2nd Session

Opening Address

Prof. Claude Maurin,
Dr. O. Rodríguez Martín.

Experience Papers

1. Overview of Workshop, and Comments on Economic and Social Aspects of Fishery Management Development (B. J. Rothschild).
2. ICNAF Experience (R. Hennemuth).
3. Fishery Management and Population Dynamics (J. A. Gulland).
4. ICCAT Sampling Program (P. M. Miyake).
5. Sampling and Statistics (A. Fonteneau).
6. Description of Atlantic Surface Fisheries (A. Fonteneau).
7. Description of Longline Fisheries (A. Suda).
8. Indian Ocean Fisheries (A. Suda).
9. Southern Bluefin Tuna Paper (C. Lucas).
10. Anchovetta Management (L. Boerema).

Reports from Discussion Leaders on Meeting Report

1. Production models (W. Fox).
2. Fishing effort (R. Francis).
3. Age dependent models, mixed species problems and recruitment (A. Laurec).
4. Fishery management (L. Boerema).
5. Sampling and Statistics (A. Fonteneau).

(Note: discussion leaders will provide a general introduction to subject; discuss meeting results and lead discussion with participants.)

Roundtable and Workshop Discussion on Tuna Experience in various Countries.
(Participants should contribute status of tuna work in their country.)

CHAPTER III

NATIONAL REPORTS

RECENT DATA ON THE INVESTIGATION AND FISHERY OF TUNAS AND TUNA-LIKE SPECIES IN BRAZIL

by

M. P. PAIVA

Investigations on the fishery of tunas and tuna-like species in Brazil have shown little advancement as a consequence of the low level of national tuna exploitation.

In order to determine the catch potential of tunas and tuna-like species (Table 1) in the longline fishery areas off the coast of Brazil (Figure 1), an analysis was made of Japanese catch data for the years 1956-1971.

After making the necessary calculations, values were obtained of the total longline fishing effort and the weight of the catches. The next steps were to ascertain the annual averages of the estimated catches of tuna and tuna-like fishes in the areas off the coast of Brazil, together with the percentage breakdown by species (Table II).

The relations between catch per unit of fishing effort and fishing effort were calculated for the major tuna species in the longline fishery areas off the coast of Brazil (Table III). Considering the values of the Pearson correlation coefficient of the above mentioned relations, the relations between catch and fishing effort were calculated for the yellowfin tuna only, in the longline fishery areas Brazil I and II (Table IV).

Finally, the potential annual catches of tunas and tuna-like fishes were estimated for the longline fishery areas off the coast of Brazil (Table V).

The data now presented belong to a study being prepared by the author of this report, together with Dr. Jean Yves Le Gall, which has not yet been concluded.

Biological samplings of tunas and tuna-like fishes are being made in the port of Santos (State of São Paulo) on industrial landings. The data are being studied

Original report in English

by the biologist Luiz Alberto Zavala Camin, of the Fisheries Institute of the State of São Paulo (Instituto de Pesca do Estado de São Paulo).

The following weight/length relations were calculated for the fishes landed at the port of Santos (taken from Zavala's paper):

Yellowfin tuna	$W = 1{,}109 \times 10^{-7}\ L^{3.05}$
Albacore	$W = 484 \times 10^{-7}\ L^{2.79}$
Bigeye tuna	$W = 2{,}353 \times 10^{-8}\ L^{2.94}$

The tuna fleet based at the port of Santos comprises 3 longliners, which applied a fishing effort of 457,655 hooks in 1973. Landings by these boats in the said year reached a total of 523.6 tons, with a predominance of yellowfin tuna in the catches (Table VI).

Table I. Codes and names of tunas and tuna-like fishes caught in the longline fishery areas off the coast of Brazil

codes	*ICCAT names*
BFT	Bluefin tuna
	Southern bluefin tuna
YFT	Yellowfin tuna
ALB	Albacore
BET	Bigeye tuna
SJK	Skipjack
ASF	Atlantic sailfish
BKM	Black marlin
ABM	Atlantic blue marlin
AWM	Atlantic white marlin
BSF	Broadbill swordfish

ICCAT = International Commission for the Conservation of Atlantic Tunas.

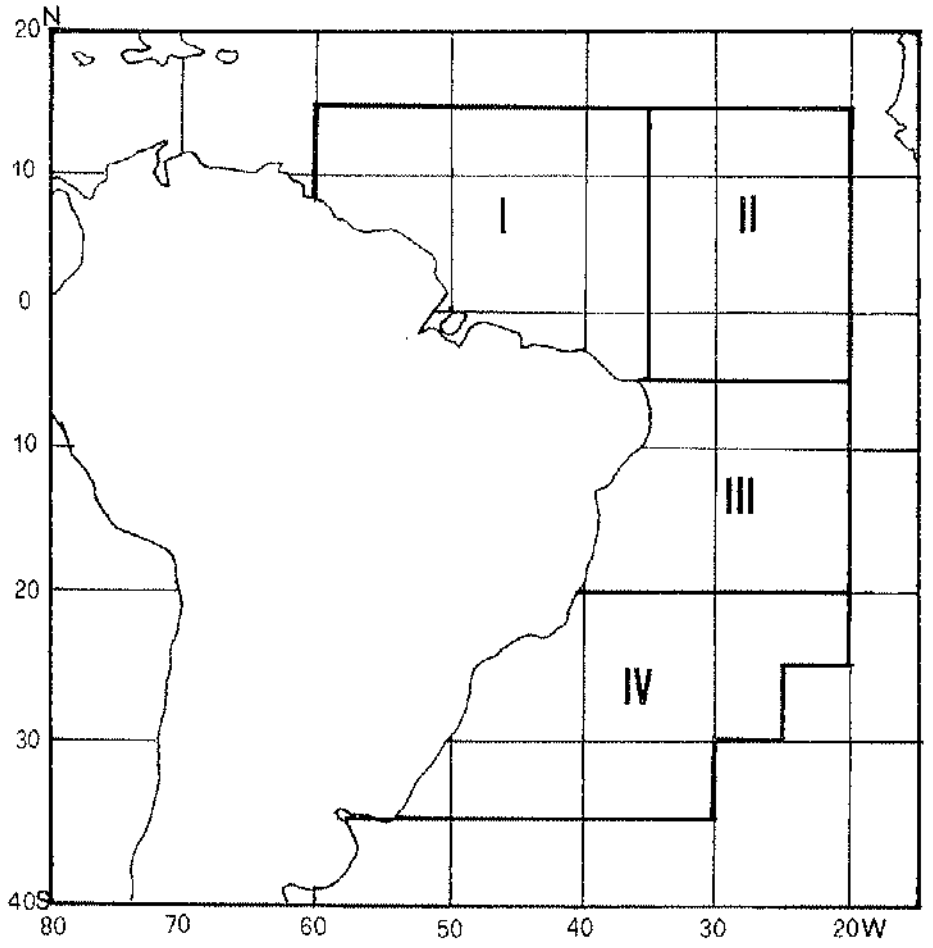


FIG. 1. Longline fishery areas off the coast of Brazil.

Table II. Annual means of the estimated catches of tuna and tuna-like fishes in the areas off the coast of Brazil, with percentage breakdown by species

Species and catches	*Areas/Annual means (1956-1971)*			
	Brazil I	*Brazil II*	*Brazil III*	*Brazil IV*
BFT	1.3	2.1	10.5	0.7
YFT	56.0	54.1	10.3	3.7
ALB	12.6	6.5	49.8	50.5
BET	18.2	26.5	5.5	13.2
SJK	0.0	0.0	0.0	0.4
ASF	2.4	1.2	4.9	4.3
BKM	0.1	1.0	0.1	0.0
ABM	4.9	4.3	11.7	3.2
AWN	3.5	1.8	6.0	9.8
BSF	1.0	2.5	1.2	14.2
Total	100.0	100.0	100.0	100.0
Catches in tons	9,481	13,283	6,411	5,334

Table III. Relations between catch per unit of fishing effort (C/E) and fishing effort (E), with the respective Pearson correlation coefficient (r), for major tuna species in the longline fishery areas off the coast of Brazil, based on data from 1956 to 1971

Brazil areas	*Main species*	*Relations*	*r values*
I	YFT	$C/E = 4.662 - 22 \times 10^{-6} E$	—0.558*
II	YFT	$C/E = 4.256 - 15 \times 10^{-6} E$	—0.576*
III	ALB	$C/E = 4.043 - 12 \times 10^{-6} E$	—0.165 n.s.
IV	ALB	$C/E = 3.244 - 58 \times 10^{-7} E$	—0.288 n.s.

C = annual catch in number of fish.
E = annual longline fishing effort (100 hooks).
* = significant at the level $\alpha = 0.005$.
n.s. = not significant at the level $\alpha = 0.005$.

Table IV. Relations between catch (C) and fishing effort (E), with the maximum annual values of catch and fishing effort for the yellowfin tuna (YFT) in the longline fishery areas Brazil I and II, based on data from 1956 to 1971

Brazil areas	*Relations*	*Maximum annual catch*		*Maximum effort (100 hooks)*
		fishes	*tons*[1]	
I	$C = (4.662 - 22 \times 10^{-6} E)\ E$	251,434	10,309	107,875
II	$C = (4.256 - 15 \times 10^{-6} E)\ E$	312,236	14,051	146,720

C = annual catch in numbers of fish.

E = annual longline fishing effort (100 hooks).

(1) Product between the maximum annual catch in fishes and the annual mean weight of the species (area I = 41 kg and area II = 45 kg).

Table V. Potential annual catches of tunas and tuna-like fishes, in the longline fishery areas off the coast of Brazil

Species	*Catches in tons*				
	Brazil I[1]	*Brazil II*[1]	*Brazil III*[2]	*Brazil IV*[2]	*Total*
BFT	239	545	675	38	1,497
YFT	10,309	14,051	661	198	25,219
ALB	2,320	1,688	3,194	2,691	9,893
BET	3,351	6,883	349	706	11,289
SJK	0	0	3	22	25
ASF	442	312	317	231	1,302
BKM	18	260	6	0	284
ABM	902	1,117	747	177	2,943
AWM	644	467	385	516	2,012
BSF	184	649	74	755	1,662
Total	18,409	25,972	6,411	5,334	56,126

(1) Calculations based on the maximum annual catch of YFT and the percent composition of the catches.

(2) Mean composition of the annual catches.

Table VI. Landings of tunas and tuna-like fishes at the port of Santos (State of São Paulo) during the year 1973. Catches made by longliners operating in the area Brazil IV

Species	*Catches in tons*
YFT	125.1
ALB	78.0
BET	58.6
BKT[1]	1.7
ASF	30.7
ABM	6.6
AWM	8.7
BSF	114.0
Others	100.2
Total	523.6

Source: Fisheries Institute of the State of São Paulo (Instituto de Pesca do Estado de São Paulo).

BKT = blackfin tuna.

CANADIAN RESEARCH REPORT 1973-1974

by

J. F. CADDY and J. S. BECKETT

The major part of recent Canadian research efforts on tuna and related species has been concentrated on improving statistical reporting and in achieving adequate sampling of the various catches. The increased demand and price for «giant» bluefin has resulted in marked increases in the effort for this species, the introduction of preliminary domestic regulations to control the catch and, incidentally, a major reduction in ongoing tagging programmes.

A. Status of the fisheries

1. *Swordfish*

Only small quantities of swordfish of the order of 10 metric tons annually are landed in Canada, owing to a maximum permitted level of 0.5 ppm mercury and the relatively high mercury content of the flesh.

2. *Tunas*

Landings of all species in 1973, at 2300 metric tons, were quadruple those of the previous year. This was due, in part, to renewed participation by purse seiners in the east Atlantic fisheries (1250 M.T. skipjack and yellowfin), and, in part, to a doubling of the bluefin catch in the west Atlantic. The higher bluefin catches (1000 M.T.) resulted from increases in landings from both the purse-seine fishery for juveniles off the U.S. coast (635 M.T.) and from the various fisheries for large fish along the Canadian coast (370 M.T.). The catches in the sport fisheries actually declined slightly, but since virtually all fish were sold the actual landings increased. The total sports landings (230 M.T.) conceal a major shift in the catches, with those off eastern Newfoundland declining drastically and those off Prince Edward Island increasing by 37 %, due in part to a doubling of effort there.

Original report in English.

Preliminary figures for 1974 indicate that the total landings will be considerably reduced since no vessels fished in the eastern Atlantic and the Canadian catch of juvenile bluefin, off the U. S. coast, was only about 100 M.T. The catch of large bluefin will be considerably higher, around 650 M.T. by all gears combined, despite domestic restrictions on the sports fisheries to limit the catches.

B. Special research studies

1. *Swordfish*

Current studies are confined to studies of accumulated data, with particular reference to the resolution of size frequency components in order to estimate growth and mortality parameters. Studies have also shown that mercury can be removed from swordfish fish meal.

2. *Tunas*

Increased emphasis on the size sampling of bluefin resulted in 2199 juveniles being measured in 1973, and in 800 adults being weighed. The samples indicate that the purse-seine fishery took mainly two year old fish (58 % by count) with three year olds the next largest component (23 %) and only small numbers of one and four year olds. The fisheries in Canadian coastal waters took adult fish exclusively (140-510 kg), although the average size varied somewhat with area and method. Sports caught fish off Prince Edward Island averaged 344 kg while fish taken by the same method off Newfoundland averaged 240 kg, a size similar to that of fish taken in Nova Scotia trap nets (243 kg).

The tagging programme based on the trap fisheries for large bluefin in Saint Margaret's Bay, Nova Scotia, was discontinued in 1973 due to the high price resulting from an increased demand for the fish, although nine fish were released in 1974. The recovery in 1974 of a fish released in 1969 off Prince Edward Island brings to fourteen the number recaptured of the 412 released from 1963 to 1972. The results suggest that bluefin throughout the coastal northwest Atlantic change area, rather than return each year to the same locality.

Despite the growing demand for large bluefin, sixty-eight were tagged and released by anglers in 1973-74 (53 in 1974), eighteen of these off eastern Newfoundland and the remainder, including forty-seven tagged by one individual, in the Gulf of St. Lawrence.

Analysis by tag type of the recoveries (21) from 156 juvenile bluefin double tagged in 1973 shows similar results to those reported last year from 268 fish tagged in 1971.

A preliminary attempt was made in 1974 to use acoustic telemetering devices to determine the survival of large bluefin released after capture on rod and reel. Three fish were tagged, and despite their apparently exhausted condition, they moved off at speed on release, soon outdistancing the tracking boat, although one fish was followed for some three hours.

RESEARCH REPORT FOR 1973 — FRANCE

by

R. LETACONNOUX

Status of fishing in France

In 1973, more than 54,000 tons of tuna were caught by French fishermen based in France and in African coastal ports.

	1967	*1968*	*1969*	*1970*	*1971*	*1972*	*1973*
Albacore	16.6	14.3	10.0	6.6	9.8	9.8	6.0
Yellowfin	23.8	32.5	28.9	26.0	25.9	35.6	32.3
Skipjack	5.5	13.0	8.5	14.0	19.5	20.5	12.7
Bigeye	—	—	1.6	1.2	0.5	0.3	2.5
Bluefin (Atl.)	1.0	0.6	0.6	0.8	0.8	0.9	0.5
(Atl. + Med.)	2.2	1.9	1.8	1.7	2.6	1.9	1.0
Thousand tons	48.1	61.7	50.8	49.5	58.3	68.1	54.5

On the French Atlantic coast, 319 vessels — 282 trollers and 37 baitboats — were equipped for albacore fishing, against 292 in 1972. The tonnage unloaded amounted to 6,097 tons, representing a decrease of around 2,000 tons compared with 1972 (8,154 tons).

French fishery of albacore in the N.E. Atlantic

Years	*1967*	*1968*	*1969*	*1970*	*1971*	*1972*	*1973*
No. of trollers	328	380	313	212	254	250	282
Tons landed (1,000 t)	12.4	11.9	8.2	4.6	8.2	7.0	5.0
No. of baitboats	86	80	33	54	57	42	37
Tons landed (1,000 t)	4.2	2.4	1.8	2.0	1.6	1.1	1.0
Total tons	16.6	14.3	10.0	6.6	9.8	8.8	6.0
Total no. of vessels	414	460	346	266	311	292	319

Original report in French.

The increase in the number of vessels equipped for albacore fishing (9.2 %) was due to hopes being raised by the large catches taken at the start of the 1972 season in the vicinity of the Azores.

Again this year, catches taken in this sector and landed up to July 31 corresponded to 57.5 % of the overall tonnage landed during the fishing season. The gradual disappearance of baitboats continued this year (−12 %).

Albacore fishery in the N.E. Atlantic in 1973 — monthly catches

Month	*Catch**	*No. of trips*	*Monthly yield*
June	249	23	10.82
July	3,184	427	7.45
August	1,260	279	4.51
September	935	125	7.48
October	469	99	4.73
Total	6,097	953	6.4 (average)
1972 figures	8,140	834	8.71

* In tons.

Yield per unit

Vessels	*Catch*	*Yield/unit*	*1972 figures*
Trollers 282	5,076 t.	18 t.	28 t.
Baitboats 37	995 t.	26.9 t.	16.4 t.

The average catch per trip was 6.30 t., showing a decrease compared with 1972 (8.7 t) and 1971 (7.2 t).

Research

1. *Research carried out by ISTPM*

Four cruises and a series of aerial surveys were dedicated to research and to the study of albacore fisheries in the N.E. Atlantic.

From May 14 - May 20, the Merchant Marine training ship «La Perle» surveyed the sector between the Bay of Biscay and the Azores. From June 2 to July 23, «La Pelagia» took over from «La Perle» in the vicinity of the Azores.

From August 6 to 24, «La Perle» started its work again in the open sea and in the Bay of Biscay. «La Pelagia» concluded her mission September 3-19 by also surveying the Bay of Biscay sector and the open sea off the Bay area.

Between June 1 and June 16, 8 exploratory flights were made around the islands of the Azores by the plane «Britain Norman» belonging to the company Inter Thon, equipped for the purpose with a Barnes infra-red radiometer.

During the course of these missions, observeations were carried out on the behavior, biology and ecology of albacore. During the various cruises, 680 albacore, 16 bigeye and 14 skipjack were tagged.

From January 1 to December 31, 1973, 21 tags were recovered, as follows:

Bluefin:

3 fish tagged in 1972 off the coast of Morocco. — Tagging cruise by the Moroccan Institut des Pêches.

Albacore:

1	fish	tagged	in	1969
1	»	»	»	1970
7	»	»	»	1971
6	»	»	»	1972
3	»	»	»	1973.

These tag recoveries have confirmed the separation of the migratory routes between the sector of the Azores and the area close to Europe.

Research program for 1974

A research program is planned for the region of the Azores. Emphasis will be on tagging operations and the study of albacore behavior in relation to the fishing material employed.

2. *Work completed by the «Centre Océanologique de Bretagne» in 1973*

Albacore (Thunnus alalunga)

a) The French fishery has been studied as in previous years from the 15th of June to the 30th of September by a small team of scientists and experts who worked on board the patrol vessel (15 June - 12 July; 16 July - 13 August; 16 August - 12 September; 15-30 September).

5,050 albacore specimens have been measured in the course of more than 200 surveys effected at sea on board the tuna boats, taking advantage of the auxiliary operations.

b) The patrol vessel has served as a base for receiving daily sea surface charts which were then given out to active boats. This method has proved very effective to locate the main fishing areas.

c) A troller has been put into service during two months for the purpose of doing particular studies on the trophic environment of albacore and trying to mechanize fishing operation.

Bluefin (Thunnus thynnus thynnus)

Regular samplings have been made from June 1st to the end of October of the two Basque ports fishing this species. 2,400 fish have been measured on this landing.

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REPORT FROM THE IVORY COAST ON TUNA FISHERIES AND RESEARCH, 1973-1974

Tuna fishing and research on tunas were expanded in the Ivory Coast in 1973-1974.

1. Fishing

The tuna fleet of the Ivory Coast, which started fishing in 1970, has been expanding in a regular way. It presently comprises 2 medium-size seiners of 200 t capacity and 2 large seiners of 400 t. A fifth vessel is in process of completion. Catches in 1973 were 3,500 t (2,500 t of yellowfin and 1,000 t of skipjack) and a total catch of 5,000 t is forecast for 1974.

The totality of this catch is canned locally. The capacity of cold storages intended fundamentally for transshipments of tunas increased to 50,000 m^3 in 1974. Abidjan, as in previous years, has been an important port for the transshipment of tunas. It has also been frequented by surface fishery fleets (France, Senegal, Spain, USA, Cuba, Morocco) as well as longline fleets (China, Korea, Panama), (Table 1).

A document (SCRS/74/10) summarizes such transshipments over the last 10 years. The most important species is yellowfin, a quarter of the catches in the Atlantic having been landed in Abidjan in 1973.

2. Research

The studies on biology, fishery statistics and tuna population dynamics carried out at the CRO on surface fisheries have been continued. A new program concerned with longline fishing was started in 1973.

Surface fishery statistics

The CRO in Abidjan undertakes the collection of logbooks and measurements on board vessels of the FIS tuna fleet which unload in Abidjan. Table 2 shows the samples made in 1973.

Original report in French.

Moreover, all data relative to the FIS fleet are centralized, recorded on perforated cards, processed by computer and published at Abidjan.

The statistics are published in the following way:

— Task 1: total catch and effort
— Task 2: catch, effort and yield by month, by 1° × 1° square, by gear
— Size distribution for yellowfin, by gear, quarter and sector.

Longline fishery statistics

A full program of statistics and measurements for longline landings at Abidjan was started in 1973. The first results of this program are described in detail in SCRS document 74/43. The 1974 production, by biweekly fishing and by 5° × 5° square, will be published at the start of 1975.

Population dynamics

Three scientists from the Abidjan Centre de Recherches took part in the meetings of the Nantes working group (September 1974). They presented six papers on tuna population dynamics (documents 6, 12, 14, 15, 16 and 26).

Biology

A program concerning the sexual maturity of tunas in the Atlantic has been under way since 1974 thanks to the cooperation of the cannery at Abidjan.

Several survey cruises on tuna larvae have been carried out in the sector between the Anno Bon and Sao Tome islands, and Ghana, in connection with this program.

Ecology and infra-red radiometry

A program on tuna ecology, and especially on the reasons which explain the concentration of tuna in frontal areas, has been developed since 1971. The activities are carried out by an oceanographic ship, the «Capricorne», and by an airplane equipped with an infra-red radiometer which registers the surface temperatures.

3. Future projects

Activity in the fields of statistics and dynamics will be continued in 1975. Special attention will be given to biological problems. Measurements, particularly those from longliners, will be expanded. An overall sampling plan for Atlantic tunas was proposed by the CRO scientists at the Nantes meeting (annex 4 of the report). SCRS document 74/41 analyzes this project, which should aim at improving the quality of samplings in the Atlantic.

Table 1. Transshipments and landings at Abidjan in 1973 (in metric tons)

		YF	*SJ*	*BE*	*AL*	*Others*	*Total*
Surface	France	9694	2058	4	64	0	11820
	Senegal	2546	462	0	74	0	3082
	Ivory Coast	1675	426	23	0	0	2124
	Spain	696	923	0	0	0	1619
	U.S.A.	36	1209	0	0	0	1245
	Japan	436	513	3	2	59	1013
	Morocco	90	60	0	0	0	150
	Norway	365	0	0	0	0	365
Long-line	Korea	2340	40	1221	1043	802	5446
	Panama	1573	9	1020	814	654	4070
	Taiwan	312	5	319	2138	465	3239
	TOTAL	19763	5705	2590	4135	1980	34173

Table 2. Measurements carried out at Abidjan in 1973 (The number of fish measured is followed in parentheses by the number of samples)

	YF	*SJ*	*BE*	*ALB*	*Total*
Baitboats	664(12)	0	0	0	664(12)
Purse Seiners	5353(74)	1917(19)	0	0	7270(93)
Longliners	1380(16)	0	642(8)	788(12)	2810(36)
TOTAL	7397(102)	1917(19)	642(8)	788(12)	10744(141)

JAPANESE FISHERIES AND RESEARCH ACTIVITIES ON TUNAS AND TUNA-LIKE FISHES IN THE ATLANTIC OCEAN, 1972-1974

by

S. KUME

1. Fishing activities

The Japanese catch of tunas and tuna-like fishes in the Atlantic Ocean experienced its best year — 127,000 tons — in 1965, and then rapidly decreased to less than half in 1967. Since that year, the catch has almost leveled off at between 50 and 80 thousand tons (Fig. 1). The average catch over the past 5 years amounts to about 64,000 tons. There is a recent trend for the purse seine catch to decrease but, on the contrary, the pole-and-line catch has been on the increase. The total yield in 1974 is expected to almost reach the recent level.

1.1. *Longline fishery*

Among the Japanese tuna fisheries in the Atlantic, longline is still the most prevailing gear, although the longline share in the catch was down to about a little over half of the total national catch in 1973. In the longline operation, the remarkable growth in the homeland-based boats has been replacing foreign-based boats and deckloaded motherboats. This situation is reflected in the catch (Table 1) and in the number of boats (Table 2). The number of homeland-based boats in Table 2 is overestimated in the sense that many boats fishing for southern bluefin tuna in the area off southern Africa move frequently from the Atlantic to the Indian Ocean and vice-versa. Over the last few years, most of the Japanese longline effort has been directed explicitly on fishing grounds of bigeye and bluefin. This is reflected by the increasing proportion that the combined catch of these species has of the total longline catch — 65 % in 1972 and 77 % in 1973 — especially in the case of bigeye, which comprised more than half of the total Japanese longline catch in 1973. On the other hand, the decreasing trend in the catch of yellowfin tuna

Original report in English.

and albacore has become more marked. The combined catch of both species comprised only 17 % of the total in 1973 (Table 3).

In 1974, such a species preference of the longline fleet as mentioned above is more prevailing. The recent operation for bluefin tuna in the Mediterranean Sea is attracting a lot of attention.

1.2. *Pole-and-line fishing*

The Japanese pole-and-line fishery has operated in the Gulf of Guinea for more than ten years since 1962. The number of boats and the amount of catch stayed at a fairly constant level up to and including 1971, being followed by an increase in catch and number of boats in the following year. In 1973, a further increase in the number of boats, to a total of 22, produced 23,000 tons of tunas, 36 % of the total Japanese tuna catch in the Atlantic (Tables 1 and 2). Most of the catch consisted of yellowfin tuna and skipjack, the latter always being predominant (Table 4).

Up until now, fishing activities this year (1974) appear to be at almost the same level as last year. The new pole-and-line fishing started off Venezuela for the first time in late 1973 was continued in 1974 on a small scale.

1.3. *Purse seine fishery*

This fishery was initiated in 1964 and has been conducting its operation in the Gulf of Guinea. Its peak year was in 1968, when 15,800 tons were caught, and it then went on a downward trend. In 1973, 5 units of seiners were reported, though 3 units of double-boat seiners operated only in January, and the catch was 3,348 tons — 5 % of the total Japanese tuna catch. In earlier years, the major part of the catch of this fleet had been composed of yellowfin tuna, with less skipjack, while recently the amount of both species has been nearly the same (Table 5).

In 1974, to date, two single-boat purse seiners are operating in the eastern Atlantic.

2. Research activities

2.1. *Catch statistics*

The Statistics and Information Department of the Ministry of Agriculture and Forestry provides the official catch and effort statistics of the longline and pole-and-line fleets. The Fisheries Agency compiles similar data from purse seiners in the Gulf of Guinea. Final versions of the statistics for 1971 and onward have been compiled *by year of catch* but not *by year of landing*, and therefore meet completely the requirement of Task 1 defined at the first SCRS meeting.

The Fisheries Agency and its research laboratories have continuously collected

detailed catch records from major fisheries. These data are adequate enough to prepare Task 2 statistics. However, the processing system for the Atlantic pole-and-line fishery is not yet working well.

2.1.1. *General statistics*

In March 1974, the Statistics and Information Department published the national fisheries statistical yearbook for 1972, which included data on catch and effort (in number of cruises, operations and days at sea) by type of fishery, species and base port. Also compiled by the Department are provisional 1973 catch statistics from the pole-and-line and longline fisheries.

The Fisheries Agency and the Far Seas Fisheries Research Laboratory (FSFRL) obtained final catch and effort statistics for the Japanese purse seine fishery in the Atlantic Ocean up to 1973 (Honma and Suzuki ms a).

2.1.2. *Detailed statistics*

The annual report on 1972 longline catch and effort statistics by area was published in May 1974 (Fisheries Agency 1974). The succeeding data are now being processed, and the 1973 annual report will appear early in 1975.

Logbooks were also collected from the pole-and-line fishery. However, the data from the Atlantic Ocean have not been compiled yet.

Purse seiners also submitted their logbooks to the Fisheries Agency. Honma and Suzuki (ms a) processed the Atlantic data in 1973, as a data series of purse seine catch and effort tabulations.

2.2. *Length statistics*

In 1973, length composition data were compiled for tunas and billfishes taken in 1972 and reported to the FSFRL by the end of August 1973.

The resultant length composition statistics from the Atlantic Ocean are tabulated in separate papers (Shingu and Hisada ms and Honma and Suzuki ms b). The measurements obtained in 1973 and reported by August 1974 will be processed by early 1975.

Since May 1972, an onboard-survey program has been started to measure the body length of yellowfin tuna, albacore and bigeye tuna taken by longline in the Atlantic. In fiscal year 1972, starting in April, and in fiscal year 1973, we obtained length data from 8 vessels and 4 vessels for the respective years. The additional data from this source have provided better length statistics for 1972, though these are not satisfactory yet. This program is highly essential to substantiate the accuracy of length data for the longline catch in the Atlantic as, at the place of unloading, (1) it is almost impossible to assign to each fish where and when it was caught due to the wide range of operation of one cruise in respect of space and time and (2) most of the landings of large longliners are frequently not covered by our sampling scheme.

2.3. *Contribution to the Workshop on Population Dynamics of Tuna*

ICCAT sponsored the above Workshop held in Nantes, France, in September 1974 to facilitate the tuna population studies necessary for the rational utilization of tuna resources. The Workshop covered all studies from sampling to stock assessment techniques. Two scientists of the FSFRL were directly associated with this workshop and submitted seven working papers (Suda ms a-c and Hayasi ms a-d). One of them participated in the meeting's discussion.

2.4. *Stock assessment*

To advance cooperative studies in ICCAT, the staff of the FSFRL calculated the overall fishing intensity of the Japanese longline fishery for albacore, yellowfin, bigeye and Atlantic blue marlin during 1956 through 1972, together with the catch by length class for albacore and yellowfin tuna (Honma ms, Shiohama and Morita ms, Kikawa and Honma ms and Kume ms). Honma (1974) examined in detail the technique used in this series of studies to estimate overall effective fishing intensity, using Atlantic yellowfin tuna as an example.

Taking into account recently available data, Honma *et al* (ms) commented on further considerations for the management of Atlantic yellowfin tuna. By reviewing various studies on bluefin tuna and supplementing the information on bluefin tuna caught by longline, Shingu and Kume (ms) inferred the structure of the stock and made a few comments on its condition and possible management measures. Warashina and Hisada (1974) made preliminary evaluations of the effects of a voluntary regulation implemented by Japanese longline fishermen since October 1971 on the southern bluefin tuna stock.

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(a) Papers published in Japan during the period from November 1973 to September 1974.
(b) Unpublished papers prepared for the 1974 SCRS meeting.
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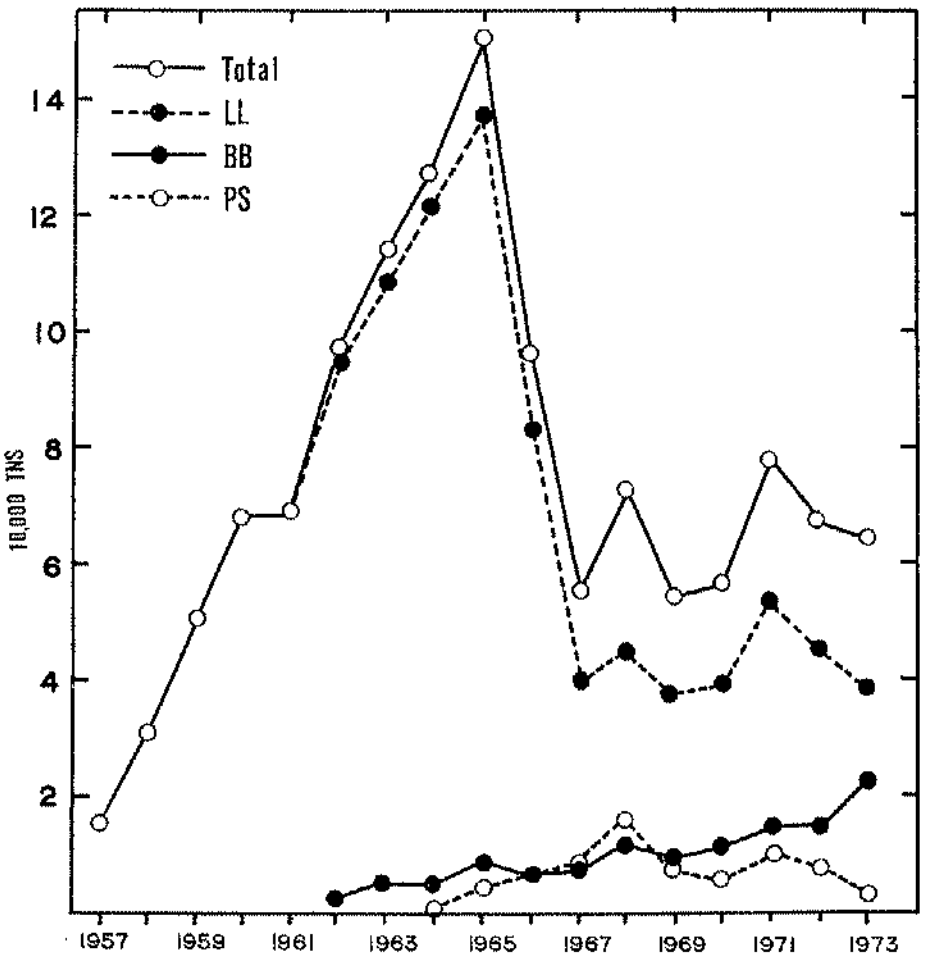


FIG. 1. Annual yield of Japanese tuna fisheries in the Atlantic Ocean, 1957-1973.

Source of data: 1957-1967 — ICCAT Statistical Bulletin Vol. 1.
1968-1971 — ICCAT Statistical Bulletin Vol. 3.
1972-1973 — Table 1 of this report.

Table 1. Catch and percentages (in italics) of tunas and tuna-like fishes taken by different types of Japanese Atlantic fisheries, 1959, 1964, 1969, 1972 and 1973

Type of fishery		1959	1964	1969	1972	1973
Total		50,654	127,214	53,914	67,718	64,057
Longline	Subtotal	50,654 *100*	121,468 *95*	37,535 *70*	45,009 *66*	37,762 *59*
	Deckloaded motherboat	—	53,284 *(44)*	19,857 *(53)*	3,835 *(9)*	450 *(1)*
	Homeland-based boat	—	—	3,548 *(9)*	39,274 *(87)*	36,813 *(97)*
	Foreign-based boat	50,654 *(100)*	68,184 *(56)*	14,130 *(38)*	1,900 *(4)*	499 *(1)*
Purse seine	Subtotal	—	488 *0*	6,989 *13*	7,750 *11*	3,348 *5*
	Single-boat seiner	—	—	1,442 *(21)*	2,399 *(31)*	2,751 *(82)*
	Double-boat seiner	—	488 *(100)*	5,547 *(79)*	5,352 *(69)*	597 *(18)*
Pole-and-line		—	5,258 *4*	9,390 *17*	14,959 *22*	22,947 *36*

Source of data: Statistics and Information Department for longline and pole-and-line fisheries, and Fisheries Agency and Far Seas Fisheries Research Laboratory for catch of purse seine fishery.

Percentages without and in parentheses are ratios to total and gear subtotals, respectively.

Note: At the time of SCRS Meeting, 1973 figures on longline catch were preliminary estimates. The final statistics for 1973 became available in December 1974, upon which this table was corrected.

Table 2. Number of Japanese tuna boats operated in the Atlantic Ocean, 1959, 1964, 1969, 1972 and 1973

Type of fishery		Size class*	1959	1964	1969	1972	1973
Longline	Decklooaded motherboat	Total	—	38	15	8	1
		201- 500	—	8	—	2	1
		501-1,000	—	13	15	5	—
		1,001-	—	17		1	—
	Homeland-based boat	Total	—	—	13	186	199
		51- 200	—	—	—	1	—
		201- 500	—	—	13	181	199
		501-1,000	—	—	—	4	—
	Foreign-based boat	Total	62	144	35	11	2
		51- 200	. .	21	6	2	—
		201- 500	. .	115	29	9	2
		501-1,000	. .	8	—	—	—
		1,001-	. .	—	—	—	—
Purse seine	Single boat seiner	Total	—	—	3	2	2
		- 50	—	—	1	—	—
		51- 100	—	—	—	—	—
		101- 200	—	—	1	—	—
		201- 400	—	—	1	1	1
		401-	—	—	—	1	1
	Double boat** seiner	Total	—	1	4	3	3
		51- 150	—	1	4	3	3
Pole-and-line		Total	—	7	6	14	22
		151	—	7	6	14	22

Source of data: Statistics and Information Department for longline and pole-and-line fisheries, and Fisheries Agency and Far Seas Fisheries Research Laboratory for purse seine fishery.

* Size is given in gross tonnages except for single-boat seiners that are expressed in carrying capacity.

** Number of double-boat purse seiners is given in terms of a fishing unit that comprises two net-boats and several carriers.

Table 3. Catch and permillage (in italics) of tunas and tuna-like fishes taken by Japanese Atlantic longline fishery, 1959, 1964, 1969, 1972 and 1973 *

Year	1959	1964	1969	1972	1973
Total	50,654	121,468	37,535	45,009	37,762
Albacore	3,614	39,451	11,048	3,892	2,154
	71	*325*	*294*	*86*	*57*
Bigeye tuna	1,478	17,336	10,266	18,525	20,243
	29	*143*	*274*	*412*	*536*
Bluefin tuna**	256	12,626	118	562	1,141
	5	*104*	*3*	*12*	*30*
Southern bluefin tuna	—	—	704	10,775	7,533
			19	*239*	*199*
Yellowfin tuna	44,071	35,106	9,823	7,527	4,189
	870	*289*	*262*	*167*	*111*
Juveniles	—	186	143	—	—
		2	*4*		
Skipjack	0	19	6	3	0
	0	*0*	*0*	*0*	*0*
Swordfish	99	1,988	2,273	2,023	1,186
	2	*16*	*61*	*45*	*31*
Blue & black marlins	841	7,590	960	444	368
	17	*62*	*26*	*10*	*10*
White marlin	112	3,495	843	456	366
	2	*29*	*22*	*10*	*10*
Sailfish	28	1,170	458	222	144
	1	*10*	*12*	*5*	*4*
Unclassified and others	155	2,501	893	580	438
	3	*21*	*24*	*13*	*12*

Source of data: Statistical and Information Department.

* Figures until 1970 are of landings.

** 112 tons of bluefin tuna caught in the Mediterranean Sea in 1972, and 246 tons in 1973, are not included.

Note: At the time of SCRS Meeting, 1973 figures on longline catch were preliminary estimates. The final statistics for 1973 became available in December 1974, upon which this table was corrected.

Table 4. Catch and percentage (in italics) of tunas and tuna-like fishes taken by Japanese Atlantic pole-and-line fishery, 1964, 1969, 1972 and 1973.

Year	1964	1969	1972	1973
Total	5,258	9,390	14,959	22,947
Albacore	22	—	—	—
Bluefin tuna	3	—	—	—
	0			
Bigeye tuna	30	312	—	190
	1	*3*		*1*
Yellowfin tuna	2,059	944	4,425	8,068
	39	*10*	*30*	*35*
Skipjack	3,132	4,926	10,149	13,401
	60	*52*	*68*	*58*
Frigate mackerels	—	3,208	25	1,237
		34	*0*	*5*
Unclassified and others	12	—	360	51
	0		*2*	*0*

Source of data: Statistics and Information Department.

Table 5. Catch and percentage (in italics) of tunas and tuna-like fishes taken by Japanese Atlantic purse seine fishery, 1964, 1969, 1972 and 1973.

Year	1964	1969	1972	1973
Total	489	6,989	7,750	3,348
Albacore	—	—	—	3
				0
Bigeye tuna	—	161	308	18
		2	*4*	*1*
Yellowfiin tuna	455	5,805	2,827	1,542
	93	*83*	*36*	*46*
Skipjack	32	679	3,386	1,544
	7	*10*	*44*	*46*
Frigate mackerels	—	177	1,189	216
		3	*15*	*6*
Unclassified and others	1	166	40	25
	0	*2*	*1*	*1*

Source of data: Fisheries Agency and Far Seas Fisheries Research Laoratory.

KOREAN FISHERIES FOR ATLANTIC TUNA IN 1973

1. General situation

During the last decade, since one Korean tuna longliner operated for the first time in the Atlantic in 1964, the Korean tuna fishing fleet in the area has gradually increased, amounting to 109 boats in 1973 and catching 34,460 metric tons of tunas. The tuna fishing fleet in the Atlantic comprised 24 percent of the total Korean tuna fishing fleet, 447 units, and its catch was 33 percent of the 105,723 metric tons total tuna catch of Korea.

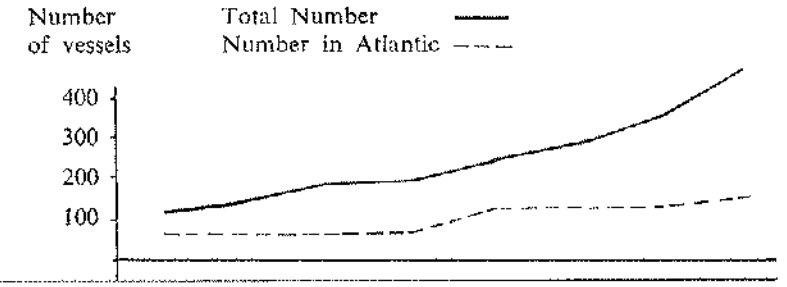
The Korean tuna fishing vessels operating in the Atlantic and based in ports on the Atlantic coast are all longliners, except for 3 skipjack pole-and-line vessels.

2. Fishing vessels

The number of Korean tuna fishing vessels which operated in the Atlantic as of the end of 1973 was 109, which showed an increase of only two units compared with 1972 and a decrease of eight units compared with 1970.

The following chart shows the trend of increase in the tuna fishing fleet, by year. While the rate of increase for the total number of Korean tuna fishing vessels was 18 percent in 1971 and 24 percent in 1972 over the previous years, respectively, the rate of increase in the Atlantic was very low.

Trend of increase of Korean tuna fishing vessels



Total Number . . .	130	152	179	191	246	291	360	447
Number in the Atlantic.	54	56	49	57	109	117	107	109
Year	66	67	68	69	70	71	72	73

Original report in English.

Of the 109 boats operating in the Atlantic, 64 range from 200 to 300 gross tons, and the classification of the vessels by tonnage is a follows:

Tonnage (G/T) . . .	100-200	201-300	301-400	over 401	Total
Number of vessels . .	8	64	23	14	109

In the above total of 109 tuna fishing vessels, 19 foreign-registered vessels are included, which are chartered and operated by Koreans and are subject to the same fishery regulations and obligations as the vessels flying the Korean flag.

3. Catch

The total catch of tunas in 1973 by the 109 vessels in the Atlantic amounted to 34,460 metric tons, slightly below the previous year's catch of 36,345 metric tons.

Total Catch and CPUE by Year and Ocean

(Unit: 1,000 M/T)

Ocean	*Category*	1970	1971	1972	1973
Atlantic	No. of vessels	105	117	107	109
	Total catch	34.9	37.1	36.3	34.5
	CPUE	0.33	0.32	0.34	0.32
Pacific	No. of vessels	105	122	178	226
	Total catch	27.7	29.9	40.4	41.5
	CPUE	0.26	0.24	0.23	0.18
Indian	No. of vessels	36	52	75	112
	Total catch	8.8	16.8	20.9	29.8
	CPUE	0.24	0.32	0.28	0.27
Total	No. of vessels	236	291	360	447
	Total catch	71.4	83.8	87.7	105.7
	CPUE	0.30	0.29	0.24	0.24

The average catch per boat in 1973 was 316 metric tons which, though a little less than the 339 metric tons of the previous year, maintained the level of 1971. In general, the average catch per boat has been stable, with no considerable fluctuation since 1970.

In comparison with the CPUE of other Oceans, those of the Atlantic are definitely higher, as shown in the preceding table.

Major species were, as in the preceding years, yellowfin tuna and albacore, taking the major share —64 percent— of the total catch.

The percentage of yellowfin tuna in the total catch is growing every year, from 26 percent in 1971 to 30 percent in 1972 and further to 39 percent in 1973.

The percentage of albacore in the total catch showed some fluctuation, increasing from 31 percent in 1971 to 37 percent in 1972, and decreasing to 24 percent in 1973.

The following table shows annual catches and percentages by species.

Catch by Species and Composition Ratio

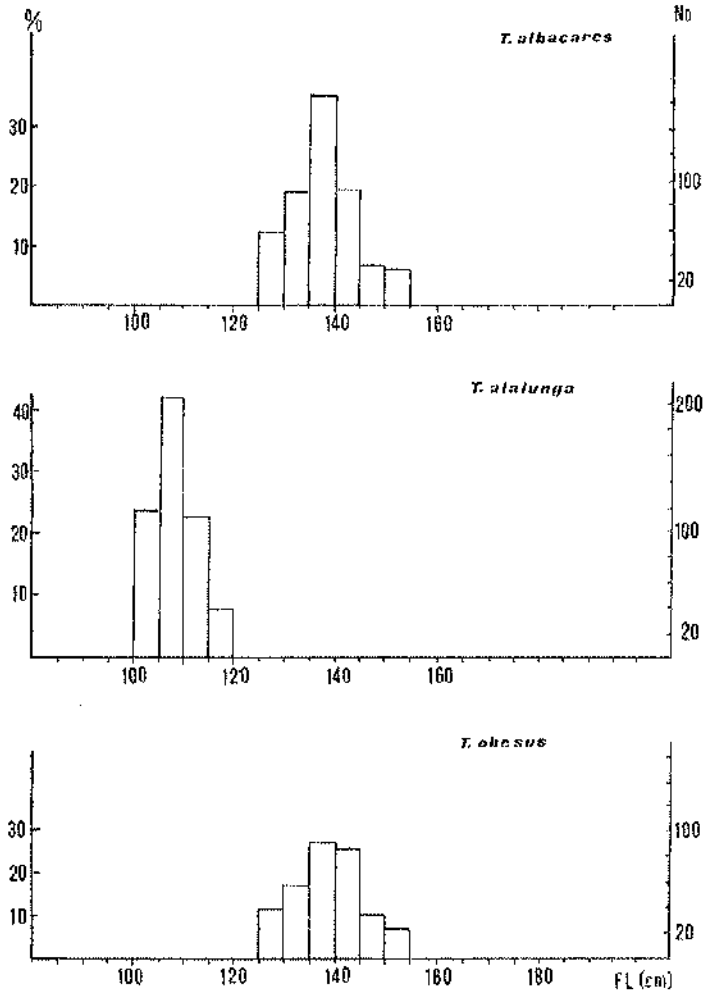
(Unit: M/T)

Species	1971		1972		1973	
	Catch	%	*Catch*	%	*Catch*	%
Yellowfin	9,901	27	11,078	30	13,744	40
Albacore	11,539	31	13,577	37	8,525	25
Bigeye	7,353	20	5,730	16	5,229	15
Bluefin	3,039	8	30	—	66	—
Skipjack	47	—	45	—	922	3
Marlins	780	2	1,608	4	1,713	5
Miscellaneous	4,483	12	4,277	12	4,261	12
TOTAL	37,142	100	36,345	100	34,460	100

4. Research activities

All captains of Korean tuna vessels operating in the Atlantic are obliged to report their catches by species to the Office of Fisheries. In addition to this, 23 tuna longliners and 3 pole-and-line fishing vessels are designated to submit to the Office of Fisheries various data necessary for analyzing the status of resources. The reports and data are sent for analysis to the Fisheries Research and Development Agency, located in Pusan, Korea.

1973 data on length composition by species, analyzed together with part of the data mentioned above, show that ratios of small-size fish are very low for each species, and that large-size fish, over 100 centimeters, are the main object for fishing, as illustrated in the following charts. Particularly in the case of yellowfin tuna, the length of fish taken ranges between 125 and 175 centimeters, with a mode at around 135 centimeters (4 year old fish).



Category	*Yellowfin*	*Albacore*	*Bigeye*
Total No. of fish caught . .	1,986	2,329	887
No. of fish measured . . .	480	468	323
Fishing gears used . . .	long-line		
Period	March-June 1973		
Fishing ground	05°-45°N, 05°-52°W		

PORTUGUESE NATIONAL REPORT

by

O. M. MOURA

The Institute of Marine Biology takes care of fishing in the continent and in the islands of Madeira and the Azores.

Data for 1973 already appear in the ICCAT Statistical Bulletin, Vol. 4; catches are not broken down by species. Examination of data sent by the canneries of the islands of S. Miguel, Pico and Faial (Azores) for 1973 shows that the principal species are bigeye *(Thunnus obesus)*, which comprises approximately half of the total, albacore *(Thunnus alalunga)* and skipjack *(Katsuwonus pelamis)*. This was confirmed in 1974 by the samples taken. There is also some bluefin *(Thunnus thynnus thynnus)*, which constitutes less than 10 % of the catches.

The collection of catch and effort data (in number of boats and hours fishing) by species and statistical area was started in July 1974 at the landing ports of Funchal (Madeira), Angra do Heriosmo and Horta (Azores). Catch and effort data (in number of boats) are obtained monthly for the islands of Pico and Faial (Azores), directly from the canneries. In regard to fishing gear, only baitboats are used.

Since July 1974, biological sampling is also being carried out on the principal species.

Original report in French.

REVIEW OF NATIONAL FISHERIES AND RESEARCH ACTIVITIES SOUTH AFRICA

by

C. S. DE V. NEPGEN

A) *The fishery*

Fishing was conducted by four vessels equipped with purse-seine nets in the vicinity of Cape Agulhas while ten boats using the pole and live bait method and 52 sport fishing boats with commercial licences were trolling in the Cape Point area. The total catch was about 150 metric tons and consisted mainly of albacore and yellowfin.

B) *Tagging*

Due to the fuel crisis the tagging programme was suspended. Tagging operations will commence again in the summer of 1974.

C) *Biological sampling*

Sampling of purse-seine catches was done at Gansbaai on the southern coast of the Cape Province at the beginning of the year. A total of 99 yellowfin was examined.

D) *The environment*

Regular hydrographic surveys were carried out on the southern part of the Cape west coast. Similar surveys are planned on the southern Cape coast.

E) *Statistics*

Catch statistics were collected and supplied to ICCAT.

F) *Legislation*

South Africa's Amended Sea Fisheries Act (No. 58 of 1973) became effective and a regulation prohibiting the taking and landing of yellowfin tuna weighing less than 3.2 kg is provided for.

Original report in English.

SPANISH NATIONAL REPORT — 1974

by

JOSÉ A. PEREIRO

Spanish catches of tuna in 1974 amounted to 86,131 metric tons, of which approximately 33 % was albacore, 42 % skipjack, 19 % yellowfin, 4 % bigeye and 2 % bluefin.[1]

In regard to Atlantic tunas, both the Spanish Administration and Institutes devoted to fishery research, in association with the Administration, have given priority to establishing a statistical set-up. This would enable them to control the catch, effort and age structure of the stocks exploited, upon which future studies in the field of population dynamics could be based.

The results obtained in 1974 have been quite encouraging and, in many cases, have enabled accurate fishery statistics to be obtained already. The Table shows the «scientific attention» given, from the beginning of 1972 until the end of 1974, to the different stocks of Atlantic tunas and tuna-like species commercially exploited. By «scientific attention» we refer to the realization of ICCAT Tasks I and II and biological samples.

Study of different fisheries

A) *Seasonal fishery on young albacore*

Statistical coverage of Task I is practically 100 %. In regard to Task II, coverage is also 100 % for trollers, and 50 % for baitboats.

In this fishery, the total catch of albacore was 25,457 metric tons, made up as follows: 19,034 metric tons corresponded to the troller fleet (2,598,433 fish captured in 29,554 days at sea); 6,423 metric tons to the baitboat fleet (666,277 fish captured in 3,272 days at sea). A total of 5,992 fish caught by trollers and 2,180 caught by baitboats were measured to obtain catch/effort data by age class. Studies were carried out to evaluate the fishing power of both gears.

1. This figure does not include secondary species such as frigate mackerel, Atlantic little tuna, Mediterranean bonito or broadbill swordfish.

Original report in Spanish.

B) *Bluefin fishery in the Bay of Biscay*

This fishery was very closely monitored in 1974 for catch and effort, as well as age structure, and similar data were gathered for 1972 and 1973.

The total catch of bluefin in 1974 was 1,009 metric tons, corresponding to a fishing effort of 1,318 days at sea. This effort indicated a decrease compared with previous years, which was probably due to the fact that longliners were also fishing in the area. Histograms of age structure of catches have been prepared for the three years mentioned.

C) *Broadbill swordfish fishery*

The historical sequence of Spanish catches of broadbill swordfish has been traced from 1962 to 1973. These catches, which will be published elsewhere, reach amounts of between 1,000 and 3,500 metric tons, except for 1973, when 8,390 metric tons were caught. The total figure for 1974 is not yet available. However, it is known that troller vessels which fish for albacore, alternatively fish for broadbill swordfish by longline. These latter catches amounted to 623 metric tons in 1974.

D) *Traps in the south of the peninsula*

The catch and effort history of this fishery is very well known, as also the age structure of catches. According to provisional data, trap catches of bluefin in 1974 were very low (13 metric tons) for the three traps set, and captures were mainly of frigate mackerel (556 metric tons).

E) *Tropical surface fishery*

Important data have been gathered on the two phases of the fishery: 1959-64 and 1964-74. At the present, for phase 2, we know the catches by wide fishing areas («Angola», «Gulf of Guinea», etc.) by quarter. We also know the development of the freezer seiner fleet and its accompanying baitboats since 1963.

In 1974, some 14,407 metric tons of yellowfin and 30,000 metric tons of skipjack were caught. This big increase in skipjack is mainly due to catches taken off the coast of Angola. Twenty-three Spanish flag freezer-seiners fished in the area. The crucial problem of estimating size frequencies of the catch has not yet been solved.

F) *Canary Islands tuna fishery*

The Spanish Oceanographic Institute is responsible for the collection of fishery statistics from Spanish flag tuna vessels which operate in Canarian waters.

Until now, it has not been possible to fully carry out the program; however, considerable progress was made in 1974, and the catch and effort of Canarian vessels and the catch of peninsular boats were monitored.

As of November, 1974, size sampling of landings has been begun (data for yellowfin, albacore, bigeye and skipjack are already available).

The total catch of tuna in the area by Spanish vessels amounted to 13,797 metric tons, as follows: 5,357 tons of skipjack; 3,170 of bigeye; 2,692 of albacore; 2,032 of yellowfin and 546 of bluefin. The corresponding effort data are presently being compiled.

Future plans

The tasks to be undertaken in the future, apart from continuing those presently under way, can be deduced from the Table. The present outlook is very optimistic in regard to the region of the Canary Islands and in the Mediterranean, in respect to Task I and biological data. At the moment we only know the bluefin catch in the latter case, which in 1974 was 354 metric tons. An attempt is being made to obtain preliminary information on the fleet of small longliners based in the south Mediterranean region, which captures large quantities of broadbill swordfish, and in a lesser amount, bluefin, both in the Mediterranean and in the Atlantic.

For the first time in 1975 we intend to undertake biological sampling from the tropical tuna fishery. For recording Task II data, logbooks have been distributed to the masters of seiner vessels fishing in this area. Finally, studies on population dynamics, especially for albacore and bluefin fisheries in the north of Spain, will be started. A tagging cruise and hydrographic studies will be carried out at the start of the fishing season on young albacore.

Final note

The teams of researchers presently undertaking the collection and processing of tuna fishery data in the Atlantic are as follows:

ALONSO-ALLENDE & PÉREZ-GÁNDARAS: Instituto de Investigaciones Pesqueras, Vigo. (Albacore).

CENDRERO & CORT: Laboratorio Oceanográfico de Santander. (Albacore and bluefin).

GARCÍA CABRERA & SANTOS: Laboratorio Oceanográfico de Tenerife. (Canarian tunas).

GONZÁLEZ-GARCÉS et al: Laboratorio Oceanográfico, La Coruña. (Broadbill swordfish and albacore).

PEREIRO & FERNÁNDEZ: Laboratorio Oceanográfico, Madrid. (Tropical tunas).

RODRÍGUEZ RODA: Instituto de Investigaciones Pesqueras (Cádiz). (Traps).

VILLEGAS & PÉREZ: Departamento de Zoología de la Universidad de Oviedo. (Albacore).

Attention given to fisheries of tunas and tuna-like species in the Atlantic (See text)

Fishing zone	*Species*	*Task I*		*Task II*		*Biological Sampling*	
		1972	1974	1972	1974	1972	1974
North and Northwest Peninsula	Albacore	×	×		×		×
	Bluefin		×		×		×
	Broadbill swordfish		×				×
Canary Islands	Bluefin, bigeye, yellowfin, skipjack albacore		×		×[1]		×[1]
Tropical (Africa)	Yellowfiin & skipjack		×		?		
Southern traps	Bluefin and others	×	×	×	×	×	×
Mediterranean	Bluefin and others		×				

(1) For the first time in 1974.

(2) Only catches by large sector and quarterly period.

UNITED STATES REPORT ON FISHERIES AND RESEARCH OF ATLANTIC TUNA AND TUNA-LIKE FISHES, 1973 [1]

by

National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Review of fisheries

U.S. fishermen landed about 33,757 metric tons (mt) of Atlantic tuna and tuna-like fish in 1973, which is a 0.6 % decrease from the 1972 landings (Table 1). The tropical fishery continued to dominate the catch with landings of 23,873 mt.

As in all years since 1967, only minor amounts of the catch of tropical tunas were taken in the western Atlantic. The 1973 tropical fishery was characterized by very good skipjack fishing. Most fishing effort took place south of 10° S latitude producing a catch mostly from pure schools of skipjack. Catch rates for the entire season were 2.2 mt of yellowfin/day fishing and 17.0 mt of skipjack per day of fishing (Table 2). The average length of fish in the catch was 75.8 cm for yellowfin and 45.1 cm for skipjack (Table 3).

This year (1974) appears to be another good year for the U.S. fishermen in the eastern tropical Atlantic. Preliminary data indicate that the total tuna catch rate will be slightly lower than in 1973, but still relatively high as compared with previous years. Fishing effort appears to be about the same as in 1973 and much of the effort has been similarly directed towards skipjack in the southern grounds. Early estimates indicate that 75 % or more of the catch will be skipjack.

U.S. landings of bluefin tuna in 1974 continued a downward trend begun in 1971. Slightly more than 800 mt of age 1-5 bluefin were captured in the seine fishery which is about 50 % of the 1973 catch. Preliminary estimates place the total landings of large bluefin at about 1,300 fish through the end of September 1974. It appears that the 1973 year-class was relatively good or highly available with large numbers of age 1 bluefin appearing in U.S. coastal waters during 1974. Estimates of the sport fish catch of these small fish range as high as 100,000 fish.

1. Submitted to the Third Regular Meeting of the Council of ICCAT in Madrid, November 1974. Southwest Fisheries Center Administrative Report No. LJ-74-51.

Original report in English.

The seine fishery operated under a voluntary quota of 1,091 mt and a voluntary minimum size limit of 6.4 kg. In addition, the large fish commercial fisheries operated under a voluntary 455 mt quota. Most of the 1-year-old bluefin captured in the seine fishery were as a result of sets made specifically for tagging.

With the exceptions of a record high landing of bonito and no reported landings of swordfish, 1973 landings of other species do not exhibit unusual differences from 1972.

Review of research

U.S. research activities on Atlantic tuna and tuna-like fishes are conducted by the National Marine Fisheries Service (NMSF), Southwest Fisheries Center (SWFC), La Jolla Laboratory; the NMFS, Southeast Fisheries Center (SEFC), Miami Laboratory; and the Woods Hole Oceanographic Institution (WHOI). Coordinating responsibility lies with the SWFC. In 1974, U.S.A. research was on problems associated with the yellowfin, skipjack, bluefin and albacore tuna and billfish populations.

Yellowfin. — Preliminary statistics on the total 1973 catch of yellowfin from the Atlantic show a slight decrease from 1972 and catches for 1971 have been raised upwards. Because previous analyses of the yellowfin fishery indicated that the fishery was approaching the maximum sustainable yield, we continued to closely monitor the fishery. Lenarz and Fox used the production model approach to estimate maximum sustainable average yield. A theoretical study was made on the interaction between longline and surface fisheries for tunas, with the Atlantic yellowfin tuna fishery as an example (Lenarz and Zweifel).

Under a NMFS contract, the Inter-American Tropical Tuna Commission collected statistics on catch and effort and length-frequency samples of Atlantic tunas landed by U.S.A. vessels in California and Puerto Rico. U.S.A. and non-U.S.A. transshipments of Atlantic-caught tunas to Puerto Rico were sampled by a member of the staff of the SWFC. Particular attention was placed on determining the accuracy of estimates of the species composition of the transshipped landings.

Skipjack. — Although routine data collection and compilation continued, no research was conducted on skipjack during 1974.

Bluefin. — A major research effort on bluefin was initiated at the NMFS Southeast Fisheries Center in 1974. In cooperation with WHOI, sea-going samplers were placed aboard the three U.S. seiners operating in the western North Atlantic to gather catch, effort, and biological data. Tagging was performed on an opportunistic basis and over 1,400 tags were placed, 1,000 of these on 1-year-olds. Detailed studies on status of stocks, spawning, age and growth, sex-ratio, and stock identification are in process. Aerial surveys in the Bahamas Islands during

the spring migration were conducted to provide estimates of the Bahamas spawning run. Additional aerial remote sensing experiments were performed. A review of the status of stocks was prepared (Beardsley).

Albacore. — An analysis of the status of the stocks of North Atlantic albacore was made (Lenarz and Coan). The production model approach was taken to estimate maximum sustainable yield. A cohort analysis was carried out to estimate the effects of changes in minimum size and fishing effort on yield per recruit.

Billfish. — A paper (Lenarz and Nakamura) was published on the relationships among weight, girth, total length, fork length, body length, trunk length, and caudal spread for blue marlin, white marlin, and sailfish captured in the western Atlantic. Research on billfish in the western North Atlantic continued at the SEFC. Over 40 big-game fishing tournaments were sampled for catch/effort and biological data. Logbooks were designed and distributed to individual anglers to provide other sources of data. Catch rates for blue marlin and white marlin in 1972 and 1973 were exactly the same; however, catch rates for sailfish in 1973 were higher than those in 1972. Preliminary analyses were begun on various hard parts from blue and white marlins to evaluate their reliability in providing age and growth estimates.

Reports submitted to ICCAT in 1974

BEARDSLEY, G. L., Jr.
ms. A review of the status of the stocks of Atlantic bluefin tuna.

FOX, W. W., Jr.
ms. An overview of production modeling. ICCAT-WPTD-Nantes/74/13.

LENARZ, W. H. and A. Coan.
ms. Assessment of the condition of the North Atlantic albacore fishery.

LENARZ, W. H. and W. W. FOX, Jr.
ms. Production model analysis of Atlantic yellowfin tuna fishery, 1964-1973.

LENARZ, W. H. and E. L. NAKAMURA.
1974. Analysis of length and weight data on three species of billfish from the western Atlantic Ocean. Proceedings of the International Billfish Symposium, Kailua-Kona, Hawaii, August 9-12, 1972. Part 2 R. S. Shomura and F. Williams (editors).

LENARZ, W. H. and J. R. ZWEIFEL.
ms. A theoretical examination of some aspects of the interaction between longline and surface fisheries for tunas.

ROTHSCHILD, B. J.
ms. Issues in population dynamics of tunas. ICCAT-WPTD-Nantes/74/20.

Table 1. Commercial landings of Atlantic tuna and tuna-like fish by United States Fishermen for 1960-73 [1] landings (metric tons) by species [2]

	TUNA								*MACKEREL*			
Year	*Bluefin*[3]	*Yellowfin*[3/4]	*Skipjack*[3]	*Little Tunny*[3]	*Bigeye*[3]	*Albacore*[3]	*Bonito*[5]	*Swordfish*[5]	*Spanish*[5]	*King*[5]	*Unclassified*[5]	*Total*
1960	637			7			80	459	3,581	1,654		6,418
1961	1,074			1			63	409	3,372	1,734		6,653
1962	3,969	17	463	7			78	424	4,355	1,886		11,199
1963	5,673		2,055	5			96	1,250	3,535	2,294	5	14,913
1964	4,882		3,891	2			29	1,384	2,755	1,569	56	14,568
1965	3,184		64	10			83	1,226	3,634	2,083	114	10,398
1966	1,238		40	21			56	616	4,295	2,051	4	8,321
1967	2,320	1,136	508	7			22	474	3,577	2,767	10	10,821
1968	807	5,941	3,312	6	15		43	274	5,342	2,813	2	18,555
1969	1,226	18,790	4,747	7	148		98	171	4,952	2,814	1	32,954
1970	3,327	9,029	11,648	158	195		83	287	5,506	3,050		33,283
1971	3,169	3,764	16,204	5	544		90	35	4,713	2,571	50	31,145
1972[6]	2,138	12,342	12,256	212	212	10	23	89	4,225	2,455		33,962
1973[6]	1,508	3,082	20,688	14	103		277		5,308	2,827		33,757

1. Includes catches by U.S. vessels landed at Puerto Rico and outside U.S.: does not include catches from other oceans landed at Puerto Rico, does not include sport catches of species other than those listed, does not include more than 3,500 tons caught by U.S. vessels in the eastern tropical Atlantic in 1958-1963. Tropical tunas include landings by purse seiners fiying the flags of Panama and the Netherlands.
2. Bluefin, *Thunnus thynnus*; Yellowfin, *T. albacores*; Skipjack, *katsuwonus pelamis*; Little Tunny, *Euthynnus alletteratus*; Bigeye, *T. obesus*; albacore *T. alalunga*; bonito, *Sarda sarda*; Swordfish, *Xiphias gladius*; Spanish mackerel *scomberomorus maculatus*; King mackerel, *scomberomorus cavalla.*
3. Data provided by SWFC, La Jolla, California.
4. Includes catches of bigeye in some years, but the amount is thought to be small.
5. Data compiled by statistics and Market News Division, Washington, D. C. and SWFC, La Jolla, California.
6. Premilinary: 1972 is due to be revised in December, 1974.
   1973 is due to be revised in April, 1975.

Table 2. Summary of logbook estimates of catch and catch rate of yellowfin and skipjack tunas caught by American seiners [1] in the eastern tropical Atlantic. Source of data is the Inter-American Tropical Tuna Commission

Year	Number of seiners	YELLOWFIN		SKIPJACK	
		Catch (metric tons)	Catch rate (metric tons/day fishing)	Catch (metric tons)	Catch rate (metric tons/day fishing)
1967	3	977	7.8	473	3.8
1968	8	6,198	23.3	3,193	12.0
1969	25	19,845	10.9	4,440	2.4
1970	23	9,065	4.0	11,423	5.1
1971	24	4,356	2.7	16,141	10.0
1972	33	10,919	3.3	12,200	3.7
1973	24	2,605	2.2	20,400	17.0

1. Purse seiners flying the flags of Canada, Netherlands, Panama and USA are included.

Table 3. Preliminary length composition of U.S. caught yellowfin and skipjack tuna from the Atlantic Ocean, 1973

YELLOWFIN TUNA						*SKIPJACK TUNA*		
Fork length (cm)	*Number of fish*	*Weight of fish (metric tons)*	*Fork length (cm)*	*Number of fish*	*Weight of fish (metric tons)*	*Number of fish*	*Fork length (cm)*	*Weight of fish (metric tons)*
37	—	—	101	6,356	124.1	31	—	—
39	3,858	4.4	103	11,074	229.1	33	4,189	2.5
41	7,645	10.2	105	1,354	29.7	35	10,332	7.6
43	8,964	13.8	107	10,144	235.1	37	97,260	86.2
45	5,822	10.3	109	1,337	32.7	39	335,072	353.6
47	3,157	6.3	111	2,567	66.3	41	1,336,308	1664.5
49	1,495	3.4	113	937	25.5	43	2,478,876	3615.7
51	1,951	5.0	115	3,369	96.7	45	3,340,416	5664.9
53	8,066	23.1	117	2,866	86.6	47	2,749,787	5386.3
55	11,080	35.5	119	2,350	74.7	49	1,409,205	3169.3
57	18,714	66.7	121	2,053	68.6	51	379,019	973.3
59	16,290	64.3	123	1,275	44.7	53	63,213	184.4
61	23,706	103.3	125	1,002	36.9	55	13,647	45.0
63	13,155	63.1	127	1,506	58.1	57	21,165	78,6
65	14,604	76.9	129	1,693	68.4	59	1,333	5.5
67	2,155	12.4	131	877	37.1	61	1,612	7.5
69	4,291	27.0	133	2,215	98.0			
71	3,342	22.9	135	2,212	102.3			
73	3,214	23.9	137	877	42.4			
75	1,998	16.1	139	501	25.3			
77	2,794	24.3	141	2,170	114.2			
79	2,794	26.3	143	375	20.6			
81	1,624	16.5	145	376	21.5			
83	1,286	14.0	147	125	7.5			
85	4,173	48.8	149	125	7.8			
87	959	12.0	151	125	8.1			
89	2,387	32.0	153	250	16.8			
91	2,668	38.2	155	—	—			
93	1,542	23.6	157	—	—			
95	3,723	60.6	159	—	—			
97	5,259	91.0	161	—	—			
99	6,463	118.9	163	125	10.1			
Total				249,415	2883.7		12,241,434	21,244.9