

INTERNATIONAL COMMISSION
FOR THE
NORTHWEST ATLANTIC FISHERIES



ANNUAL REPORT
(formerly Annual Proceedings)

Vol. 28
for the year
1977/78

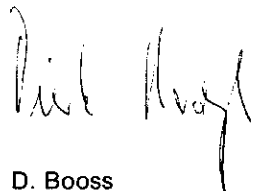
Dartmouth • Canada
December 1978

Letter of Transmittal

The Chairman of the International Commission for the Northwest Atlantic Fisheries presents his compliments to the Governments signatory of the International Convention for the Northwest Atlantic Fisheries signed at Washington under date of 8 February 1949, and to the Commissioners and Observers representing those Governments and has the honour to transmit herewith annual reports of the International Commission for the Northwest Atlantic Fisheries for the year 1977/78.

This is the 28th annual report of proceedings of the Commission and is an authoritative record of its activities and achievements from 1 July 1977 to 30 June 1978. The report contains an account of the activities of the Commission's Secretariat; an account of the 28th Annual Meeting, June 1978; and summaries of research carried out in each of the five Convention subareas and on seals in 1977.

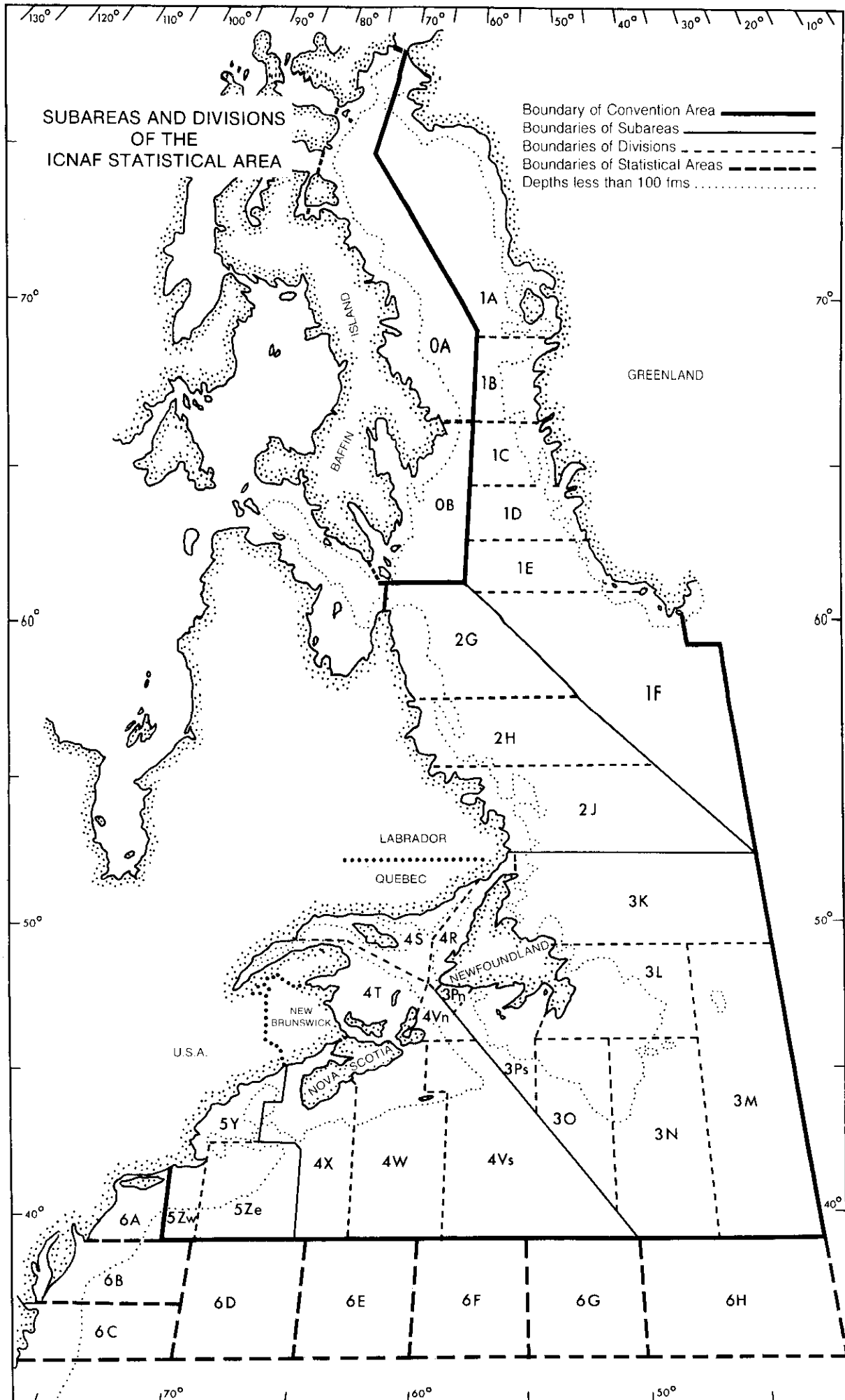
This report is prepared and transmitted in conformity with the requirements of Article VI(1) (f) of the International Convention for the Northwest Atlantic Fisheries and Rules 3.2 (g) and 9.1 of the Rules of Procedure of the Commission.



D. Booss
Chairman,
International Commission for the
Northwest Atlantic Fisheries

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Commission's Organization, 1977/78

Participating Governments

Bulgaria, Canada, Cuba, Denmark, France, Federal Republic of Germany, German Democratic Republic, Iceland, Italy, Japan, Norway, Poland, Portugal, Romania, Spain, Union of Soviet Socialist Republics and United Kingdom.

Chairman of Commission

Dr D. Booss,
Bundesministerium für Ernährung,
Landwirtschaft und Forsten,
Rochusstrasse 1,
5300 Bonn-Duisdorf,
Federal Republic of Germany.
(to 6 June 1978)

Mr S. Ohkuchi,
Nippon Suisan Kaisha Ltd.,
6-2 Otemachi,
2-Chome Chiyoda-ku,
Tokyo, Japan.
(from 6 June 1978)

Vice-Chairman of Commission

Mr S. Ohkuchi,
Nippon Suisan Kaisha Ltd.,
6-2 Otemachi,
2-Chome Chiyoda-ku,
Tokyo, Japan.
(from 10 June 1977
to 6 June 1978)

Dr W. Ranke,
VVB Hochseefischerei,
251 Rostock-Marienehe.
German Democratic Republic.
(from 6 June 1978)

Panels for the Subareas

Subarea	Panel	Member Governments	Chairman
1	1	Denmark, France, Federal Republic of Germany, Norway, Poland, Portugal, Spain, Union of Soviet Socialist Republics, United Kingdom.	(Vacant)
2	2	Canada, Cuba, France, Federal Republic of Germany, German Democratic Republic, Iceland, Norway, Poland, Portugal, Romania, Spain, Union of Soviet Socialist Republics, United Kingdom.	(Vacant)
3	3	Bulgaria, Canada, Cuba, Denmark, France, Federal Republic of Germany, German Democratic Republic, Iceland, Italy, Japan, Norway, Poland, Portugal, Romania, Spain, Union of Soviet Socialist Republics, United Kingdom.	Capt A. S. Gaspar, Praca Duque de Terceira 24-3-E, Lisbon 2, Portugal.
4	4	Bulgaria, Canada, Cuba, Denmark, France, Federal Republic of Germany, Japan, Poland, Portugal, Spain, Union of Soviet Socialist Republics.	(Vacant)
5	5	Bulgaria, Canada, Cuba, France, German Democratic Republic, Japan, Poland, Romania, Spain, Union of Soviet Socialist Republics.	(Vacant)

Panel for Harp and Hooded Seals

A Canada, Denmark, Norway.

Mr E. Lemche,
Ministry for Greenland,
Hausergade 3,
DK-1128 Copenhagen K, Denmark.

Commission's Organization, 1977/78 (continued)**Standing Committees**

Committees	Members	Chairman
On Finance and Administration	One Nominee from each of the Contracting Governments (Canada, Federal Republic of Germany, Portugal, Union of Soviet Socialist Republics, United Kingdom.	Miss D. E. Pethick, International Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario, Canada K1P 6C9
On Research and Statistics	One Nominee from each Contracting Government who may be assisted by experts and advisers.	Dr A. W. May, Resource Services Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario, Canada K1P 6C9 (to 28 March 1978)
		Dr E. C. Lopez-Veiga, Instituto Investigaciones Pesqueras, Muelle de Bouzas, Vigo, Spain. (from 18 May 1978)
On Regulatory Measures	One Nominee from each Contracting Government who may be assisted by experts and advisers.	(Vacant)
On International Control	One Nominee from each Contracting Government who may be assisted by experts and advisers.	Dr A. W. H. Needler, P. O. Box 481, St. Andrews, New Brunswick E0G 2X0

Headquarters

Dartmouth, Nova Scotia, Canada

Executive Secretary	— Mr L. R. Day	Statistical Clerk (Surveys and Sampling)	— Ms P. A. Cave
Assistant Executive Secretary	— Mr V. M. Hodder	Statistical Clerk (Fishery Statistics)	— Mr. F. D. Keating
Administrative Assistant	— Mr W. H. Champion	Clerk-Duplicator Operator	— Mr R. A. Myers
Bio-Statistician	— (Vacant)	Clerk-Duplicator Operator	— Mr B. T. Crawford
Senior Secretary	— Mrs V. C. Kerr	Documents and Mailing Clerk	— Mrs F. E. Perry
Senior Statistical Clerk	— Mr G. M. Moulton	Clerk Typist	— Mrs P. M. Wadman
Finance and Publications Clerk Steno	— Ms E. R. Cornford	Data Processing Clerk	— Miss G. H. Langille

PART 1

Administrative Report for the Year Ended 30 June 1978

1. Future of ICNAF

Following the extension of fisheries jurisdiction to 200 miles offshore by the coastal states in the Northwest Atlantic Convention Area, the first of two international preparatory conferences was convened by the Government of Canada from 14 to 25 March 1977. The first conference considered the draft of a proposed new Convention developed by the Government of Canada which would replace the present International Convention for the Northwest Atlantic Fisheries of 8 February 1949 and provide arrangements for future multilateral cooperation in the management of the fisheries in the Northwest Atlantic (*ICNAF Com. Doc. 77/VI/11*).

The second conference, convened by the Government of Canada on 6, 7, and 10 June 1977 in conjunction with the Twenty-Seventh Annual Meeting of ICNAF discussed points of principle and possible amendments to a revised version of the text of the proposed new Convention (*ICNAF Com. Doc. 77/VI/14*). In addition, arrangements for the smooth transition from ICNAF to the proposed new Northwest Atlantic Fisheries Organization (NAFO) were discussed and suggestions recorded.

At its Twenty-Seventh Annual Meeting in June 1977, ICNAF considered a suggestion from the second preparatory conference to amend the present ICNAF Convention to provide for its termination on 31 December of the year the new NAFO Convention enters into force. The Meeting agreed to consider and act upon the suggestion at a special ICNAF meeting to be held on 21 October 1977, immediately following a diplomatic conference convened by the Government of Canada to finalize the text of the new NAFO Convention.

The Diplomatic Conference was convened from 11 to 21 October 1977 (*ICNAF Com. Doc. 78/VI/4*). A consensus was reached on all Articles and Annexes of the new Convention, except those Articles regarding the non-prejudice of national claims, the national allocations of catches in the Regulatory Area, the requirements to call meetings other than annually, and reservations to the Convention. As a consequence, the Special ICNAF Meeting arranged for 21 October 1977 to act on the proposal for termination of the ICNAF Convention was not convened.

Since all delegates to the Diplomatic Conference emphasized the importance of future multilateral co-operation and expressed the hope that full agreement on the new Convention would be reached in the near future, the Government of Canada convened an informal meeting of experts from the Member Countries of ICNAF, The European Economic Community (EEC), and the USA in Ottawa on 1-2 May 1978 to deal with those issues that were not resolved at the end of the Diplomatic Conference in October 1977.

2. The Commission's Officers

Chairman of the Commission	— Dr D. Booss (Federal Republic of Germany)
Vice-Chairman of the Commission	— Mr S. Ohkuchi (Japan)
Chairman, Panel 1	— Vacant
Chairman, Panel 2	— Vacant
Chairman, Panel 3	— Capt A. S. Gaspar (Portugal)
Chairman, Panel 4	— Vacant
Chairman, Panel 5	— Vacant
Chairman, Panel A (Seals)	— Mr E. Lemche (Denmark)

The Chairman and Vice-Chairman were elected at the June 1977 Annual Meeting for the 1977/78 and 1978/79 periods. However, due to the resignation of Dr Booss at the June 1978 Annual Meeting, Mr Ohkuchi (Japan) was elected Chairman for the remainder of Dr Booss' term of office for 1978/79 and Dr W. Ranke, (German Democratic Republic), was elected Vice-Chairman for 1978/79 to complete Mr Ohkuchi's term of office. The Chairman of Panel 3 was elected to serve for the 1977/78 and 1978/79 periods. The Chairman of Panel A (Seals) completed his term of office at the 1978 Annual Meeting. Chairmanships of Panels 1, 2, 3, and 5 were not filled as no meetings of these Panels were held in 1977/78.

Chairman of the Standing Committee on Research and Statistics (STACRES)	— Dr A. W. May (Canada) (to 28 March 1978)
	— Dr E. C. Lopez-Veiga (Spain) (eff 23 May 1978)

Chairman of the Standing Committee on Finance and Administration (STACFAD)	— Mr E. B. Young (Canada) (to 31 December 1977)
	— Miss D. E. Pethick (Canada) (eff 5 June 1978)

Chairman of the Standing Committee on Regulatory Measures (STACREM) — Vacant
 Chairman of the Standing Committee on International Control (STACTIC) — Mr D. R. Bollivar (Canada)

Dr A. W. May (Canada) had agreed to act as Chairman of STACRES until June 1978. However, due to pressure of national duties, Dr May submitted his resignation on 28 March 1978 (*ICNAF Circular Letter 78/30* dated 4 April 1978). Dr E. C. Lopez-Veiga (Spain) was elected Chairman at the first meeting of STACRES on 23 May 1978.

The Commission Secretariat was advised that Mr E. B. Young (Canada) had retired from the Canadian Government service. Miss D. E. Pethick (Canada) was elected Chairman of STACFAD on 5 June 1978.

3. The Commission's Panel Memberships for 1977/78

Country	Panel					A	Total
	1	2	3	4	5		
Bulgaria	—	—	1974	1975	1973	—	3
Canada	—	1952	1951	1951	1951	1966	5
Cuba	—	1976	1976	1976	1976	—	4
Denmark	1951	—	1969	1974	—	1966	4
France	1953	1953	1953	1953	1974	—	5
Federal Republic of Germany	1957	1960	1977	1970	—	—	4
German Democratic Republic	—	1974	1974	—	1974	—	3
Iceland	—	1974	1976	—	—	—	2
Italy	—	—	1977	—	—	—	1
Japan	—	—	1971	1971	1971	—	3
Norway	1952	1970	1968	—	—	1966	4
Poland	1962	1962	1962	1968	1968	—	5
Portugal	1953	1953	1953	1953	—	—	4
Romania	—	1970	1970	—	1967	—	3
Spain	1952	1954	1952	1952	1972	—	5
USSR	1958	1958	1958	1962	1962	—	5
UK	1951	1960	1951	—	—	—	3
Total	9	13	17	11	10	3	63

4. The Commission's Secretariat

a) Staff personnel

Executive Secretary — Mr L. R. Day
 Assistant Executive Secretary — Mr V. M. Hodder
 Bio-Statistician — Vacant
 Administrative Assistant — Mr W. H. Champion
 Senior Secretary — Mrs V. C. Kerr
 Finance and Publications Clerk Steno — Ms E. R. Cornford
 Senior Statistical Clerk — Mr G. M. Moulton
 Clerk-Duplicator Operator — Mr R. A. Myers
 Clerk-Duplicator Operator — Mr B. T. Crawford
 Statistical Clerk (Surveys and Sampling) — Ms P. A. Cave

Documents and Mailing Clerk — Mrs F. E. Perry
 Clerk-Typist — Mrs P. M. Wadman
 Statistical Clerk (Fishery Statistics) — Mr F. D. Keating
 Data Processing Clerk — Miss G. H. Langille

In addition, part-time services were provided by a computer programmer and an editorial assistant.

b) Staff activities

The Executive Secretary presented proposals from the 1977 Annual Meeting to Depositary Government (Washington, D. C., 19-21 June 1977); serviced, with Messrs Hodder, Champion and Myers, Mrs Kerr and Cornford, the Twenty-Seventh Annual and associated Meetings of the Commission, Informal Intergovernmental Consultations, and the Second International Preparatory Meeting on Future Multilateral Cooperation in Northwest Atlantic Fisheries (Ottawa, 24 May-10 June 1977); participated with full staff in the Ninth Meeting of the Coordinating Working Party on North Atlantic Fishery Statistics (CWP) (Dartmouth, 17-23 August 1977); participated in and serviced with Mr Hodder and Mrs Kerr, the Diplomatic Conference on Future Multilateral Cooperation in the Northwest Atlantic Fisheries (Ottawa, 11-21 October 1977); participated with full staff in the Special STACRES Meeting on Shrimp and Seals (Dartmouth, 15-18 November 1977); participated in, with Mr Hodder and Mrs Kerr, the Special STACRES Meeting on Squid (Havana, 13-18 February 1978); and serviced with full staff the Mid-Term Meeting of the Assessments Subcommittee (Dartmouth, 4-11 April 1978).

5. The Commission's Publications

With the extension of fisheries jurisdiction to 200 miles offshore by the coastal states in the Northwest Atlantic and the resultant dramatic increase in scientific, statistical, and management effort, the Commission's responsibilities and workload in the printing and publishing field has increased considerably.

In October 1977, the Secretariat leased a Comp/Set 500 typesetting machine making it now possible to edit, type print and collate all the Commission's publications, where formerly the Research Bulletin and Annual Report were printed by a commercial firm. The new machine requires no additional staff. At present, the Finance and Publications Clerk-Steno (Ms Cornford) operates the machine, while other Secretariat personnel are being trained. Leasing the typesetter has enabled the Secretariat to reduce the advance estimates for publications from \$25,000 in 1977/78 to \$12,000 in 1978/79. Cost of leasing and maintaining the typesetter

is \$5,610. The Secretariat now has full control over all printing and can avoid the delays encountered in dealing through commercial printers.

In the year 1977/78, the Secretariat printed and distributed approximately 2.8 million pages of print included in the following:

The *Proceedings of the Ninth Special Meeting, December 1976, and the 27th Annual Meeting, June 1977* (172 p.) was distributed in September 1977.

The *Annual Report (formerly Annual Proceedings) Vol. 26, for 1975/76* (139 p.), containing the Administrative Report and Financial Statements for the fiscal year ending 30 June 1976, the Reports of the Seventh Special Meeting, September 1975, the Eighth Special Meeting, January 1976, the 26th Annual Meeting, June 1976, and the Summaries of Research and Status of Fisheries for Subareas and Seals, 1975, was distributed in September 1977.

The *Annual Report Vol. 27, for 1976/77* (84 p.), containing the Administrative Report and Financial Statements for the fiscal year ending 30 June 1977, the Reports of the Ninth Special Commission Meeting, December 1976 and the 27th Annual Meeting, June 1977, and the Summaries of Research and Status of Fisheries for Subareas and Seals, 1976, was distributed in May 1978.

The *Redbook 1977* (116 p.), containing the Reports of the Standing Committee on Research and Statistics (STACRES) for December 1976, May-June 1977, and the Reports of the Scientific Advisers to Panels 1-4 and A (Seals) for May-June 1977, was distributed in August 1977.

The *Research Bulletin of ICNAF No. 13* (90 p.), containing seven scientific contributions, will be distributed in July 1978.

The *Statistical Bulletin Vol. 26, for 1976* (236 p.), containing tabular summaries of fish and seal catches 1962-76, and eight tables of catch and effort statistics for fish and seals, 1976, was distributed in January 1978.

The *Selected Papers of ICNAF No. 3* (117 p.), containing 13 scientific papers and a List of ICNAF Standard Oceanographic Sections and Stations, was distributed in March 1978.

The *Selected Papers of ICNAF No. 4* (76 p.), containing 11 scientific papers on shrimp, will be distributed in August 1978.

The *Sampling Yearbook Vol. 20, for 1975* (46 p.), containing information on the ICNAF sampling program, notes on sampling data, list of sampling data for commercial fisheries, 1975, and list of sampling data for research vessel surveys, 1975, was distributed in February 1978.

The *Report of the Special Meeting of STACRES on Seals and Shrimp, November 1977* (19 p.) was distributed as *ICNAF Sum. Doc. 78/VI/1*.

The *Report of the Ninth Session of the Coordinating Working Party on Atlantic Fisheries Statistics (CWP), August 1977* (40 p.) was distributed as *ICNAF Sum. Doc. 78/VI/2*.

The *Report of the Special STACRES Meeting on Squid, February 1978* (15 p.) was distributed as *ICNAF Sum. Doc. 78/VI/3*.

The *Report of the Silver Hake Ageing Workshop, March 1978* (10 p.) was distributed as *ICNAF Sum. Doc. 78/VI/10*.

The *Report of the Assessments Subcommittee, April 1978* (30 p.) was distributed as *ICNAF Sum. Doc. 78/VI/16*.

The *1977/78 (to November 1977) ICNAF Fishery Regulations* (64 p.) was distributed as *ICNAF Com. Doc. 78/VI/1*.

The *Report of the Diplomatic Conference on Future Multilateral Cooperation in the Northwest Atlantic Fisheries, October 1977* (97 p.) was distributed as *ICNAF Com. Doc. 78/VI/4*.

The *Status of Commission Proposals for Changes in the Convention and for International Regulation of the Fisheries under the Convention* (as of 1 May 1977) (24 p.) was distributed as *ICNAF Com. Doc. 78/VI/8*.

6. The Commission's Research and Statistics Program

a) Fisheries statistics

At the 1976 Annual Meeting, STACRES adopted a new revised STATLANT 21B form for the reporting of detailed catch and effort statistics by 30' x 30' unit areas and twice-monthly time periods. However, in the light of the implementation of coastal state jurisdiction over fisheries to 200 miles in 1977 and the uncertainty about the requirements of the coastal states for detailed catch and effort statistics for assessment and management purposes and noting that the new ICNAF

requirement might be a duplication, STACRES agreed that countries not be required to report by 30' x 30' unit areas and twice-monthly time periods for 1976 and 1977 but that they continue to complete STATLANT 21B in accordance with previous practices. Immediately after the 1977 Annual Meeting, all countries were notified by cable and also by circular letter of the change in requirement for reporting 1976 statistics on STATLANT 21B forms.

Pending the publication of *Statistical Bulletin Vol. 26*, provisional statistics of 1976 nominal catches in the Northwest Atlantic, as derived from STATLANT 21A returns and other advance reports, were compiled and circulated in later June 1977 [ICNAF Sum. Doc. 77/VI/29 (Rev.)]. Much of the 6-month delay from the 30 June deadline for the receipt of detailed catch and effort data and the actual printing of the Statistical Bulletin continues to be due to the late submission of STATLANT 21B statistics by a few countries. While most countries generally submit their catch and effort data in the detail specified in the instructions for completing the STATLANT 21B forms, the reports from some countries continue to lack fishing effort data and an adequate breakdown of catches by species, division, month, gear, etc. The arrangement of the tabular material in Vol. 26 (issued in January 1978) is essentially the same as that used following the major reorganization of the tables in Vol. 22. In addition to the 1976 data, part IV of Vol. 26 contains five tables of amended and additional statistics pertaining to data published in previous issues of the Bulletin.

Since 1975, the Assessments Subcommittee has been meeting annually in April to review the status of the various stocks, to update assessments and to advise the Commission on total allowable catches in advance of its Annual Meeting in June. This procedure for stock assessments requires the reporting of preliminary catch statistics and sampling data by month and division for selected species in advance of the April Meeting in order to facilitate pre-meeting processing of the data preparatory to their use in assessments. As in previous years, the Secretariat made special requests to national scientists to ensure that all bio-statistical data relevant to the assessments be forwarded to designated experts and to the Secretariat about 6 weeks in advance of the April 1978 Meeting. Despite several reminders to countries about the urgency and need for data, much of the information required was not available until the meeting was in progress, and even then some data were not provided in the required format and the monthly catches of some countries in 1977 were not available. In fact, there was an obvious deterioration in the promptness of reporting and in the quality of the data reported for the April 1978 Meeting of the Subcommittee, despite the fact that all countries have been provided with detailed

instructions for the submission of data in each of the past five years (e.g. Circular Letter 78/23). This lack of attention to STACRES requirements continues despite the Commission's frequent urging that Member Countries provide their statistical offices and research institutes with the facilities necessary to collect and report promptly to the Secretariat such data as are required to improve the assessments of all stocks subject to conservation measures.

During 1977/78, the Secretariat has continued its program of updating national fisheries statistics of previous years as amendments and additions are reported, and preparing the data for rapid retrieval through the Secretariat's remote job entry terminal which has direct access to an IBM 370/155 computer. The data-processing capabilities at the Secretariat was enhanced during the year through the employment of a computer programmer for about 6 months.

b) Sampling data

Following the decision of STACRES to discontinue the publication of detailed sampling data after 1972, *Sampling Yearbook Vol. 18* (1973) and subsequent issues contain lists of all length and age data submitted to the Secretariat. The list of available data for 1975 was initially issued in ICNAF Sum. Doc. 77/VI/5 and subsequently published in *Sampling Yearbook Vol. 20* (issued in March 1978). The delay in final publication of 1975 data in Vol. 20 was due in part to the large volume of data being prepared for computer processing but also to the tardiness by some countries in responding to requests for revisions following the preparation of the initial list of 1975 data in ICNAF Sum. Doc. 77/VI/5. Pending the final compilation of 1976 data for presentation in Vol. 21, a provisional list of 1976 data was issued as *ICNAF Sum. Doc. 78/VI/4*.

To facilitate the rapid retrieval of sampling data for distribution to scientists involved in the Commission's work, much time during the past 3 years has been devoted to setting up a computerized retrieval system and in organizing the large volume of data available for 1973-76. Following a concerted effort to upgrade data-processing procedures, all of the 1973-76 data have been punched on computer cards, most of the data have been edited, and computer programs prepared for data retrieval. Computer printouts of monthly length and age frequencies, quarterly age-length keys and mean length-at-age data are available upon request to scientists or research institutes involved in the Commission's work.

c) CWP activities relevant to ICNAF

The Ninth Session of the CWP was held at ICNAF Headquarters during 17-23 August 1977, with the

Assistant Executive Secretary and the Chairman of the Statistics and Sampling Subcommittee participating on behalf of ICNAF (*ICNAF Sum. Doc. 78/VI/2*). Among the wide range of matters discussed, the following are of direct importance to ICNAF:

- i) The CWP recommended that ICNAF should extend its northern boundary of Statistical Area 0 to take account of catches reported from waters north of Statistical Area 0. Subsequently, at its November 1977 Meeting, STACRES agreed to the extension of Statistical Area 0 such that its boundaries would coincide with those of Subarea 0 as proposed in the Convention of the new organization to replace ICNAF.
- ii) The CWP noted that recreational fishing has become a significant aspect of the social and economic life of many countries and recommended that regional agencies should draw the attention of their member countries to the value of collecting catch and effort statistics for such fisheries.
- iii) The CWP noted that regional agencies have for some time been attempting to obtain adequate statistics on discards but without much success. The problem was discussed in detail and priorities established for the reporting of discard data by national offices. In particular, it was noted that statistics on discards should be collected and reported in the same detail as required for nominal catch statistics on STATLANT B forms.
- iv) With the extension of national jurisdiction over fisheries, it was anticipated that increasing use will be made of logbooks in the management of fisheries. No proposal for a standard logbook was made since national considerations could greatly affect the format and different fisheries might require different forms of logsheets. However, the CWP identified a list of standard elements essential to the fishing logbook (*ICNAF Sum. Doc. 78/VI/2*, p. 17-18) and recommended that the design of logbooks should be based on these requirements.

d) Index and list of titles

Following the publication in 1975 of *Special Publication No. 11*, containing an index and list of titles for ICNAF publications (except meeting documents), considerable progress has now been made on the compilation of a similar index for the Meeting

Document series covering the period 1950-75, and it is anticipated that this index will be completed by the end of 1978. In the meantime, however, a provisional index and list of titles for meeting documents and other ICNAF publications issued in 1976 has been completed (*ICNAF Sum. Doc. 78/VI/18*).

e) Other activities

Other research and statistical activities of the Secretariat during the year 1977/78 include:

- i) editing of the Reports of STACRES Meetings in December 1976 and May-June 1977 for publication in *Redbook 1977*;
- ii) editing of 14 papers selected by STACRES from documents presented to the 1977 Annual Meeting for publication in *Selected Papers No. 3*;
- iii) editing of 11 papers on shrimp from documents presented to the STACRES Meetings in 1976 and 1977 for publication in *Selected Papers No. 4*;
- iv) editing of six papers refereed for publication in *Research Bulletin No. 13*;
- v) updating of historical catches (1967-76) by country for all stocks under regulation in the Northwest Atlantic;
- vi) documentation of various biostatistical material required for scientific meetings at Dartmouth, Canada, in November 1977 and April 1978, and at Havana, Cuba, in February 1978; and
- vii) preparation of several documents for the 1978 Annual Meeting, including list of fishing vessels for 1976; provisional catch statistics for 1977 by species, country and division; seal catch and effort data for 1977; information on discards for 1976; summary of information on tagging activities by Member Countries in 1977; analysis of sampling data for 1976 in relation to the minimum sampling requirements.

7. Mid-Term Meetings

The *Special STACRES Meeting on Shrimp and Seals* met at ICNAF Headquarters, Dartmouth, Canada, 15-18 November 1977, under the chairmanship of Dr A. W. May (Canada), to review, at the request

of the Commission, conservation measures for the northern deepwater prawn stock in Subarea 1 and Statistical Area 0, and to provide, at the request of Canada, advice for management of the seal stocks (*ICNAF Sum. Doc. 78/VI/1*). An *ad hoc* Working Group on Shrimp, convened by Mr A. T. Pinhorn (Canada), found a critical lack of knowledge on the various parameters essential to proper assessment of the stocks and could not recommend any change in the TAC for 1978 from the 40,000-ton (including discards) limit for 1977. An *ad hoc* Working Group on Seals, convened by Dr A. W. Mansfield (Canada), completed a critical assessment of two population models presented and applied the most stable to project population trends of age 1+ harp seals in the Front and Gulf under various levels of pup production and projected catches as advice to Canada.

The *Special STACRES Meeting on Squid* met in Havana, Cuba, 13–18 February 1978, under the chairmanship of Dr A. W. May (Canada), to provide advice, at the request of Canada, on the scientific basis for the management of the stocks of squid, *Illex*, within national fishery limits of Subareas 3 and 4 (*ICNAF Sum. Doc. 78/VI/3*). After examining the data, the Standing Committee favoured, in principle, effort regulation as a means on controlling the exploitation rate in the *Illex* fishery, and that the implementation of a TAC should be conditional on the control of the fishing effort. Further and detailed studies were recommended.

The *Ageing Workshop on Silver Hake* was convened by Mr J. J. Hunt (Canada) at Fisheries and Marine Service, Marine Fisheries Division, Dartmouth, Canada, 28–31 March 1978, to continue comparative interpretation of otoliths, to identify sources of difference, to review new research, and to recommend specific studies related to ageing problems not solved by otolith interpretation (*ICNAF Sum. Doc. 78/VI/10*). The Workshop established sources of different estimates of age as (1) weak hyaline zones which accounted for 10–15% variance between and within age readers, and (2) the tendency to anticipate patterns of early growth by area. It was agreed that a continuing exchange of otoliths would be adequate to monitor any changes or developing bias by individual age readers.

The *Assessments Subcommittee Meeting (ICNAF Sum. Doc. 78/VI/6)* of STACRES was convened at ICNAF Headquarters, Dartmouth, Canada, from 4 to 11 April 1978 and prepared advice for 1978 at the request of Canada and the EEC on 23 stocks which lie within or partly within the Canadian or Danish 200-mile fisheries management zones. Advice was also provided on the cod, American plaice and redfish stocks which lie

completely outside the 200-mile fishery limits of the coastal states in Div. 3M. Working groups convened by Dr E. C. Lopez-Veiga (Spain) and Dr G. H. Winters (Canada) reviewed relevant stocks of cod, redfish, silver hake, American plaice, witch flounder, yellowtail flounder, Greenland halibut, roundnose grenadier, argentine, capelin, squid (*Illex*) and shrimp.

8. Status of Commission Proposals

a) For changes in the Convention (*ICNAF Com. Doc. 78/VI/8*, Tabulation I)

The *1973 Protocol Relating to Basic Payment by Contracting Governments* has, to date (1 May 1978), only been approved by Canada, Cuba, France, Federal Republic of Germany, Norway, and Portugal. In accordance with amended Convention Article XVII, this Protocol will take effect for all Contracting Governments 120 days following the date on the notification by the Depositary Government of receipt of written notification of approval of three quarters (12) of all Contracting Governments, unless objected to within 90 days.

The *1976 Protocol Relating to Continued Functioning of the Commission* has, to date (1 May 1978), only been approved by Canada, Cuba, Denmark, GDR, Iceland, Norway, Romania, USSR, and UK.

b) For international regulation of the fisheries (*ICNAF Com. Doc. 78/VI/8*, Tabulation II)

December 1976 Proposals (1) and (3) to (10) became effective for all Contracting Governments 17 June 1978. Proposal (2), re mesh size regulation for northern deepwater prawn, in accordance with paragraph 4, did not enter into force until 1 January 1978.

June 1977 proposal (1) regarding catch quota regulations for stocks in Subareas 2, 3, and 4 was adopted by the Commission on 10 June 1977, transmitted to Depositary Government on 17 June 1977, and transmitted to Contracting Governments on 24 June 1977. The proposal became effective for all Contracting Governments on 24 December 1977, under the normal 6-month waiting procedure.

9. The Commission's Conservation Program

a) Catch quota reporting

In accordance with a resolution adopted by the Commission on 14 June 1974, Contracting Governments were required to submit provisional

monthly catch statistics for each of the 65 stocks under catch quota regulation, as determined for 1977 during the 1976 Annual and December 1976 Special Meetings of the Commission. The majority of the Contracting Governments were unable to meet the deadline for reporting their catch within a month of the month of catch. As a consequence, collation and distribution of the monthly catches by the ICNAF Secretariat was often delayed and more often incomplete. One Contracting Government failed to submit any catch reports for 1977.

Extension of jurisdiction over fisheries by the coastal states Members of the Commission to 200 miles offshore in the Northwest Atlantic in 1977 has limited the Commission's jurisdiction to those fisheries which lie outside the coastal state jurisdiction. Therefore, during 1977, the ICNAF Secretariat only advised Contracting Governments of where and how much countries intended to fish from the "Others" catch allocations for the stocks of cod, redfish, and American plaice in Div. 3M (Flemish Cap). Advice was also given when catch quotas in Div. 3M for "Others" were reached and closure required, and when nationals advised that their catch allocation had been reached and they had ceased fishing.

Timeliness in provisional monthly catch reporting to the Secretariat improved somewhat in 1978 as Contracting Governments became better organized to meet the additional administrative and reporting requirements of the new jurisdictional reality in the Northwest Atlantic area.

b) Effort limitation

No regulations for the limitation of effort were adopted by the Commission for application in its zone of jurisdiction in 1978.

10. The Commission's Enforcement Scheme

Outside the 200-mile zone and mainly in Div. 3M (Flemish Cap), the Commission's program of enforcement has been, in 1977, implemented solely by Canadian surveillance by ship and aircraft and inspection at sea from ships. Canadian surveillance reported 346 vessel sightings. Canadian ICNAF inspectors made 67 inspections and recorded 11 incidents of irregularity. Three vessels were found using small mesh of trawl nets, five vessels were using illegal double codends, and three vessels were cited for fishing after the fishery had been closed.

Through 1977 and into 1978, fishing activity increased dramatically and uncontrolled outside the 200-mile zone in Div. 3M (Flemish Cap) where data from inspectors' reports gave evidence of overfishing

catch quotas and neglect by some Contracting Governments to notify their intention to fish under the "Others" allocation and to report their catch in 100-ton increments.

As a consequence, surveillance and inspections have been stepped up by Canada who, over the period from 1 January to 30 April 1978 alone, reported 596 vessel sightings and 10 inspections. Two vessels were found using trawl nets with illegal size of meshes. Reports of inspections carried out were received from Canada for the year 1977. Reports on national and international infringements and their disposition for 1977 are contained in *ICNAF Com. Doc. 78/VI/9*.

Information required by the Commission in accordance with its September 1975 Meeting's decisions for the registration of vessels engaged in fishing or in the treatment of sea fish outside national fishery jurisdiction was provided by most Contracting Governments for 1977.

Circular letters from the Secretariat regularly updated the status of implementation of the Enforcement Scheme and reported changes in inspection officers and vessels.

Contracting Governments have, when necessary, supplied the Secretariat with information on new fishery research vessels and their planned activities.

11. Cooperation with Other International Organizations and with Non-Member Countries

In accordance with Convention Article X, the Secretariat has continued to maintain close working arrangements with other public international organizations with related objectives. Invitations were extended to non-Member Countries and other international fishery bodies to participate in an observer status in all meetings of the Commission or its Standing Committee on Research and Statistics.

Close collaboration continues in the development of common statistical procedures in Atlantic fisheries with the Department of Fisheries of the Food and Agriculture Organization of the United Nations (FAO), the International Council for the Exploration of the Sea (ICES), the International Commission for the Conservation of Atlantic Tunas (ICCAT), and the International Commission for the Southeast Atlantic Fisheries (ICSEAF) through the CWP.

The Commission is contributing financially to the Symposium on the Biological Basis of Pelagic Fish

Stock Management to be held at Aberdeen, Scotland, 3-7 July 1978.

A Special Session on the Theory and Application of Sampling Systems and Statistical Data Analysis in Fisheries Science will be held in conjunction with the October 1978 meeting of ICES and co-chaired by the Chairmen of the ICES Statistics Committee and of the ICNAF Standing Committee on Research and Statistics.

The Commission is cooperating with ICES in the early planning for the Second International Symposium on the Early Life History of Fish, Woods Hole, Massachusetts, USA, April 1979.

12. Financial Matters

The International Fisheries Commissions Pension Society (IFCPS) continues to expend considerable expertise and effort in attempting to make its retirement and other plans compatible with both the Canadian and US Civil Service plans.

The IFCPS's early retirement supplemental pension plan based on the attainment of age 60 and with 20 years of service (60/20 plan), as approved by the Commissions, was formally approved by the Sun Life Assurance Company and by IFCPS on 26 September 1977 to be effective 1 October 1976.

Annual upgrading of pension credits to the 1974 earnings level was completed on 1 October 1977.

At the May 1978 Annual Meeting of the Society, suggestions for the development of a 55/30 early retire-

The Chairman and Members,
International Commission for the
Northwest Atlantic Fisheries.

I have examined the balance sheet of the International Commission for the Northwest Atlantic Fisheries as at 30 June 1978 and the statements of receipts and expenditures - General Fund, budget appropriations, expenditures and balances of appropriations - General Fund, changes in financial position - General Fund, statement of principal - Working Capital Fund and statement of principal - Miscellaneous Fund for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

I have been unable to confirm or otherwise verify the collectibility of a contribution receivable from a member government aggregating \$ 31,599. Had the Commission provided for the non-collectibility of this account the balance of appropriations and principal of the Working Capital Fund would have been reduced by \$ 31,599.

In my opinion, except for the failure to provide for the possible non-collectibility of the receivable referred to in the preceding paragraph, these financial statements present fairly the financial position of the Commission as at

ment plan, for changes in the Group Life policy and Long-Term Disability policy benefit ceilings, for changes in the procedure for calculating the initial cost of living adjustment an annuitant will receive, and for clarification of some aspects of the reciprocal transfer agreement will be considered.

The Auditor General of Canada completed his examination of the financial statements of the Commission for the year ended 30 June 1977. Copies of the Auditor General's report were sent to Heads of Delegations of Member Governments on 27 April 1978. No serious deficiencies in either internal control or compliance with the Commission Rules or Regulations were noted. At the suggestion of the Auditor General, insurance protection on furniture and equipment (both owned and leased) was reviewed and increased to \$100,000 from \$50,000 effective 1 May 1978.

13. Financial Statements for the Fiscal Year Ended 30 June 1978

The accounts of the Commission for the year ended 30 June 1978 showed that Can \$425,000 was appropriated by the Commission for ordinary expenses. The amount included a surplus transferred to the Working Capital Fund of \$51,803.

Obligations incurred during the fiscal year totalled Can \$373,197.

In accordance with the Financial Regulations of the Commission, an audit of the Commission's finances was completed on 10 August 1978 by the Office of the Auditor General of Canada. The report of the Auditor General reads as follows:

30 June 1978 and the results of its operations and changes in its financial position for the year then ended in accordance with the accounting policies set out in Note 3 applied, after giving retroactive effect to the change in accounting policy as described in Note 4, on a basis consistent with that of the preceding year.

In compliance with the requirements of Financial Regulation 8.2, I certify that, in my opinion,

- (a) the financial statements are in accord with the books and records of the Commission;
- (b) the financial transactions reflected in the statements have been in accordance with the rules and regulations, the budgetary provisions, and other applicable directives; and
- (c) the monies on deposit and on hand have been verified by certificate received direct from the Commission's depositories or by actual count.

Ottawa, Ontario
10 August 1978

Auditor General of Canada
(Signed J. J. Macdonell)

Balance Sheet as at 30 June 1978
(Expressed in Canadian dollars)

Assets		Liabilities			
	1978	1977		1978	1977
General Fund					
Cash	\$ 73,510	\$ 49,446	Accounts payable and accrued liabilities	\$ 16,190	\$ 21,519
Accounts receivable	3,120	677	Contribution overpayments by member governments	10,114	8,784
Contributions receivable from member governments	74,377	42,577	Amount owing to Working Capital Fund	84,446	21,863
			Amount owing to Miscellaneous Fund	40,257	40,534
	<u>\$ 151,007</u>	<u>\$ 92,700</u>		<u>\$ 151,007</u>	<u>\$ 92,700</u>
Working Capital Fund					
Certificates of deposit	\$ 20,000	\$ 20,000	Provision for employee termination benefits (Note 4)	\$ 38,000	\$ 30,300
Accounts receivable	817	2,060	Principal of fund (Note 6)	68,235	14,473
Accrued interest receivable	972	850			
Amount receivable from General Fund	84,446	21,863			
	<u>\$ 106,235</u>	<u>\$ 44,773</u>		<u>\$ 106,235</u>	<u>\$ 44,773</u>
Miscellaneous Fund					
Amount receivable from General Fund	\$ 40,257	\$ 40,534	Principal of fund	\$ 40,257	\$ 40,534

The accompanying notes are an integral part of the financial statements.

Certified correct,

Executive Secretary,
(Signed L. R. Day)

Statement of Receipts and Expenditures—General Fund for the year ended 30 June 1978

(Expressed in Canadian dollars)

	<u>1978</u>	<u>1977</u>
Receipts		
Members' contributions (Note 7)	\$ 384,466	\$ 313,658
Transfer from Miscellaneous Fund	40,534	54,842
Transfer from Working Capital Fund	5,000	—
	<u>430,000</u>	<u>368,500</u>
Expenditures		
(See attached Statement of Budget Appropriations, Expenditures, and Balances of Appropriations—General Fund)	<u>378,197</u>	<u>362,051</u>
Excess of Receipts over Expenditures for the year (transferred to Working Capital Fund)	<u>\$ 51,803</u>	<u>\$ 6,449</u>

The accompanying notes are an integral part of the financial statements.

Statement of Budget Appropriations, Expenditures, and Balances of Appropriations - General Fund for the year ended 30 June 1978

(Expressed in Canadian dollars)

	1978			1977		
	<u>Budget Appropriations</u>	<u>Expenditures</u>	<u>Balances of Appropriations</u>	<u>Budget Appropriations</u>	<u>Expenditures</u>	<u>Balances of Appropriations</u>
Personal services:						
Salaries	\$ 235,000	\$ 217,973	\$ 17,027	\$ 197,000	\$ 183,957	\$ 13,043
Salary contingencies	14,000	8,000	6,000	17,000	20,202	(3,202)
Employee benefits	10,000	19,821	(9,821)	14,500	14,572	(72)
Additional help	2,000	7,721	(5,721)	2,000	10,000	(8,000)
Travel	6,000	4,119	1,881	5,500	4,633	867
Transportation	1,000	460	540	1,500	506	994
Communication services	25,000	16,411	8,589	20,000	19,714	286
Publications	25,000	10,383	14,617	22,000	15,247	6,753
Other contractual services	20,000	23,439	(3,439)	20,000	19,343	657
Material and supplies	12,000	11,587	413	9,000	10,297	(1,297)
Equipment	5,000	4,576	424	5,000	3,611	1,389
Annual and mid-term meetings	25,000	22,927	2,073	20,000	33,491	(13,491)
Computer services	35,000	25,780	9,220	25,000	26,478	(1,478)
Contingencies	10,000	—	10,000	10,000	—	10,000
	<u>425,000</u>	<u>373,197</u>	<u>51,803</u>	<u>368,500</u>	<u>362,051</u>	<u>6,449</u>
Balance of appropriations transferred to Working Capital Fund	51,803	—	51,803	6,449	—	6,449
	<u>373,197</u>	<u>373,197</u>	<u>—</u>	<u>362,051</u>	<u>362,051</u>	<u>—</u>
Appropriated from Working Capital Fund for publications of Pelagic Fish Symposium Report	5,000	5,000	—	—	—	—
	<u>\$ 378,197</u>	<u>\$ 378,197</u>	<u>\$ —</u>	<u>\$ 362,051</u>	<u>\$ 362,051</u>	<u>\$ —</u>

The accompanying notes are an integral part of the financial statements.

Statement of Changes in Financial Position—General Fund for the year ended 30 June 1978

(Expressed in Canadian dollars)

	<u>1978</u>	<u>1977</u>
Source of cash		
Member government contributions	\$ 384,466	\$ 313,658
Transfer from Working Capital Fund	5,000	—
Transfer from Miscellaneous Fund	40,534	54,842
Decrease in accounts receivable	—	425
Decrease in contributions receivable from member governments	—	7,198
Increase in accounts payable	—	5,815
Increase in contribution overpayments by member governments	1,330	—
Increase in amount owing to Working Capital Fund	62,583	19,705
	<u>493,913</u>	<u>401,643</u>
Use of cash		
Expenditures	378,197	362,051
Increase in accounts receivable	2,443	—
Increase in contributions receivable from member governments	31,800	—
Decrease in accounts payable	5,329	—
Decrease in contribution overpayments by member governments	—	253
Decrease in amount owing to Miscellaneous Fund	277	14,308
Balance of appropriations transferred to Working Capital Fund	51,803	6,449
	<u>469,849</u>	<u>383,061</u>
Increase in cash	24,064	18,582
Cash—beginning of the year	49,446	30,864
Cash—end of the year	<u>\$ 73,510</u>	<u>\$ 49,446</u>

The accompanying notes are an integral part of the financial statements.

Statement of Principal — Working Capital Fund for the year ended 30 June 1978

(Expressed in Canadian dollars)

	<u>1978</u>	<u>1977</u>
Principal of Fund—beginning of the year		
As previously reported	\$ 44,773	\$ 27,244
Provision for employee termination benefits relating to prior years (Note 4)	(30,300)	(25,972)
As restated	<u>14,473</u>	<u>1,272</u>
Add:		
Revenue:		
Bank interest	5,835	6,376
Interest on certificates of deposit	1,911	1,988
Sales of publications	<u>1,888</u>	<u>2,716</u>
	9,634	11,080
Unexpended balances of prior years' special appropriations	5,025	—
Balance of appropriations transferred from General Fund	<u>51,803</u>	<u>6,449</u>
	<u>66,462</u>	<u>17,529</u>
Deduct:		
Transfer to General Fund for Symposium on Pelagic Fish	(5,000)	—
Provision for employee termination benefits—current year	<u>(7,700)</u>	<u>(4,328)</u>
	<u>(12,700)</u>	<u>(4,328)</u>
	<u>53,762</u>	<u>13,201</u>
Principal of Fund—end of the year	<u>\$ 68,235</u>	<u>\$ 14,473</u>

The accompanying notes are an integral part of the financial statements.

Statement of Principal - Miscellaneous Fund for the year ended 30 June 1978

(Expressed in Canadian dollars)

	<u>1978</u>	<u>1977</u>
Principal of Fund—beginning of the year	\$ 40,534	\$ 54,842
Transfer to General Fund	<u>(40,534)</u>	<u>(54,842)</u>
Additions to Fund (Note 5)	—	—
Grant from Province of Nova Scotia	11,989	10,338
Levy in lieu of Canadian personal income tax	<u>28,268</u>	<u>30,196</u>
Principal of Fund—end of the year	<u>\$ 40,257</u>	<u>\$ 40,534</u>

The accompanying notes are an integral part of the financial statements.

Notes to the Financial Statements 30 June 1978

1. Objectives and Operations of the Commission

The International Commission for the Northwest Atlantic Fisheries (ICNAF) was established under a convention signed by eleven countries in 1949.

The objective of the Commission is the investigation, protection and conservation of the fisheries of the Northwest Atlantic Ocean. At present, the Commission is comprised of seventeen member governments that finance operations on the basis of each country's fishing activity in the Northwest Atlantic.

With the declaration of 200-mile offshore zones by the states, ICNAF's regulatory responsibilities are now restricted to areas lying outside those territorial waters.

Recognizing this changing status of the Northwest Atlantic fisheries the Commission at its annual meeting in June 1977 presented a suggested timetable by which a new Convention establishing the Northwest Atlantic Fisheries Organization would come into effect on 1st January 1979. The present Commission's operations would cease on 31st December 1979.

The purpose of the proposed Convention is to establish a firm basis in treaty law for the continuation of multilateral co-operation in Northwest Atlantic fisheries within a framework that is specifically tailored to the new regime of extended coastal state jurisdiction.

2. Purpose of Funds

The Commission operates three separate funds:

- a General Fund to record member country contributions and operating expenditures;
- a Working Capital Fund to record sales of publications, bank interest, refunds of prior period expenditures, balances of appropriations remaining in the General Fund at year-end, and the initial levy of \$ 1000 paid by contracting countries;
- a Miscellaneous Fund to record initial annual payments from new contracting governments and any other monies received for which the disposition is not specified above.

3. Significant Accounting Policies

Inventories

In order to meet possible future needs of scientists, the Commission prints more copies of each of its publications than are currently required by member governments. The costs of these extra copies are charged as current expenses.

Fixed assets

Office furniture and equipment are expensed when purchased.

4. Change in Accounting Policy

During the year, the Commission adopted the policy of recording a provision for employee termination benefits in its accounts. Previously, such termination benefits had been expensed in the year of payment, although during 1978 and 1977 no such payments were necessary. This change in accounting policy has been applied retroactively and previous years' financial statements have been restated. The total provision for employee termination benefits

as at 30 June 1978, amounted to \$ 38,000, of which \$ 7,700 is applicable to the year ended 30 June 1978, and has been charged to the Statement of Principal - Working Capital Fund for the year then ended. Of the remaining \$ 30,300, \$ 4,328 is applicable to the year ended 30 June 1977, and, as above, has been charged to the Statement of Principal - Working Capital Fund for that year while \$ 25,972 is applicable to years prior to 1 July 1976, and has been applied to reduce the Principal of the Working Capital Fund at that date, previously reported as \$ 27,244.

5. Personal Income Taxes

Federal

According to an Order in Council P.C. 1967-2313 issued by the Government of Canada, the Commission comes under the jurisdiction of the Convention on the Privileges and Immunities of the United Nations. Article V, Section 18(b) of this Convention exempts officials of United Nations organizations from federal taxation on the salaries and emoluments paid to them by the United Nations. Accordingly, ICNAF deducts and credits to the Miscellaneous Fund an amount equal to the Canadian federal income tax that would be assessed on staff remuneration.

Provincial

ICNAF deducts provincial income taxes from the salaries of its employees and remits amounts deducted on a regular basis to government authorities. At the end of each calendar year ICNAF applies to the Province of Nova Scotia for an ex gratia grant equal to the amount of provincial personal income taxes paid by its employees. Such grants are recorded in the Miscellaneous Fund as they are received.

6. Transfers of Principal - Working Capital Fund

Under authority of Financial Regulation 4.7 appropriations of funds deemed to be in excess of the needs of the Working Capital Fund can be transferred to the Miscellaneous Fund. The Commission at its annual meeting on 6 June 1978 authorized the transfer of \$ 26,000 from the Working Capital Fund to the Miscellaneous Fund for each of the fiscal years 1978-1979 and 1979-1980.

7. Members' Contributions Assessed

	1978	1977
Bulgaria	\$ 18,411	\$ 14,347
Canada	30,324	23,582
Cuba	24,368	18,965
Denmark	24,368	18,965
France	30,324	23,582
Federal Republic of Germany	24,368	18,965
German Democratic Republic	18,411	14,347
Iceland	12,454	9,729
Italy	6,497	5,112
Japan	18,411	14,347
Norway	24,368	18,965
Poland	30,324	23,582
Portugal	24,368	18,965
Romania	18,411	14,347
Spain	30,324	23,582
Union of Soviet Socialist Republics	30,324	23,582
United Kingdom	18,411	14,347
United States of America	—	14,347
	<u>\$ 384,466</u>	<u>\$ 313,658</u>

8. Occupancy Expenses

Occupancy expenses, which include rent, heat, taxes and electricity related to the Commission's premises in Dartmouth, Nova Scotia aggregated \$ 43,791 for the year ended 30 June 1978 (1977 - \$ 38,855). These amounts are paid directly by the Canadian Department of Public Works and accordingly are not reflected in the Commission's accounts.

9. Comparative Figures for 1976-77

Certain figures for 1977, presented for comparative purposes, have been restated to conform to the 1978 presentation.

PART 2

Report of the 28th Annual Meeting of the International Commission for the Northwest Atlantic Fisheries, Bonn-Bad Godesberg, Federal Republic of Germany 30 May-6 June 1978

1. Introduction

Under the terms of a Convention signed in 1949, ICNAF is responsible for the investigation, protection and conservation of the fisheries of the Northwest Atlantic in order to make possible the maintenance of a maximum sustained catch from these fisheries. Based on the results of scientific investigations, promoted and coordinated by the Commission, and on economic and technical considerations, measures to achieve the optimum utilization of the stocks of those species of fish which support international fisheries in the Convention Area are recommended to the 17 Contracting Governments.

The Commission has six panels, five of which review the fisheries and recommend conservation measures in geographic subareas of the Convention Area (Subarea 1, off West Greenland; Subarea 2, off Labrador; Subarea 3, off East and South Newfoundland; Subarea 4, the Gulf of St. Lawrence and Nova Scotia banks; and Subarea 5, the Gulf of Maine). The sixth panel has jurisdiction respecting harp and hooded seals in the Convention Area.

The Commission has Standing Committees on Research and Statistics (STACRES), on Finance and Administration (STACFAD), on Regulatory Measures (STACREM), and on International Control (STACTIC).

Efforts by ICNAF Member Countries, the European Economic Community (EEC), and USA continued in 1977 and 1978 in an attempt to obtain agreement on a new Convention to ensure the continuation of multilateral cooperation in Northwest Atlantic fisheries within the framework of the new regime of extended coastal state jurisdiction. A second preparatory meeting in June 1977 and a Diplomatic Conference in October 1977 failed to result in agreement being reached on all Articles and Annexes. As a result, Canada convened an informal meeting of experts from the ICNAF Member Countries and from the EEC and USA in early May 1978. Consensus was reached on most Articles of the new Convention.

Where consensus was not reached the majority decision was recorded. Canada proposed circulating the resultant text for affirmation of acceptance and of whether the Convention should be opened for signature.

2. Time and Place of Meeting

The 28th Annual Meeting of the Commission was convened in the Kleiner Saal of the Stadthalle in Bonn-Bad Godesberg, Federal Republic of Germany (FRG), from 30 May to 6 June 1978, under the chairmanship of Dr D. Booss (FRG).

The Standing Committee on International Control (STACTIC) met, under the chairmanship of Dr A. W. H. Needler (Canada), on 29 May 1978 at Bonn-Bad Godesberg, FRG, and reviewed implementation of the Scheme of Joint International Enforcement, the annual returns of inspections, infringements, and their disposition for 1977, the notification of research vessels and registration of fishing vessels. A further meeting was held on 5 June to review the report of a working group which met on 1 and 5 June, under the chairmanship of Mr L. Riche (Canada), to consider possible improvements to the Scheme of Joint International Enforcement.

The annual meeting of the Standing Committee on Research and Statistics (STACRES) and its Subcommittees was convened from 18 to 28 May 1978 and on 2 June 1978 at Bonn-Bad Godesberg, FRG, under the chairmanship of Dr E. C. Lopez-Veiga (Spain). Special meetings of STACRES were held, under the chairmanship of Dr A. W. May (Canada), during 15-18 November 1977 at Dartmouth, Canada, on northern deepwater prawn (= shrimp) in Subarea 1 and Statistical Area 0 and on seals in the "Gulf" and "Front" areas, and during 13-18 February 1978 at Havana, Cuba, on squid (*Loligo*) in Subareas 3 and 4. A workshop on the ageing of silver hake was convened by Mr J. J. Hunt (Canada) at Dartmouth, Canada, from 28 to 31 March 1978. The STACRES Assessments

Subcommittee met, under the chairmanship of Mr A. T. Pinhorn (Canada), at Dartmouth, Canada, during 4-11 April 1978.

Items from the agenda of the 28th Annual Meeting were considered by the Commission in Plenary Session or assigned for study and reporting during the period 29 May to 6 June 1978. Reports and recommendations from meetings of STACRES, STACFAD, STACTIC, and from a meeting of Panel 3 were considered for approval by the Commission in Plenary Session on 6 June 1978.

3. Participants (Appendix I)

Commissioners, their Advisers and Experts, were present from the 17 Member Countries of the Commission. Observers were present from EEC, the Food and Agriculture Organization of the United Nations (FAO), the International Council for the Exploration of the Sea (ICES), the International Commission for the Southeast Atlantic Fisheries (ICSEAF), the Organization for Economic Cooperation and Development (OECD), and the USA. The organization and officers of the Commission for the year 1977/78 are recorded on page 2 of this volume.

4. Opening Session

The Opening Session of the 28th Annual Meeting of the Commission was convened in the Kleiner Saal of the Stadthalle in Bonn-Bad Godesberg, FRG, at 1015 hrs on 30 May 1978. The Chairman of the Commission, Dr D. Booss (FRG) welcomed State Secretary Hans-Jürgen Rohr of the Ministry of Food, Agriculture, and Forestry of FRG, who addressed the meeting as follows:

"On behalf of the Government of the Federal Republic of Germany, I should like to welcome you all. We consider it an honour to be the hosts of the ICNAF Conference which begins today and hope that the negotiations will have positive results.

"Despite all the work involved, I trust that the participants at this Conference will also have the opportunity to get to know Bonn and its beautiful surrounding area. However, nobody should be under the illusion that the much-praised Rhine is rich in fish. Formerly, the river enjoyed such a richness in fish that boundaries were created by Prussian decree last century to restrict the serving of fish to the personnel of inns and hotels on the Rhine. Too much salmon had been served. Now great pains are being taken to cleanse the river;

this is a lengthy and very expensive process — the price of our industrialization. In any case, the participants in this Conference should not be misled that our intention to be able to begin catching fish again in the Rhine at a later date could substitute the fish which we should like to catch to date in ICNAF waters.

"For almost three decades, there has been a great amount of cooperation within the ICNAF framework between the nations which fish in the Northwest Atlantic. The joint management of the available resources has, however, not been able to avoid overfishing of stocks. Amongst other things, it was this overfishing which led to the creation of fishing limits by the coastal states before conclusions were drawn at the Conference on the Law of the Sea. ICNAF, as other international fisheries organizations, thus finds itself confronted by a new situation. However, they will have important tasks to complete in the future too.

"Some countries with a long coastline have acquired an extensive fishing potential. They are on the bright side of fishing developments. For other states, catchability in traditional areas was drastically reduced. They are on the black side of fishing developments. The Federal Republic of Germany, too, is one of these countries. In this difficult situation, it is essential to facilitate the compatibility of the fishing industry and to avoid friction. Even these favoured coastal states are called upon to offer a commensurate contribution.

"As in the past, coastal states will play a special role within the ICNAF framework through which new emphases will result due to the new situation. Above all, it will be necessary to produce a coherence between the preservation measures of the coastal states within their fishing limits and ICNAF's preservation measures outside the 200-mile limit. Furthermore, there should be an increased participation in the fields of research and control by the coastal states. It is on this basis that I see the Canadian demands for recognition of special rights in the framework of a new fisheries convention for the Northwest Atlantic. I am certain that a solution to this problem can be found upon which Canada places so much importance. On the other hand, in order to avoid prejudice in fishing rights outside the 200-mile limit, understanding should be shown to the interest of other states.

"In all our efforts, as much in those for the coastal states as in those for the international fisheries organizations, our target should be an optimal utilization of the sea's resources. Overfishing, which has already caused so much trouble, must

at all costs be avoided. On the other hand, in consideration of the world's food situation, particularly protein deficiency, it should not be tolerated that inadequate use be made of available potential. Thus, the scientists are faced with the important task of sounding out these possibilities. Since it cannot be undertaken by individual states, this task must be broached through international cooperation, which, as regards fishing, has a very good tradition. The careful preparation of this ICNAF Conference offers a renewed effort. The Federal Republic of Germany is prepared to continue to contribute to research.

"I should like to wish this ICNAF Conference every success."

The Chairman thanked State Secretary Rohr for his good wishes for the success of the meeting.

5. Agenda (Appendix II)

In accordance with Commission Rules of Procedure 4.2(b), a provisional agenda for the Annual Meeting was transmitted to all Contracting Governments and Commissioners not less than 60 days in advance of the Meeting. The agenda was adopted at the First Plenary Session.

6. Publicity

In accordance with past practice, the Commission appointed the Chairman, with the Chairman of STACRES, the Executive Secretary, and a representative from the Canadian delegation to a committee on policy regarding publicity. A press release covering the items of major importance is at Appendix IV.

7. Report of the Standing Committee on Finance and Administration (STACFAD)

STACFAD met on 5 June and elected Miss D. E. Pethick (Canada) Chairman to replace the former Chairman, Mr E. B. Young (Canada), who had retired from the Canadian Government service. Items on the STACFAD agenda and financial and administrative items assigned from the Plenary Agenda (Items 6, 10, 19, and 22) were considered. The Report of STACFAD with recommendations was presented to the Final Plenary Session on 6 June 1978.

a) Panel memberships

Panel memberships were reviewed, as required by Article IV(2) of the Convention. No applications to

transfer, withdraw, or take up memberships had been received by the Panels and the Commission. Panel memberships for 1978/79 remain at 63 and are distributed among the 17 Member Countries as follows:

Country	Panel					A (Seals)	Total
	1	2	3	4	5		
Bulgaria	—	—	1974	1975	1973	—	3
Canada	—	1952	1951	1951	1951	1966	5
Cuba	—	1976	1976	1976	1976	—	4
Denmark	1951	—	1969	1974	—	1966	4
France	1953	1953	1953	1953	1974	—	5
Fed. Rep. Germany	1957	1960	1977	1970	—	—	4
German Dem. Rep.	—	1974	1974	—	1974	—	3
Iceland	—	1974	1976	—	—	—	2
Italy	—	—	1977	—	—	—	1
Japan	—	—	1971	1971	1971	—	3
Norway	1952	1970	1968	—	—	1966	4
Poland	1962	1962	1962	1968	1968	—	5
Portugal	1953	1953	1953	1953	—	—	4
Romania	—	1970	1970	—	1967	—	3
Spain	1952	1954	1952	1952	1972	—	5
USSR	1958	1958	1958	1962	1962	—	5
UK	1951	1960	1951	—	—	—	3
Total	9	13	17	11	10	3	63

b) Reports by the Secretariat

The following reports on administrative and financial matters were presented by the Executive Secretary:

- i) Auditor's Report for the fiscal year ended 30 June 1977 (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 14-16);
- ii) Administrative and Financial Report for the fiscal year ending 30 June 1978 (estimated from 1 May 1978) (*ICNAF Com. Doc. 78/VI/7*);
- iii) Budget estimate for the fiscal year ending 30 June 1979 (Appendix I to the 1978 STACFAD agenda);
- iv) Budget forecast for the fiscal year ending 30 June 1980 (Appendix II to the 1978 STACFAD agenda).

c) Recommendations on finance and administration

The Commission **adopted** the following recommendations:

- i) that the Auditor's Report showing appropriations of Can \$368,500 including a surplus appropriation of Can \$6,449 to the Working Capital Fund and obligations incurred of Can \$362,051 for the fiscal year ended 30 June 1977, be adopted;

- ii) that the provisional Administrative Report with the financial statements for the fiscal year ending 30 June 1978 (estimated from 1 May 1978) be adopted;
- iii) that the Working Capital Fund be reduced by increments of Can \$26,000 to be transferred to the Miscellaneous Fund, in accordance with Commission Financial Regulation 4.7, for application against the ordinary expenses of the Commission in each of the fiscal years ending 30 June 1979 and 30 June 1980;
- iv) that the Commission appropriate a sum of Can \$454,300 from the Contracting Governments and from the Miscellaneous Fund to meet ordinary expenses for the fiscal year ending 30 June 1979, while taking note of a double-payment problem [see Section 11(d)] in the second half of the 1978/79 fiscal year for the Contracting Parties which might have withdrawn from ICNAF on 31 December 1978 and joined its successor, the Northwest Atlantic Fisheries Organization (NAFO) on 1 January 1979. The appropriations are to be used for the following purposes:

1.	Personal Services	
a)	Salaries	\$250,000
b)	Superannuation	20,000
c)	Additional help	2,000
d)	Group medical and insurance plans	3,800
e)	Contingencies	16,000
2.	Travel	4,000
3.	Transportation of Things	1,500
4.	Communications	25,000
5.	Publications	12,000
6.	Other Contractual Services	26,000
7.	Materials and Supplies	14,000
8.	Equipment	5,000
9.	Annual and Mid-Year Meetings	25,000
10.	Computer Services	40,000
11.	Contingencies	10,000
Total Ordinary Expenditures		\$454,300
Special Appropriation from Working Capital Fund		
Transfer to Miscellaneous Fund		\$ 26,000

- v) that the Contracting Governments be billed by the Commission for payments due under the 1978/79 administrative budget, in accordance with Article XI of the Convention, on 15 August 1978;
- vi) that the Commission record the request of the delegates of the German Democratic Republic and Poland to hold the budget forecast for the fiscal year 1979/80 to the 1977/78 budget amount of Can \$425,000 and the request of the delegate of Portugal to hold it to the 1978/79 budget amount of Can \$454,300,

and give consideration at the 1979 Annual Meeting to authorizing appropriations of Can \$514,500 for the ordinary expenses of the Commission for the fiscal year ending 30 June 1980 the appropriations to be used for the following purposes:

1.	Personal Services	
a)	Salaries	\$275,000
b)	Superannuation	22,800
c)	Additional help	2,000
d)	Group medical and insurance plans	4,200
e)	Contingencies	25,000
2.	Travel	5,000
3.	Transportation of Things	1,500
4.	Communications	25,000
5.	Publications	15,000
6.	Other Contractual Services	28,000
7.	Materials and Supplies	16,000
8.	Equipment	5,000
9.	Annual and Mid-Year Meetings	25,000
10.	Computer Services	45,000
11.	Contingencies	20,000
Total Ordinary Expenditures		\$514,500
Special Appropriation from Working Capital Fund		
Transfer to Miscellaneous Fund		\$ 26,000

- vii) that the Executive Secretary seek advice from the Canadian Government Treasury Board or an appropriate Canadian Government body on an appropriate salary classification for the position of the Executive Secretary to become effective on the date of the establishment of the new international organization;
- viii) that the Commission accept the invitation of the Government of Canada to hold a special meeting of the Commission to consider conservation measures for capelin and squid after early February 1979;
- ix) that the Commission hold its 29th Annual Meeting in Halifax, Nova Scotia, from 30 May to 10 June 1979;
- x) that the Commission hold its 1980 and 1981 Annual Meetings in the Dartmouth-Halifax area of Nova Scotia;
- xi) that the Commission note the re-election of Miss D. E. Pethick (Canada) as Chairman of STACFAD for the year 1978/79.

8. Status of Commission Proposals

The Commission reviewed the status of proposals for changes in the Convention and for international fishery regulations.

a) Changes in the Convention

The Commission **noted** that the 1973 Protocol Relating to Basic Payment by Contracting Governments (*ICNAF Annu. Rept.*, Vol. 23, 1972/73, p. 40-41) had only yet been approved by Canada, Cuba, France FRG, Norway, and Portugal. Also, the 1976 Protocol Relating to Continued Functioning of the Commission (*ICNAF Annu. Rept.*, Vol. 26, 1975/76, p. 21) had only been approved by Canada, Cuba, Denmark, German Democratic Republic (GDR), Iceland, Norway, Romania, USSR, and UK. In accordance with amended Convention Article XVII, these Protocols become effective for all Contracting Governments 120 days following the date on the notification by the Depository Government of receipt of written notification of approval of three-quarters (13) of all Contracting Governments, unless objected to within 90 days.

b) International fishery regulations

The Commission **noted** that the December 1976 proposals (1) and (3) from the Ninth Special Commission Meeting (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 33-45) became effective for all Contracting Governments 17 June 1977. Proposal (2), re regulation of trawl mesh size for northern deepwater prawn, in accordance with paragraph 4 of the proposal, did not enter into force until 1 January 1978. The June 1977 proposal (1) from the 27th Annual Commission Meeting (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 67-68) became effective on 24 December 1977.

The Commission **adopted** the June 1978 proposal (1) from the 28th Annual Commission Meeting (Appendix III of Part 2 of this volume) on 6 June 1978 and transmitted it on 15 June 1978 to the Depository Government who circulated it to Contracting Governments on 13 July 1978.

9. Report of the Standing Committee on Research and Statistics (STACRES)

STACRES met in special session at ICNAF Headquarters, Dartmouth, Canada, under the chairmanship of Dr A. W. May (Canada), during 15-18 November 1977. *Ad hoc* Working Groups considered the Commission's request (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 59) for advice on the scientific basis for management in 1978 of the northern deepwater prawn (= shrimp, *Pandalus borealis*) stocks in Subarea 1 and Statistical Area 0 and of the seal stocks within national fishery limits in Subareas 1, 2, 3, and 4 and Statistical Area 0. Details of the advice given are at Part A of *ICNAF Redbook 1978*.

STACRES met again in special session at Havana, Cuba, under the chairmanship of Dr A. W. May

(Canada), during 13-18 February 1978, at the request of Canada (*ICNAF Com. Doc. 78/II/2*) to provide scientific advice on the scientific basis for management of the stocks of squid, *Illex illecebrosus*, in 1978 within national fishery limits in Subareas 3 and 4. Discussion and working groups, led by Dr E. C. Lopez-Veiga (Spain), Mr A. T. Pinhorn (Canada), and Dr F. Nagasaki (Japan), reviewed certain key issues in detail (*ICNAF Redbook 1978*, Part B).

A workshop on the age determination of silver hake was convened by Mr J. J. Hunt (Canada) at ICNAF Headquarters, Dartmouth, Canada, during 28-31 March 1978 (*ICNAF Sum. Doc. 78/VI/10*).

Meetings of the Assessments Subcommittee of STACRES were held, under the chairmanship of Mr A. T. Pinhorn (Canada), at ICNAF Headquarters, Dartmouth, Canada, during 4-11 April 1978 to review the state of and advise on catch levels in 1979 for certain stocks of cod, redfish, capelin, American plaice, witch flounder, yellowtail flounder, Greenland halibut, roundnose grenadier, silver hake and argentine in Subareas 2 to 4 and of shrimp, Greenland halibut and roundnose grenadier in Statistical Area 0 and Subarea 1, and to examine the feasibility of an effort regulation for squid, *Illex*, in Subareas 3 and 4 (*ICNAF Redbook 1978*, Part C, Appendix I).

The Annual Meeting of STACRES and its Subcommittees was held, under the chairmanship of Dr. E. C. Lopez-Veiga (Spain), at Bonn-Bad Godesberg, FRG, during 18-28 May 1978 prior to the 28th Annual Meeting of the Commission.

The Reports of the Meetings of STACRES and its Subcommittees and Working Groups are published in *ICNAF Redbook 1978*, Part C. The Reports were **adopted** by the Commission in Plenary Session on 6 June 1978. Major items are summarized below.

a) Assessments

The Assessments Subcommittee reported

- i) that the total nominal catch of all species in the Northwest Atlantic (Subareas 1-5 and Statistical Areas 0 and 6) was 2,950,000 metric tons in 1977, a decline from 3,460,000 tons in 1976 and from 3,800,000 tons in 1975. Substantial **declines** occurred for cod (10%) mainly in Subareas 3 and 4, redfish (12%) in Subareas 2 to 4, silver hake (36%) mainly in Subarea 4, red hake (71%) in Subarea 5 and Statistical Area 6, roundnose grenadier (37%) in Statistical Area 0 and Subareas 1 to 3, herring (12%) mainly in Subarea 5, mackerel (68%) in Subarea 5 and Statistical Area 6,

other pelagics (14%) in Subarea 5 and Statistical Area 6, and capelin (37%) mainly in Subarea 3. Significant **increases** occurred for haddock (56%) in Subareas 4 and 5, squids (44%) mainly in Subareas 3 and 4, and sea scallops (25%) in Subarea 5. Decreases were reported in Statistical Area 0 (37%), Subarea 3 (23%), Subarea 4 (11%), Subarea 5 (20%), and Statistical Area 6 (13%). Increases were recorded in Subarea 1 (14%) and Subarea 2 (9%).

- ii) that assessments were completed (a) for 14 stocks for which Canada requested advice and which lie completely or partly within its 200-mile fisheries management zone in Subareas 2 to 4, (b) for 3 stocks which overlap the Canadian and Greenland fisheries zones in Statistical Area 0 and Subarea 1, (c) for the cod and redfish stocks in Subarea 1 at the request of EEC, (d) for the 3 regulated stocks on Flemish Cap which lie completely outside of the national fisheries zones in Div. 3M, and (e) on the feasibility of effort regulation as an alternative management measure for squid, *Illex*, in Subareas 2 to 4;
- iii) that, for 1979, increases in the total allowable catches (TACs) were advised for cod in Div. 3NO, redfish in Div. 3M and 3LN, and yellow-tail in Div. 3LNO. Decreases were advised for silver hake in Div. 4VWX and American plaice in Div. 3M. Management options were presented for cod in Subarea 1, cod in Div. 2J-3KL, and American plaice in Div. 3LNO. A TAC was advised for redfish in Subarea 1 for the first time. No TAC was advised for shrimp in Subarea 1. The TACs advised for the other stocks remained the same as in 1978; and
- iv) that advice for 1979 on an appropriate management strategy for squid, *Illex*, in Subareas 3 and 4, on the level of TAC for capelin stocks in Div. 3LNOPs, and on the level of TAC for the shrimp stock in Subarea 1 would be considered at special meetings of STACRES in late 1978 or early 1979.

b) Statistics and sampling

The Statistics and Sampling Subcommittee reported

- i) that the 9th Session of the Coordinating Working Party on Atlantic Fisheries Statistics (CWP) held at ICNAF Headquarters, Dartmouth, Canada, during 17-23 August 1977 developed recommendations of direct relevance to ICNAF, particularly the list of

essential standard elements for fishing sheets and logbooks, proposals for reporting discards, and the 3-alpha code for identifying North Atlantic species;

- ii) that the 10th Session of the CWP is provisionally scheduled to be convened in Madrid, Spain, during 26 June-4 July 1979, at the joint invitation of the International Commission for the Conservation of Atlantic Tunas (ICCAT) and ICSEAF. ICNAF participation will consist of the Assistant Executive Secretary, the Chairman of Statistics and Sampling Subcommittee and a representative from Canada;
- iii) that there was a general deterioration from 1977 to 1978 in statistical reporting, with a lack of consistency in reporting catch data in some cases which casts some doubt on the quality of statistics, and that information on discards continues to be inadequate despite recommendations from the 1976 and 1977 Annual Meetings of the Commission;
- iv) that an *ad hoc* Working Group on standardization of reporting procedures for sampling data would be convened not later than the autumn of 1978 and would consist of a representative from each of Canada, an EEC Member Country, the USSR, the ICNAF Secretariat, and the Chairman of Statistics and Sampling, with the USA being invited to participate. The Working Group will consider changes from the 1977 standards as a result of the extension of fishery jurisdiction to 200 miles by the coastal states in the Northwest Atlantic; and
- v) that the ICNAF Secretariat could serve as the depositary for sampling data from the Northwest Atlantic.

c) Biological surveys

The Biological Surveys Subcommittee reported

- i) that an evaluation of the need for and the value of survey indices of abundance to support catch assessments and a parallel evaluation of the accuracy of commercial fishery-based abundance indices would be carried out jointly by the Assessments and Biological Surveys Subcommittees in April 1979;
- ii) that further research on a photographic method of directly estimating the catchability of fish by a research trawl could contribute

significantly to survey methodology; and

- iii) that the results of a pilot study on the processing of survey data by the ICNAF Secretariat would be prepared for consideration at the 1979 Annual Meeting.

d) Environmental studies

The Environmental Subcommittee reported

- i) that, during the period 1978/79, the international study of the factors determining year-class success for groundfish on Flemish Cap (Div. 3M) will focus on the ichthyoplankton and adult fish communities as well as on achieving a satisfactory description of the oceanography of the area;
- ii) that analytical assessments of the commercial fisheries on Flemish Cap have not been possible, to date, due to the almost complete absence of biological sampling data;
- iii) that a major international multi-disciplinary, multi-ship larval herring patch experiment was planned for October–November 1978 on Georges Bank; and
- iv) that a complete list of standard oceanographic sections and stations developed for the Northwest Atlantic was published in *ICNAF Sel. Papers* No. 3 and that copies are available from the Secretariat upon request.

e) Ageing techniques

- i) The Workshop on the determination of age in silver hake, March 1978 (*ICNAF Sum. Doc. 78/VI/10*) concluded that the classification of weak hyaline zones on the otoliths of silver hake was difficult and contributed to one source of error in ageing, while differences in early growth and the probable size of age 1 and 2 fish contributed to a source of bias in interpreting checks and zones and large or small first annuli on the otoliths. Further otolith exchanges and studies were recommended and a set of guidelines for the age determination of silver hake from otoliths would be drafted by Mr J. J. Hunt (Canada) for comment and later publication.
- ii) STACRES **noted** that, due to inadequate sampling and lack of agreement on ageing, the Assessments Subcommittee was unable to carry out an analytical assessment of the

redfish stock in Div. 3LN and a redfish scale and otolith exchange program would be initiated as soon as possible by the St. John's Laboratory; and

- iii) STACRES reviewed the preliminary draft of a set of guidelines for the interpretation of cod otoliths for ageing purposes. A revised paper would be submitted for publication by Mr R. Wells (Canada).

f) Gear and selectivity studies

- i) STACRES **noted** that additional data would be collected on the effect of various mesh sizes on catch of silver hake and that Canadian and Japanese scientists had carried out joint studies on the effect of different types of trawls on the by-catch in the squid *Illex* fishery, and that experiments to determine the selection curves for squid over the range of mesh sizes (40–60 mm) would be carried out in 1978;
- ii) STACRES **agreed** that selectivity experiments should be carried out on Greenland halibut to provide the basis for determining the most appropriate mesh size for its trawl fishery; and
- iii) STACRES considered the request from Panel 3 for advice on a Canadian proposal that the application of the current 130-mm minimum mesh size to redfish fishing on Flemish Cap (Div. 3M) be suspended and 75-mm minimum mesh size be applied, pending the results of a scientific review, and **advised** that there should be no reduction in the minimum mesh size until a proposed study on the immediate and long-term effects of such action on the cod and redfish stocks was completed in 1978 (see Section 12).

g) Other matters

- i) STACRES was pleased to note that the compilation of an index and list of titles of ICNAF meeting documents for the period 1965–74 is expected to be completed later in 1978 by the Assistant Executive Secretary; a second list covering the period 1950–65 is in progress;
- ii) STACRES **noted** the invitation of Norwegian scientists to hold the special STACRES meeting on shrimp and seals in Bergen in November 1978, and the invitation of the Japanese scientists to hold the special STACRES meeting on capelin and squids in Japan in February 1979;

- iii) STACRES **noted** that the Assessments and the Biological Surveys Subcommittees would meet at the new fisheries laboratory in St. John's, Newfoundland, during 28 March–10 April 1979; and
- iv) STACRES welcomed Dr E. C. Lopez-Veiga (Spain) as the Chairman of STACRES and thanked Dr A. W. May (Canada) who resigned from the chairmanship before the 1978 STACRES Annual Meeting.

10. Report of the Standing Committee on International Control (STACTIC)

a) STACTIC met under the chairmanship of Dr A. W. H. Needler (Canada), in the absence of the Chairman-elect Mr D. R. Bollivar (Canada), on 29 May and 5 June to consider the report of a working group set up on recommendation of the 1977 Annual Meeting (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 57) to examine the provisions of the Scheme of Joint International Enforcement, in view of the reduced area of application following extension of coastal state jurisdiction. The Working Group, under the chairmanship of Mr L. Riche (Canada), reported that proposals for changes to the Scheme had been presented by Poland, USSR, Canada, and FRG but, because of the complexities associated with many of the proposals and the need for further internal consultation, recommended further study. STACTIC **unanimously recommended**

that Member Countries submit proposals for improvements to the Scheme of Joint International Enforcement to the Secretariat, in writing, for circulation to Member Countries for further study, and that the STACTIC Working Group meet again at some convenient date, perhaps at the time of any Special Meeting of the Commission, to reconsider improvements to the Scheme.

b) STACTIC **noted** the information from Canadian surveillance which showed a considerable increase in fishing effort on Flemish Cap (Div. 3M) during January–April 1977 and 1978 by vessels of Member and Non-Member Countries of ICNAF. STACTIC **agreed** that such fishing represented a serious threat to the Commission's conservation program and that the matter should be referred to the Commission for further consideration (see Section 14).

11. Future Multilateral Cooperation in Northwest Atlantic Fisheries

a) Status of the new multilateral Convention

The Commission **noted** that the Diplomatic Conference on Future Multilateral Cooperation in

Northwest Atlantic Fisheries, 11–21 October 1977 (*ICNAF Com. Doc. 78/VI/4*) failed to reach a consensus on all of the Articles and Annexes of the proposed new Convention which would establish the Northwest Atlantic Fisheries Organization (NAFO) to replace ICNAF. An informal meeting of experts from the Member Countries of ICNAF and from EEC and USA, convened by Canada on 1 and 2 May 1978, reached a consensus of all issues except those regarding national allocation of catches and reservations to the Convention. For those issues, decisions were taken on drafts which had the widest support. The Commission **noted** that Canada would circulate the revised version of the Convention through diplomatic channels to participants with a request for agreement in the hope that the next step could be the opening of the new Convention for signature.

b) Arrangements for terminating ICNAF

The Commission reviewed a revision of the Resolution, which was drafted by the 1977 Annual Meeting of the Commission (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 58), to amend the Convention to provide for termination of ICNAF on 31 December of the year the NAFO Convention entered into force and to prohibit adoption of any proposal under Article VIII. The Commission **agreed** that the Resolution provided neatness but recognized difficulties should the NAFO Convention enter into force before 31 December 1978. In such a circumstance, there could be a period in 1979 when some countries would not be members of NAFO or ICNAF, resulting in uncertainties regarding implementation of the enforcement scheme and regulatory measures. The Commission **agreed**

that the Resolution to amend the ICNAF Convention to allow termination of ICNAF on 31 December of the year the NAFO Convention entered into force should not be adopted, and that the matter of the termination of ICNAF should be left pending further developments.

c) Arrangements for establishing and implementing 1979 quotas

The Commission, in Plenary Session, discussed the arrangements necessary to establish TACs and allocations for 1979 for those stocks of regulated species in Subarea 3 which were included in the Plenary Agenda (Appendix III).

i) *re overlapping stocks*

The Commission **agreed** that, as at the 1977 Annual Meeting, this meeting would proceed under the assumption that the December 1976 amendments to Article I and VI of the ICNAF Convention (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 21) were in effect. This required

that Canada convene informal intergovernmental consultations to deal with stocks which overlap national fishery limits and that Panel 3 would deal with the overlapping stocks and those stocks completely outside national fishery limits. However, the Commission, reminded by the EEC that any quota proposal recommended by Panel 3 for the stocks which overlap into the area of national fisheries jurisdiction would contradict the agreement to work under the December 1976 amendments with its jurisdictional limits for ICNAF, **agreed to draw to the attention of Panel 3** that any proposal for the quota regulation of overlapping stocks in 1979 by Panel 3 should include a clause which would ensure that catches made by vessels of Member Countries fishing outside areas under national fisheries jurisdiction would not exceed the TACs and national allocations set for each stock.

ii) *re quota interchange*

The Commission **noted** that, at the 1977 Annual Meeting, the five EEC Member Countries were grouped in the table of catch quotas for 1978 and were permitted to interchange quotas subject to notification to the Commission not later than 1 October (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 68) and **agreed** that Panel 3, when recommending quota regulation, should consider including similar provisions for 1979.

iii) *re quota carry-over*

The Commission considered the arrangements necessary when notified by the EEC that its Members would withdraw from ICNAF on 31 December 1978, expecting that NAFO would be in effect 1 January 1979, and the EEC a Contracting Party. In such circumstances, the conservation measures adopted by ICNAF for 1979, when being applied in NAFO, would be for the EEC and not for the EEC Countries who were Members of ICNAF. The Commission **agreed to draw to the attention of Panel 3** that, when quota regulations were recommended by the Panel for 1979, consideration be given to ensuring that any proposal include a provision for the carry-over of EEC Member Countries' quotas into NAFO, as a single EEC quota.

d) **Financial considerations relative to the transition from ICNAF to NAFO**

The Commission, in considering the budget for the fiscal year 1978/79 presented by STACFAD [see

Section 7(c)(iv)], was reminded that the EEC Member Countries might withdraw from ICNAF 31 December 1978 and join NAFO 1 January 1979 and that contributing for the full year 1978/79 to ICNAF could mean a double payment for the second half of the 1978/79 fiscal year. The EEC proposal to add a footnote to the 1978/79 budget which said that, in the event that NAFO entered into force on 1 January 1979, any Contracting Party which is a Member of NAFO shall have its contribution reduced by 50%, was withdrawn in favour of a proposal that the Commission adopt the 1978/79 budget, **noting** that there appeared to be a problem of double payment in the second half of the 1978/79 fiscal year for those Parties which might have left ICNAF and joined NAFO. The budget with footnote was **adopted** by the Commission which **took note** that FRG, France, and UK would agree to the adoption but had not been instructed to agree to a full year's payment since, from 1 January 1979, they might not be Members of ICNAF.

12. Report of Panels

Agenda items dealing with the conservation of those fish stocks in Subarea 3 lying outside and those lying partly inside and partly outside Canadian national fishing limits were dealt with, in accordance with the decision of the Commission [see Section II(c)], using the procedure adopted at the 1977 Annual Meeting (*ICNAF Annu. Rept.*, Vol. 27, 1976/77, p. 57).

The Report of Meetings of Panel 3, with proposals developed by the Panel for regulatory measures for 1979 for the stocks outside Canadian fishing limits in Subarea 3 and those developed by the Informal Intergovernmental Consultations convened by Canada on 1 June 1978, and concurred in by the Panel, for the stocks overlapping the Canadian fishing limits in Subarea 3, were **adopted** by the Commission in Final Plenary Session on 6 June 1978. FRG, France, Italy, and UK voted against the cod allocation in Div. 3M. Denmark, FRG, France, Italy, and UK voted against the redfish allocation in Div. 3M.

a) **Panel 3.** The Panel, under the chairmanship of Capt A. S. Gaspar (Portugal), accepted the recommendations of STACRES for TACs for 1979 for the cod, redfish, and American plaice stocks in Div. 3M (Flemish Cap) which was entirely outside the Canadian extended fishery jurisdiction. Following considerable discussion, the Panel, with FRG, France, Italy, and UK voting against the national allocation for the cod stock and Denmark, FRG, Italy, and UK voting against the national allocation for the redfish stock, **recommended**

that the Commission transmit to the Depositary

Government, for joint action by the Contracting Governments, proposals for international quota regulation of the fisheries for cod, redfish, and American plaice in Division 3M of Subarea 3 for 1979 (see proposal (1) in Appendix III).

The Panel reviewed a table of TACs and national allocations, which had been recommended to the Panel by the Informal Intergovernmental Consultations convened by Canada, for five of the seven stocks overlapping the 200-mile line. The Panel, **noting** that the scientific advice on 1979 TACs for capelin in Div. 3LNO and squid *lllex* in Subareas 3 and 4 would not be available until after a mid-term meeting of STACRES early in 1979, **recommended**

that the Commission transmit to the Depositary Government, for joint action by the Contracting Governments, proposals for international quota regulation of the fisheries for cod in Div. 3NO, for redfish in Div. 3LN, for American plaice in Div. 3LNO, for witch in Div. 3NO, and for yellowtail in Div. 3LNO for 1979 (see proposal (1) in Appendix III).

The Panel, having due regard to the discussion and recommendation of the Commission relating to the control of catches from overlapping stocks [see Section 11(c)(i)], the interchange of quotas by EEC Member Countries [see Section 11(c)(ii)], and the carry-over of EEC Member Country quotas from ICNAF into NAFO as a single EEC quota [see Section 11(c)(iii)], **agreed to recommend**

- i) that Contracting Governments conduct their fisheries outside areas under national fisheries jurisdiction in such a manner that catches shall not exceed the total allowable catch for each stock and the national quotas for each stock set out in the attached Table (see paragraph (a) of the ICNAF proposal (1) in Appendix III);
- ii) that, the allocation among these Contracting Governments of the sum of the quotas attributed to them in this Table (in parentheses) may be changed by them subject to notification to the Commission not later than 1 October 1978, and, where applicable, subject to the concurrence of the coastal state in respect of the area in which it exercises national fisheries jurisdiction, without prejudice to the exercise of its licensing authority. The quota attributed to Denmark in respect of cod in Div. 3M is not included in the aforementioned sum and is not subject to change (see footnote (2) of the ICNAF proposal (1) in Appendix III); and

- iii) that, in the event that a convention establishing a new Northwest Atlantic Fisheries Organization (NAFO) enters into force as of 1 January 1979 and that EEC is a Party to it, the quotas to FRG, France, Italy, and the UK established under this proposal shall be substituted by a single quota to EEC which shall be equal to the sum of the individual quotas which it substitutes (see paragraph (b) of the ICNAF proposal (1) in Appendix III).

The Panel considered a Canadian proposal to suspend the present 130-mm mesh-size regulation for redfish in Div. 3M and to use a mesh size not less than 75 mm, pending results of a review and advice from STACRES. Advice from STACRES, based on the limited information available to its scientists at this meeting, recognized that suspension or reduction of present mesh size would reduce the wastage of commercial-size redfish at the surface but that there should be no reduction in minimum mesh size until the immediate and long-term effects of reductions on the cod and redfish stocks had been studied. The Panel **agreed**

that STACRES be requested to review the effectiveness of the existing mesh regulations for redfish throughout Subareas 2 and 3, with particular reference to Div. 3M.

The Panel **noted** information from Canadian surveillance under the ICNAF Scheme of Joint International Enforcement indicating an apparent increase in the level of fishing activity by Member Countries and the presence of non-members of ICNAF fishing in Div. 3M (Flemish Cap) and referred the matter to the Plenary for further consideration.

13. International Quota Regulation

The Commission **noted** that the report of meetings of Panel 3 recommended TACs and national allocations for 1979 in respect of a combined total of eight stocks which would, if combined in a single table, comprise a proposal for international quota regulation of the fisheries in Subarea 3 of the Convention Area. Therefore, the Commission, taking into account its recommendations regarding arrangements for establishing the 1979 quotas [see Section 11(c)] and the recommendations of Panel 3 (see Section 12), **agreed**

to transmit to the Depositary Government, for joint action by the Contracting Governments, proposal (1) for international quota regulation of the fisheries in Subarea 3 of the Convention Area for 1979 (Appendix III).

14. Fishing Activity by Non-Member Countries

The Commission considered information concerning the sighting of two Venezuelan and two Panamanian vessels fishing in 1978 in the ICNAF Area beyond national fisheries jurisdiction. The Commission recognized that these vessels fishing without regard to ICNAF regulations and outside the ICNAF Scheme of Joint International Enforcement represented a serious threat to the conservation regime established by ICNAF for this area, and to the maintenance of the stocks of this area, which are being fully utilized by the vessels of the ICNAF Member Countries, **agreed to adopt** the following **Resolution Relating to the Operations of Non-Member Countries in the ICNAF Area Beyond National Fisheries Jurisdiction**:

The Commission

Having Regard to its responsibility for the investigation, protection and conservation of the fisheries of the Northwest Atlantic Ocean pursuant to the terms of the International Convention for the Northwest Atlantic Fisheries;

Noting that the Convention applies to an area beyond the fisheries limits of the coastal states of the Northwest Atlantic Ocean and that international cooperation is, therefore, required to ensure the conservation of the stocks of this area;

Bearing in Mind that the stocks of this area have been protected through the restraint of Member States of the Commission operating in conformity with the Commission's management regime in the conduct of their traditional fisheries in this area;

Considering that these stocks are being fully utilized by Member States of the commission, and that any fishing exceeding total allowable catches would lead to stock depletion;

Noting reports that fishing vessels of two Non-Member states, Panama and Venezuela, have been sighted fishing in this area in 1978;

Hereby Resolves that the Chairman of the Commission be instructed to inform the Governments of Venezuela and Panama of the objectives of the Commission and the Commission's regulations pertaining to the area concerned;

And Calls Upon all Member States of the

Commission, pursuant to Article XIII of the ICNAF Convention, to invite the attention of the Governments of Venezuela and Panama to the importance of ensuring that fisheries in the area concerned be conducted in conformity with the Commission's management regime in order to avoid affecting adversely the operations of the Commission and the carrying out of the objectives of the ICNAF Convention.

15. Other Business

The Commission **agreed** that the 29th Annual Meeting of the Commission would be held in Halifax, Canada, from 30 May to 9 June 1979 and that, following a special STACRES Meeting convened at the invitation of Japan in early February 1979 to provide scientific advice for management of capelin and squid stocks, a Special Commission Meeting would be convened at the invitation of Canada to recommend management measures for these stocks.

16. Election of Chairman and Vice-Chairman

The Commission received, with regret, the resignation of Dr D. Booss (FRG) as Chairman of the Commission, and was pleased to welcome Mr S. Ohkuchi (Japan), Vice-Chairman of the Commission, as the new Chairman to complete Dr Booss' term of office.

The Commission **agreed unanimously** that Dr W. Ranke (GDR) should complete Mr Ohkuchi's term of office as Vice-Chairman of the Commission.

17. Acknowledgements and Adjournment

The Chairman, Dr Booss, thanked the meeting participants for their contributions. He had enjoyed the friendly and working climate which contributed so much to ICNAF's leading role as a model for management consultations. The meeting delegates recorded their gratitude to the Government of FRG for the excellent working facilities and warm hospitality. The delegate of Canada expressed appreciation for the facilities provided for the Informal Intergovernmental Consultations.

There being no other business, the 28th Annual Meeting of the Commission was declared adjourned at 1415 hrs, 6 June 1978.

PART 2

Appendix 1

List of Participants

(Head of Delegation in bold)

Chairman: Dr D. Booss, Bundesministerium für Ernährung, Landwirtschaft und Forsten, Rochusstrasse 1, 5300 Bonn, Federal Republic of Germany

BULGARIA

Commissioner:

Mr P. Kolarov, Research Institute of Fisheries and Oceanography, Boul. Chervenoarmeisky 4, Varna

CANADA

Commissioners:

Mr E. H. Demone, National Sea Products Ltd., P. O. Box 867, Lunenburg, Nova Scotia B0J 2C0

Mr A. A. Etchegary, Fishery Products Ltd., P. O. Box 550, General Post Office, St. John's, Newfoundland A1C 5K8

Dr A. W. May, Resource Services Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Advisers:

Mr B. Applebaum, International Fisheries Policy, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr S. W. Bartlett, Resource Allocation Branch, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr J. S. Beckett, Fisheries Research Branch, Resource Services Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr E. Cadegan, Resource Management, Nova Scotia Department of Fisheries, P. O. Box 2223, Halifax, Nova Scotia B3J 3C4

Dr P. J. G. Carrothers, Marine Fish Division, Department of Fisheries and Oceans, Biological Station, St. Andrews, New Brunswick E0G 2X0

Mr F. Dopplinger, Department of Fisheries for Newfoundland, Viking Building, St. John's, Newfoundland A0A 2E0

Dr W. G. Doubleday, Fisheries Research Branch, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr V. R. Dufour, Marine Fish Division, Department of Fisheries and Oceans, Biological Station, St. Andrews, New Brunswick E0G 2X0

Mr J. Gagnon, Marine Environmental Data Service, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Dr R. G. Halliday, Marine Fish Division, Department of Fisheries and Oceans, P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2

Mr J. John, Marketing Branch, Department of Fisheries and Oceans, 240 Sparks Street Ottawa, Ontario K1P 6C9

Mr A. LaChance, Quebec Fisheries Directorate, 2700 Einstein Blvd., Ste. Foy, Quebec G1P 3W8

Mr G. Leger, Fisheries and Environmental Law Section, Department of External Affairs, Ottawa, Ontario K1A 0G2

Mr A. Losier, New Brunswick Department of Fisheries, P. O. Box 6000, Fredericton, New Brunswick E3B 4W7

Mr D. A. MacLean, Fisheries and Marine Service, Policy and Planning, Department of Fisheries and Oceans, P. O. Box 550, Halifax, Nova Scotia B3J 2S7

Mr J. W. Mahon, Bonavista Cold Storage — Lake Group Ltd., P. O. Box 5337, St. John's, Newfoundland

Dr A. W. H. Needler, Special Adviser, P. O. Box 481, St. Andrews, New Brunswick E0G 2X0

Capt E. M. Nowe, R. R. 2, Center, Lunenburg, Nova Scotia

Mr L. S. Parsons, Fisheries Research Branch, Resource Services Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr B. A. Paul, Fisheries Management (Newfoundland), Department of Fisheries and Oceans, P. O. Box 5667, St. John's, Newfoundland A1C 5X1

Miss D. E. Pethick, International Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Ontario K1P 6C9

Mr A. T. Pinhorn, Research and Resource Services, Department of Fisheries and Oceans, Biological Station, St. John's, Newfoundland A1C 1A1

Mr R. J. Prier, Surveillance Branch, Department of Fisheries and Oceans, P. O. Box 550, Halifax, Nova Scotia B3J 2S7

Mr A. Proulx, Statistics Branch, Department of Fisheries and Oceans, 901 Cap Diamant, Quebec, Quebec

Mr L. G. Riche, Conservation and Protection (Nfld.) Branch, Department of Fisheries and Oceans, P. O. Box 5667, St. John's, Newfoundland A1C 5X1

Dr C. K. Ross, Atlantic Oceanographic Laboratory, P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2

Mr E. J. Sandeman, Research and Resource Services, Department of Fisheries and Oceans, Biological Station, St. John's, Newfoundland A1C 1A1

Mr W. Short, N.F.F.A.W.U., P. O. Box 5158, St. John's, Newfoundland

Mr R. C. Stirling, Nova Scotia Fish Packers Association, P. O. Box 991, Dartmouth, Nova Scotia B2Y 3Z6

Mr P. H. Sutherland, Conservation and Protection Branch, Fisheries Management Service, Department of Fisheries and Oceans, P. O. Box 550, Halifax, Nova Scotia B3J 2S7

Mr L. K. Theriault, Nova Scotia Fishermen's Association, R. R. 1, Sandy Cove, Digby County, Nova Scotia

Dr R. W. Trites, Marine Ecology Laboratory, Bedford Institute of Oceanography, P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2

Mr R. Wells, Research and Resource Services, Department of Fisheries and Oceans, Biological Station, St. John's, Newfoundland A1C 1A1

CUBA

Commissioners:

Mr R. Cabrera, Ministerio de la Industria Pesquera, Ensenada de Potes y Atares, Puerto Pesquera, Habana

Mr A. Margolles, Ministerio de la Industria Pesquera, Ensenada de Potes y Atares, Puerto Pesquera, Habana

Alternate Commissioner:

Dr J. A. Varea, Direccion Relaciones Internacionales, Ministerio de la Industria Pesqueras, Ensenada de Potes y Atares, Puerto Pesquera, Habana

Advisers:

Mr N. Abdelnur, Cuban Embassy, Hansaring 60, 5000 Köln I, Federal Republic of Germany

Mr A. Mari, Centro de Investigaciones Pesqueras, Ave I^{ra} y 26, Miramar, Habana

Mr O. Muniz, Flota Cubana de Pesca, Mercado y Desempacados, Habana

DENMARK

Commissioners:

Mr H. Iversen, Ministry of Foreign Affairs, Stormgade 10, DK-1470 Copenhagen K

Mr E. Lemche, Ministry for Greenland, Hausergade 3, DK-1128 Copenhagen

Mr P. Reinert, Government of the Faroe Islands, 3800 Tinganes, Torshavn, Faroe Islands

Advisers:

Mr D. M. Carlsson, Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, 2920 Charlottenlund

Mr F. N. Christensen, Ministry of Foreign Affairs, Stormgade 10, DK-1470 Copenhagen K

Mr Sv. Aa. Horsted, Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, DK-2920 Charlottenlund

Mr F. Isaksen, Government of the Faroe Islands, 3800 Tinganes, Torshavn, Faroe Islands

Mr P. Kannevorff, Grønlands Fiskeriundersøgelser, Jaegersborg Allé 1B, DK-2920 Charlottenlund

Mr J. Karup-Pedersen, Provincial Council of Greenland, P. O. Box 615, Godthaab, Greenland

Mr H. J. Kass, Government of the Faroe Islands, 3800 Tinganes, Torshavn, Faroe Islands

Mr A. Olafsson, Ministry of Foreign Affairs, Stormgade 10, DK-1470 Copenhagen K

Mr O. Steenholdt, Edith Rodes Vej 58, DK-4700 Naestved

FRANCE

Commissioners:

Mr D. Hery, Direction des Pêches Maritimes, Secrétariat Général de la Marine Marchande, 3 Place de Fontenoy, 75007 Paris

Mr R. H. Letaconnoux, Institut Scientifique et Technique des Pêches Maritimes, B. P. 1049, 44037 Nantes-CEDEX

Advisers:

Mr R. Chevalier, Institut Scientifique et Technique des Pêches Maritimes, CRIP, B. P. 26, St. Pierre et Miquelon

Mr J. Dezeustre, French Ship Owners Association, UAPF, 59 rue des Mathurins, 75008 Paris

Mr F. Lott, 40 Bd. du Régent, 1000 Bruxelles, Belgique

Mr A. J. Parres, Union des Armateurs à la Pêches de France, UAPF, 59 rue des Mathurins, 75008 Paris

FEDERAL REPUBLIC OF GERMANY

Commissioners:

Dr D. Booss, Bundesministerium für Ernährung, Landwirtschaft und Forsten, Rochusstrasse 1, 5300 Bonn

Mr N. Kleeschulte, Bundesministerium für Ernährung, Landwirtschaft und Forsten, Rochusstrasse 1, 5300 Bonn

Mr H. Schlapper, Bundesministerium für Ernährung, Landwirtschaft und Forsten, Rochusstrasse 1, 5300 Bonn

Advisers:

Mr K. H. Feilhauer, Association of German Trawler Owners, P. O. Box 403, 2850 Bremerhaven 29

Mr H. Junge, Association of German Trawler Owners, P. O. Box 403, 2850 Bremerhaven 29

Dr J. Messtorff, Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Fischkai, 2850 Bremerhaven

Capt W. J. Muschkeit, Association of German Trawler Owners, P. O. Box 403, 2850 Bremerhaven 29

Mr G. Ohlogge, Association of German Trawler Owners, P. O. Box 403, 2850 Bremerhaven 29

Mr M. Stein, Institut für Seefischerei, Palmaille 9, D-2000 Hamburg 50

GERMAN DEMOCRATIC REPUBLIC

Commissioner:

Dr W. Ranke, VVB Hochseefischerei, 251 Rostock-Marienehe

Advisers:

Mr E. Fibig, VVB Hochseefischerei, 251 Rostock-Marienehe
Dr W. Mahnke, Institut für Hochseefischerei, 251 Rostock-Marienehe

ICELAND

Commissioner:

Mr S. Bjornsson, Icelandic Embassy, Kronprinzen Strasse 6, Bonn-Bad Godesberg, Federal Republic of Germany

ITALY

Commissioner:

Mr A. Luciano, Ministero della Marine Mercantile, Viale Asia, 00100 Rome

Advisers:

Mr E. Dobosz, FEDERPESCA, Corso d'Italia 92, 00198 Rome
Mr V. Sciacovelli, Corso Vittorio Emanuele N. 20/A, Bari
Mr O. Tontini, FEDERPESCA, Corso d'Italia 92, 00198 Rome

JAPAN

Commissioner:

Mr S. Ohkuchi, Nippon Suisan Kaisha Ltd., 6-2 Otemachi, 2-Chome Chiyoda-ku, Tokyo

Advisers:

Mr K. Imamura, Research Division, Fishery Agency, 1-2-1 Kasumigaseki, Chiyoda-ku, Tokyo
Mr K. Seki, Fishery Division, Economic Affairs Bureau, Ministry of Foreign Affairs, 2-1 Kasumigaseki, Chiyoda-ku, Tokyo
Dr F. Nagasaki, Far Seas Fisheries Research Laboratory, Fishery Agency, 1000 Orido, Shimizu, Shizuoka

NORWAY

Commissioner:

Mr H. Rasmussen, Directorate of Fisheries, P. O. Box 185, 5001 Bergen

Advisers:

Mr A. Høyen, Institute of Marine Research, P. O. Box 2906, Bergen-Nordnes
Mr P. L. Mietle, Directorate of Fisheries, P. O. Box 185, 5001 Bergen
Mr P. Sævik, Rimøy, 6094 Leinøy

POLAND

Commissioners:

Mr W. Pelczar, Ministry of Foreign Trade and Shipping, ul. Wiejska 10, Warsaw
Mr W. Sonta, Fisheries Central Board, Odrowaza 1, 70-952 Szczecin

Adviser:

Dr A. J. Paciorkowski, Sea Fisheries Institute, Skr. Poczta 184, 81-345 Gdynia

PORTUGAL

Commissioner:

Mr E. Cadima, Instituto Nacional de Investigacao das Pescas, Alges-Praia, Lisbon
Capt J. C. E. Cardoso, ave 24 de Julho 80, Lisbon
 Capt A. S. Gaspar, Praca Duque de Terceira 24-3-E, Lisbon 2

Advisers:

Mr A. R. Leitao, S.N.A.B., rua Campolide 105-2° esq., Lisbon
 Mr A. Pontes, Portuguese Shipowners Association, Travessa Corpo Santa, 21-2°, Lisbon
 Mrs A. M. Tavares, Instituto Nacional de Investigacao das Pescas, Alges-Praia, Lisbon

ROMANIA

Commissioner:

Mr L. Popescu, Ministry of Agriculture and Foodstuff Industry, Walter Maracineanu Place, Bucharest

SPAIN

Commissioners:

Mr R. Garcia, Direccion General de Pesca, Ruiz de Alarcon 1, Madrid 14
Mr L. Gonzales, Direccion General de Pesca, Ruiz de Alarcon 1, Madrid 14

Adviser:

Dr E. C. Lopez-Veiga, Instituto Investigaciones Pesqueras, Muelle de Bouzas, Vigo

UNION OF SOVIET SOCIALIST REPUBLICS

Commissioners:

Mr V. M. Kamentsev, Ministry of Fisheries, 12 Rozhdestvensky Boul., Moscow K-45
 Mr A. A. Volkov, Welsford Place, Suite 2202-3, 2074 Robie Street, Halifax, Nova Scotia, Canada B3K 5L3

Advisers:

Mr G. M. Chursin, Ministry of Fisheries, 12 Rozhdestvensky Boul., Moscow K-45
 Mr A. Kouznetsov, Ministry of Fisheries, 12 Rozhdestvensky Boul., Moscow K-45
 Dr V. A. Rikhter, Ministry of Fisheries, 12 Rozhdestvensky Boul., Moscow K-45
 Dr A. S. Seliverstov, Polar Research Institute of Marine Fisheries (PINRO) 6 Knipovich Street, Murmansk
 Mr V. Solodovnik, Foreign Department, Ministry of Fisheries, 12 Rozhdestvensky Boul., Moscow K-45

UNITED KINGDOM

Commissioner:

Mr P. Elliott, Ministry of Agriculture, Fisheries and Food, Great Westminster House, Horseferry Road, London SW1P 2AE, England

Observers

EUROPEAN ECONOMIC COMMUNITY

Mr D. Cross, Eurostat, B. P. 1907, Luxembourg, Grand Duchy
 Mr J. B. Farnell, Directorate General for Fisheries, Commission for the European Communities, 200 rue de la Loi, 1050 Brussels, Belgium
 Mr M. Marcussen, Directorate General for Fisheries, Commission for the European Communities, 200 rue de la Loi, 1050 Brussels, Belgium
 Mr E. H. Stein, Secretariat General of the Council of the European Communities, 170 rue de la Loi, 1048 Brussels, Belgium

FOOD AND AGRICULTURE ORGANIZATION

Dr W. G. Clark, Department of Fisheries, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy
Mr L. P. D. Gertenbach, Fisheries Statistics Unit, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy

INTERNATIONAL COMMISSION FOR THE SOUTHEAST ATLANTIC FISHERIES

Capt J. C. E. Cardoso, ave. 24 de Julho 80, Lisbon, Portugal

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

Dr A. W. May, Resource Services Directorate, Department of Fisheries and Oceans, 240 Sparks Street, Ottawa, Canada K1P 6C9

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

Mr P. L. C. Adam, OECD, 2 rue Andre Pascal, Paris, 16^e, France

UNITED STATES OF AMERICA

Mr T. Azarovitz, Northeast Fisheries Center, National Marine Fisheries Service, Woods Hole, MA 02543
Mr D. Crestin, Northeast Region, National Marine Fisheries Service, 14 Elm Street, Gloucester, MA 01930
Miss M. E. McLeod, Office of the Legal Adviser, Department of State, Washington, D. C. 20520
Mr N. L. Pease, Embassy of the United States, 24 Dag Hammarskjolds, 2100 Copenhagen, Denmark
Mr D. A. Reifsnnyder, National Marine Fisheries Service, NOAA, Washington, D. C. 20235
Mr L. L. Snead, OES/OFA/FA, Department of State, Washington, D. C.
Dr T. Wolford, Coast Guard Oceanographic Unit, Bldg. 159-E, Navy Yard Annex, Washington, D. C. 20590

SECRETARIAT

Mr L. R. Day, Executive Secretary, ICNAF
Mr V. M. Hodder, Assistant Executive Secretary, ICNAF
Mr W. H. Champion, Administrative Assistant, ICNAF
Mrs V. C. Kerr, Senior Secretary, ICNAF
Ms E. R. Cornford, Finance and Publications Clerk-Steno, ICNAF
Mr B. T. Crawford, Clerk-Duplicator Operator, ICNAF

SECRETARIAT ASSISTANCE

Mr J. Edwards, Federal Ministry of Food, Agriculture and Forestry, Bonn, Federal Republic of Germany
Mrs U. Gaertner, Federal Ministry of Food, Agriculture and Forestry, Bonn, Federal Republic of Germany
Mrs A. C. Jordan-Stekelenberg, Federal Ministry of Food, Agriculture and Forestry, Bonn, Federal Republic of Germany
Mrs A. Useldinger, Federal Ministry of Food, Agriculture and Forestry, Bonn, Federal Republic of Germany

PART 2

Appendix II

Agenda

1. Opening
2. Agenda
3. Publicity
4. Approval of Proceedings of the 27th Annual Meeting, June 1977 (see Proceedings of Ninth Special Meeting, December 1976, and 27th Annual Meeting, June 1977)
5. Panel memberships (*Com. Doc. 78/VI/6*)
6. Administrative Report (*Com. Doc. 78/VI/7*)
7. Auditor's Report, 1976/77
8. Financial Statement, 1977/78 (*Com. Doc. 78/VI/7*)
9. Budget Estimates, 1978/79 (Appendix I to STACFAD Agenda)
10. Budget Forecast, 1979/80 (Appendix II to STACFAD Agenda)
11. Status of Commission's proposals (*Com. Doc. 78/VI/8*)
 - a) for changes in the Convention
 - b) for regulation of fisheries
12. Annual Return of Infringements (*Com. Doc. 78/VI/9*)
13. Research vessel notification and fishing vessel registration (*Com. Doc. 78/VI/10*)
14. Review of Scheme of Joint International Enforcement (*Com. Doc. 78/VI/1, p. 42-53*)
15. Consideration of Arrangements for Future Multilateral Cooperation in Northwest Atlantic Fisheries
 - a) Report of the Diplomatic Conference, October 1977 (*Com. Doc. 78/VI/4*)
 - b) Status of December 1976 Protocol Relating to Continued Functioning of the Commission (*Com. Doc. 78/VI/8*)
 - c) Adoption of June 1977 Resolution Relating to the Succession from ICNAF to the New Fisheries Organization (Proceedings Ninth Meeting, December 1976, and 27th Annual Meeting, June 1977, p. 134)
16. Conservation of fish stocks outside national fishing limits in Subarea 3
 - a) Cod in Div. 3M
 - b) Redfish in Div. 3M
 - c) American plaice in Div. 3M
17. Conservation of fish stocks lying partly inside and partly outside national fishing limits in Subarea 3
 - a) Cod in Div. 3NO
 - b) Redfish in Div. 3LN
 - c) American plaice in Div. 3LNO
 - d) Yellowtail flounder in Div. 3LNO
 - e) Witch flounder in Div. 3NO
 - f) Capelin in Div. 3L and in Div. 3NO
 - g) Squid (*Illex*) in Subarea 3 (and 4)
18. Reports of Standing Committee on Research and Statistics (STACRES) (*Sum. Doc. 78/VI/1*) (shrimp and seals) and *Sum. Doc. 78/VI/3* (*Illex* squid)
19. Report of Standing Committee on Finance and Administration (STACFAD)
20. Report of Standing Committee on International Control (STACTIC)
21. Report(s) of Panel(s)
22. Date and location of 1979, 1980, and 1981 Annual Meeting
23. Press Statement
24. Other Business
25. Adjournment

PART 2

Appendix III

Conservation Proposal (1) from the Annual Meeting, June 1978

(1) Proposal for International Quota Regulation of the Fisheries in Subarea 3 of the Convention Area, adopted by the International Commission for the Northwest Atlantic Fisheries in Plenary Session 6 June 1978

- That (a) Contracting Governments conduct their fisheries outside areas under national fisheries jurisdiction in such a manner that catches shall not exceed the total allowable catch for each stock and the national quotas for each stock set out in the attached Table; and
- (b) in the event that a convention establishing a new Northwest Atlantic Fisheries Organization (NAFO) enters into force as 1 January 1979 and that the European Economic Community is a Party to it, the quotas to the Federal Republic of Germany, France, Italy, and the United Kingdom established under the proposal shall be substituted by a single quota to the European Economic Community which shall be equal to the sum of the individual quotas which it substitutes.

Table - Integral part of Proposal (1) for International Quota Regulation of the Fisheries in Subarea 3 of the Convention Area, adopted by the International Commission for the Northwest Atlantic Fisheries in Plenary Session on 6 June 1978. Total allowable catches and national quotas (metric tons) for 1979 of particular stocks or species in Subarea 3 of the Convention Area.

Country	COD		REDFISH		AMERICAN PLAICE		WITCH	YELLOWTAIL	CAPELIN	SQUID (<i>Illex</i>)
	3M ¹	3NO	3M ¹	3LN	3M ¹	3LNO	3NO	3LNO	3LNO	SA 3+
Bulgaria	—	—	—	—	—	—	—	—	—	—
Canada	2,910	9,500	5,500	10,000	250	44,800	4,900	17,100	—	—
Cuba	1,800	850	1,550	1,150	—	—	—	—	—	—
German Democratic Republic	—	—	—	425	—	—	—	—	—	—
Iceland	—	—	—	—	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—
Norway	1,300	—	—	—	—	—	—	—	—	—
Poland	1,400	—	—	—	—	—	—	—	—	—
Portugal	9,700	1,100	600	425	250	—	—	—	—	—
Romania	—	—	—	—	—	—	—	—	—	—
Spain	2,090	7,820	—	—	—	—	—	—	—	—
USSR	4,750	4,340	10,350	5,900	1,000	1,000	2,030	—	—	—
Denmark ²	6,650	—	—	—	—	—	—	—	—	—
France ²	(6,500)	(210)	—	—	—	(700)	—	(400)	—	—
Federal Republic of Germany ²	(500)	—	—	—	—	—	—	—	—	—
Italy ²	—	—	—	—	—	—	—	—	—	—
UK ²	(2,000)	—	—	—	—	—	—	—	—	—
Others	400	1,180	2,000	100 ³	500	500 ³	70 ³	500 ³	—	—
Total	40,000	25,000	20,000	18,000	2,000	47,000	7,000	18,000	—	—

¹ Stocks which lie completely outside the 200-mile fisheries zone of the coastal states.

² The allocation among these Contracting Governments of the sum of the quotas attributed to them in this Table (in parentheses) may be changed by them subject to notification to the Commission not later than 1 October 1978, and where applicable, subject to the concurrence of the coastal state in respect of the area in which it exercises national fisheries jurisdiction, without prejudice to the exercise of its licensing authority. The quota attributed to Denmark in respect of cod in Div. 3M is not included in the aforementioned sum and is not subject to change.

³ Reserved for by-catch only.

PART 2

Appendix IV

Annual Meeting — June 1977

Press Notice

1. The 28th Annual Meeting of the International Commission for the Northwest Atlantic Fisheries (ICNAF), under the chairmanship of Dr D. Booss (Federal Republic of Germany), was held in Bonn-Bad Godesberg, Federal Republic of Germany, during 30 May-6 June 1978. About 125 representatives attended from all 17 Member Countries: Bulgaria, Canada, Cuba, Denmark, France, Federal Republic of Germany, German Democratic Republic, Iceland, Italy, Japan, Norway, Poland, Portugal, Romania, Spain, Union of Soviet Socialist Republics, and United Kingdom. Observers were present from the European Economic Community (EEC), the Food and Agriculture Organization of the United Nations (FAO), the International Council for the Exploration of the Seas (ICES), the International Commission for the Southeast Atlantic Fisheries (ICSEAF), the Organization for Economic Cooperation and Development (OECD), and the Government of the United States of America.

Purpose of the Meeting

2. Conservation measures for a number of stocks in ICNAF Subareas 2, 3, and 4 were discussed. Some of these stocks lying within or partly within the 200-mile fisheries zone of Canada were considered in Informal Intergovernmental Consultations convened by Canada. An important item for discussion involved future arrangements pursuant to extended jurisdiction by coastal states, including arrangements for transition from ICNAF to a new multilateral organization.

Scientific Advice

3. The Commission's Standing Committee on Research and Statistics (STACRES) met at the Commission's Headquarters in Dartmouth, Canada during 4-11 April 1978 and again at Bonn-Bad Godesberg, Federal Republic of Germany, during 18 May-2 June, and submitted advice on conservation of specified stocks in Statistical Area 0 and Subareas 1 to 4 in 1979. Advice was provided for consideration by Canada and Denmark on four stocks in the northern part of the ICNAF Area (Statistical Area 0 and Subarea 1) which lie within the 200-mile fisheries zone of these countries; at the request of Canada, advice was provided on 13 stocks which lie completely within or overlapping the 200-mile fisheries zone in Subarea 2, 3, and 4; and similar advice was provided to the Commission on three stocks which lie completely outside the 200-mile fisheries zone of the coastal states. Specific advice for 1979 on the conservation of shrimp in Statistical Area 0 and Subarea 1, capelin in Divisions 3LNOPs, and squid in Subarea 3 and 4 was deferred for consideration in late 1978 or early 1979 when information on the 1978 fisheries will be available.

In addition to its Annual Meeting, STACRES met at ICNAF Headquarters in November 1977 and at Havana, Cuba, in February 1978 and provided the relevant coastal states with advice on shrimp and seals in the first instance, and on squid in the other.

Catch Quotas

4. The Commission agreed to total allowable catches and national allocations for 1979 in respect of three stocks (cod, redfish, and American plaice in Division 3M), which lie completely outside the Canadian 200-mile fisheries zone. The Commission also considered seven other stocks which overlap the Canadian 200-mile fisheries zone and for which scientific advice has been requested by Canada. With the concurrence of the coastal state, consensus was reached on total allowable catches and national allocations for five of these stocks. Conservation measures for two stocks were deferred, pending the provision of advice by STACRES in late 1978 or early 1979 (Table 1).

Enforcement of Fishery Regulations

5. The Commission's Standing Committee on International Control (STACTIC) reviewed the present procedures of international control of fishing activities outside the 200-mile fisheries zone of coastal states. A number of proposals for improving the Scheme of Joint International Enforcement were reviewed but final consideration was deferred to a later meeting to allow delegates time to study the practical and legal implications of the proposals.

Election of Chairman and Vice-Chairman

6. Dr D. Booss (Federal Republic of Germany) expressed his regret at being no longer able to act as Chairman of the Commission. Mr S. Ohkuchi, Commissioner of Japan to ICNAF and Vice-Chairman, was named the Chairman and Dr W. Ranke (German Democratic Republic) was elected Vice-Chairman.

Special Commission Meeting

7. A Special Meeting of the Commission will be held in Canada in February 1979 to consider advice from the Commission's scientists on the conservation measures for capelin in the Newfoundland-Grand Bank area. A working group was planned to meet in conjunction with the Special Meeting to consider improvements to the Scheme of Joint International Enforcement.

1979 Annual Meeting

8. The 1979 Annual Meeting of the Commission will be held in Halifax, Canada, between 30 May and 9 June 1979.

Office of the Secretariat, Dartmouth, Nova Scotia, Canada, 28 June 1978.

TABLE 1. Total allowable catches and national quotas (metric tons) for 1979 of particular stocks in Subarea 3 and 4 of the Convention Area. (The values listed include quantities to be taken both inside and outside the 200-mile fisheries zone, where applicable).

Country	COD		REDFISH		AMERICAN PLAICE		WITCH	YELLOWTAIL	CAPELIN	SQUID (<i>Illex</i>)
	3M ¹	3NO	3M ¹	3LN	3M ¹	3LNO	3NO	3LNO	3LNO	SA 3+
Bulgaria	—	—	—	—	—	—	—	—	—	—
Canada	2,910	9,500	5,500	10,000	250	44,800	4,900	17,100	—	—
Cuba	1,800	850	1,550	1,150	—	—	—	—	—	—
German Democratic Republic	—	—	—	425	—	—	—	—	—	—
Iceland	—	—	—	—	—	—	—	—	—	—
Japan	—	—	—	—	—	—	—	—	—	—
Norway	1,300	—	—	—	—	—	—	—	—	—
Poland	1,400	—	—	—	—	—	—	—	—	—
Portugal	9,700	1,100	600	425	250	—	—	—	—	—
Romania	—	—	—	—	—	—	—	—	—	—
Spain	2,090	7,820	—	—	—	—	—	—	—	—
USSR	4,750	4,340	10,350	5,900	1,000	1,000	2,030	—	—	—
Denmark ²	6,650	—	—	—	—	—	—	—	—	—
France ²	(6,500)	(210)	—	—	—	(700)	—	(400)	—	—
Federal Republic of Germany ²	(500)	—	—	—	—	—	—	—	—	—
Italy ²	—	—	—	—	—	—	—	—	—	—
UK ²	(2,000)	—	—	—	—	—	—	—	—	—
Others	400	1,180	2,000	100 ³	500	500 ³	70 ³	500 ³	—	—
Total	40,000	25,000	20,000	18,000	2,000	47,000	7,000	18,000	—	—

¹ Stocks which lie completely outside the 200-mile fisheries zone of the coastal states.

² The allocation among these Contracting Governments of the sum of the quotas attributed to them in this Table (in parentheses) may be changed by them subject to notification to the Commission not later than 1 October 1978, and where applicable, subject to the concurrence of the coastal state in respect of the area in which it exercises national fisheries jurisdiction, without prejudice to the exercise of its licensing authority. The quota attributed to Denmark in respect of cod in Div. 3M is not included in the aforementioned sum and is not subject to change.

³ Reserved for by-catch only.

PART 3

Summaries of Research and Status of Fisheries for Subareas, Statistical Areas and Seals, 1977

The nominal catch of all species, including finfishes, invertebrates, and seaweeds, from the Northwest Atlantic (Subarea 1 to 5 and Statistical Areas 0 and 6) was about 2,993,000 metric tons. This total tonnage figure is provisional as Portugal, Spain, the United Kingdom (UK) and Ireland have not yet provided final catch figures for 1977.

The following summaries are based on data for 1977 presented in national reports and other pertinent documentation considered by the Commission's scientists at meetings of the Standing Committee on Research and Statistics (STACRES) in 1977. Further details for each Subarea and Statistical Area will be found in ICNAF *Redbook* 1978 for research and in ICNAF *Statistical Bulletin* Vol. 27 for 1977 for catch statistics.

Summaries were prepared by the following:

for Statistical Area 0 — Sv. Aa. Horsted
Subarea 1 and (Denmark);
East Greenland

for Subarea 2 and Statistical Area 0 — A. T. Pinhorn
(Canada);

for Subarea 3 — A. T. Pinhorn
(Canada);

for Subarea 4 — R. G. Halliday
(Canada);

for Subarea 5 and Statistical Area 6 — R. C. Hennemuth
(USA);

for Seals — A. W. Mansfield
(Canada).

Subarea 1, Statistical Area 0 and East Greenland

Reports of research in 1977 were submitted by Denmark, Federal Republic of Germany (FRG), and Portugal.

1. Status of Fisheries

In Subarea 1 and Statistical Area 0, total nominal catches (metric tons) by country and major species for 1976 and 1977 were as follows:

Country	Statistical Area 0		Subarea 1	
	1976	1977	1976	1977
Denmark	916	1,237	61,537	84,834
France	—	—	803	924
FRG	—	—	14,367	48,281
GDR	—	287	341	349
Japan	—	—	148	—
Norway	65	150	14,934	9,467
Portugal	—	—	3,004	1,052
Spain	352	—	9,055	—
USSR	6,726	3,810	27,277	5,783
UK	—	—	188	—
Total	8,059	5,484	131,654	150,690

Major Species	Statistical Area 0		Subarea 1	
	1976	1977	1976	1977
Cod	—	—	33,286	39,129
Redfish	126	169	13,698	30,890
Greenland halibut	4,906	4,137	10,882	8,441
Other flounders	—	—	2,640	4,060
Greenland cod	—	—	4,746	7
Roundnose grenadier	2,610	721	5,893	2,212
Wolffishes	—	—	6,105	3,271
Other fish	25	—	4,730	20,982
Shrimp	392	457	49,674	41,698
Total	8,059	5,484	131,654	150,690

2. Work Carried Out

- a) **Denmark:** Standard hydrographic and plankton sections occupied off West Greenland. Collecting invertebrates and fish for general background studies of content of (natural) hydrocarbons and metals. Studies of occurrence of oil degrading bacteria in sediment and water. Environmental studies in connection with a small oil spill in

Melville Bay in August. Continuation of studies of the marine environment at the lead and zinc mine in Umanak Fjord in March and September. Ice observations. Sampling eggs, larvae, pre-recruit and recruited cod. Tagging cod. Collection of biological data on shrimp, queen crab, salmon, capelin, lumpsucker, Greenland cod, redfish, wolffish, American plaice, and Greenland halibut. Sampling commercial catches of shrimp and cod. Studies on shrimp density by bottom photography and trawling by research vessel and by analysis of catch-per-unit-effort data from commercial vessels. Fishing experiments (trap and trawl) on queen crab in Div. 1E, inshore, in October. Surveys for cod (included sampling) by chartered vessels (a longliner and a gillnetter) off East Greenland during August-October and for capelin off East Greenland in September by a chartered purse seiner.

- b) **FRG:** Groundfish survey by R/V *Anton Dohrn* in Div. 1D-1F in December, including hydrographic observations.
- c) **Portugal:** Sampling of cod and Greenland cod for length, age, and maturity on board commercial gillnetters in Div. 1B, 1C, and 1D.

3. Hydrography

Data from the survey by FRG in November 1976 indicated rather warm conditions off West Greenland at the time. Danish data, collected through 1977 along standard oceanographic sections on Fylla Bank, showed water temperatures to be generally higher in 1977 than in the previous cold years and even above average for the years 1950-66. The lowermost temperatures were found over the shallow part of Fylla Bank in February-March but were not lower than -0.5°C as compared to -1.8°C in the same months of 1976. The strong inflow of Irminger water usually observed in November-December occurred already in September. Temperatures at the western slope of Fylla Bank remained at a relatively high level through the last part of 1977 and also in the beginning of 1978.

4. Plankton

The plankton on the standard oceanographic sections in the Davis Strait showed an extraordinarily high content of voluminous ctenophores and medusae, whereas crustaceans (including copepods) were sparse.

5. Cod

- a) **Eggs and larvae:** Although temperatures were rather favourable, the number of cod larvae found in the Danish plankton samples was very low. However, the efficiency of the plankton nets may have been influenced by the many ctenophores (see section above). Thus, there is at present a great uncertainty as to the likely strength of the 1977 cod year-class.
- b) **Young fish:** Age-group 1 (the 1976 year-class) was very scarce in Danish pre-recruit cod surveys, whereas age-group 2 (the 1975 year-class) occurred both in research hauls and as discards in commercial inshore pound-net catches, especially in Div. 1B. The 1975 year-class seems to be relatively good, probably with a northern distribution. Three-year-old cod (the 1974 year-class) were found in most research hauls (Denmark and FRG), as well as in commercial pound-net catches, but the year-class does not seem as good as the 1975 year-class though it may be more evenly distributed.
- c) **Commercial stock:** About 75% (by weight as well as by number) of the total landings of cod from the Subarea were made up by the newly-recruited 1973 year-class. In the research hauls by FRG, up to 80% of the cod belonged to this year-class. Off East Greenland the samples from Faroese surveys showed 5- to 8-year-old cod to be the most important in the catches by longliners, but 4-year-old-fish (the 1973 year-class) also occurred in these catches.

6. Shrimp (= northern deepwater prawn)

As in 1976, the major part of the offshore commercial fishery took place in Div. 1B, and surveys seem to confirm that this is where the highest levels of offshore abundance occur. The seasonal northwestward shift of fishing activity and probably of shrimp concentrations observed in 1976 was also observed in 1977.

Previous swept-area estimates of the biomass on the offshore grounds in Div. 1B, based on Danish observations, were supplemented by additional work in 1977. Although the 1977 survey was not as complete as in 1976, the results indicate that the biomass level in Div. 1B was rather similar to that estimated for 1976. Also, estimates from bottom photography in 1977 point to a similar stock level in 1977 as that estimated in 1976 by the swept-area method.

Estimates of by-catches in the shrimp fishery were given by Denmark and Norway. The by-catches vary

considerably both seasonally and between areas, but consist mainly of small redfish.

Subarea 2

Reports on research in 1977 were submitted by Canada, France [Saint-Pierre and Miquelon (SP&M)], FRG, GDR, Poland, and USSR.

1. Status of Fisheries

In Subarea 2, total nominal catches (metric tons) by country and major species for 1976 and 1977 were as follows:

Country/Major Species	1976	1977
Bulgaria	—	2,892
Canada	8,815	10,814
Cuba	—	3,156
Denmark	292	371
France	697	912
FRG	11,019	15,366
GDR	11,325	4,953
Japan	19	569
Norway	1,375	—
Poland	17,060	15,729
Portugal	760	4,380 ^a
Romania	—	1,346
Spain	18	470 ^a
USSR	123,274	127,756
UK	—	1,021 ^a
Total	174,654	189,735
Cod	40,565	47,460
Redfish	16,107	7,354
Greenland halibut	9,076	11,099
Other flounders	2,390	2,702
Roundnose grenadier	6,682	3,328
Capelin	94,599	108,842
Other species	5,235	8,950
Total	174,654	189,735

^a Provisional data

2. Work Carried Out

- a) **Canada:** A program to study the Labrador Current from Hudson Strait to Belle Isle Strait involving current meter moorings and 13 temperature, salinity, oxygen, and nutrient sections. Hydrographic observations on the Labrador Shelf in August. Monitoring coastal fisheries. Sampling offshore fisheries for cod, redfish, capelin, grenadier, and flatfishes. Autumn random-stratified groundfish survey cruise in Div. 2J and 3K in November. Research cruise in Div 2J in collaboration with FRG on board the FRG R/V *Anton Dohrn*. Research cruise in Div. 2G and Statistical

Area 0 in collaboration with France on board French R/V *Cryos*. Inshore capelin survey of South Labrador coast in July. Herring survey of southern Labrador by purse seiner in August. Research vessel cruise in October to study North American proportions of salmon in the Labrador Sea. Sampling of Atlantic salmon, and Arctic char from commercial fishery.

- b) **France (SP&M):** Sampling by R/V *Cryos* for commercial fishery.
- c) **FRG:** Late autumn groundfish survey in Div. 2J with hydrographic observations, in company with Canadian research personnel, from R/V *Anton Dohrn*, November-December. Sampled cod, redfish, American plaice, witch, and Greenland halibut during the cruise for length and age. Commercial sampling of cod and redfish in Div. 2J.
- d) **GDR:** Biological samples of cod, Greenland halibut, roundnose grenadier from the commercial fishery.
- e) **Poland:** Biological samples of cod and Greenland halibut from the commercial fishery.
- f) **USSR:** Hydrographic observations across Hamilton Inlet Bank in November. Biological samples of cod, Greenland halibut, and capelin for length and age composition from the commercial fishery. Biomass survey of capelin.

3. Environmental Studies

Surface and 10-m temperatures over the Labrador Shelf in early August were lower than those of August 1976 and considerably lower than the 1965-71 average for the same period. The volume of cold water less than 0°C extended farther seaward at this time but not as deep in the inshore area where bottom and lower layer temperatures were much higher than those of the previous year and slightly higher than the recent average. In the seaward Stations in August where the deep water was related to the West Greenland Current, especially in the upper and intermediate depths, temperatures were higher in 1977 which suggests the inflow of the warmer Irminger Current was much stronger than in the previous year. In November-December an extreme warming of the water mass in

the Labrador Current was registered. Both the cold and warm components of the Labrador Current were weaker in autumn.

4. Cod

Catches in the Labrador coastal fishery were slightly less than in 1976 but still above the 1975 level. A research vessel survey conducted by FRG indicated that the previously observed decline in the Labrador stock has ceased with a stabilization of the population in numbers and an increase in the biomass, due to increased growth rates of the relatively strong 1973 and 1972 year-classes, which now seem to be dominating both the commercial stock and the catches. Analyses of cod liver and gonads as bioenergetic indices indicated that percent water content in liver is very constant.

5. Redfish

The catch of redfish was 35% less than that in 1976 due to less directed fishing by some countries. Over the last few years the general production model has been used to generate advice on possible TAC levels in this stock but irregularities existing in the current catch effort data did not allow updating of the model in 1977.

6. Capelin

Few spawning and post-spawning capelin were detected in July during an inshore Canadian survey of the South Labrador coast. Small concentrations were recorded during an offshore Canadian survey in late October in Div. 2J. USSR investigations indicated that, due to the anomalous warm water mass of the shoreward branch of the Labrador Current, capelin kept much closer to shore and were inaccessible for investigation. The 1973 year-class predominated in its samples.

7. Roundnose Grenadier

Canadian research and commercial samples were obtained from Subarea 2 during 1977. Research was

concentrated on obtaining a reliable index of length to alleviate the broken/regenerated tail problem and on the interpretation of the ages of grenadier. Lengths of grenadier in the GDR fishery in December ranged from 44 to 76 cm.

8. Greenland Halibut

Biological studies indicated that most mature Greenland halibut in Subarea 2 are in deep water; however, a considerable portion of the fishery is directed at immature fish in relatively shallow water. Sizes of Greenland halibut of both sexes are less in the South Labrador area than off Baffin Island area and this probably reflects the fact that the main spawning areas are probably situated in the Davis Strait area, apparently on the southern slope of the Greenland and Canadian Ridge.

Samples from the GDR fishery showed a length range of 40-70 cm compared with 35-90 cm in the USSR samples.

9. Salmon

Canadian studies indicated about 58% of North American salmon in the Labrador Sea in October from scale analyses and blood transferring analyses. Samples were collected from various areas of the Labrador fishery for size, age, and sex ratios.

10. Herring

A survey of southern Labrador in August failed to detect commercial concentrations of herring. A dominance of summer spawners was indicated.

11. Char

Mortality estimates and optimum levels of exploitation were determined from yield-per-recruit assessments on various stocks.

Subarea 3

Reports on research in 1977 were submitted by Canada, France (SP&M), FRG, GDR, Japan, Poland,

Portugal, and USSR. In addition, commercial sampling was reported by Italy, Norway, Spain, and UK.

1. Status of Fisheries

In Subarea 3, total nominal catches (metric tons) by country and major species for 1976 and 1977 were as follows:

Country/Major Species	1976	1977
Bulgaria	1,340	578
Canada	276,583	339,120
Cuba	—	8,116
Denmark	3,604	7,069
France	12,804	16,567
FRG	16,340	9,929
GDR	6,829	4,693
Iceland	8,853	3,394
Italy	—	109
Japan	5,368	4,518
Norway	27,354	22,648
Poland	33,156	10,686
Portugal	57,627	28,484 ^a
Romania	—	1,622
Spain	33,035	34,123 ^a
USSR	329,110	135,083
UK	252	2,682 ^a
USA	231	122
Ireland	386	2,879 ^a
Total	812,872	632,422
Cod	271,731	212,065
Redfish	81,884	74,668
American plaice	64,381	57,760
Witch flounder	17,938	16,739
Yellowtail flounder	10,481	12,014
Greenland halibut	15,659	20,750
Other flounders	1,114	1,429
Roundnose grenadier	13,911	12,058
Herring	29,414	29,718
Mackerel	5,276	7,865
Capelin	265,801	121,585
Other fish	19,872	24,567
Squid	11,257	35,818
Other invertebrates	4,153	5,386
Total	812,872	632,422

^a Provisional data

2. Work Carried Out

a) **Canada:** Hydrographic stations occupied from off Labrador to the Grand Bank, including the Flemish Cap Section, observations being incomplete on some Sections due to involvement in Search and Rescue operations. Monitoring coastal and offshore cod fisheries. Biomass surveys in the area to determine levels of abundance of various groundfish stocks. Collection of data for improvement of the data base and various parameters used in updating stock assessments for cod, haddock, redfish, flatfishes (American plaice, Greenland halibut, witch, and yellowtail flounders). Survey for capelin larvae in Div. 3L in

February. Research cruise of the A.T. *Cameron* in June to monitor spawning population of capelin on Southeast Shoal (Div. 3N). Studies of stock discrimination and general biology of capelin. Assessment of herring biomass levels and potential yield along eastern Newfoundland. Mackerel sampling for length and age composition. Tagging of adult salmon in the Fortune Bay area and sampling of the commercial fishery, along with biological studies. Sampling the squid fishery.

- b) **France (SP&M):** Research with R/V *Cryos* on cod in Subdiv. 3Pn, 3Ps, and Div. 3K and 3L. Groundfish survey in Subdiv 3Ps with R/V *Cryos* in April and November. Squid survey in Subdiv. 3Ps with R/V *Cryos* in April and November.
- c) **FRG:** Commercial sampling of cod and redfish in Div. 3K.
- d) **GDR:** Commercial sampling of cod and capelin from the commercial fishery.
- e) **Italy:** Commercial sampling of squid in Div. 3L.
- f) **Japan:** Commercial sampling of the capelin fishery.
- g) **Norway:** Commercial sampling of capelin in Div. 3N.
- h) **Poland:** Commercial sampling of cod, Greenland halibut, and witch from Div. 3K.
- i) **Portugal:** Commercial sampling of cod in Div. 3L, 3N, and 3O.
- j) **Spain:** Commercial sampling of cod (Div. 3L, 3M, 3N, 3O), redfish (Div. 3L, 3M), American plaice (Div. 3L, 3N, 3O), and yellowtail (Div. 3N and 3O).
- k) **USSR:** Hydrographic investigations at standard Sections. Young cod survey. Groundfish biomass surveys. Biological investigations on various groundfish species. Assessment of capelin spawning stock biomass and abundance in Div. 3N.
- l) **UK:** Commercial sampling of cod in Div. 3K and 3M.

3. Environmental Studies

Surface temperatures on Flemish Cap in July in Canadian hydrographic surveys were similar to those

of 1976 and 1951-71 average. However, at the two most coastward stations and stations in the Flemish Channel, surface temperatures were well below the average and lower than any previously encountered, including the unusually cold year of 1972. In the deep water of the Flemish Channel, especially in the upper and intermediate layers, temperatures were higher than those of the previous year but similar to the 1951-71 average.

The volume of cold water less than 0°C was greater than in 1976 and extended in an unbroken core over the Grand Bank with temperatures below average and very similar to the lowest of the 1951-71 period.

In spring, summer, and autumn, USSR hydrographic observations indicated that the temperatures of the Labrador Current waters were 1° to 2°C higher than the 1976 temperatures and the long-term average. Short-term negative anomalies were observed in waters of the southern slopes of the Grand Bank. The maximum positive anomalies were registered in the 50-200 m layer and the maximum negative ones in the 200-500 m layer.

Mapping of zooplankton and oceanographic conditions indicated a high production region in the shallowest waters and the northwest corner and that the Labrador Current did not flow around the east side of Flemish Cap.

4. Plankton

Numbers of phytoplankton were below average in spring but there were rich crops in September and November. Copepods were below average in every month except June. Numbers of copepodite stages I-IV of *Calanus finmarchicus* were close to the long-term mean while the adult stages were abundant from March to September and in December. Numbers of *Euchaeta norvegica* were above average for most months while numbers of euphausiids (mostly *Thysanoessa longicaudata*) were above the long-term mean in the first three months of the year but below average from April onwards. *Sebastes* spp. were not found at all.

Analyses of cod and redfish egg and larvae distribution on Flemish Cap indicated that the abundance of cod and redfish year-classes on Flemish Cap is determined by the intensity of the off-bank drift and the consequent loss of larvae from the system.

Investigations of phytoplankton development in 1970-71 on Flemish Cap indicated that the pattern of phytoplankton development is determined by the

algae cosmopodites dominating in the area and the zones of interaction of different water masses. The species composition of zooplankton complexes changes very little during the season but abundance is highest from March to June. There is a good correlation between the mass and prolonged spawning of *Calanus* and the area of high phytoplankton.

5. Cod

Monitoring of the coastal and offshore fisheries was continued in 1977. Catches showed some improvement over 1976 especially in the northern subdivisions.

A decrease in the size of cod caught in the Div. 2J-3KL stock occurred due to the 1972 and especially 1973 year-classes entering the fishery. In January-February, 83% of the USSR catches of cod from this stock was composed of the 1972 and 1973 year-classes.

Canadian survey cruises to the Grand Bank (Div. 3LNO) and St. Pierre Bank (Subdiv. 3Ps) showed little change in cod abundance over previous years, although catches by the French R/V *Cryos* were larger in the autumn cruise. USSR surveys, however, indicated an increase in the cod biomass in Div. 3NO. Cod of the 1973 year-class dominated the catch on Flemish Cap leading to an increase in biomass in that area.

In June 1977 cod liver percent water from Div. 3N was 53.6, with cod under 30 cm apparently quite higher (62.6%). The condition factor liver weight over fish weight was 2.21, while the condition factor fish weight over length cubed was 0.807. These fish are, by comparison to the Div. 2J November 1977 results, energetically deficient during the capelin spawning period.

6. Redfish

Length frequency data for Div. 3M indicated better than average year-classes for 1963 and 1972. Both year-classes were evident in research cruises while the latter year-class also showed up in 1976 commercial catches. Numbers of males and females on Flemish Cap were almost equal in trawl catches throughout the season, although during the spawning period large females were predominant. The Div. 3LN fishery has been a traditional bottom trawl fishery but switched to a midwater trawl fishery for one year only (1974).

Div. 3O redfish appear to be underexploited while

the better than average year-classes expected in Div. 3P in the late 1970's have not materialized, nor is there any clear indication from length frequency data that better than average year-classes will be forthcoming.

7. Flatfish

The primary objective has continued to be the improvement of the data base and a better understanding of the biology of the different flatfish species. The use of stratified-random surveys as a means of estimating relative abundance of flatfish is being expanded. Indices of abundance from Grand Bank cruises in 1977 suggested that plaice and yellowtail are recovering somewhat from the low levels encountered during the 1973-75 period. Plaice stocks in Subarea 2 + Div. 3K and in Subdiv. 3Ps were being exploited about $F_{0.1}$ level and TACs were thus reduced. The yellowtail stock is increasing in abundance and the TAC was, therefore increased while witch stocks were assessed as being stable. Biological studies on Greenland halibut indicate that most mature fish in the northern areas were in deep water; however, a considerable portion of the fishery is directed at immature fish in relatively shallow water. The stock is apparently being exploited at $F_{0.1}$ level at present.

8. Roundnose Grenadier

No change in the stock of roundnose grenadier was obvious.

9. Capelin

In spring-summer, capelin distribution and behaviour were significantly different from that observed in previous years. Concentrations kept along

the eastern Avalon (Div. 3L) up to the end of May, while the greatest numbers of fish migrated through Div. 3O in the second half of May in previous years. The first concentrations appeared on the spawning ground on 10 June and spawning then commenced. Unusual capelin distribution was caused by anomalously high temperatures of the water masses on the Grand Bank. Assessment of the spawning stock biomass in Div. 3N from USSR acoustic surveys resulted in an estimate of 1.0×10^6 tons. Individuals of the 1973 and 1974 year-classes at ages 3 and 4 prevailed on the spawning grounds.

10. Herring

Recruitment prospects for fisheries along eastern and southern Newfoundland continue to be poor, the last strong year-class occurring in 1968. The 1974 year-class has been the strongest to appear in the 1970's, yet is less than 25% as strong as the 1968 year-class.

11. Mackerel

Sampling of the Newfoundland commercial fishery does not indicate recruitment of any substantial year-classes; 75% of the catch was composed of fish 5 years of age and younger, with the 1973 year-class dominant (35%).

12. Salmon

Of 51 adult fish tagged in Fortune Bay, all 13 recaptures were from Fortune Bay. Blood and gonads samples analyzed from 1976 collections indicated an average of 79% of the females in five stocks were spawners of the year. Other samples collected in 1977 have not been analyzed.

Subarea 4

Reports on research in 1977 were submitted by Canada, Cuba, France, FRG, GDR, Japan, Poland, Spain, USSR, UK, and USA.

1. Status of Fisheries

In Subarea 4, total nominal catches (metric tons) by country and major species for 1976 and 1977 were as follows:

Country/Major Species	1976	1977
Bulgaria	4,187	3,860
Canada	530,719	543,750
Cuba	17,823	5,429
Denmark	7,762	290
France	21,443	19,978
FRG	1,423	10,110
Italy	1,355	2,429
Japan	3,312	5,292
Norway	45	—
Poland	814	3,010
Portugal	11,227	—
Romania	15	1,312
Spain	14,327	251 ^a
USSR	160,637	58,122
USA	7,054	5,999
Ireland	2,925	—
Total	785,068	659,832
Cod	148,952	129,284
Haddock	18,915	24,641
Redfish	56,442	33,677
Silver hake	97,184	36,752
Pollock	24,239	22,187
American plaice	25,412	20,423
Witch flounder	12,617	5,470
Other flounders	10,535	12,066
Herring	198,703	199,200
Mackerel	27,789	12,630
Argentine	7,010	2,487
Skates	9,345	1,456
Other fish	42,147	36,191
Squid	30,510	44,129
Scallops	13,379	8,292
Lobster	14,586	16,197
Other invertebrates	16,509	20,097
Seaweeds	30,794	34,653
Total	785,068	659,832

^a Provisional data

2. Work Carried Out

- a) Canada:** Physical oceanography of Browns Bank and Northeast Channel in relation to lobster research. Study of the dynamics at the Continental Shelf break. Ichthyoplankton studies in St. Georges Bay (Div. 4T), the Bay of Fundy (Div. 4X), and the Scotian Shelf (Div. 4VWX). Phytoplankton and zooplankton studies in Bedford Basin (Div. 4X) and the edge of the Scotian Shelf (Div. 4W). Study of the behaviour and dynamics of heavy metals in the St. Lawrence, nutrients and organic pollutants in St. Georges Bay, the effects of the 1970 oil spill in Chedabucto Bay (Div. 4W), and nutrients in Bedford Basin. Biological sampling of commercial landings of all major species. At-sea observations of by-catch problems in the silver hake-squid fishery. Research vessel inventory of groundfish stocks in all areas. Stock assessments and yield predictions for all major finfish stocks. Study of parasites and diseases of cod and haddock. Tagging of herring in the Bay of Fundy and Sydney Bight. Study of feeding and fecundity of mackerel. Study of feeding behaviour, physiological parameters, nutrition, sex determination, and migration of bluefin tuna. Measurement of acoustic target strength of fishes. Continued development of a bottom-referencing underwater towed instrument vehicle. Trawl mesh selection studies for silver hake, in cooperation with Cuba and USSR. Evaluation of relative by-catch rates for off-bottom trawls, in cooperation with Japan. Population structure, maturity and fecundity of *IIIex*.
- b) Cuba:** Oceanographic survey of Scotian Shelf (Div. 4VWX). Acoustic survey of Scotian Shelf. Trawl mesh selection for silver hake, in cooperation with Canada. Studies of ageing, maturation, and fecundity of silver hake. Evaluation of by-catch problems in the silver hake-squid fishery. Stock assessment of *IIIex*.
- c) France (SP&M):** Trawl survey in Div. 4R with study of length, sex, age, and stomach contents of cod and lengths of redfish.
- d) FRG:** Herring larval surveys in March and November, and a bottom trawl survey in October with emphasis on herring conducted primarily in Subarea 5 but some stations sampled in Div. 4X.
- e) GDR:** A juvenile herring survey in March-April conducted primarily in Subarea 5, but one station in Subarea 4.
- f) Japan:** Commercial sampling of *IIIex*. Evaluation of relative by-catch rates for off-bottom trawls, in cooperation with Canada.
- h) Spain:** Commercial sampling of *IIIex*. Study of

catch rates and by-catches in *Illex* fishery.

- i) **USSR:** Oceanographic, zooplankton and ichthyoplankton studies on the Scotian Shelf (Div. 4VWX) in September-October. Trawl mesh selection studies for silver hake. Biological sampling of commercial catches. Study of winter distribution of mackerel. Stock assessment and feeding study for *Illex*. Evaluation of research vessel trawl survey abundance indices for silver hake. Stock assessment of silver hake.
- j) **UK:** Continuous Plankton Recorder survey covering 80 miles in May.
- k) **USA:** Study of the inflow of water through the Northeast Channel through deployment of current meters. Semi-annual bottom trawl surveys in Div. 4X. Study of the incidence and distribution of viral blood disease in anadromous fishes.

3. Hydrographic, Environmental and Plankton Studies

Studies of the levels, behaviour, and dynamics of heavy metals in the sediments of the St. Lawrence and Saguenay Fjord indicate that very little of the anthropogenic inputs of mercury, zinc, lead, vanadium and nickel have reached the open Gulf, except for local sources in Chaleur Bay, Northumberland Strait and the Bay of Islands, Newfoundland. Elsewhere, the elemental concentrations are at or near natural levels. Analysis of surface sediments in the Gulf of St. Lawrence for hydrocarbon content and composition indicates their derivation from biogenic terrestrial sources and slight alterations of hydrocarbon composition at abandoned exploratory drilling sites. Study of the effects of the 1970 oil spill in Chedabucto Bay indicates that the recovery potential of the clam *Mya arenaria* in oiled sediments is low and oiled populations remain under stress 6 years after the oil spill.

Hydrographic studies of the shelf break area south of Halifax resulted in the observation of a remarkably persistent warm-core eddy in the area for 4-5 months. Another study found high fish densities associated with warm bottom water in the central Scotian Shelf between LaHave and Emerald Banks and another area of fish concentration between a cold and warm boundary to the west of Sable Island. The amount of high salinity, nutrient-rich water in the Gulf of Maine was found to relate to the inflow of water through the Northeast Channel.

Capelin eggs were found off beaches on the west side of St. Georges Bay (Div. 4T). In September-October, the greatest seston biomass on the Scotian

Shelf was recorded in the Emerald Bank area and in the shallow waters near Sable Island and Browns Bank. The densest concentrations of silver hake eggs were encountered in the same areas. The length of silver hake larvae ranged from 3.0 to 13.8 mm with 4.0-6.0 mm larvae predominating.

4. Cod and Haddock

The occurrence of mouth neoplasms in cod, which had been observed in previous years, was not substantiated in 1977. The prevalence of gas bladder disease in haddock decreased markedly in 1977 in the Emerald Bank area. The incidences in spring and autumn were 9.1 and 4.0%, respectively, compared with 40 and 12.2%, respectively, in 1976, and 70-80% prior to 1975. Current studies indicate a southwesterly movement of the infection.

A general production model for the Div. 4RS-Subdiv. 3Pn cod stock indicates a maximum sustainable yield (MSY) of 80,000-85,000 metric tons, but that fishing effort in recent years has been beyond that giving MSY.

5. Silver Hake

Cooperative selectivity studies by Canada, Cuba, and the USSR indicated that the selection factor for silver hake is about 4.0 for the kapron netting presently used in the fishery. Further evaluation of research vessel abundance indices confirm that their precision is low and that the sequence of abundance indices differ greatly between USSR and Canadian surveys and between these and abundance calculated from virtual population analysis. Although agreement on ageing techniques in workshops is high, major differences among national laboratories in estimation of the age composition of removals by the fishery are still occurring.

6. Herring

A summer survey of herring larval distribution in the Bay of Fundy revealed a concentration in the Bay at the same time as larval hatching off southwestern Nova Scotia, probably implying very rapid transport of larvae from the spawning area. Recoveries from tagging experiments of previous years confirmed that Bay of Fundy herring move freely across the Bay with populations migrating to both Chedabucto Bay and the Gulf of Maine during winter. A small tagging experiment in Chedabucto Bay confirmed the return migration, recoveries being made in the Bay of Fundy and Gulf of Maine.

7. Mackerel

Analysis of winter catches of mackerel on the Scotian Shelf by the USSR research and commercial fleet reveals that some mackerel, particularly juveniles, may overwinter on the Shelf in years when sufficiently high water temperatures occur (6°C). However, there is no indication from these data that a significant proportion of the mackerel populations overwinter in the Scotian Shelf area.

8. Capelin

A review of the available data on capelin in the Gulf of St. Lawrence suggests that four stock components may be present with a standing stock biomass in the order of 160,000 metric tons.

9. Squid (*Illex*)

The rapidly expanding fishery for *Illex* in Subarea 3-5 and Statistical Area 6, and the Special STACRES Meeting on Squid in February 1978 stimulated production of a large number of analyses concerning aspects of *Illex* biology and the fishery for it. In relation

to Subarea 4, *Illex* occurs on the Scotian Shelf from about April to November. Stock relationships remain unclear but the occurrence of maturing females on the Scotian Shelf in late autumn indicates that spawning probably occurs nearby. However, it is conceivable that some *Illex* taken in Subareas 3 and 4 are spawned in Subarea 5 and Statistical Area 6. In Div. 4VWX in 1977, removals in numbers per 100 metric tons decreased from 2.7 million in late April to 0.32 million in November, reflecting rapid growth during the season. It is likely that growth substantially exceeds mortality early in the season, and that an increase in yield-per-recruit could be achieved by delaying the start of the fishing season until at least the middle of June. Squid abundance varies greatly over a period of years and may fluctuate by a factor of several times from one year to the next. It appears that a period of high abundance in 1955-67 was followed by a period of low abundance in 1968-74 and then by another period of high abundance in 1975-77. By-catches in the *Illex* fishery were relatively high early in the fishing season (up to 30%) but decreased by mid-July (to 0-8%) and remained relatively low for the remainder of the season. By-catches were lower in midwater than in bottom trawls. By-catches in chain-type off bottom trawls were much less than in bobbin-type off-bottom or in true bottom trawls. Examination of statoliths indicates that they hold potential for ageing of *Illex*.

Subarea 5 and Statistical Area 6

Reports on research in 1977 were submitted by Canada, FRG, GDR, Japan, Poland, USSR, and USA.

1. Status of Fisheries

In Subarea 5 and Statistical Area 6, total nominal catches (metric tons) by country and major species for 1976 and 1977 were as follows:

Country	Subarea 5		Statistical Area 6	
	1976	1977	1976	1977
Bulgaria	531	1,598	14,060	3,417
Canada	88,934	123,417	837	254
Cuba	10,558	1,255	1,490	326
Denmark	17	3	—	—
France	1,220	—	—	—
FRG	14,224	—	1	—
GDR	11,787	782	36,890	7,283
Italy	67	1,191	6,246	4,213
Japan	10,378	2,903	6,898	12,074
Poland	50,521	270	23,937	19,825
Romania	2,204	—	4,179	1,152
Spain	5,750	971 ^a	9,525	13,254 ^a
USSR	159,781	63,672	45,876	38,518
USA	290,272	319,667	747,063	737,972
Ireland	806	386 ^a	3,059	325 ^a
Total	647,050	516,115	900,061	838,613

^a Provisional data

Major Species	Subarea 5		Statistical Area 6	
	1976	1977	1976	1977
Cod	29,676	39,565	438	334
Haddock	6,280	14,165	2	1
Redfish	10,696	13,223	78	—
Silver hake	69,273	63,277	12,524	13,605
Red hake	20,568	7,111	8,235	1,509
Pollock	13,379	16,239	3	32
Yellowtail flounder	16,910	16,092	254	536
Other flounders	17,792	23,620	9,827	10,493
Herring	92,925	52,199	901	612
Mackerel	102,374	5,420	106,294	49,601
Butterfish	9,230	2,287	2,578	2,249
Menhaden	40,466	15,833	257,449	272,939
Alewife	1,811	1,758	6,444	4,586
Other fish	36,208	29,505	42,664	47,685
Squids	24,043	6,870	26,177	35,320
Scallops	104,220	156,424	56,575	50,524
Clams	28,592	30,307	162,259	169,079
Other molluscs	4,137	6,231	177,825	146,464
Crustaceans	15,987	13,603	29,371	33,001
Others	2,483	2,386	163	43
Total	647,050	516,115	900,061	838,613

2. Work Carried Out

- a) **Canada:** R/V *E.E. Prince*. Sea scallop sampling.
- b) **FRG:** R/V *Anton Dohrn*. Plankton and

hydrographic survey, March. Trawl and acoustic survey of spawning Atlantic herring, October. Larval Atlantic herring survey, November.

- c) **GDR:** R/V *Gorlitz*. Juvenile Atlantic herring survey, March, Plankton survey, March.
- d) **Japan:** R/V *Suzuka Maru*. Squid investigations.
- e) **Poland:** R/V *Wieczno*. Plankton and benthos, March. Juvenile Atlantic herring, March. Shark tagging, March. Pre-spawning Atlantic herring, September. Atlantic herring predators and prey, September. Larval Atlantic herring and hydrography, October.
- f) **USSR:** R/V *Nogliki*. Atlantic herring tagging, April-May. Plankton and hydrography, May-June. R/V *Yubileiniy*. Larval hake and hydrography, July. Plankton, August. Biological oceanography, August-September. R/V *Argus*. Plankton and hydrography, October-November. Squid, November.
- g) **USA:** Sampling of all commercial landings for length, weight, and age. Stock assessments for Atlantic cod, haddock, redfish, silver hake, red hake, pollock, yellowtail flounder, summer flounder, Atlantic herring, Atlantic mackerel, river herring, scup, weakfish, butterfish, bluefish, white hake, squid, American lobster, northern shrimp, red crab, surf clam, ocean quahog, sea scallop. R/V *Delaware II*. Oil spill, January. Clam survey, January. Trawl survey, March, July and September. Egg and larvae survey, April, June, and December. Physical oceanography, June and September. Benthos, July. Gear research, August. R/V *Mt. Mitchell*. Atlantic herring larvae, February. Plankton and hydrography, November. R/V *Kelez*. Physical oceanography, February, April, and November. R/V *Spirit of 76*. Inshore trawl and plankton survey, March, April, and June. R/V *Albatross IV*. Trawl survey, April. Sea scallop survey, May and September. Physical oceanography, June, July, and September. Effects of pollution, July. Hydroacoustics, August. R/V *Alvin*. Canyon biology and geology, September.

3. Hydrography

US scientists continued looking into subsurface currents and water temperatures in Subarea 5. The USA and Poland cooperatively chartered water mass distributions on Georges Bank (Subdiv. 5Ze) from the R/V *Wieczno*.

The USA continued its efforts to monitor variations in the hydrographic environment of Subarea 5. Particular attention was given to satellite imagery showing warm-core eddies from the Gulf Stream which profoundly change the fishery environment of the outer Continental Shelf and Slope region as they move along it from Georges Bank to Cape Hatteras.

4. Plankton (including Ichthyoplankton)

a) Subarea 5

In cooperative studies among the USA, FRG, and Poland, there were two cruises each on the R/V *Anton Dohrn* and R/V *Wieczno*. The distribution and relative abundance of Atlantic herring larvae, along with their predators and prey, were sampled with midwater gear in the Georges Bank-Nantucket Shoals-Gulf of Maine area (mostly Subdiv. 5Ze). In the spring, the 1976 production of Nantucket Shoals larvae was the lowest ever recorded. In the autumn, however, the 1977 production of Nantucket Shoals larvae was much higher, although it was still low elsewhere in Subarea 5.

Also, on Georges Bank there was the fourth straight year of large catches of sand lance larvae. Sand lance are important forage for major commercial and recreational fishes, but as larvae they might also be competing for food with the larvae of those same commercial and recreational fishes. In fact, in 1977 low numbers of Atlantic cod, haddock, and pollock larvae were recorded on Georges Bank.

b) Statistical Area 6

US scientists studied the relative abundance of larval fishes to detect any future changes in the adult populations. This approach has been successful with the Atlantic croaker where the number of larvae in 1974 was 90% greater than in 1973; and those 1974 larvae entered the fishery off Virginia, Maryland, and New Jersey (Div. 6A and 6B) last year where catches increased from 220 tons the previous year to 3,500 tons last year.

In the Mid-Atlantic Bight (Div. 6A, 6B, and 6C) there was the fourth straight year of large catches of sand lance larvae.

5. Benthos

a) Subarea 5

The commercial sea scallop, *Placopecten magellanicus*, catch in Div. 5Y was sampled for age and growth studies along the Maine coast. A total of 3,000 scallops was tagged and released. Returns from the

commercial fishery will be analyzed for age and growth.

Nearshore areas along the southern Maine coast were surveyed to determine the abundance of ocean quahogs, *Arctica islandica*, and surf clams, *Spisula solidissima*.

An assessment cruise was made in August in the northern Gulf of Maine to obtain estimates of stock size and mortality by year-class for the northern shrimp, *Pandalus borealis*. Laboratory experiments were conducted to determine the relation between water temperature and the recruitment success of northern shrimp through its effect on egg survival and hatching time. Results indicate that unusually warm winters may accelerate the development rate of the eggs so that hatching takes place before food organisms are available.

In the spring of 1975, a total of 2,882 American lobsters, *Homarus americanus*, were tagged at three locations off the Maine coast. A total of 2,188 of these lobsters has been captured through September 1977. Estimates of catchability and movement by sex were made.

b) Statistical Area 6

The USA catch and effort data from the American lobster fishery and described some of the biological characteristics of the stocks on the Continental Shelf and in canyons at the edge of the Shelf in Div. 6A, 6B, and 6C.

6. Environmental Studies

a) Subarea 5

The USA began the Ocean Pulse Program, an effort to assess and monitor environmental conditions along the Northwest Atlantic's Continental Shelf in both Subarea 5 and Statistical Area 6. Operational test phase cruises made collections and analyses at contaminated and uncontaminated stations. Analyses were done at sea with instruments normally only used in the laboratory and experiments were conducted on organisms native to the sampling stations.

In a cooperative study between the USA and Poland on effects of the *Argo Merchant* oil spill, the R/V *Wieczno* sampled fish, benthos, and plankton and observed birds and mammals in the spill area. Every surface tow for plankton (neuston) yielded small tar balls. US scientists made biochemical, environmental, and physiological measurements of biological materials collected during and after the release of oil

from the vessel. These preliminary data suggested, but did not confirm, that the crude oil had had an effect on selected fish and shellfish.

b) Statistical Area 6

In a cooperative study on the fate of the oil spilled from the *Argo Merchant*, the USA and Poland sampled both warm-core and cold-core eddies in Div. 6A and 6C for entrapped oil. The R/V *Wieczno* was used as the sampling platform. Results were negative.

The USA continued its study of environmental conditions in the New York Bight (Div. 6A). Baseline information was developed on the distribution of organic contaminants and heavy metals. It was found that such highly stressed environments as the Bight can increase the numbers of phytoplankton produced as well as changing the species of phytoplankton. The results of this latter finding also suggest that much of the primary food production in stressed environments is in a dissolved organic state which is generally unavailable to the rest of the food web.

7. Haddock and Atlantic Cod

US scientists showed through laboratory experimentation that, in Subarea 5, the growth of haddock and Atlantic cod larvae depends on temperature.

8. Atlantic Herring

Cooperative studies of juvenile and adult Atlantic herring in Subarea 5 involved three cruises of the R/V *Wieczno*, and one each of the R/V *Anton Dohrn* and R/V *Gorlitz*. Juvenile distribution and relative abundance studies in the inshore waters of the Gulf of Maine (Div. 5Y) showed an extremely small number of individuals—eight fish were caught at five stations. Studies of adult fish focused on those on Georges Bank. Studies of the food habits of fishes located on the traditional spawning grounds showed the presence of adult Atlantic herring in the stomachs of Atlantic cod, pollock, and bluefish. There were few adults on these spawning grounds though. Water temperatures were less than 8°C (which is well below the long-term average) and may have had some effect on the spawning aggregations.

In addition, more than 73,000 tags were applied by Canadian scientists to adult Atlantic herring, most in the Bay of Fundy area (Div. 4X). After two unsuccessful attempts in 1975 and 1976, 3,500 herring were tagged in the Sydney Bight area (Div. 4V). Recoveries from

previous tagging confirmed that Bay of Fundy herring moved freely across the Bay with populations migrating to Chedabucto Bay (Div. 4W) and the Gulf of Maine (Div. 5Z) areas during winter. A small tagging experiment in Chedabucto Bay confirmed the return migration, recoveries being made in the Bay of Fundy and Gulf of Maine.

A total of 16,993 Atlantic herring, 1,796 adults and 15,197 juveniles, was tagged along the Maine coast in Div. 5Y in 1977 by the USA to determine if these fish remain in local waters or move seasonally to other areas. The juvenile herring seem to move only short distances since 95% of their tag returns were within 25 miles of the tagging site. Many adult tags were returned from the winter fishery in Massachusetts Bay. Age and growth studies of Atlantic herring caught along coastal Maine, in Massachusetts Bay (Div. 5Y), and on Georges Bank (Subdiv. 5Ze) were initiated in 1977.

9. Atlantic Mackerel

The USA conducted a study of Atlantic mackerel reproduction in the Mid-Atlantic Bight (Div. 6A, 6B, and 6C).

10. Sharks, Tunas, and Billfishes

a) Subarea 5

The USA continued its tagging study of sharks, tunas, and billfishes in the Atlantic Ocean, Gulf of Mexico, and Mediterranean Sea, with an emphasis on the migrations, feeding, growth, and reproduction of sharks. This information was sent to those fishermen who helped by tagging 3,000 fish and recapturing 100 others that had been tagged earlier.

b) Statistical Area 6

The R/V *Wieczno* cooperatively assisted the USA in the study of pelagic sharks by tagging individual fish for migration and age-growth studies, and by collecting individuals for food habit and reproductive studies on shore.

11. Alewives

Biological sampling of commercially fish stocks of alewives along the Maine coast (Div. 5Y) was continued in 1977. Data collected included sex ratios, catch, age composition of the stocks, spawning stock size, escapement, and production of offspring.

12. Gear, Selectivity, and Fishing Operations

a) Subarea 5

US engineers developed a small beam trawl for use by scientists and commercial fishermen, experimented with squid pair trawling, developed hardware for calibrating hydroacoustical fisheries assessment equipment, improved surf clam and ocean quahog assessment equipment, and studied escape vents for undersized individuals in lobster pots. US diverscientists evaluated the effectiveness and efficiency of the hydroacoustic and shellfish assessment methods.

b) Statistical Area 6

The USA is evaluating and describing the biological and physical features of aquatic ecosystems which affect the obtaining of accurate samples of fish eggs and larvae, listing the types of gear used and assessing their accuracy in obtaining samples of fish eggs and larvae, and compiling a list of factors to be maximized in sampling gear. An ichthyoplankton gear and sampling handbook is being prepared for use by resource management personnel, program administrators, and researchers.

13. Miscellaneous

a) Subarea 5

The semi-annual research vessel surveys by the USA were continued in 1977. To improve the surveys, scientists worked on a sonar system that records the species, sizes, and numbers of fishes located above the fishing depth of a bottom trawl, and studied the performance of midwater and bottom trawls. Diverscientists were a vital part of the hydroacoustical study.

The USA also participated in surveys aboard research vessels from Canada, FRG, GDR, Japan, Poland, and USSR. Investigations aboard these ships focused on Atlantic herring, squids, sea scallops, and associated midwater and bottom-dwelling species. Two special projects were the second year of tagging Atlantic herring in the Gulf of Maine-Georges Bank area in order to study movements, and the study of the effects of the *Argo Merchant* oil spill.

Another approach to gather information on fisheries resources was the US underwater study of the Atlantis Submarine Canyon (Subdiv. 5Zw) fishes with the deep submergence R/V *Alvin*, and of Gulf of Maine (Div. 5Y) Atlantic herring spawning grounds with scuba gear.

Additional US research has concentrated on the

effects of natural environmental influences on the growth and mortality of sub-adult fishes in the Gulf of Maine and Georges Bank. Scientists have also measured not only the growth but also the health of early life stages of fishes by looking at the ratio of ribonucleic acid to deoxyribonucleic acid in embryonic cells, and they have also assessed the health of embryonic fishes by noting abnormalities in the chromosomes and divisions of various cells.

The USA has looked into the role of climate on fisheries production. Ongoing research includes the influence of climate on groundfishes in the Southern New England area (Subdiv. 5Zw).

Also, on Georges Bank (Subdiv. 5Ze), US scientists are determining the amount and rate of flow of energy through the ecosystem. Stomachs from 30,000 fish have been analyzed to determine the food web in that area.

b) Statistical Area 6

The semi-annual research vessel surveys by the

USA were continued in 1977.

The USA continued censusing the recreational charter and party boat fishery off Maryland, New Jersey, and New York (Div. 6A and 6B). Information on catches, the amount of effort expended, and the lengths, weights, and ages of the fishes landed was used in the preparation of stock assessments.

The USA has looked into the role of climate on fisheries production. Ongoing research includes the influence of climate on sharks in the Long Island area (Div. 6A) and blue crabs in the Delmarva area (Div. 6B).

The USA studied the possible roles and effects of pollutants as causes of diseases in marine organisms. Studies have shown no correlation between fin rot disease in fish and dumping of sewage sludge in the New York Bight (Div. 6A). Other studies have dealt with the effects of chlorinated hydrocarbons, cadmium, and copper on marine organisms.

Seals

Reports on research in 1977 and provisional catch statistics were received from Canada, Denmark, and Norway. With extension of fisheries jurisdiction to 200 miles offshore by the coastal states, Canada and Denmark (Greenland), catch quotas, national allocations and the conservation measures for the harp and hooded seals for 1978 have been negotiated by Canada, the European Economic Community on behalf of Denmark (Greenland), and Norway with STACRES providing scientific advice on request.

1. Status of Fisheries

a) Harp Seals

In 1977, the total harvest from the Gulf of St. Lawrence and Front¹ areas of the Northwest Atlantic was 161,400 animals, well within the total allowable catch (TAC) of 170,100.

In 1978, the TAC was set at 180,000 harp seals, including 10,000 for Greenland, the Canadian Arctic, and Labrador.

Canada's share was increased from 125,000 in 1977 to 135,000 in 1978, while Norway's share

remained the same at 35,000.

Preliminary catch figures for 1978, compared with catches reported for 1975, 1976, and 1977, are as follows:

Year	TAC	Greenland	Front		Gulf	Total
			Canada	Norway	Canada	
1975	150,100	5,979	97,417	60,161	16,785	179,363
1976	127,000	4,904	99,629	45,483	19,490	169,906
1977	170,100	6,257	100,766	35,624	18,753	161,400
1978	180,000	?	89,684	16,254	49,405	155,343

b) Hooded Seals

In 1977, the total harvest from the Front area was 15,263 animals against a TAC of 15,100.

In 1978, the TAC remained at 15,100 with Norway allocated 6,000 and Canada 6,000 to 27 March when 3,000 would be allocated to either country. The remaining 100 was unallocated. Total catch could only consist of 7-1/2% adult female hooded seals.

Preliminary figures for the 1978 hooded seal catch,

¹ Icefields northeast of Newfoundland and Labrador.

compared with catches reported for 1975, 1976, and 1977, are as follows:

Year	TAC ¹	Front			Total
		Greenland	Canada	Norway	
1975	15,000	3,692	5,366	10,226	19,265
1976	15,100	3,316	3,794	8,518	15,701
1977	15,100	3,170	6,036	6,049	15,263
1978	15,100	?	3,908	6,315	10,223

¹ Excluding Greenland

2. Work Carried Out

a) Harp Seals

Canada reported the results of 1977 studies

relating to recoveries of tagged and branded seals, age composition of the catch, an aerial census of the Front and Gulf herds with associated ice-level observations, estimates of production utilizing catch and effort data combined with aerial survey results, a critical evaluation of two harp seal population models, and further analysis of mortality and production in harp seals. Norway reported on field observations at the front. Denmark presented estimates of catch levels and age composition for West Greenland in 1972-75.

b) Hooded Seals

Canada reported on the results of an aerial survey for breeding seals in Davis Strait, tagging and branding activities and recoveries, and age composition data. Norway and Canada presented an analysis of hooded seal population data and a population model.

