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SCIENTIFIC COUNCIL MEETING - JUNE 1980

Provisional Report of the Scientific Council

Dartmouth, Canada, 3-13 June 1980

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PROVISIONAL REPORT OF SCIENTIFIC COUNCIL

Special Meeting, June 1980

Chairman: Mr R. H. Letaconnoux

Rapporteur: V. M. Hodder

The Scientific Council and its Standing Committees met at NAFO Headquarters in the Bedford Institute of Oceanography, Dartmouth, Canada, during 3-13 June 1980 to consider and report on matters listed in its Agenda (App. V). In addition to dealing with matters of general scientific interest, the Council considered requests from the Fisheries Commission and the coastal states (Canada and European Economic Community) for advice on management in 1981 of a number of stocks in Subareas 0 to 4. Representatives attended from Canada, Cuba, EEC (Denmark, Federal Republic of Germany, France), German Democratic Republic, Japan, Poland and USSR, and observers were present from Spain and USA (App. VI).

Prior to the first session of the Council, the Executive Committee met briefly to review the agenda and the scheduling of meetings of the Standing Committees. It was noted that Dr A. S. Seliverstov had recently resigned as Chairman of the Standing Committee on Research Coordination, and the Scientific Council at its first session unanimously elected Dr V. A. Rikhter (USSR) to act as Chairman of STACREC for the remainder of the 2-year term.

The reports of the Standing Committees, as adopted by the Council at this meeting are given in Appendix I (STACFIS), Appendix II (STACREC) and Appendix III (STACPUB); the amended Rules of Procedure for the Scientific Council, adopted unanimously on 13 June 1980, are given in Appendix IV; the agenda is at Appendix V; the list of participants is at Appendix VI; and the lists of research and summary documents is at Appendix VII. Brief summaries of the reports and other matters considered by the Council are given below.

I. FISHERIES SCIENCE (APP. I)

1. General Fishery Trends

[To be completed by the Assistant Executive Secretary in consultation with the Chairman of STACFIS as soon as complete 1979 statistics become available]

2. Stock Assessments

a) Summary

STACFIS reviewed the state of, and advised on, catch levels in 1981 for a number of stocks in Subareas 0 to 4, which lie completely or partly within the 200-mile fisheries zones of Canada and the European Economic Community (Agenda Annexes 1 and 2) and the three stocks which lie outside national fisheries zones in Div. 3M. Insofar as it was possible, total allowable catch (TAC) levels for 1981 were advised and these are listed in the last column of Table 1. Details of the stock assessments are given in the Report of STACFIS at Appendix I.

When it was possible to do so for some stocks, management options at various levels of fishing mortality and the long-term effects on catch and biomass are presented rather than a TAC associated with a particular level of fishing mortality, in accordance with requests from Canada and the European Economic Community. Such management options are provided for the cod stocks in Subarea 1 and Div. 2J+3KL.

Increases in TAC for 1981, compared with 1980, were advised for American plaice in Div. 3LNO, yellowtail in Div. 3LNO, and Greenland halibut in Div. 2+3KL. Decreases in TAC were advised for witch flounder in Div. 2J+3KL and Div. 3NO, roundnose grenadier in Subareas 2+3, and silver hake in Div. 4VWX. In the case of redfish and wolffishes in Subarea 1, the information available was inadequate for assessment, and the Council can only indicate approximate sustainable yield levels based mostly on historical catch levels.

In view of the substantial contribution of recruiting year-classes to annual yields, no TACs were advised for the shrimp stocks in Subareas 0+1 and the two capelin stocks in Subareas 2+3, because of the necessity of having available complete information from the commercial fishery and research vessel surveys in 1980. Advice on TAC levels in 1981 for the cod stocks in Div. 3M and Div. 3NO was also deferred to a mid-term meeting, due to the continued uncertainty about the state of these stocks and the need to consider potentially valuable data from the commercial fishery and research vessel surveys in 1980. In view of the unlikely prospect that the abundance of squid in 1981 can be predicted, the Council reiterates the management regime proposed for squid at its Special Meeting in February 1980 (SCS Doc. 80/II/1).

Table 1. Summary of recent catches (1974-79) and TACs (1974-80) for stocks reviewed at the June 1980 meeting of STACFIS, together with the advised TACs for 1981.

Species	Stock area	Nominal catches (000 tons)						TACs (000 Tons)							
		1974	1975	1976	1977	1978	1979 <sup>1</sup>	1974	1975	1976	1977	1978	1979	1980	1981
Cod	1	48	48	33	38	39	51	107	60	45	31	... <sup>2</sup>	... <sup>2</sup>	... <sup>2</sup>	( ) <sup>3</sup>
	2J+3KL	373	288	214	173	139	172	657	554	300	160	135	170	180	( ) <sup>3</sup>
	3M	25	22	22	25	33	30	40	40	40	25	40	40	13	( ) <sup>4</sup>
	3NO	73	44	24	18	15	28	101	88	43	30	15	25	26	( ) <sup>4</sup>
Redfish	1	3	9	14	31	8	9	-	-	-	-	13	...	...	( ) <sup>3</sup>
	3M	35	16	17	20	17	20	40	16	16	16	16	20	20	(20)
	3LN	22	18	21	16	12	14	28	20	20	16	16	18	25	(25)
Silver hake	4VWX	96	116	97	37	48	52	100	120	100	70	70	70	90	(70-80)
A. plaice	3M	2	2	1	1	1	1	2	2	2	2	4	2	2	(2)
	3LNO	46	43	52	44	50	49	60	60	47	47	47	47	47	(55)
Witch	2J+3KL	16	12	11	8	7	3	22	17	17	17	17	17	17	(8)
	3NO	8	6	6	6	3	3	10	10	10	10	10	7	7	(5)
Yellowtail	3LNO	24	23	8	12	15	18	40	35	9	12	15	18	18	(21)
G. halibut	0+1	14	25	16	13	12	19	-	-	20	20	20	25	25	(25)
	2+3KL	27	29	25	32	39	32	40	40	30	30	30	30	35	(55)
R. Grenadier	0+1	12	5	9	3	6	7	-	10	14	8	8	8	8	(8)
	2+3	28	27	21	15	21	8	32	32	32	35	35	35	30	(27)
Wolffishes	1	6	6	6	6	6	17	-	-	-	-	-	-	-	( ) <sup>3</sup>
Argentine	4VWX	17	15	7	2	2	3	25	25	25	20	20	20	20	(20)
Capelin	2+3K	127	199	216	152	55	12	110	160	160	212	212	75	5	( ) <sup>4</sup>
	3LNO	158	166	144	74	30	12	148	180	180	200	200	10	16	( ) <sup>4</sup>
Shrimp	0+1	22	38	50	42	34	37	-	-	-	36 <sup>5</sup>	40 <sup>5</sup>	29.5 <sup>5</sup>	29.5 <sup>5</sup>	( ) <sup>4</sup>
Squid	2-4	1	18	42	83	94	160	-	-	-	-	100	120	150	(150)

<sup>1</sup> Provisional statistics.  
<sup>2</sup> Catches restricted to Greenlanders' fishery and to by-catch.  
<sup>3</sup> See relevant subsections of STACFIS Report (Appendix I).  
<sup>4</sup> Deferred to mid-term meeting.  
<sup>5</sup> TACs pertain to offshore grounds.

b) Additional comments relevant to assessments

i) Fishery statistics for Subarea 1

In its review of the stock assessments, particularly with reference to cod and redfish and possibly other species in Subarea 1, the Council noted the implications that the data base (i.e. Statistical Bulletin) contains inaccurate catch and effort statistics. Although the magnitude of the discrepancies have not yet been determined, the Council strongly urges that, if the errors are large, updated statistics should be reported to the Secretariat, so that the data base can be amended for future use.

ii) Redfish in Div. 3LN

The Council noted the great uncertainty associated with the assessment of this stock and agreed that the calculated equilibrium yield at  $2/3 F_{MSY}$  of 32,000 tons is likely to be an overestimate. Not being able to realistically specify a particular catch associated with  $2/3 F_{MSY}$ , the Council advises that a catch of 25,000 tons in 1981 should control fishing effort at a level less than that associated with  $F_{MSY}$ .

iii) Wolffishes in Subarea 1

The Council noted the problems associated with assessing wolffish in Subarea 1 due to the limited biological information available and the absence of information on separate catch statistics for the two commercially-caught species. The scientific necessity of breaking down the catches of wolffish by species was noted, if detailed assessments of the wolffish stocks are required. The matter was referred to STACREC for further consideration.

iv) Squid-*Illex* in Subareas 3 and 4

The Council agreed that it would be unnecessary to consider the management of squid at a mid-term meeting in 1981 but that a 3-day session should be held immediately before the June 1981 Meeting of the Scientific Council to consider all of the biological information that may be available at that time.

3. Gear and Selectivity

The Council noted the results of mesh selection studies on Greenland halibut in 1979, and recommends

*that selection studies on Greenland halibut be continued, using a range of mesh sizes including the current minimum mesh size in effect (130 mm).*

4. Ageing Techniques and Validation Studies

The Council noted that the guidelines for cod otolith interpretation are not yet available and recommends

*that these guidelines be prepared and documented in time for the September 1980 Meeting of the Council.*

Regarding the apparent discrepancies in age interpretation of redfish by scales and otoliths, the Council

recommends

- i) that scientists of the various laboratories search their data files for sampling data which validate redfish ageing by otoliths or scales and document such data;*
- ii) that validation of ageing redfish by scales be presented; and*
- iii) that comparative ageing studies on the same redfish specimens be initiated by the exchange of material between Canadian and Federal Republic of Germany scientists.*

The Council also noted the apparent discrepancies in age interpretation of roundnose grenadier, and therefore

recommends

*that an exchange of ageing material for grenadier be initiated between Federal Republic of Germany and German Democratic Republic scientists in an attempt to resolve the differences.*

II. RESEARCH COORDINATION (APP. II)

1. Statistics and Sampling

a) CWP activities relevant to NAFO statistics

The Council noted the work of the CWP (Coordinating Working Party on Atlantic Fishery Statistics), particularly with regard to the operation of the STATLANT system, the development of a standard world list of 3-alpha species identifiers, the improvements to standards for fishing vessels, gear and effort, and the updating of conversion factors. It was also noted that the 10th Session of the CWP will be held at Madrid, Spain, during 22-29 July 1980, with NAFO being represented by the Assistant Executive Secretary and two Canadian nominees, Dr W. G. Doubleday and Mr D. A. Tilley. Concerning the recent use of "off-bottom" trawls in some areas for some directed fisheries, the Council endorsed the STACREC

recommendation

*that the Assistant Executive Secretary obtain from Canadian scientists an account of the recent use of the "off-bottom" trawl, including a description of the trawl, for consideration at the 10th Session of the CWP, with a view to its possible incorporation in the standard gear list.*

b) Fishery statistics

The Council expressed grave concern about the difficulties being encountered by the Secretariat, after the implementation of 200-mile fisheries management zones, in obtaining and compiling fishery statistics for stock assessments and for publication in the Statistical Bulletin. The problems are attributed in part to the late submission of STATLANT 21 reports by member states and in part to complications arising from the reporting of statistics from cooperative arrangements between Canada and other countries. The notes for the completion of STATLANT forms have been modified to avoid confusion about reporting procedures, and the Council urges that particular attention be given to the preparation of future STATLANT submissions.

In considering the content and format of the NAFO Statistical Bulletin, the Council endorsed the STACREC

recommendations

- i) *that the NAFO list of species be amended to include the two commercially-caught species of wolffish (Anarhichas lupus and A. minor), the two species of redfish (Sebastes marinus and S. mentella), blue ling (Molva byrkelange), and roughhead grenadier (Macrourus berglax), with their 3-alpha identifiers;*
- ii) *that the Secretariat circulate to Scientific Council members for comment sample listings of the proposed new format for Statistical Bulletin Table 5, and present the findings for decision at the September 1980 Meeting of the Scientific Council; and*
- iii) *that countries reporting large quantities of unspecified finfish in their national statistics should conduct studies during fishing operations with a view to providing an estimated breakdown of such quantities by species in future reports.*

c) Sampling program

The Council noted that the sampling data base for 1977 and 1978 was still incomplete, thus delaying the publication of the lists in Sampling Yearbook, and strongly urged scientists to check their national files to ensure that all available commercial length compositions and age-length keys are submitted to the Secretariat as soon as possible. The Council emphasized that the new CFS-1 and CFS-2 forms are to be used in reporting data for 1979 and subsequent years, and urged that all national data, as well as sampling data collected by international observers, be forwarded to the Secretariat for incorporation into its data base.

The Council noted the results of studies related to an appropriate partial length measurement for grenadiers and endorsed the STACREC

recommendation

*that length measurements of the roundnose (Macrourus rupestris) and roughhead (M. berglax) grenadiers separated by sex be made and reported as partial lengths, measured from the tip of the snout to the base of the first anal fin-ray (anal-fin length) in half-cm intervals.*

d) Scientific observer program

The Council endorsed the procedures adopted by STACREC for the collection and reporting of data by international observers, noting that the Secretariat will coordinate the development of a suitable form for the reporting of set details, and reiterates the STACREC

recommendation

*that the bilateral parties involved in the International Observer Scheme should identify the appropriate fisheries to be covered.*

e) List of fishing vessels

The Council agreed that publication of the triennial list of vessels should be continued without change, but indicated that the Fisheries Commission might wish to comment on the adequacy of the vessel characteristics listed in the tables.

2. Biological Surveys

a) Survey activity

The Council noted that STACREC had reviewed research vessel survey activities in the Northwest Atlantic in 1979 and survey plans for 1980, details of which are listed in Tables 1 and 2 of Appendix II.

b) Manual on groundfish surveys

The editor (Dr W. G. Doubleday) informed the Council that a revised draft of the manual, planned for review at this meeting, would be provided at the September 1980 Meeting. Meanwhile, the Council urged its members to provide the editor with information on survey methodology as noted in Section II(3) of Appendix II. No amendments to survey stratification schemes were reported, but Danish scientists indicated that the scheme for Subarea 1 was under revision.

c) Special survey needs

The Council observed that there was an increasing tendency to use data from research vessel surveys for estimating the minimum trawlable biomass of certain stocks, especially those for which analytical assessments are difficult or impossible. In particular, the increase in survey activity on the Grand Bank and Flemish Cap since 1978 was noted, and the Council endorsed the STACREC

recommendation

*that the effectiveness of the existing survey activity for cod in Div. 3M, 3N and 3O be evaluated in order to determine future needs in these divisions.*

3. Environmental Studies

a) Environmental conditions in 1979

The Council noted that the review of environmental conditions in 1979 (Appendix II, Section III (1)) must be considered preliminary as it lacked input from the Marine Environmental Data Service (MEDS), whose progress report for 1979 was not completed in time for this meeting and will now be considered at the September 1980 Meeting.

b) Flemish Cap Project

The Council observed that preliminary discussion of data being accumulated for the Flemish Cap area took place at a meeting of the Working Group in January 1980, and that further analyses will be considered at the September 1980 Meeting. Meanwhile, concern was expressed about the excessive loss of a number of moored current meters and their guard buoys, presumably through fishing activity, and the Council strongly

recommends

*that the Fisheries Commission consider how the fishing fleets might best be made aware of the location of moored scientific equipment in the NAFO Area.*

c) Gulf of Maine-Georges Bank Project

The Council noted that the Task Force on the Larval Herring Program had preliminary discussions in a meeting at Woods Hole, USA, during 28 April-1 May 1980, and that a more comprehensive review of the data was planned for September 1980. The Council agreed to endorse the STACREC

recommendation

*that the Task Force on the Larval Herring Program should meet on 3-4 September 1980, in conjunction with the Scientific Council Meeting at St. John's, Newfoundland, to review further the analyses of the time series of data and to evaluate the data base with emphasis on factors affecting the recruitment process in herring.*

d) Other cooperative research projects

Noting the need for expansion of survey activity to cover the likely times and areas of larval and juvenile squid (*Illex*) distribution, the Council endorsed the action of STACREC in establishing a working group to examine the status of cooperative studies on squid and to coordinate survey activity, and

recommends

*that the ad hoc Working Group on Coordination of Squid Research, with Mr T. Rowell (Canada) as Convener, meet immediately before the September 1980 Meeting of the Council to consider final vessel availability and program planning relative to surveys for larval and juvenile *Illex* in early 1981.*

III. PUBLICATIONS (APP. III)

1. Consideration of Publication Requirements

The Council endorsed the proposals of STACPUB relating to the format and numbering of the Statistical Bulletin, Sampling Yearbook, List of Fishing Vessels, and Scientific Council Reports, and noted that final decisions on other scientific publications and editorial policy relating to them were deferred to the September 1980 Meeting. Meanwhile, the Secretariat was requested to proceed with the prepar-

ation of material for the first NAFO Research Bulletin.

2. Status of Working Papers

The Council endorsed the views of STACPUB that working papers have no official status outside of the meetings to which they are presented, and strongly emphasized that scientists intending to present substantial data and analyses should suitably prepare the material for distribution as research documents.

3. Papers for Possible Publication

The Council noted that the STACPUB members had reviewed all research documents presented to the November 1979, February 1980 and June 1980 Meetings, and have nominated 17 of them for possible publication in one of the NAFO publication series, subject to revision by the authors and acceptance by the editors.

IV. COLLABORATION WITH OTHER ORGANIZATIONS

1. NAFO Participation in 10th Session of CWP

The Council noted that the 10th Session of the Coordinating Working Party on Atlantic Fishery Statistics will be hosted by ICCAT and ICSEAF at Madrid, Spain, during 22-29 July 1980, to discuss a variety of statistical matters, and that NAFO will be represented by the Assistant Executive Secretary and two Canadian nominees, Dr W. G. Doubleday and Mr D. A. Tilley.

2. Proposed NAFO/ICES Study on Redfish

The Council noted that the spawning areas of redfish inhabiting Subarea 1 are actually outside the NAFO area in the adjacent ICES region, and agreed that studies of the stock and fisheries in the area should be considered in cooperation with ICES. The main objective of the proposed joint study is to investigate whether the redfish resource of West Greenland can be assessed and managed separately from redfish in the adjacent ICES region. The second objective should be to identify deficiencies in the data base and, if necessary, to develop research programs to collect the relevant information. The third objective should be to assess the status of the stock and to advise on the management of redfish in Greenland waters.

The study could be initiated by evaluating all available information on (i) distribution and drift of larvae and 0-group redfish at East and West Greenland and in the Irminger Sea, (ii) distribution and emigration of juvenile and adult redfish along the Greenland coast and to the spawning areas in the Irminger Sea on the basis of tagging results and changes in model length, with a view to establishing immigration and emigration coefficients to be used in assessments, and (iii) the establishment of a catch-at-age series (including estimates of by-catches and discards in the fisheries for cod and shrimp) and a catch-per-unit-effort series for assessments.

Noting the need for immediate action on the above proposal, the Council

recommends

*that the Executive Secretary should communicate with the General Secretary of ICES with a view to initiating the establishment of a Joint NAFO/ICES Working Group on Redfish Research in the Greenland Area.*

V. RULES OR PROCEDURE (APP. IV)

1. Revision to Rules of Procedure

At the Inaugural Meeting of NAFO in March 1979, the Scientific Council adopted its Rules of Procedure as listed in Appendix II to its Report of the March 1979 Meeting. Meanwhile, the General Council appointed an *ad hoc* Working Group to examine the proposed Rules of Procedure for the General Council and the Fisheries Commission, which were subsequently adopted at the June 1979 Annual Meeting. The Working Group also analyzed the Rules of Procedure for the Scientific Council and proposed certain amendments which were referred to the Executive Committee for consideration (SCS Doc. 80/VI/2). The revised Rules of Procedure were presented to the Scientific Council and were unanimously adopted on 13 June 1980 (Appendix IV).

2. Guidelines for the Application of Rule 1.2 in the Event of a Request for an Invitation to Attend a Meeting of the Scientific Council as an Observer

The Executive Committee recommended and the Scientific Council unanimously agreed that a request for



an invitation to attend a meeting of the Scientific Council shall be dealt with by the Executive Secretary in the following manner:

- a) If the request comes from an international public organization having related objectives, the reply should be positive, as required by the Convention. If the international public organization does not appear to have related objectives, it should be replied that admission is subject to the approval of the Scientific Council by vote at the beginning of the meeting in question.
- b) If the request comes from a non-Member Government, it should be replied that admission is subject to the approval of the Scientific Council by vote at the beginning of the meeting in question.
- c) If the request comes from a national public organization or any private organization, it should be replied that admission is subject to:
  - i) the acceptance of a paper or papers presented by the requesting organization, of significant scope relevant to any item or items of the agenda of the meeting in question, with the presence of the requesting organization only allowed in the sessions dealing with the paper(s) and item(s) in question;
  - ii) approval by the Contracting Party within whose jurisdiction the requesting headquarters or branch of the organization is located; and
  - iv) approval of the Scientific Council by vote at the beginning of the meeting in question.

The presented paper(s) should be sent to the Chairman of the Scientific Council and to the representatives of the Contracting Party referred to in c(ii) above. Without the assent of every one of these representatives, the request shall be immediately rejected. Once the assent of all these representatives is in hand, the request and the paper(s) shall be sent to their Contracting Party without whose approval the request shall also be rejected.

#### VI. FUTURE SCIENTIFIC MEETINGS

##### 1. Annual Meeting of NAFO, September 1980

The Scientific Council and its Standing Committees will meet during 3-8 September 1980 to consider the following items, some of which were deferred from the June 1980 Meeting:

- a) Larval herring studies in the Gulf of Maine-Georges Bank area, 1970-79.
- b) Evaluation of the Flemish Cap research program.
- c) Review of proposed manual on groundfish surveys.
- d) Review of MEDS progress report for 1979/80.
- e) Guidelines for cod otolith interpretation.
- f) Coordination of research surveys for *Illex* in 1981.
- g) Plans for joint NAFO/ICES research on redfish in Greenland area.
- h) Proposed new Table 5 for Statistical Bulletin.
- i) Editorial policy relating to publications.

##### 2. Mid-term Meeting for Assessment of Deferred Stocks

The Council noted that STACFIS had not been able to provide advice for management in 1981 of shrimp in Subareas 0 and 1, capelin in Subareas 2 and 3, and cod stocks in Div. 3M and 3NO, and agreed that an appropriate time to consider the status of these stocks would be at meeting early in 1981, when data from the commercial fisheries and research surveys would be fully available. Arrangements for this mid-term meeting will be considered at the September 1980 Meeting.

##### 3. Special Topics for Review at 1981 Meetings of the Scientific Council

- a) A special session on "Squid biology and distribution" will be held immediately before the June 1981 Meeting of the Council to review all information that may be available at that time.
- b) The topic "Evaluation of scientific advice provided for management of the Northwest Atlantic fish stocks, with particular reference to cod" will be considered by STACFIS at the June 1981 Meeting, when one or more papers on the subject are expected to be available.
- c) A special session with invited lectures on "Remote sensing methods and their possible application to fisheries science" will be held during the September 1981 Meeting of the Council, with Dr R. W. Trites (Canada) as convener.

- d) A special session on "Review of environmental conditions in the Northwest Atlantic during the 1970-79 decade" will be held during the September 1981 Meeting of the Council, the convener to be appointed at the September 1980 Meeting.

VII. OTHER BUSINESS

1. Provisional Report of February 1980 Meeting

The Council reviewed and formally approved the report of its meeting at Lisbon, Portugal, during 5-13 February 1980, as presented in SCS Doc. 80/II/1.

2. Tribute to L. R. Day, retiring Executive Secretary

The Chairman noted that Mr L. R. Day, who has been Executive Secretary of ICNAF (now NAFO) since 1963, will be retiring at the end of June 1980, and, on behalf of the Scientific Council, paid him a tribute as given in Appendix VIII.

VIII. ACKNOWLEDGEMENTS

The Chairman expressed his appreciation to the Director and staff of the Bedford Institute for the excellent meeting facilities, to the Secretariat for their usual efficient work in servicing the meeting, to the chairman and rapporteurs of committees and working groups and to all participants for their cooperation and contributions.

APPENDIX I. REPORT OF STANDING COMMITTEE ON FISHERIES SCIENCE (STACFIS)

Chairman: G. H. Winters

Rapporteurs: Various

The Committee met at Dartmouth, Nova Scotia, Canada, during 3-9 June 1980, to consider and report on matters referred to it by the Scientific Council (Agenda section B). Scientists attended from Canada, EEC (Denmark, Federal Republic of Germany and France), German Democratic Republic, Japan, Poland, Spain, USSR and USA. Instead of appointing a rapporteur to record the results of the discussions on the many items considered, it was agreed that the Chairman designate scientists, as required, to prepare draft reports on the various topics under consideration.

Since the 1979 catch statistics available to the Committee were incomplete and generally confined to species and stocks under catch quota regulation, it was agreed that the Chairman, in collaboration with the Assistant Executive Secretary, would prepare the usual summary of fishery trends for insertion into this report as soon as reasonably complete statistics for 1979 become available.

I. FISHERY TRENDS

[This section including Table 1 to be prepared as soon as complete 1979 statistics become available.]

II. STOCK ASSESSMENTS

1. Cod in Subarea 1 (SCR Doc. 80/VI/72, 76, 113; SCS Doc. 80/VI/17)

a) Fishery trends

The provisional statistics reported for 1979 show the catch of cod to be about 50,000 tons, but there is strong evidence that this figure is very much a minimum figure, and the same is probably the case for the reported catches in 1977 and 1978. Consequently, the Committee, in its analysis of the stock situation at this meeting, has used estimates of catches higher than those recorded for these years. Uncertainty about the catches reported for earlier years is less critical because a major part of projected catches in the 1980's will come from new recruits. Trends in recent catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	107	60	45	31	... <sup>1</sup>	... <sup>1</sup>	... <sup>1</sup>
Catch (000 tons)	63	48	48	33	73 <sup>2</sup>	73 <sup>2</sup>	99 <sup>2</sup>	

<sup>1</sup> Catches limited to Greenlanders' fishery and to by-catch

<sup>2</sup> Estimates used for assessment of the stock.

Despite the uncertainty about the actual nominal catches, the information available indicates that catches have increased substantially during 1976-79. The catch of 49,000 tons by the Greenland fleet in 1979 is about one-third higher than in 1978, with a substantial increase (doubling) in the inshore component of the fishery.

b) Trends in distribution, abundance and stock composition

The trend in the fishery over the last three years has been closely related to the 1973 year-class. This year-class has been rather heavily fished since age 3 and yielded good catch rates in periods when it formed in shoals in 1978 and especially in pre-spawning and spawning shoals in 1979, mainly in Div. 1C to 1E. This fishery on concentrations generated the impression among fishermen that the improvement in stock size was higher than indicated by the assessment. However, there seems to have been a southward displacement in the fishery on this year-class over the years, and emigration to East Greenland has contributed to an evident drastic decline of this year-class by 1980, especially in Div. 1C and 1D. In the northern divisions, the 1973 year-class is now at a very low level and has been replaced by the relatively good 1975 year-class and the 1977 year-class, both of which have been observed in the southern part of Div. 1B. This may mean a northward extension of the offshore cod fishery which during the most recent years has taken place only in the southern part of Div. 1C and southward. The residuals of the 1973 year-class may still be of some importance to the fishery in Div. 1E and 1F in 1980, but, even in this area, there will be younger year-classes with the 1975 year-class dominating the catches.

The catch rate of Greenland trawlers decreased from a high level of 3.3 tons per hour in 1978 to 2.4 tons per hour in 1979, and a further decrease to 1.7 tons per hour has been observed in the first quarter of 1980. In terms of the number of removals, the catch per hour decreased from 1,446 fish in 1978 to 1,136 in 1979. Total fishing effort, based on the catch rates of Greenland trawlers, decreased from 1977 to 1978 and increased in 1979, but the magnitude of these changes is complicated by the above-mentioned uncertainty about the nominal catches.

c) Assessment parameters

Mortality rates. Estimates of total mortality (Z) for 1977-79, derived from catch curves for the period, varied considerably between age-groups. For the major age-group 5, Z was as high as 1.17 in 1977 and was 0.65 in 1978. From a catch curve for 1977-79 adjusted for the strength of the 1973 year-class, the estimate of Z was 1.01, while a catch curve for age-groups 7-10 in 1978-79 gave a Z of 1.07. Deducting natural mortality (M = 0.20) and emigration rate (0.05) from the last-mentioned value of Z, the Committee considered the value of 0.82 as the best estimate of (terminal) F for 1979. This value of F is higher than those estimated for recent years on the basis of recorded catch and effort statistics. This in itself indicates that analyses carried out using the high estimates of catch would probably give more realistic results. Consequently, the analyses were performed using the upper limit of catch level for 1979, estimated to be 99,000 tons.

Partial recruitment. The same catch curves indicate that partial recruitment of age-group 4 corresponded to an F-value about one-third of that for fully-exploited age-groups, and for age-group 3 the relative F-value was about 0.02. The Committee could not find sufficient evidence to warrant using reduced F-values for older age-groups and therefore decided to apply the full F-value to all age-groups older than age 4.

Year-class estimates. The use of the high estimates of catches for 1977-79 in the analyses shows the size of the 1973 year-class at age 3 to be about 211 million fish, well above previous estimates which were in the range of 100-200 million fish. Estimates of recruitment at age 3 for 1978-82 are based on biological and environmental consideration and on estimates of discards. Among these year-classes, the 1975 year-class seems to be relatively good followed by the 1977 year-class, whereas the 1976 and 1978 year-classes appear to be poor. The 1975 year-class is tentatively estimated to be 115 million fish at age 3, the 1977 year-class about 90 million, and the 1976 and 1978 year-classes about 20 million fish each. Temperatures in 1979 were favorable for the survival of cod larvae, and, although not many larvae were found in the plankton, the 1979 year-class is tentatively estimated to be about 75 million recruits at age 3.

d) Results of assessment

The EEC has requested advice on yield and spawning stock size for various fishing strategies:  $F = 0.1$ ,  $F = 0.2$ ,  $F = 0.6$ , and  $F = F_{0.1}$ . The yield-pre-recruit curve, using the most up-to-date parameters (weight-at-age, partial recruitment, natural mortality, and emigration rate), show  $F_{max} = 0.48$  and  $F_{0.1} = 0.25$ . The EEC request to base all projections on a catch in 1980 equal to the TAC cannot be completely met because the TAC does not apply to all components of the fishery. However, on the basis of preliminary catch statistics for the early months of 1980, it is anticipated that the catch in 1980 will be about 55,000 tons, and this figure is taken as the basis for forecasting the stock size and spawning biomass. The results of the analyses are given in Table 2 and illustrated in Fig. 1.

These results, of course, are dependent on the actual stock situation and the estimated future recruitment. A constant level of recruitment is not likely ever to occur, but an illustration of yield-per-recruit and spawning biomass per recruit may, nevertheless, be of some guidance (Fig. 2). This illustration, as well as Table 2 and Fig. 1 clearly demonstrate the great difference in resultant spawning stock size for rather small changes in F. For example, the spawning biomass per recruit at  $F = 0.2$  will be twice that at  $F = 0.4$ .

Variation in the spawning stock size (age 6 and older) during 1972-80 relative to that in 1971 is indicated as follows:

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Index	100	71	39	44	28	13	11	7	43	29

The increase in the index in 1979 was due to the recruitment of the relatively good 1973 year-class to the spawning stock. There will likely be an increase in 1981 (to an index level of 55) when the 1975 year-class recruits to the spawning stock. Further increases could be achieved by fishing at low effort levels.

Although environmental factors play a major role in the year-class fluctuations of cod in this area, it should be remembered that no really strong year-class (250 million fish or more at age 3) has occurred since 1963, not even in years when temperature conditions were favorable. If the aim of management is to rebuild the stock to a level where annual catches similar to those in the 1960's (300,000-400,000 tons) can be taken, it is necessary to establish and maintain the spawning biomass above the present level. The occurrence of the relatively good 1973 year-class offered the possibility for increasing the spawning stock, but this opportunity was exchanged for 2-3 years of relatively good fishing. Another opportunity to rebuild the spawning stock may occur in 1981-83 with the recruitment at age 6 of the 1975 and 1977 year-classes. Unless the sizes of these year-classes are very much underestimated, they cannot be used both for rebuilding the spawning stock and increased fishing.

Table 2. Subarea 1 cod: projections of stock biomass, spawning stock and catch (000 tons) for 1981-84 at various fishing strategies.

Year	Parameter	Options <sup>1</sup>				
		1	2	3	4	5
1981	Stock biomass	268	268	268	268	268
	Spawning stock	151	151	151	151	151
	Catch	17	33	83	40	55 (0.360)
1982	Stock biomass	344	325	263	316	297
	Spawning stock	165	150	100	142	127
	Catch	24	42	81	50	55 (0.304)
1983	Stock biomass	384	343	233	325	300
	Spawning stock	256	216	110	198	174
	Catch	26	43	64	49	55 (0.325)
1984	Spawning stock	262	202	74	178	147

<sup>1</sup> Option 1 with  $F = 0.1$  in all years; option 2 with  $F = 0.2$  in all years; option 3 with  $F = 0.6$  in all years; option 4 with  $F_{0.1} = 0.25$  in all years; option 5 with catch of 55,000 tons in all years ( $F$ -values in parentheses).

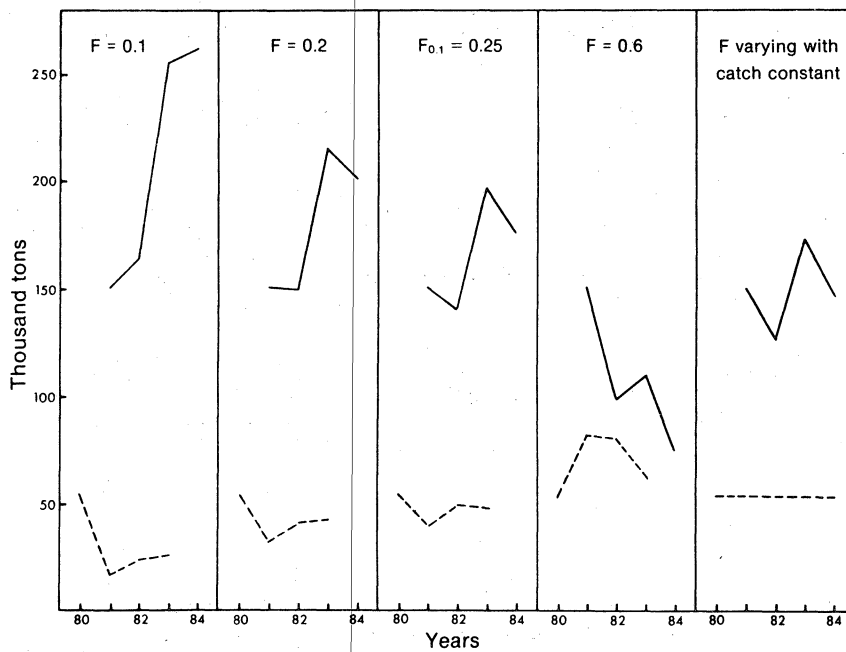


Fig. 1. Subarea 1 cod: projected spawning biomass (upper) and catch (lower) levels for various fishing strategies, assuming a catch of 55,000 tons in 1980. (Spawning biomass pertains to the beginning of the year indicated.)

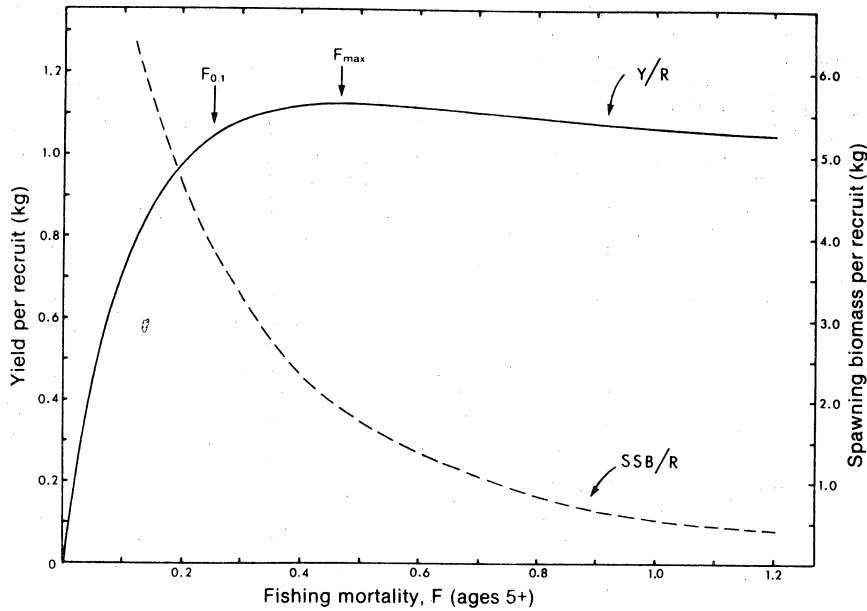


Fig. 2. Subarea 1 cod: yield per recruit and spawning stock biomass per recruit.

e) Mesh size assessment (SCR Doc. 80/VI/76)

Although there was no specific request for a mesh assessment of the cod stock in Subarea 1, the Committee welcomed a paper on this subject. The assessment shows that an increase in mesh size from the present minimum of 130/120 mm manila/synthetic to mesh sizes up to 140-160 mm, and even higher mesh sizes at high levels of F, would result in an increase in yield-per-recruit in the range of 2-9%, depending on the level of F and the particular increase in mesh size. However, the increase in spawning stock size per recruit would be substantially greater, in the range of 9-40% for an increase in mesh size to 140-160 mm and F in the range of 0.2-0.4.

2. Cod in Divisions 2J, 3K and 3L (SCR Doc. 80/VI/61, 81, 89, 101; SCS Doc. 80/VI/18)

a) Fishery trends

The average nominal catches in the 1955-59, 1960-64, 1965-69, 1970-74 and 1975-79 periods were about 275, 500, 650, 425 and 195 thousand tons respectively. The increase in catch in the 1960's was largely the result of increased fishing effort, as large pre-spawning, spawning and post-spawning concentrations of cod were discovered and exploited, especially in Div. 2J. Management since 1973 has been by catch limitation. Recent nominal catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	666	657	554	300	160	135	180	180
Catch (000 tons)	355	373	288	214	173	139	160	

b) General production models

The Committee reviewed two general production model analyses of the stock (SCR Doc. 80/VI/81, 89). One based on catch rates of Portuguese trawlers for the 1958-77 period indicated an MSY of 470,000 tons, and the other based on standardized effort for the period 1958-80 indicated an MSY of 638,000 tons. The standardized catch rate for 1980 was based on limited data and has a wide variance associated with it. The lower 90% confidence bound of this catch rate was considered a more prudent estimate than the mean value. If this lower catch rate applies in 1981, as well as in 1980, the yield in 1981 at the effort level corresponding to 2/3 MSY would be about 220,000 tons.

c) Assessment parameters

Biological sampling of commercial catches (or landings) of various countries was used to estimate the age composition of removals in 1979. Cod of age-groups 4-7 predominated. Length frequencies of cod in USSR research vessel catches in April-May 1979 showed a trend toward larger modal sizes from south to north. Age-groups 4-6 were dominant in the catches of Canadian and French surveys in 1979. Survey results for the 1970's generally indicated that the 1972-74 year-classes were at least average (500 million recruiting at age 4), the 1975 year-class was somewhat below average, and the 1976 and 1977 year-classes were quite poor.

A partial recruitment pattern similar to that derived in 1978 was used in the cohort analysis, incorporating commercial age compositions for the years 1962-79. These values and the average weight-at-age values derived from 1979 sampling are as follows:

Age	4	5	6	7	8	9	10	11	12	13
Partial recruitment	0.15	0.50	0.63	0.80	0.90	1.00	1.00	1.00	1.00	1.00
Average weight (kg)	740	1120	1680	2490	3600	4460	5310	5860	7180	9020

Commercial catch rates (adjusted for gear, country, month and division effects) and estimated fishing efforts were available from an analysis of ICNAF catch and effort statistics for 1959-78. Information on catch rates in 1979 was obtained from the Canadian data base which contains preliminary data on the fishing activity of all vessels fishing within the 200-mile zone. A preliminary standardized catch rate for 1980 was derived from the catch rates of Canadian vessels in the winter of 1980 adjusted for seasonal trends. Regressions of fishing effort on fishing mortality and of stock biomass on standardized catch rates for the 1962-77 period, excluding the points for 1974, 1975 and 1976 which were considered anomalous, indicated a terminal F of 0.20 for 1979.

Catch-curve analyses of research vessel survey data indicated that the stock had been exploited during the 1970's at a level above  $F_{max}$  (0.37). The average fishing mortality thereby derived (0.47) was consistent with estimates from cohort analysis.

Since all research vessel survey information indicated that the abundance of the 1976 and 1977 year-classes was very low, an arbitrary recruitment value of 125 million fish at age 4, slightly lower than the minimum estimate of age-group 4 in the 1962-79 period, was used for these year-classes. An average value of 500 million fish at age 4 was used as the size of all subsequent recruiting year-classes in the projections.

d) Projections of catch and spawning stock biomass

With terminal  $F = 0.2$  in 1979, and with partial recruitment and the sizes of recruiting year-classes as indicated above, projections of catch and spawning stock biomass were made for 1980-87 at three levels of  $F$ , with an assumed catch of 180,000 tons in 1980 (Table 3). STACFIS points out that catch levels and stock sizes projected for 1983 and later depend substantially on the assumed sizes of the recruiting year-classes. An analysis of survival rates at age from USSR commercial age compositions projects an increase in abundance in 1980 and 1981 of age-groups 5-13 compared with their abundance in 1979.

Table 3. Cod in Div. 2J+3KL: projections of catch and spawning biomass (000 tons) for 1980-87 at three levels of fishing mortality. (Spawning biomass based on age-group 7 and older.)

Year	F = 0.10		F = 0.16		F = 0.20	
	Catch	Spawning biomass	Catch	Spawning biomass	Catch	Spawning biomass
1980	180	800	180	800	180	800
1981	130	1300	200	1300	250	1300
1982	160	1800	230	1700	280	1600
1983	180	1800	260	1600	300	1500
1984	200	1800	280	1500	320	1400
1985	230	2100	310	1800	350	1600
1986	260	2500	350	2200	390	1900
1987	280	2700	370	2300	420	2100

e) Biological studies (SCR Doc. 80/VI/89)

STACFIS noted that the age at 50% maturity of cod for the stock area as a whole has been estimated from French survey data to be about 4.7 years. This new estimate is lower than the minimum age-group used in deriving the target spawning biomass of 1.2-1.8 million tons, but the Committee considered that this range was still appropriate as an indicator of the target.

A trawl selectivity study carried out in Div. 2J during the same survey in February 1980 indicates a selection factor of 3.81. These results, applied to the mean length (49.1 cm total length) and age (4.7 years) at 50% maturity indicates that a minimum codend mesh size of 130 mm (synthetic material) would substantially reduce the capture of immature cod.

3. Cod in Division 3M (SCR Doc. 80/VI/73; SCS Doc. 80/II/1)

STACFIS noted that this stock was assessed at the February 1980 Meeting of the Scientific Council. It also noted that the catch-at-age data from the Faroese longline fishery for cod in Div. 3M (dominant 1974 and 1975 year-classes with the 1973 year-class constituting a minor portion of the catch) are not consistent with the age composition of catches in 1980, as projected at the February 1980 Meeting. Since insufficient new data are available for a re-analysis of this stock, and considering that 1980 data from research and commercial sources will be needed for updating the assessment, STACFIS advises that the assessment of this stock with concomitant advice for management in 1981 should be deferred to a mid-term meeting early in 1981.

4. Cod in Divisions 3N and 3O

The assessment of this stock at the Special Meeting of the Scientific Council in February 1980 (SCS Doc. 80/II/1) indicated a yield at  $F_{0.1}$  of 26,000 tons for 1980. However, the Council emphasized that caution should be exercised in the interpretation of the cohort analysis and the projections presented for 3 reasons: firstly, there was some doubt concerning the value of terminal  $F$  (0.25) used in the cohort analysis in that it might be too low; secondly, the total biomass predicted by 1982 was only 50-60% of that necessary for exploitation at the  $F_{0.1}$  level; and thirdly, the stock in 1982 would consist mainly of fish of the 1974 and 1975 year-classes which were below the historical (1960's) average year-class size followed by relatively poor 1976 and 1977 year-classes. A cautious approach was therefore advised until there is clear evidence of stock rebuilding to the optimal biomass level.

No data was available at this meeting on the commercial fishery in Div. 3NO during the early months of 1980. The only new data presented was obtained from Canadian research vessel surveys in March-April 1980, indicating that catch rates were substantially lower than those from surveys in 1979, even though an increase in stock size was predicted when the stock was assessed at the February 1980 meeting of the Council. The 1978 year-class appeared to be strong in both the 1979 and 1980 Canadian surveys but of rather less than average strength in the 1979 USSR survey. Since the 1976 and 1977 year-classes were poor, the population in 1981 could be dominated by the 1978 year-class as 3-year-old fish. Substantial exploitation of this year-class in 1981 would result in a loss in yield-per-recruit. STACFIS therefore advises that, in view of the uncertainties produced by the survey data, any decision on management for 1981 should be deferred until further data becomes available from other surveys during 1980 and from the 1980 commercial fishery.

5. Redfish in Subarea 1 (ICNAF Res. Doc. 79/VI/54, 59)

a) Fishery trends

Nominal catches have fluctuated widely over the period in which statistics have been reported to ICNAF, increasing from 150 tons in 1951 to a maximum of 61,000 tons in 1962 but decreasing generally thereafter to a low level of about 3,000 tons in 1971-74. Catches increased again in 1975 and 1976 to 31,000 tons in 1977. Catch figures for 1977, 1978 and 1979, although officially reported, may actually be overestimates of the actual catches (SCR Doc. 80/VI/72). Recent catches are as follows:

	1973	1974	1975	1976	1977	1978	1979
Catch (000 tons)	3	3	9	14	31	10	9

b) Assessment

Two species of redfish occur in Subarea 1, *Sebastes marinus* and *S. mentella*. These species live at different depths with little overlapping. The fishery has been directed mainly towards *S. marinus*, and the assessments based on catch and effort data therefore refer to this species.



This stock was assessed at the April 1979 Meeting of the Assessments Subcommittee, but a re-assessment was not considered warranted at the present meeting due to uncertainties about the catch and effort data for 1977, 1978 and 1979. The 1979 assessment consisted of general production model analyses of two sets of standardized effort data. The results from both series of data indicated an MSY level of about 10,000 tons and an equilibrium catch at 2/3 F<sub>MSY</sub> of about 9,000 tons. However, the correlation coefficient for the regression of catch-per-unit-effort on effort (r = 0.63) indicates that catch levels derived from the model have fairly large variances.

c) By-catch of redfish in the shrimp fishery

The shrimp fishery in the northern part of Subarea 1 is known to take substantial by-catches of small redfish, nearly all of which is discarded. The estimated amount of 10,000 tons corresponds to approximately 200 million fish. It is not possible at present to evaluate the effect of these by-catches on the exploited stock of redfish since the recruitment mechanism is not well understood and since there are indications that the by-catch of small redfish in the shrimp fishery may consist mainly of *Sebastes mentella* (SCR Doc. 79/XI/6).

As indicated at the 1979 meeting, STACFIS again points out that, since the spawning areas of the stock are not inside the NAFO Area but at East Greenland and in the Irminger Sea, studies of the stock and the fisheries in Subarea 1 should be considered in cooperation with ICES.

6. Redfish in Divisions 3L and 3N (SCR Doc. 80/VI/80, 112)

a) Fishery trends

Nominal catches declined from a high of 45,000 tons in 1959 to 14,000 tons in 1970 and increased to 30,000 tons in 1972. Nominal catches and TACs since 1973 are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	28	20	20	16	16	18	25
Catch (000 tons)	33	22	18	21	16	12	14*	

\* Provisional

b) Abundance indices

Length frequencies from Canadian commercial sampling in 1979 indicate that the bulk of the catch consisted of 27-45 cm redfish in Div. 3L and 22-30 cm redfish in Div. 3N. Length frequencies from USSR commercial sampling in Div. 3N also show the catch to be mainly composed of 20-30 cm fish. Catch rates from Canadian research vessel surveys in 1978 and 1979 show a high abundance of small redfish in the 20-27 cm size range in Div. 3N. However, the small redfish in research frequencies from Div. 3L in 1978 were not evident in 1979.

c) Assessment

A general production model analysis, including data for 1978 indicated an equilibrium yield at MSY of 36,000 tons and at 2/3 F<sub>MSY</sub> of 32,000 tons. However, these yields should be viewed with caution because of the poor correlation between catch-per-unit-effort and effort and the possibility that the available yield from this stock has been overestimated by the model. TACs were decreased in the late 1970's because it was thought that catches in the range of 28,000-34,000 tons exceeded the MSY. However, the TAC was increased to 25,000 tons for 1980 which is above the historical average catch for the stock. Considering the problems associated with assessing this stock, STACFIS advises that the TAC for 1981 should remain at 25,000 tons.

d) Biological studies

The Committee reviewed a study on the use of the extrinsic gas bladder musculature as a method for separating *Sebastes fasciatus* and *S. mentella* (SCR Doc. 80/VI/112). The method shows some promise because the muscle passes over ventral ribs 2 and 3 in *S. mentella* and between ventral ribs 3-4 and 5-6 in *S. fasciatus*.

7. Redfish in Division 3M (SCR Doc. 80/VI/88)

a) Fishery trends

Redfish catches were quite low during the 1960's but increased to 42,000 tons in 1972. Nominal catches and TACs since 1973 are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	40	16	16	16	16	20	20
Catch (000 tons)	22	35	16	17	20	17	19*	

\* Provisional

b) Abundance indices

Length frequencies from Canadian commercial sampling in 1979 indicate that the bulk of the catch consisted of 32-42 cm redbfish as was also evident in 1978. Additionally, in May and June there was evidence of small redbfish in the 18-20 cm size range and in June some 16-17 cm fish. Catch rates from Canadian research vessel surveys in 1978 and 1979 similarly indicated the dominance of these size groups in the stock, and the catch rates from the 1980 surveys show a relatively strong size-class of 20-26 cm fish which are beginning to recruit to the fishery.

c) Assessment

A general production model analysis indicated an equilibrium yield at 2/3 F<sub>MSY</sub> of 15,000 tons and the MSY of 16,000 to 17,000 tons depending on the number of years that fishing effort is lagged. Commercial catch rates declined from an average of 1.62 tons per hour in 1977 to 1.14 in 1978, and preliminary data for Canadian trawlers indicate a further decline to 1.05 tons per hour in 1979. However, the influx of small redbfish to the fishery may have influenced the downward trend in catch rates. Considering the abundance of recruiting size-groups, as evidenced from the research surveys, STACFIS considers the stock to be in relatively good condition and therefore advises that the TAC for 1981 should remain at 20,000 tons.

8. Silver Hake in Divisions 4V, 4W and 4X (SCR Doc. 80/II/20, 46; 80/VI/74, 87)

a) Fishery trends

This stock has been regulated by TACs since 1974 and also by area and gear restrictions since 1977, when the nominal catches have been substantially less than the TACs although the national USSR allocations have been almost totally utilized in these years. Recent TACs and catches are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	100	120	100	70	70	70	90
Catch (000 tons)	299	96	116	97	37	48	52*	

\* Provisional

b) Biological studies

Age validation studies (SCR Doc. 80/II/20) show that the techniques established by ageing workshops held in 1976-78 are satisfactory. It was also noted that differences in estimating the age composition of removals by Canadian and USSR scientists have been decreasing (SCR Doc. 80/II/46, 80/VI/87).

c) Assessment parameters

Catch composition. Canadian estimates of catch composition by age for 1958-78 have been re-calculated and updated from earlier assessments (SCR Doc. 80/VI/87). The age range has been increased from 1 to 6+ years of age in the earlier reports to 1 to 10+ years based on updated age-length keys. The catch-at-age of removals for 1979 was derived from monthly summaries of length frequencies obtained through the International Observer Program. STACFIS agreed to use for assessment the catch-at-age table in SCR Doc. 80/VI/87.

Natural mortality. In order to maintain consistency with previous assessments, it was agreed to use  $M = 0.40$ .

Weight-at-age. The values used for the assessment and also to determine the estimate of yield-per-recruit at  $F_{0.1} = 0.65$  are as follows:

Age (yr)	1	2	3	4	5	6	7	8	9	10+
Weight (g)	61	135	200	245	285	344	411	520	553	1189

Partial recruitment. The starting F-values for age-groups 2 to 10+ were adjusted to give the best fit with an adjusted series of effort data, and the resultant partial recruitment values are as follows:

Age (yr)	1	2	3	4	5	6	7	8	9	10+
Partial re- cruitment	0.035	0.50	1.00	0.70	0.60	0.60	0.55	0.50	0.45	0.40

Terminal fishing mortality. A value of  $F = 0.35$  for fully-recruited age-groups in 1979 was estimated from regressions of fishing mortality on effort and biomass on catch-per-unit-effort.

Recruitment. No firm estimates of recruitment at age 1 were available, but the shift away from catching ages 1 and 2 silver hake makes this parameter less important. However, for use in the assessment, recruitment at age 1 was chosen as 1,000 million fish, the geometric mean of the sizes of the 1974-78 year-classes at age 1.

d) Catch projections

The Committee considered two options in making the catch projections for 1981: (i) if the 1980 TAC of 90,000 tons is fully utilized in 1980, the projected catch at  $F_{0.1} = 0.65$  in 1981 is 72,000 tons; (ii) if the 1980 TAC is not fully utilized and the catch is about 60,000 tons, the projected catch at  $F_{0.1}$  in 1981 is 81,000 tons. STACFIS therefore advises that the TAC for 1981 be in the range of 70,000-80,000 tons.

9. American Plaice in Divisions 3M

This stock has been regulated since 1974 and nominal catches during 1973-78 have been in the range of 1,000-2,000 tons. The catches reported are entirely by-catches of the cod and redfish fisheries in the area. The TAC has been set at 2,000 tons for each year except for 1978 when it was increased to 4,000 tons based on increased catch rates from surveys in 1977. However, these catch rates appeared to be anomalous and the TAC was reduced to 2,000 tons for 1979 and 1980. STACFIS advises that the TAC should remain at 2,000 tons for 1981.

10. American Plaice in Divisions 3L, 3N and 3O (SCR Doc. 80/VI/86, 110; SCS Doc. 80/VI/18)

a) Fishery trends

The highest reported nominal catch for this stock was 94,000 tons in 1967, but catches have been lower since then, averaging about 47,000 tons. Approximately 90% of the total catch in recent years have been taken in Div. 3L and 3N. Recent TACs and catches are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	60	60	60	47	47	47	47	47
Catch (000 tons)	53	46	43	52	44	50	49*	

\* Provisional

b) Abundance

Canadian research vessel surveys indicated a decrease in abundance (average number per haul) from 1978 to 1979, particularly in Div. 3N. However, while the catch rate (average weight per haul) declined in Div. 3N, there was an increase from 1978 to 1979 in Div. 3L. USSR research vessel surveys (SCS Doc. 80/VI/18) indicated opposite trends for the two divisions, with increased abundance (number and weight) in Div. 3N for 1979. Commercial catch rates from the Canadian otter-trawl fishery increased from 0.41 tons per hour in 1977 to 0.46 in 1978 and to 0.51 in 1979.

c) Assessment parameters

Catch composition. Length and age compositions and mean weight-at-age data were derived from Canadian commercial sampling during most months of 1979. Quarterly age-length keys for males and females separately were used to calculate the numbers of males and females caught by age-group, prior to their combination to give the total numbers of fish caught in Div. 3L and 3N.

Fishing mortality. The most reasonable estimate of this parameter in 1979 was derived from the regression of fishing mortality on directed fishing effort during 1965-77, giving a value of terminal  $F = 0.27$  for fully-recruited age-groups in 1979.

Partial recruitment. Values for 1979 and for projection to 1981 were derived from the average  $F$ -values for 1976-78 from the virtual population analysis.

Recruitment. The number of 6-year-old American plaice assumed to be recruiting to the fishery in Div. 3LN in 1980 and 1981 was taken as the geometric mean of the numbers of age 6 fish in the population matrix for 1976-78.

d) Assessment results

Evidence from research vessel surveys and the virtual population analysis indicates fairly strong recruitment of three or four year-classes to this stock. However, the most recent surveys indicate improved recruitment prospects only in Div. 3L. Projection for Div. 3LN from the 1979 population structure with  $F = 0.27$  for 1979 indicates that the removal of the 1980 TAC (47,000 tons) implies a fishing mortality of 0.23 (equivalent to  $F_{0.1}$ ) on fully-recruited age-groups. Projection to 1981, with recruitment of 390 million fish at age 6, implies a catch of 48,000 tons in 1981 for Div. 3LN at  $F_{0.1}$ . Assuming that the proportion of the catch taken in Div. 30 (about 13%) would continue in 1980 and 1981 as in recent years, STACFIS advises a TAC of 55,000 tons for Div. 3LNO in 1981.

e) Discards

The results of observations on board of Canadian (Nfld) trawlers indicate that the discarding of American plaice was substantial in 1978 and 1979 (SCR Doc. 80/VI/86). Estimated discard rates were 8.6% by weight (22.0% by number) of the catch in 1978, and 14.0% by weight (30.9% by number) in 1979. These values indicate that 4,100 tons (17 million fish) were discarded in 1978 and 6,700 tons (29 million fish) were discarded in 1979. This implies that the removals at the younger ages (to age 7) is underestimated by normal sampling of landings.

11. Witch Flounder in Div. 2J, 3K and 3L (SCR Doc. 80/VI/108)

a) Fishery trends

Nominal catches increased from less than 5,000 tons in the mid-1960's to a high of 24,000 tons in 1973 but have since declined steadily to 3,300 tons in 1979. Catches and TACs since 1973 are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	22	17	17	17	17	17	17
Catch (000 tons)	24	16	12	11	8	7	3*	

\* Provisional

The fishery is conducted primarily by gillnets in inshore waters and by otter trawls on the offshore grounds, mainly in Div. 3K. The inshore catch (mainly as by-catch in the cod fishery) has declined from 8,000 tons in 1971 to a few hundred tons in 1979 and the offshore otter trawl catch has also declined markedly. This decline is difficult to evaluate because offshore fishing effort has also decreased in recent years.

b) Assessment

Analyses of research vessel survey data and commercial age composition data over the past 12 years indicate that fishing mortality has been significantly greater than  $F_{0.1}$  when catches averaged about 12,000 tons. Stock size estimates from stratified-random surveys indicate a minimum trawlable biomass of about 30,000 tons in Div. 3K and 1,000-1,500 tons in Div. 2J during the last two years. Biomass estimates of about 8,000 tons were calculated for Div. 3L over the last 5 years. The inadequacy of available data makes it difficult to reliably estimate the

present stock size, but the biomass estimates indicate that the stock has been fairly stable over the last 4 years when catches averaged about 8,000 tons annually. STACFIS therefore advises that a TAC of 8,000 tons for 1981 would probably not affect the stability of the stock.

12. Witch Flounder in Divisions 3N and 30 (SCR Doc. 80/VI/95)

a) Fishery trends

Nominal catches increased from 4,700 tons in 1969 to a high of 15,000 tons in 1971 and declined to an average of 5,000 tons in 1975-79. Recent catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	10	10	10	10	10	7	7
Catch (000 tons)	7	8	6	6	6	3	3*	

\* Provisional

b) Assessment

Research vessel surveys indicate that the fishable concentrations are located along the south-west slope of Grand Bank, mainly in Div. 30. Estimates of minimum trawlable biomass from stratified-random surveys indicate levels up to 4,600 tons. A general production model analysis indicates that the equilibrium catch at  $2/3 F_{MSY}$  is about 4,000-5,000 tons. Analyses of age composition data over the past 10 years indicate that the average fishing mortality was around the  $F_{0.1}$  level when catches were in the range of 5,000-6,000 tons but it may have been higher in more recent years. STACFIS also considered that the recent decline in catch-per-unit-effort implies declining abundance, and therefore advises that the TAC for 1981 should not exceed 5,000 tons.

13. Yellowtail Flounder in Divisions 3L, 3N and 30 (SCR Doc. 80/VI/94; SCS Doc. 80/VI/18)

a) Fishery trends

The nominal catch peaked at 39,000 tons in 1972, declined to 8,000 tons in 1976 and gradually increased to 19,000 tons in 1979. Recent TACs and catches are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	50	40	35	9	12	15	18	18
Catch (000 tons)	33	24	23	8	12	16	19*	

\* Provisional

b) Abundance indices

The catch rate of Canadian otter trawlers has increased sharply and is now nearly at the level experienced in 1973. Canadian research vessel survey data for 1980 indicated increased abundance both in numbers and weight, but lower numbers of age-groups 4 and 5 were evident. USSR survey data also indicated an increase in abundance from 1978 to 1979.

c) Assessment parameters

Length and age compositions and mean weight-at-age data were derived from Canadian commercial sampling in 1979. Quarterly age-length keys and monthly catches were used to estimate the numbers caught by age-group. Partial recruitment values were derived from average F-values for 1976-78 from the virtual population analysis. Terminal F for 1979, used to initiate the virtual population analysis, was estimated from the regression of F for ages 6-10 (1969-76) on directed fishing effort of Canadian (Nfld) trawlers (OT-5), giving an average value for ages 6-9 of  $F = 0.55$ . Recruitment of age 4 fish, used to make stock projections for 1980 and 1981, was set at 120 million, the average recruitment for the 1976-78 period.

d) Assessment results

The average fishing mortality on fully-recruited age-groups in 1979 was at the  $F_{0.1}$  level of 0.45. However, the 1980 TAC of 18,000 tons is projected to generate a somewhat lower F (0.37).

As in previous reports, the Committee points out that the catch projections for 1980 and 1981 depend to some extent on the estimated number of age 4 recruits entering the fishery in these years. Based on the assumptions that the 1980 TAC will be fully utilized and that recruitment at age 4 will be average, STACFIS advises that a TAC of 21,000 tons in 1981 corresponds to fishing at the  $F_{0.1}$  level.

14. Greenland Halibut in Subareas 0 and 1 (SCR Doc. 80/VI/72)

a) Fishery trends

The nominal catch peaked at 25,000 tons in 1975 and has been less than 20,000 tons since then. Recent catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	-	-	20	20	20	25	25
Catch (000 tons)	10	14	25	16	13	12	19*	

\* Provisional

Information presented in SCR Doc. 80/VI/12 indicates that the reported catches for 1977-79 may be overestimates of the actual catches.

b) Assessment

A virtual population assessment in 1978 (ICNAF Res. Doc. 78/VI/53) indicated an annual yield of 35,000 tons. However, due to some uncertainty about the data, a precautionary TAC of 25,000 tons was advised for 1979. Lacking sufficient data to adequately assess the status of the stock in 1979, the same TAC was advised for 1980. Since no new data were presented at this meeting, STACFIS advises that the TAC remain at 25,000 tons for 1981.

15. Greenland Halibut in Subarea 2 and Divisions 3K and 3L (SCR Doc. 80/VI/96)

a) Fishery trends

Nominal catches ranged from 25,000 to 30,000 tons during 1971-76, increased to 38,000 tons in 1978 and decreased to 34,000 tons in 1979. Although the total catch decreased in 1979, the inshore gillnet fishery has increased substantially from about 7,000 tons in 1976 to 25,000 tons in 1979, whereas the offshore trawl catches declined as a result of decreased allocations. Recent trends in TACs and nominal catches are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	40	40	30	30	30	30	35
Catch (000 tons)	29	27	29	25	32	38	34*	

\* Provisional

b) Biomass surveys

Biomass surveys conducted in recent years indicate that Div. 2J and 3K are the areas of greatest abundance of this stock. Estimates of trawlable biomass from Canadian surveys in Div. 2J, 3K and 3L during the last two years were in the order of 200,000 tons. A research survey by German Democratic Republic in Div. 2G and 2H in 1978 indicated a trawlable biomass of about 100,000 tons. These surveys also indicate that recruitment to the stock is good and can be expected to remain favorable over the next few years, based on the abundance of pre-recruit year-classes. However, because of the short time series of data, it was difficult to assess quantitatively the effect of these apparently-good year-classes on future yields.

c) Assessment parameters

Catch-at-age data for 1975-79 were used to determine fishing mortalities and stock sizes. There was some uncertainty as to the value of terminal F that should be used in the analysis. Analysis of recent catch curves provided estimates of F which averaged 0.40. This estimate was considered to be biased upward due to increased recruitment in recent years and the emigration of older individuals, and the Committee agreed to use  $F = 0.35$  as the most reasonable estimate of fishing mortality in 1979. Partial recruitment values were derived from a comparison of commercial and

research vessel age composition data for 1979, because it was considered that average partial recruitment values would not realistically reflect the change in the commercial fishing pattern in recent years. For use in the projections, recruitment at age 5 was taken as the geometric mean of recruitment in 1976-78 (75 million fish), because it was not possible to obtain a realistic estimate from the short time series of survey data.

d) Assessment results

Projections for 1981, under the assumption that the 1980 TAC of 35,000 tons will be fully utilized, indicate a yield of about 55,000 tons fishing at  $F_{0.1} = 0.53$ . The Committee was concerned about the probable changes in partial recruitment estimates in the next year if the offshore trawl fishery is intensified and emphasized the need for this parameter to be closely monitored to observe any changes for future assessment. Noting the favorable condition of this stock and the promising recruitment prospects, STACFIS advises a TAC of 55,000 tons for 1981.

16. Roundnose Grenadier in Subareas 0 and 1 (SCR Doc. 80/VI/83, 100)

a) Fishery trends

Nominal catches have fluctuated between 3,000 and 12,000 tons during 1971-79. A TAC of 10,000 tons was introduced in 1975, increased to 14,000 tons in 1976 and subsequently reduced to 8,000 tons, based on an assessment in 1976. Recent catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	-	10	14	8	8	8	8
Catch (000 tons)	5	12	5	9	3	6	6*	

\* Provisional

b) Biological studies

The Committee reviewed an analysis of weight *versus* total length for roundnose grenadier in Subareas 0+1 and 2+3 (SCR Doc. 80/VI/83), which compared the mean weights of samples as submitted to the Secretariat in past years to mean weights calculated by applying empirical length-weight relationships. There were no significant difference between the observed and calculated mean weights for samples from Subareas 2+3, but the differences were significant for the samples from Subareas 0+1. However, when the length-weight relationship for Subareas 2+3 was applied to the Subareas 0+1 samples, no significant differences were noted. STACFIS urged that further studies should be conducted to resolve this discrepancy.

c) Assessment

The Committee reviewed an updated general production model analysis for the 1968-77 period, based on a modified effort standard (SCR Doc. 80/VI/100). The time series of effort data was interrupted in 1978 due to the lack of a directed fishery. The analysis indicated an MSY of 9,000 tons and a yield at  $2/3 F_{MSY}$  of 8,000 tons. Because these values were similar to those of previous assessments, and because there has been an apparent increase in catch-per-unit-effort up to 1977, STACFIS advises that the TAC for 1981 should remain unchanged at 8,000 tons.

17. Roundnose Grenadier in Subareas 2 and 3 (SCR Doc. 80/VI/84, 100)

a) Fishery trends

After peaking at 75,000 tons in 1971, the nominal catch fluctuated between 15,000 and 28,000 tons during 1972-78 and decreased to about 8,000 tons in 1979. A TAC of 32,000 tons was introduced in 1974, raised to 35,000 tons in 1977 and decreased to 30,000 tons for 1980 based on an assessment in April 1979. Recent catches and TACs are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	32	32	32	35	35	35	30
Catch (000 tons)	18	28	27	21	15	21	8*	

\* Provisional

b) Biological studies

The Committee reviewed a paper on total length *versus* anal fin length for grenadiers (SCR Doc. 80/VI/84), in response to a recommendation from the 1979 Annual Meeting (ICNAF Redbook 1979, page 54). The results, based on the measurement of 2,347 individuals, showed a highly significant correlation between total length and anal fin length with very little difference between males and females. It was also shown that a highly significant correlation exists between anal fin length and pre-anal length. The Committee noted that a decision on the appropriate length measurement to be used would be made by STACREC.

c) Assessment

The Committee reviewed an updated general production model analysis for the 1967-78 period based on a modified effort standard (SCR Doc. 80/VI/100). Although the correlation between catch-per-unit-effort and effort is low, the analysis indicates an MSY of 30,000 tons and a yield at  $2/3 F_{MSY}$  of 26,500 tons. Although the TAC has not been fully utilized in recent years, catch rates have continued to decline. STACFIS accordingly advises that the TAC should be reduced to 27,000 tons for 1981.

18. Wolffish in Subarea 1 (SCR Doc. 80/VI/77)

a) Fishery trends

A longline fishery directed mainly on spotted wolffish in Div. 1A and 1B began in the mid-1940's and annual catches were fairly stable around 500-800 tons for several years. In the early 1950's, the longline fishery expanded to Div. 1C, and by 1957 the longline catch peaked at 4,500 tons. It fluctuated between 1,700 and 3,800 tons during the 1960's. The offshore trawl fishery began to land by-catches of wolffish (mainly striped) about 1950 and the nominal catch increased slowly during the next 10 years. From 1960 the trawl fishery expanded rapidly and the trawler catch of wolffish reached a peak of 3,700 tons in 1963.

The total catch of wolffish in Subarea 1 reached a level of 5,500 tons in 1957, which was sustained for about 10 years, followed by a decline in the late 1960's to 3,000 tons and an increase in the mid-1970's to more than 6,000 tons. There was a steep decline in the Greenland fishery after 1975 and the total catch figures seem to follow that trend, but the reported statistics for the most recent years are considered not reliable.

b) Biological information

Because of the distribution of the two commercial species of wolffish, the traditional longline fishery has exploited mainly the spotted wolffish (*Anarhichas minor*) whereas the offshore trawl catches consist mainly of the striped wolffish (*Anarhichas lupus*), which has a more southerly distribution. Little is presently known about the growth and reproduction rates of these species, but the available literature indicates that they are rather slow-growing, especially the striped wolffish. The age of recruitment to the fishery is estimated to be about 10 years for striped wolffish and about 7 years for spotted wolffish.

c) General remarks

It is not possible to carry out a detailed assessment of the wolffish stocks until more biological data becomes available and the two species are separated in the reported catch statistics and sampled. However, the catch statistics for the inshore longline fishery indicate that a sustainable yield of 2,000-3,000 tons might be considered reasonable for the spotted wolffish, but, since the longline fishery has been relatively stable for many years, there seems to be no need at present to regulate this fishery by catch quota.

It is questionable whether a directed trawl fishery for striped wolffish can occur with economical benefit. Although Greenland trawlers have taken wolffish as the target species on some occasions, the number of areas where a reasonable catch rate can be achieved are very scattered. It is therefore more likely that wolffish will be taken as by-catch rather than in a directed fishery. However, if a directed trawl fishery for striped wolffish should develop, the historical catch statistics indicate that the sustainable yield might be about 3,000 tons. Noting the limited biological information on the two species of wolffish and the absence of catch for the two species separately, STACFIS

recommends

- i) that the feasibility of breaking down the catches of wolffish by species be studied by the Standing Committee on Research Coordination (STACREC); and



ii) that the scientific necessity of breaking the catches of wolffish down by species, if detailed assessment of the wolffish stocks is requested, be brought to the attention of the European Economic Community (EEC).

d) By-catches

In sporadic directed fishing for wolffish by Greenland trawlers, by-catches of Greenland cod and Atlantic cod were recorded in 1976 to 1979. In Div. 1B and 1C, the by-catch of Greenland cod accounted for 23% by weight of the total catch and Atlantic cod only 3%, whereas in Div. 1D and 1E the by-catches were 3% for Greenland cod and 29% for Atlantic cod. The total effort during the directed trawl fishery on wolffish in the four years was less than 1,000 hours fishing, more than half of the time in Div. 1D.

The recorded by-catches of Greenland cod and Atlantic cod in the wolffish fishery occurred in a period when the cod fishery was very poor, being nearly absent in Div. 1B. If the cod stock increases to earlier recorded levels, it is likely that this species will account for a large part of the catches in a trawl fishery for wolffish although large fluctuations in by-catch are likely to occur.

19. Argentine in Divisions 4V, 4W and 4X

a) Fishery trends

The peak catch in recent years was 17,000 tons in 1974, after which nominal catches declined to 2,000-3,000 tons in 1977-79. Recent TACs and catches are as follows:

	1973	1974	1975	1976	1977	1978	1979	1980
TAC (000 tons)	-	25	25	25	20	20	20	
Catch (000 tons)	1	17	15	7	2	2	3*	

\* Provisional

The decline in catch has been attributed to the exclusion of third party fishing effort from the areas of disputed jurisdiction between Canada and USA, namely the Fundian Channel, where the highest concentrations of argentine are believed to be. The most recent catches of argentine are mainly by-catches in the squid and silver hake fisheries along the edge of the Scotian Shelf.

b) Assessment

Data were presented which showed that argentine taken in 1977-79 were smaller than those in 1970-71, possibly because of the depth at which the silver hake and squid fisheries were carried out in the most recent period. As insufficient data were available to indicate any change in the status of the stock, STACFIS can only reiterate previous advice that the TAC for 1981 be set at 20,000 tons, the estimated MSY level in Div. 4VWX.

20. Capelin in Subareas 2 and 3

STACFIS noted the request of Canada to consider whether the analyses of the capelin stocks, carried out at the Special Meeting of the Scientific Council in February 1980, are sufficient to provide advice on management of these stocks in 1981. Considering the critical importance of recruitment to the exploitable stocks and the current inability to adequately predict such recruitment, STACFIS advises that it would be more appropriate to consider the status of the capelin stocks at a meeting early in 1981 when data from the 1980 fishery and research surveys become available.

21. Squid-Illex in Subareas 3 and 4

a) STACFIS continues to support the management regime proposed by the Scientific Council in February 1980 (SCS Doc. 80/II/1), and therefore advises that the TAC for 1981 should be maintained at the same level as for 1980 (150,000 tons), subject to adjustment on the basis of any significant new information forthcoming from the 1980 fishery. Given the unlikely prospect that the abundance of squid in 1981 can be predicted, the Committee agreed that a mid-term meeting in early 1981 to advise on management of the squid fishery in 1981 would not be necessary, but that a special 3-day session should be held immediately before the June 1981 Meeting of the Scientific Council to consider all of the biological information on squid that might be available at that time.

b) Commencement date for the fishery

No new information was available to indicate that a change in the 1 July commencement date of the squid fishery in Subareas 3 and 4 is necessary.

22. Shrimp in Subareas 0 and 1

STACFIS acknowledges the request of Canada and the EEC for advice on management of the shrimp stocks in 1981. However, considering the substantial contribution of shrimp recruitment to the annual yields and the current imprecision of predicting such recruitment, STACFIS advises that it is more appropriate to assess the shrimp stocks and advise on conservation measures for 1981 at a mid-term meeting early in 1981 when data for the 1980 fishery become available.

III. GEAR AND SELECTIVITY

1. Selection Studies on Silver Hake and Squid-*Illex*

There were no new data presented on trawl selectivity of these two species. However, the Committee reviewed two analyses of historical silver hake selection data (SCR Doc. 80/II/39, 80/VI/109), which showed such great variation that no firm conclusions could be drawn. It was noted that an increase in the mesh size would increase the escapement of young silver hake and thereby reduce the catch rate, but no quantitative estimates of the changes could be derived from the data. The Committee therefore emphasized the need for further analysis after the completion of the selection studies conducted in 1980, as recommended at the 1979 Annual Meeting (*ICNAF Redbook 1979*, page 83).

2. Selection Studies on Greenland Halibut

The Committee reviewed a paper on the first of a series of mesh selection experiments initiated in 1979 (SCR Doc. 80/VI/69). Noting that this first experiment was carried out using a codend mesh size of 120 mm, STACFIS

recommends

*that selection studies on Greenland halibut be continued, using a range of mesh sizes including the current minimum mesh size in effect (130 mm).*

IV. AGEING TECHNIQUES AND VALIDATION STUDIES

1. Further Progress on Ageing Silver Hake

The Committee noted that age validation studies on silver hake in Div. 4VWX (SCR Doc. 80/II/20) supported the results and techniques accepted at ageing workshops held during 1976-78. A comparison of age compositions used in the two most recent assessments (SCR Doc. 80/II/46, 80/VI/87) shows that ageing of silver hake has improved. STACFIS agreed that validation studies should be continued.

2. Guidelines for Cod Otolith Interpretation

STACFIS noted that these guidelines have not yet been documented in accordance with previous recommendations, and therefore

recommends

*that the proposed guidelines for cod otolith interpretation be prepared and documented in time for the September 1980 Meeting of the Scientific Council.*

3. Progress on Ageing Squid from Statoliths

STACFIS noted with interest the progress being made in studies on the use of statoliths as indicators of age in *Illex* (SCR Doc. 80/II/22, revised), and urged that such studies be vigorously continued.

4. Redfish Age Validation

Papers on age determination by scales (SCR Doc. 80/VI/91) and age validation by otoliths (SCR Doc. 80/VI/79, 105) were reviewed. When age compositions of commercial-sized redfish from Subarea 1 (aged by scales) were compared with Gulf of St. Lawrence redfish (aged by otoliths), the mean size at age was greater in Subarea 1. This implies that redfish in Subarea 1 are faster-growing than

those in the Gulf of St. Lawrence or that scales and otoliths give different interpretations of age. Age validation studies on redfish in the Gulf of Maine indicated good correspondence between the age determinations of a dominant year-class or year-classes of young redfish and the progression of modal groups in length frequencies. Furthermore, length frequencies of redfish in the Gulf of St. Lawrence indicate that dominant year-classes first evident in 1959 averaged 31-32 cm for males and 34-35 cm for females in 1974 after 15 years, indicating that these fish were at least 15 years old. Noting the problems associated with age determination in redfish, STACFIS

recommends

- i) *that scientists of the various laboratories search their data files for sampling data which would validate redfish ageing by otoliths or scales and document such data;*
- ii) *that validation of ageing redfish by scales be presented; and*
- iii) *that comparative ageing studies on the same redfish specimens be initiated by the exchange of material between Canadian and Federal Republic of Germany scientists.*

5. Ageing and Validation Studies on Other Species

a) Spiny dogfish (SCR Doc. 80/VI/51)

From samples taken in the Northwest Atlantic, ages were determined from longitudinal sections of the second dorsal spines. The presence of additional "false" rings was noted, these being more prevalent in females and in specimens younger than 12-18 years. A correction incorporating spine diameter is necessary if the method is used for older individuals. Growth data for males and females separately were provided in the study.

b) Roundnose grenadier

The Committee was informed that age validation studies were being pursued by scientists of the Federal Republic of Germany and the German Democratic Republic.

V. OTHER MATTERS

1. Items for Consideration at Future Meetings of the Scientific Council

STACFIS endorsed the proposal that time be allotted at the September 1980 Meeting to consider one or more topics of general scientific interest. In particular, it was noted that analyses of the results of the larval herring surveys in the Gulf of Maine-Georges Bank area during 1970-79 were in progress (SCS Doc. 80/VI/16) and that a more detailed report of the Larval Herring Task Force would be presented at the September 1980 Meeting. STACFIS also expressed the wish that various analyses related to the Flemish Cap Project would be completed and documented in time for that meeting.

STACFIS strongly supports the proposal that the opportunity be taken soon to review environmental conditions in the Northwest Atlantic during the 1970-79 decade, but notes that time may be a limiting factor in the preparation of papers for the September 1980 Meeting.

2. Adjournment

The Chairman expressed his appreciation to Dr F. Nagasaki who convened the *ad hoc* Working Group on Squid, to the rapporteurs for preparing initial draft reports of the various matters under consideration, to all participants for their cooperation during the meeting, and to the Secretariat for their usual efficient work.

## APPENDIX II. REPORT OF STANDING COMMITTEE ON RESEARCH COORDINATION (STACREC)

Chairman: V. A. Rikhter

Rapporteurs: Various

The Committee met at Dartmouth, Nova Scotia, Canada, during 9-13 June 1980, to consider and report on matters referred to it by the Scientific Council (Agenda section C). Scientists attended from Canada, Cuba, EEC (Denmark, Federal Republic of Germany and France), German Democratic Republic, Japan, Poland, Spain, USSR and USA. As indicated in the Report of the Scientific Council, Dr V. A. Rikhter (USSR) was elected Chairman of this Committee to replace Dr A. S. Seliverstov (USSR) who recently resigned.

In considering the various agenda items, the Chairman appointed Dr W. G. Doubleday to convene the session dealing with Biological Surveys and Mr E. J. Sandeman to convene the session dealing with Environmental Research. Mr J. S. Beckett convened a meeting of the *ad hoc* Working Group on the International Observer Scheme, which was deferred from the February 1980 Meeting of the Scientific Council, and Mr T. Rowell was appointed convener of the *ad hoc* Working Group on Coordinated Squid Research. The Assistant Executive Secretary and several participants contributed to the preparation of the initial drafts of different sections of this report.

### I. STATISTICS AND SAMPLING

#### 1. CWP Activities Relevant to NAFO Statistical Matters

##### a) Operation of the STATLANT program

On behalf of Mr L. P. D. Gertenbach, Secretary of the CWP (Coordinating Working Party on Atlantic Fishery Statistics), the Assistant Executive Secretary briefly reviewed the current operation of the inter-agency STATLANT program, noting that significant delays on the part of some countries in submitting their STATLANT reports hamper the provision of the most up-to-date statistics for assessments and also for publication.

##### b) Standard world list of 3-alpha identifiers (SCS Doc. 80/VI/14)

The development of a standard world list of 3-alpha species identifiers and its use in the most recent *FAO Yearbook of Fishery Statistics* (Vol. 46 for 1978) was noted. FAO is the maintenance agency for the world list, and procedures have been established for making additions to the list upon request by inter-governmental and national agencies, as the need arises, to record the catches of new species items. The list is intended only for use when dealing with commercial fishery statistics. It was noted that the NAFO list of species items represents an extract from the world list maintained by FAO.

##### c) Standards for fishing vessels, gear and effort (SCS Doc. 80/VI/10)

The Assistant Executive Secretary reviewed the international standards developed for fishing vessels, gear and effort, noting that those relevant to Northwest Atlantic fishery statistics have been used for many years and are published annually in the *Statistical Bulletin*. It was pointed out that some countries have not yet adopted all of the "effort level A" measures in reporting effort data for some gears, particular reference being made to longlines and gillnets. The recent use of "off-bottom" trawls in some areas for some directed fisheries was noted, and it was agreed that this matter be brought to the attention of the CWP, with a view to having this gear incorporated into the standard list. STACREC therefore

##### recommends

*that the Assistant Executive Secretary obtain from Canadian scientists an account of the recent use of the "off-bottom" trawl, including a description of the trawl, for consideration at the 10th Session of the CWP, with a view to the possible incorporation of this gear in the standard list.*

##### d) Conversion factors (SCS Doc. 80/VI/6, Rev.)

STACREC was informed that FAO, in collaboration with other intergovernmental agencies, has essentially completed the collection and compilation of detailed data on nationally-used weight conversion factors by species and type of product. Noting that the last published list of such factors was contained in *FAO Fish. Bull.*, No. 25 (1971), STACREC welcomed the completion of this updated list and hoped that its publication by FAO would not be long delayed.

##### e) Agenda for the 10th Session of the CWP (SCS Doc. 80/VI/15)

The Assistant Executive Secretary indicated that the 10th Session of the CWP will be held at

Madrid, Spain, during 22-29 July 1980, and that a wide variety of statistical matters will be discussed. As agreed at the 1979 Annual Meeting, NAFO will be represented by the Assistant Executive Secretary and by two Canadian nominees, Dr W. G. Doubleday and Mr D. A. Tilley. Normally the Chairman of STACREC would be attending this meeting, but in view of his very recent election as Chairman, Dr Rikhter indicated that he probably could not attend due to other commitments. The CWP Secretary has indicated in correspondence to the Secretariat that some national representatives at the 10th Session include Mrs N. V. Yanovskaya and Dr S. A. Studentsky from USSR and Dr E. G. Heyerdahl from USA.

f) Other matters (SCS Doc. 80/VI/5)

The Assistant Executive Secretary briefly reviewed the report of the *ad hoc* Consultation on Atlantic Fishery Statistics, held at Warsaw, Poland, during 28-29 September 1979, noting that all of the items considered provisionally at that meeting will again be dealt with at the July 1980 Session.

2. Fishery Statistics

a) Problems associated with publication of 1977 and 1978 statistics (SCS Doc. 79/XI/1)

Problems encountered by the Secretariat in documenting fishery statistics from cooperative arrangements between Canada and other countries are outlined in SCS Doc. 79/XI/1, which was presented to the November 1979 Meeting of the Scientific Council but deferred for consideration at this June 1980 Meeting. The problems related to the significant amount of time required for clarification of national STATLANT 21A and 21B reports for 1977 and 1978 to eliminate the possibility of double-counting and under-counting of nominal catches. To avoid confusion about future STATLANT reports, emphasis was placed on the accepted principle "that the flag of the vessel should be the determining feature which establishes the country to whose national production the catches and landings should be allocated, and that this should only be overridden when it is obvious that the wording of chartering and joint venture operation contracts indicates otherwise or when the interrelationships are too complicated to settle" (ICNAF Sum. Doc. 78/VI/2). As a result of the delays, *ICNAF Statistical Bulletin*, Vol. 27 for 1977, was published in November 1979, nearly a year behind schedule, and Vol. 28 for 1978 is expected to be published in August 1980, about 8 months behind schedule.

b) Fishery statistics for 1979 (SCS Doc. 80/VI/21)

STACREC noted that, for the first time in several years, the Secretariat has not been able to prepare the "advance release" of provisional nominal catches for 1979, due to the late receipt of STATLANT 21A reports from some countries and the absence of such reports from a few others, despite the clearly indicated deadline of 15 April for the submission of these summary reports. This tardiness has a consequent effect on the quality of the data used in the assessments. The Assistant Executive Secretary indicated that, since most of the outstanding data had just now been received, it should be possible to issue the "advance release" of 1979 nominal catches for distribution within a week following this meeting.

c) Review of statistical requirements

Following a review of the NAFO species list, the need for the addition of several species items to the list was noted. In particular, STACREC

recommends

*that the NAFO list of species be amended to include the two commercially-caught species of wolffish (Anarhichas lupus and A. minor), the two species of redfish (Sebastes marinus and S. mentella), blue ling (Molva byrkelange), and roughhead grenadier (Macrourus berglax), with their corresponding 3-alpha identifiers.*

d) Historical catch records (SCS Doc. 80/VI/11)

Some scientists indicated that they have found these 10-year tabulations of catches of selected species by stock area and country very useful and urged that the preparation of this document be continued on an annual basis.

e) Progress in updating statistics for earlier years

STACREC was informed that detailed catch and effort data for 1972-78 have been updated where necessary and exist as computer files. The processing of pre-1972 data is complicated by the lack of uniformity in the reporting forms and procedures used in the earlier years, although some progress has been made in processing the data for some countries. A complete file of nominal catch data in STATLANT 21A format exists for all years back to 1965.

f) Format of future NAFO Statistical Bulletin

STACREC reviewed the format of presentation of the tabular material in the Statistical Bulletin, preparatory to the publication of the first NAFO issue (Vol. 29) in early 1981, noting that there has been no significant changes after the major reorganization of the tables in Vol. 22. The Assistant Executive Secretary noted that the numerous requests for monthly catches of species not listed in Table 4 and not given separately in Table 5 indicate the possible need for a change in the format of Table 5, which is the only table providing detailed effort and catch data, the latter for a few selected species and for some groups of species. Significant among the species affected are Greenland halibut (now grouped under FLX), roundnose grenadier and wolffish (now grouped under GRO), argentine and capelin (now grouped under VFF), and squid and shrimp (now grouped under INV).

The Assistant Executive Secretary noted that a new format for Table 5 might be based on a computer program developed by the Secretariat, whereby the catches of all species items individually can, if necessary, be extracted from the table by country, gear, vessel class, division and month, together with associated data on fishing effort, if available. It was estimated that this new format for Table 5 would increase the size of the Bulletin substantially but that part of this increase would be offset by deleting Table 6 which is apparently seldom used. STACREC agreed in principle to the proposed format but indicated that some experimental computer runs should be undertaken with a view to deciding on the most appropriate order of sorting the data sets, and therefore

recommends

*that the Secretariat circulate to Scientific Council members for comment sample listings of the proposed new format for Statistical Bulletin Table 5 and present the findings for decision at the September 1980 Meeting of the Scientific Council.*

3. Sampling Program

a) Sampling data for 1977 and 1978

Annual lists of sampling data received at the Secretariat are initially issued as summary documents to allow scientists to check the lists against data in their national archives and report any errors and omissions prior to publication of the lists. The issue of *ICNAF Sampling Yearbook*, Vol. 22 for 1977, based on data presented in ICNAF Sum. Doc. 79/VI/12, has been delayed due to the absence of USA sampling data. However, these data are now in hand and Vol. 22 will be issued as soon as the data have been processed.

The list of available sampling data for 1978 is given in SCS Doc. 80/VI/8. It was noted that this list is very incomplete. STACREC emphasized the need to have the NAFO data base as complete as possible and urged scientists, upon returning to their institutes, to have the 1978 list checked against national records to ensure that all available commercial sampling data are submitted to the Secretariat as soon as possible.

b) Acquisition and processing detailed sampling data for 1979

Detailed length frequency data for 1979 on the new sampling form (CFS-1) are only now being received at the Secretariat and processed, but few, if any, age-length keys have as yet been reported. Also, there exists a large volume of sampling data collected by observers on board of fishing vessels operating within the 200-mile fishing zones of the coastal states. The Assistant Executive Secretary reported that much of the data accumulated at the St. John's laboratory will be supplied on magnetic tape as soon as the backlog of data has been processed.

c) Efficiency of sampling in 1978 (SCS Doc. 80/VI/13)

STACREC reviewed the "sampling efficiency" achieved in 1978, based on the data available in the NAFO data base. It was observed that the minimum sampling requirement, used as the basis for calculating the efficiency factors, was no longer applicable in view of the more detailed sampling requirements. In any case, it was noted that the adequacy (or inadequacy) of commercial sampling should be a matter for consideration by STACFIS, as the scientists involved in stock assessments are in the best position to point out the deficiencies pertinent to the individual stocks.

d) Acquisition of Greenland halibut sampling data

Following the recommendation from the 1979 Annual Meeting regarding this matter, the Assistant Executive Secretary through correspondence with some countries requested that existing data for Greenland halibut be submitted in time for use in the assessments, prior to the 1980

Annual Meeting. In December 1979, USSR scientists submitted length compositions and age-length keys for the years 1969 to 1976 by division for Subareas 0 and 1, and indicated that data for Subareas 2 and 3 would be forwarded after ageing had been completed. STACREC requested the Secretariat to follow up on the need to have the outstanding data reported as soon as possible.

e) Partial length measurement for grenadiers (SCR Doc. 80/VI/84, 92)

STACREC considered the results of two studies, carried out at the request of STACRES and endorsed by the Scientific Council, regarding the most suitable partial length measurement for grenadiers (*ICNAF Redbook* 1979, page 54). It was noted that two possible methods of measurement were examined: (i) pre-anal length from the tip of the snout to the anterior edge of the anus; and (ii) anal-fin length from the tip of the snout to the base of the first anal fin-ray. Both methods gave satisfactory results in so far as the regressions of the respective partial lengths on total length were highly significant. It was noted that the "anal-fin length" was probably less subject to error than the "pre-anal" length in some specimens with distorted anuses due to being brought to the surface from very deep water. STACREC accordingly

recommends

*that length measurements of both roundnose grenadier (Macrourus rupestris) and roughhead grenadier (Macrourus berglax) separated by sex be made and reported as partial lengths measured from the tip of the snout to the base of the first anal fin-ray (anal-fin length) in half-cm intervals.*

f) Processing of historical sampling data

The Assistant Executive Secretary reported that all available data for 1971-78 (except USA data for 1977 and 1978) have been computerized and can be supplied upon request to scientists and laboratories involved in the work of NAFO. Some data for 1970 and earlier years have been processed but the files are not as yet complete.

g) Revised outline of NAFO Sampling Program (SCS Doc. 80/VI/20)

As requested at the 1979 Annual Meeting, the Secretariat has updated the sampling program outline to reflect the changes relevant to the implementation of more detailed sampling requirements as indicated by the introduction of the two new sampling forms (CFS-1 and CFS-2). STACREC requested that the outline be further revised to take account of the new method for measuring grenadiers, and strongly urges all scientists to use the new forms or a similar format in reporting data to the Secretariat.

4. National Statistical Systems

The Assistant Executive Secretary reported that several countries had submitted descriptions following a request in early 1980. These include Federal Republic of Germany, France (M), France (SP), Italy, UK and USSR. It was noted that *ICES Cooperative Research Report*, No. 91, contained descriptions for Faroe Islands, German Democratic Republic, Iceland and Poland. The German Democratic Republic representative indicated that the report for NAFO was in preparation and would soon be forwarded to the Secretariat. Considerable variation in the contents of the various reports was noted, and it was proposed that, in order to achieve some degree of uniformity, the Secretariat should develop some guidelines in the form of an outline and request from those countries whose reports are considered inadequate more detailed descriptions of their systems of collecting and processing fisheries statistics.

5. Scientific Observer Program

The *ad hoc* Working Group on the Scientific Observer Program, established by STACRES and endorsed by the Scientific Council at the 1979 Annual Meeting (*ICNAF Redbook* 1979, pages 59 and 95; *NAFO Meet. Proc.* 1979, page 115), reported on the development of specific requirements for data collection. Noting that the Working Group had fulfilled its mandate according to its terms of reference, STACREC agreed to the procedures outlined and adopted, after minor amendment, the report as given in Annex 1. In particular, STACREC reiterates the Working Group's

recommendation

*that bilateral parties involved in the International Observer Scheme identify the appropriate fisheries to be covered.*

STACREC requested the Secretariat to coordinate the final development of a suitable form for reporting set data, based on the items listed in the report of the Working Group. It was noted that biological sampling data will be reported on, or in the format of, the new length and age sampling forms (CFS-1 and CFS-2).

6. List of Fishing Vessels for 1977 and 1980

STACREC noted that the list of fishing vessels for 1977 was not issued until early 1980 due to late submissions from several countries. It was agreed that this publication should be continued and that the next issue would be a NAFO issue containing data on fishing vessels operating in the Northwest Atlantic in 1980. No change in the format of presentation was proposed. However, noting that the list may also be useful to inspection officers, it was agreed that the matter of format regarding vessel characteristics should be also considered by the Fisheries Commission at their September 1980 Meeting.

7. Other Matters Relevant to Statistics and Sampling

a) Discards (SCR Doc. 80/VI/86)

The Committee was informed that this paper had been considered by STACFIS.

b) Unspecified finfish catches

The Committee was informed that a substantial portion of the overall nominal catch of finfish reported each year by some countries consists of amounts not broken down by species. These quantities appear in the Statistical Bulletin under such groups as "Groundfish (NS)", "Pelagic fish (NS)", and "Finfish (NS)". It was noted that these quantities, at least for some countries, are estimates of quantities (a mixture of species that would otherwise be discarded) being reduced for fish meal. These unspecified amounts, if large, may have a serious effect on the results of the stock assessments. STACREC therefore

recommends

*that countries reporting large quantities of unspecified finfish in their national statistics should conduct studies during the fishing operations with a view to providing an estimated breakdown of such quantities by species in future reports.*

II. BIOLOGICAL SURVEYS

1. Review of Survey Activity in 1979

The Committee noted that the following documents contained material relevant to biological surveys in 1979 and earlier years: SCR 80/II/13, 14, 17, 19, 26, 36, 37, 38, 40, 42, 43; SCR 80/VI/93, 95, 96, 102, 104, 113; SCS 80/VI/12, 17, 18, 19, 22. Since many of these documents contained the results of investigations and have been considered by STACFIS, only those documents containing information relevant to the agenda of STACREC were discussed. Such information, supplemented by additional details provided by the participants, enabled the compilation of the list of surveys carried out in the NAFO Area in 1979 (Table 1).

Changes in the level of survey activities were highlighted by participating scientists. The Cuban survey planned for 1979 was not carried out due to technical problems. The Federal Republic of Germany increased survey activity on cod and redfish in Subarea 1 and discontinued larval herring and plankton surveys in Subarea 5. The survey by the German Democratic Republic in Subarea 2 occurred later in 1979 than previously, so that the planned coverage of Subarea 0 and Div. 3K could not be carried out. Japan carried out extensive squid surveys in Div. 4VWX. The Polish groundfish survey carried out in Subarea 5 in 1978 was not repeated. USSR groundfish surveys and ichthyoplankton studies in Div. 3M were increased in 1979.

2. Survey Plans for 1980

Survey plans for 1980 and early 1981 are listed in Table 2. Attention was drawn to changes in 1980 plans from those of 1979. Problems with the Cuban research vessel may preclude the execution of Cuban surveys in the NAFO Area in 1980. Canada plans new combined acoustic and trawl surveys for redfish in Div. 4RST and for small pelagic fish in Div. 4TX, and surveys are also planned for juvenile silver hake in Div. 4VWX and for large pelagics in Subareas 5 and 6. Canada and USSR will cooperate in a "patch" study of larval silver hake in Div. 4WX in September. The USSR ichthyoplankton surveys in Div. 3M will be discontinued. Federal Republic of Germany plans no surveys in Subareas 5 and 6 in 1980. French plans include a new squid survey in Div. 4VWX in August, but the shrimp survey carried out in Subareas 0 and 1 in 1979 will not be repeated. Japan plans no surveys in the NAFO Area in 1980. USA plans include a new red crab survey in Div. 5Z.

3. Review of Proposed Manual on Groundfish Surveys

A revised draft of the manual was not available for review but will be provided by the editor at the



September 1980 Meeting. The members of the Committee agreed to provide the editor by 30 July (a) a list of survey manuals now existing in the laboratories of member countries, (b) a brief description of the history of groundfish surveys carried out in the NAFO (ICNAF) Area, including fixed station and line surveys, and (c) a description of methods of intercalibrating survey abundance indices with cohort analysis for estimating catchability at age. Such information will be incorporated into the revised draft.

Table 1. Inventory of biological surveys conducted in the NAFO area during 1979.

Sub-area	Div.	Country	Months	Sets	Sub-area	Div.	Country	Months	Type of Survey	No. of sets
<b>A. Random-stratified groundfish surveys</b>					<b>B. Other surveys</b>					
2	GHJ	GDR	11-12	79	0	B	FRA	9-10	Shrimp	16
	J	CAN(N)	9-10	111 <sup>1</sup>	0-1B		CAN(Q)	9-10	Shrimp	51
		"	11-12	130 <sup>2</sup>	-----					
		FRG	11-12	71	1	A	DEN(G)	7	Shrimp (trawl)	2
-----							"	7,8	Shrimp (photo)	2
3	KL	CAN(N)	9-10	... <sup>1</sup>			"	6	Shrimp (commercial)	24
	L	"	5-6	135	B	DEN(G)	7,8	Shrimp (trawl)	5	
		"	5-6	145			"	7,8	Shrimp (photo)	7
	M	"	1-2	96			"	5-12	Shrimp (commercial)	261
	-	"	11-12	... <sup>2</sup>			"	7	Plankton	6
	NO	"	4-5	90			FRA	9-10	Shrimp	35
	O	"	6	85	BF	FRG	4-5	Groundfish	48	
	Pn,RST	"	1-2	84			"	10-11	Groundfish	50
	Pn	"	9-10	69 <sup>3</sup>	C	DEN(G)	1,7	Shrimp & Groundfish	4	
	Ps	"	2-3	84			"	7	Shrimp (trawl)	1
		FRA	3	53			"	10	Shrimp (commercial)	2
		"	10	60			"	7	Plankton	7
-----					D	DEN(G)	1,2,6,11	Shrimp & Groundfish	9	
4	RS	CAN(Q)	5-6	84			"	2,6	Shrimp (trawl)	2
	RST	CAN(N)	9-10	... <sup>3</sup>			"	9	Shrimp (commercial)	1
	T	CAN(M)	9-10	74			"	1,2	Cod (acoustic)	-
	VWX	CAN(M)	3	118			"	2,7	Plankton	6
		"	7	145			"	1	Capelin	4
		"	10-11	126	E	DEN(G)	1,6	Shrimp & Groundfish	5	
		USSR	9-10	74	-----					
	X	USA	4-5	34	2	GH	CAN(N)	8	Groundfish	142
		"	11	31		HJ	"	9	Mesh selection	55 <sup>7</sup>
-----						J	"	2-3	Tagging cod & G. halibut	124 <sup>8</sup>
5	YZ	USA	4-5	284			"	10-11	Capelin	? <sup>9</sup>
		"	7-9	147			FRA	1-2	Cod	4
		"	10-11	366			USSR	9-11	Groundfish	203 <sup>10</sup>
	Z	USSR	9-10	87	-----					
-----					3	K	CAN(N)	2-3	Tagging cod & G. halibut	... <sup>8</sup>
6	ABC	USA	3-4	155			"	9	Mesh selection	... <sup>7</sup>
		"	7-8	127			"	10,11	Capelin	... <sup>9</sup>
		"	9-10	151			FRA	2	Cod	18
-----							GDR	2-3	Cod	?
<b>C. Coordinated herring surveys</b>							USSR	9-11	Groundfish	... <sup>10</sup>
5	YZ	FRG	2-3	125 <sup>4</sup>	KLMNO	USSR	3-6	Groundfish	312	
		"	9-10	93 <sup>5</sup>	L	CAN(N)	10	Cod feeding	58	
	Z	GDR	4-5	115 <sup>6</sup>			"	10-11	Mesh selection	105
-----							FRA	2	Cod	11
6	A	FRG	2-3	... <sup>4</sup>	LNO	CAN(N)	8-9	Groundfish	120	
		"	9-10	... <sup>5</sup>			USSR	4-6	Hydroacoustics	-
		GDR	4-5	... <sup>6</sup>	LMNO	USSR	3-6	Ichthyoplankton	208	
-----					N	CAN(N)	6-7	Capelin	?	
					NOPs	FRA	8	Albacore	-	
					Ps	CAN(N)	9-10	Tagging (flatfish)	32	
					P	FRA	2	Cod	25	
-----					-----					

Table 1. Continued

Sub-area	Div.	Country	Months	Type of Survey	No. of sets				
4	R	FRA	1	Cod	38				
	RST	CAN(N)	7-8	Shrimp & Groundfish	136				
	S	CAN(Q)	7-8	Crab	114				
	T	"	"	9-10	Crab assessment	70			
				3	Ichthyoplankton	8			
				5	"	12			
				6	"	12			
				7	"	12			
				8	"	82			
				9	"	12			
				10	"	12			
				T	CAN(M)	"	7,8,9	Scallops	?
							7-8	Scallops	?
	VWX	"	"	6-7	Mackerel eggs	132			
				1-2	Ichthyoplankton	37			
				4	"	124			
				5	"	78			
				9-10	"	91			
				11-12	"	118			
				8	Pollock	?			
				1	Hydroacoustics	-			
				3	"	-			
				10	"	-			
	4	VWX	JAP	10-11	Squid	99			
				11	"	168			
		"	USSR	2-4	Squid	297			
				2,5	Groundfish	199			
				3-4	Ichthyoplankton	106			
				8-9	Ichthyoplankton	251			
		WX	CAN(M)	3	Haddock	62			
7				Comparative fishing	61				
6				Squid	94				
X		CAN(M)	12	Squid	24				
			2	Juvenile herring	21				
			4	"	10				
			3	Larval herring	114				
			7-8	"	415				
			10-11	"	115				
			6	Scallops	?				
			10	"	?				
"		USA	5	Ichthyoplankton	4				
			10	"	8				
			11-12	"	15				
5	YZ	"	USA	4	Ichthyoplankton	42			
			"	5	"	94			
			"	10	"	87			
			"	11-12	"	64			
	Z	"	"	CAN(M)	5-6	Scallops	?		
				USA	1	Quahog, surf clam	12		
				"	2-3	Ichthyoplankton	34		
				"	6-7	"	51		
				"	4-5	Scallops	111		
				USSR	9	Silver hake	48		
"	"	"	6-8	Ichthyoplankton	266				
			FRG	10-11	Ichthyology (cont. slope)	?			
6	A	"	USA	4	Ichthyoplankton	12			
			"	11-12	"	9			
	ABC	"	"	USA	1	Quahog, surf clam	146		
				"	2-3	Ichthyoplankton	68		
				"	5	"	72		
				"	6-7	"	72		
				"	10	"	71		
				"	4-5	Scallops	201		
FRG	10-11	Ichthyology (cont. slope)	?						

NOTE

The footnoted numbers indicate situations where the number of sets given overlapped subareas: the number of sets is entered in one subarea and the symbol "... " followed by the corresponding footnoted digit indicates the other subarea to which the overall number of sets also applies.

Table 2. Biological surveys planned for the NAFO area in 1980 and early 1981.

Country	Type of Survey	Area	Dates	Year	
Canada(M)	Large pelagics	3-5	Aug-Sep	1980	
	Mackerel eggs	4T	Jun 9-July 18		
	Larval herring	4T	May-Jun		
	Groundfish	4T	Sep 2-Oct 3		
	Juvenile herring	4T	Sep-Oct		
	Silver hake and redfish	4VWX	Jan 14-25		
	Ichthyoplankton	4VWX	Feb 4-29		
	Groundfish	"	Mar 3-28		
	Ichthyoplankton	"	May 5-Jun 27		
	Comparative fishery	"	Jul 2-28		
	Groundfish	"	Jul 2-28		
	Squid	"	Aug 18-29		
	Ichthyoplankton	"	Sep 2-26		
	Groundfish and juvenile silver hake	"	Sep 29-Nov 14		
	Multispecies studies	"	Oct 14-24		
	Redfish	"	Nov 24-Dec 5		
	Ichthyoplankton	"	Nov 17-Dec 19		
	Acoustics	4WX	Feb 18-28		
	Larval herring	4X	Mar 3-21		
	Herring acoustic	"	Jul 28-Aug 15		
	Larval herring	"	Aug 11-29		
	Larval herring	"	Nov 3-21		
	Scallops	4X,5Ze	Jul 28-Aug 8		
	Scallops	5Ze	May 12-Jun 6		
	Canada(Q)	Juvenile silver hake	4VWX	Jan 5-16	1981
		Squid	"	Jan 12-Feb 24	
		Ichthyoplankton	"	Jan 19-Feb 20	
		Multispecies studies	"	Feb 2-13	
		Mackerel	"	Feb	
		Groundfish	"	Feb 23-Apr 3	
		Larval herring	4X	Mar 2-20	
		Seals (areal)	4	Jan	
Large pelagics		6 and south	Feb, Mar		
Canada(Q)	Snow crab	4S	Jul-Aug	1980	
	Exploratory fishery, herring tagging	"	Sep 12-Oct 5		
	Acoustic - capelin	4T	Apr 28-May 7		
	Herring tagging	"	May 15-21		
	Snow crab	"	May 15-30		
	Spider crab	"	Jul-Aug		
	Crab	"	"		
	Juvenile herring	"	Aug 15-Sep 15		
Snow crab	"	Oct 1-16			
Denmark(G)	Groundfish and shrimp	1C,1D,1E	Feb, Mar, Apr, May, Nov, Dec	1980	
	Cod acoustic	1C,1D,1E	Feb, Mar, Apr		
	Capelin	1D	Feb, Mar, Nov, Dec		
	Shrimp trawl	1A,1B	Aug		
	Shrimp photo	1A,1B	Aug		
	Shrimp commercial - 24 hr studies on diurnal variation	1B	Jan-Jul, Sep, Nov		
	Plankton	1B,1C	Jul		
	Plankton	1D	Jan, Mar, Apr, Jun Jul, Sep, Nov		
Fed. Rep. Germany	Groundfish	1C-E	Apr 26-May 21	1980	
	"	1B-F	Jun 9-Jul 25		
	"	1B-F	Oct 20-Nov 19		
	Random stratified groundfish	2J	Nov 20-Dec 20		

Table 2. (Continued)

Country	Type of Survey	Area	Dates	Year
France	Cod	2J-3KL	Jan 29-Feb 27	1980
	"	3P-4R	Jan 7-27	
	Groundfish random-stratified	3Ps	Mar 1-25	
	Squid ( <i>Illex</i> ) random-stratified	4VWX	Aug 26-Sep 26	
	Groundfish and squid ( <i>Illex</i> ) random-stratified	3Ps	Sep 23-Oct 13	
	Cod tagging	3Ps	Oct 15-25	
	Scallops	3Ps	Oct 27-Nov 7	
German Dem. Rep.	Groundfish random-stratified	2GHJ	Oct-Nov	1980
USSR	Groundfish	2J+3K	Oct-Dec	1980
	Hydroacoustics	3LNO	May-Jun	
	Groundfish	3KLMNO	Mar-Jul	
	Groundfish (juvenile silver hake)	4VWX	Oct-Nov	
	Ichthyoplankton	"	Aug-Oct	
	"	5Ze	Apr-Sep	
USA	Groundfish (bottom trawl)	4X	Apr 30-8 May	1980
	" "	4X	Sep 8-19 Nov	
	" "	5YZ	Mar 29-8 May	
	" "	5YZ	Jul 11-22 Aug	
	" "	5YZ	Sep 8-19 Nov	
	" "	6ABC	Mar 13-10 Apr	
	" "	6ABC	Jul 11-22 Aug	
	" "	6ABC	Sep 8-19 Nov	
	Red crab assessment	5Z	May 6-9	
	Ocean quahog/surf clam assessment	5Z-6ABC	Jan 3-10 Feb	
	" " " "	5Z-6ABC	Aug 18-3 Sep	
	Scallop assessment	5Z	May 19-21 Jun	
	" "	6ABC	May 19-2 Jul	
	Gear test (bottom trawl)	5Z	May 9-16	
	" " "	5Z	Jun 27-3 Jul	
	" " "	5Z	Jul 7-9	
	" " "	5Z	Nov 24-29	
	Ichthyoplankton	4,5,6	Feb 27-5 Apr	
	"	4,5,6	May 21-20 Jun	
	"	4,5,6	Sep 24-29 Oct	
Ichthyoplankton	4,5,6	Feb 13-19 Mar	1981	
"	4,5,6	Mar 17-16 Apr		
"	4,5,6	May 20-26 Jun		
Gear test (bottom trawl)	5Z	Jan 5-31		
Groundfish (bottom trawl)	4X	Mar 12-16 May		
" "	5YZ	Mar 12-16 May		
" "	6ABC	Mar 12-16 May		
Red crab assessment	5Z	Mar 23-13 Apr		

NOTE: Canada(N) and Poland surveys to be added when received.

4. Review of Survey Stratification Schemes

Danish scientists reported that the stratification scheme for groundfish surveys in Subarea 1 was being revised and that documentation would be available in the near future. No other revisions to stratification schemes were reported.

5. Progress in Improving Survey Methods (SCR Doc. 80/II/44)

STACREC noted that a paper entitled "Modelling of fish schools for calibration of the echo integrator" had been discussed by STACFIS at the February 1980 Meeting. No further contributions were presented at this meeting.

6. Feasibility of Developing Common Species Codes for Survey Data

The Assistant Executive Secretary reported that laboratories in Canada, Federal Republic of Germany, France, Italy, Poland, USSR and USA replied to his request for information on survey data coding schemes. He indicated that those with no codes who contemplated using the FAO 3-alpha species identifiers will find that there is no provision for many species of no commercial importance. Participants from the laboratories at St. Andrews, N. B., St. John's, Nfld., and Woods Hole, USA, indicated that, although the codes for processing research vessel survey data were under revision at their respective laboratories, standardization between laboratories did not appear feasible due to considerations of national coordination (in the case of Woods Hole) and considerations of limiting changes to minimize the cost of adjusting existing data files.

The Committee considered that universal standardization of codes for survey data was not feasible at the present time and therefore examined the possibility of using a translation program and coding scheme designed for data exchange only. Participating scientists reported that exchange of survey data has consisted of some unprocessed data and final products only. The Assistant Executive Secretary indicated that a coding system and translation programs would be necessary if the NAFO Secretariat were to establish a survey data base. The Committee concluded that no further action should be taken on the development of this coding system at the present time, but that the issue could be reopened in the context of a NAFO survey data base at a later time.

7. Special Survey Needs

a) Intensification of surveys for cod stocks in Div. 3M, 3N and 3O

The Committee observed that the intensity of surveys in Div. 3M, 3N and 3O had increased since 1978, and therefore

recommends

*that the effectiveness of the existing survey activity for cod in Div. 3M, 3N and 3O be evaluated in order to determine future survey needs in these divisions.*

b) Status of shrimp surveys in Subareas 0 and 1

Danish scientists reported that the 1978 recommendation of STACRES regarding the need for extensive trawl and photographic surveys in Subareas 0 and 1 (*ICNAF Redbook 1979*, page 20) had been implemented with regard to the photographic surveys in Subarea 1 but that expansion of the trawl surveys which could not be undertaken has been deferred to 1981. France reported that a trawl survey for shrimp in Subareas 0 and 1 had been carried out in 1979 but that no comparable survey is planned for 1980.

III. ENVIRONMENTAL STUDIES

1. Review of Environmental Survey Work for 1979

The Committee was informed that the absence of a summary report on environmental conditions in 1979 by MEDS was due to misunderstanding that the item would be considered at the September 1980 Meeting. However, a preliminary review of environmental data, derived from the available documentation, indicated the following trends.

a) Subarea 0 (SCS Doc. 80/VI/22)

Survey work reported by France indicated a correlation between the thermic structures and the distribution of the northern deepwater shrimp.

b) Subarea 1 (SCR Doc. 80/VI/58; SCS Doc. 80/VI/17, 22)

Survey work, reported by Denmark, France and Federal Republic of Germany, generally showed relatively high water temperatures in 1979, both on Fylla Bank and in the deeper areas west of the bank. Despite the relatively warm water in 1979, the volume of plankton in the Fylla Bank section was less than in 1978 when temperatures were considerably lower. Ice conditions in the subarea were close to or slightly less than normal. Relationships between water temperatures and the distribution of shrimp were also shown for this subarea.

c) Subarea 2 (SCR Doc. 80/VI/58, 59, 60, 102, 103; SCS Doc. 80/VI/18, 19)

Survey work, reported by Canada, Federal Republic of Germany, German Democratic Republic and

USSR, indicated that thermal conditions during much of 1979 did not depart significantly from normal. However, temperatures in the 50-200 m layer in November appeared to be slightly lower than in the corresponding period in 1978. USSR researches indicated that fluctuations in water temperature in the Northwest Atlantic are inversely correlated with those of the Barents Sea. Of particular interest, as well, is the forecast that negative water temperature anomalies will occur in the Seal Island section in 1981.

d) Subarea 3 (SCR Doc. 80/VI/59, 60; SCS Doc. 80/VI/18, 22)

Survey work reported by Canada, France and USSR showed that April water temperatures in Div. 3K, 3L, 3M and 3N were about 1°C lower in 1979 than in 1978. Extensive ichthyoplankton sampling was carried out by USSR. Extensive hydrographic data was also collected in the Flemish Cap area (Div. 3M) and is reported by the Working Group on the Flemish Cap Project (SCS Doc. 80/VI/9).

e) Subarea 4 (SCR Doc. 80/VI/68; SCS Doc. 80/VI/18, 22)

Survey work was noted in documents by France, USA and USSR and reported verbally by Canada. USA observations from monthly maps of surface water temperature showed colder-than-average water from Cape Hatteras to Nova Scotia in February, associated with below-normal air temperature. This pattern disintegrated in April and by June warm temperature anomalies were present between 41°N and 46°N. USSR observations from July to November indicated that subsurface water temperatures on the Scotian Shelf were 2-3°C lower than in 1978, with a strong cline in surface temperature from southwest to northeast. Joint USSR-Canadian ecological surveys were continued in August-September and the ichthyoplankton and zooplankton samples and hydrographic measurements from these surveys are being processed. The Scotian Shelf Ichthyoplankton Program continued for its third year with 8 survey cruises. Measurements of surface currents off southwest Nova Scotia indicate excursions of shelf water related to the passage of Gulf Stream eddies.

f) Subarea 5 (SCR Doc. 80/VI/64, 65, 66, 67, 68, 93, 104)

Survey work was noted in documents by Federal Republic of Germany, German Democratic Republic and USA and reported verbally by Canada and Poland. Contoured diagrams of bottom temperatures from vertical temperature sections showed that the timing of maximum bottom temperatures in 1979 was similar to that in 1978 but later than in 1974-77. Temperatures at bottom depths of 200-400 m were generally similar to those in 1977 but about 1°C higher than in 1978. USA studies on warm-core eddies indicated that they could be clearly detected by the presence of high water temperature and changes in the shelf-slope front at the bottom. Simultaneous observations on two eddies were made from fishing vessels. Poorly-defined eddies having strong currents associated with them were observed. Eddy production in 1979 was higher than in the preceding 5 years.

2. MEDS Progress Report for 1979

STACREC agreed to defer this agenda item for consideration at the September 1980 Meeting when the report by MEDS will be available. STACREC also agreed that provision be made under this agenda item to include a summary review of environmental conditions in 1979. It was suggested that Dr R. Trites (Canada) be asked to assist MEDS in preparing this summary report.

3. Report of Working Group on the Flemish Cap Project (SCS Doc. 80/VI/9)

STACREC reviewed the report of the January 1980 Meeting of the Working Group, noting in particular that a number of moored current meters, together with guard buoys, had been lost in the Flemish Cap area, presumably through fishing activity. In an attempt to avoid the recurrence of this sort of problem, STACREC

recommends

*that the Fisheries Commission consider how the fishing fleets might best be made aware of the location of moored scientific equipment in the NAFO Area.*

STACREC noted that a number of papers relevant to the Flemish Cap Project are scheduled for completion in September, and agreed that the Working Group on the Flemish Cap Project meet during the September 1980 Meeting of the Scientific Council.

The Committee noted a most useful document on the identification of species from the ichthyoplankton of Subarea 3 (SCR Doc. 80/VI/90) and commended it to the Flemish Cap Working Group.

4. Report of Task Force on the Larval Herring Program in Gulf of Maine-Georges Bank Area (SCS Doc. 80/VI/16)

The Committee reviewed the preliminary report of the Task Force on the Larval Herring Program, noting that a more comprehensive review of the data was planned for September 1980. Accordingly, STACREC

recommends

*that the Task Force on the Larval Herring Program should meet on 3-4 September 1980, in conjunction with the Scientific Council Meeting at St. John's, Newfoundland, to review further the analyses of the time series of larval herring data and to evaluate the data base with emphasis on factors affecting the recruitment process of herring.*

It was suggested that the results of the Environmental Working Group at its meeting in Aberdeen, Scotland, in 1975 (ICNAF Redbook 1975, pages 95-108) could be used as a standard, specifically for comparison of progress to date in the evaluation of hypotheses on factors influencing recruitment in sea herring (SCS Doc. 80/VI/16, Task Force Recommendation No. 4).

5. Status of Other Cooperative Research Projects

a) Distribution of larval and juvenile *Illex*

A USSR study (SCR Doc. 80/VI/98) suggested a close relationship between the distribution of larval and juvenile *Illex* and the water masses extending from the edge of the continental shelf to the northern edge of the Gulf Stream. It was pointed out, however, that the figures used in this paper do not correspond with Canadian figures derived from the same data. It was suggested that Canadian and USSR scientists should review the data used in this paper to resolve any discrepancies.

In view of the Scientific Council recommendations for squid research (SCS Doc. 80/II/1), STACREC considers that the surveys conducted by more than one country should be coordinated to study the distribution of larval and juvenile *Illex* and the influence of environmental conditions on distribution and abundance. Therefore, STACREC agreed to establish an *ad hoc* working group, consisting of oceanographers and other relevant disciplines, with Mr T. Rowell (Canada) as Convener, to consider and develop a coordinated research program for investigating these problems.

The Working Group met briefly to examine the status of cooperative studies on *Illex* and arrived at the following conclusions:

- i) Coordinated surveys should be conducted throughout Subareas 3 to 6 to determine the distribution of larval and juvenile *Illex* on and off the continental shelf. The surveys should be carried out during the late-winter to late-spring period and should include the collection of all relevant oceanographic data. The surveys should be integrated with currently ongoing survey programs such as MARMAP, Ocean Pulse, Groundfish, etc.
- ii) The following table indicates the possible research vessel availability and disposition throughout the area for 1981.

Period	Duration	Vessel (Country)	Subareas	Research
Jan-Feb	4-6 weeks	<i>Albatross</i> (USA)	5+6	MARMAP on-shelf and possible extension to off-shelf areas
Feb-Mar	3 weeks	<i>Gadus Atlantica</i> (Canada)	3	Larval and juvenile survey, shelf edge to Gulf Stream
Feb-Mar	6 weeks	<i>A. T. Cameron</i> (Canada)	4	" "
Feb-Jun	16 weeks	1 vessel (USSR)	3+4	" "
May	4 weeks	1 vessel (Japan)	3+4	Juvenile survey on and off the shelf
May-Jun	3 weeks	1 vessel (Canada)	3	" "

It is apparent that Subareas 5 and 6 will not be sufficiently covered without realignment of available vessel time or the commitment of additional vessel time. It is possible that other programs, such as MARMAP, Ocean Pulse and Groundfish surveys conducted by USA may be

capable of providing such additional requirements. It is advised that all member countries planning research vessel activity in the area should consider their possible involvement in the program.

STACREC agreed that an appropriate time to consider these matters would be at the time of the September 1980 Meeting of the Scientific Council, and urged that scientists involved in the program should be prepared to discuss and finalize details for standardization of survey design, survey equipment, data collection and data exchange. Accordingly, STACREC

recommends

*that a special 2-day meeting of the ad hoc Working Group on Coordination of Squid Research, with Mr T. Rowell (Canada) as Convener, be scheduled immediately before the September 1980 Scientific Council Meeting at St. John's, Newfoundland, to consider final vessel availability and program planning relating to the surveys for larval and juvenile Illex in 1981.*

6. Other Matters Relevant to Environmental Studies

a) Review of relevant documents (SCR Doc. 80/VI/60, 111)

The Committee reviewed two contributions, which are concerned with identifying suitable models and methods describing the empirical and theoretical relationships that may exist between fish stock, environment and recruitment. In the paper by V. A. Borovkov (SCR Doc. 80/VI/60), a hypothesis is outlined on the influence of atmospheric circulation on the thermal and dynamic condition of the Labrador Current and its possible effect on year-class strength of the Labrador cod stock. An analysis, based on available relevant records and the assumption that the strength of year-classes is primarily influenced by environmental conditions within the period of embryonic development and early larval stages before active feeding, resulted in the construction of a regression model aimed at tentatively predicting the recruitment of cod 4 to 5 years in advance.

The contribution by R. C. Hennemuth, J. E. Palmer and B. E. Brown (SCR Doc. 80/VI/111) contains a statistical description of recruitment in 18 selected stocks by examining them empirically as to frequency distribution which subsume the total effect of all factors (including environmental factors) influencing the process of recruitment. This review of recruitment data indicates that a hard line cannot be drawn distinguishing pelagic and demersal stocks on the basis of recruitment variability or the presence of dominant year-classes. Furthermore, there are great similarities in the probability distribution functions of widely differing stocks. The approach of studying these functions as more data are accumulated may provide useful guidelines in understanding the influence of recruitment on fish population and fisheries.

b) Proposed topics for future consideration

The Committee noted with great interest that the development and increasing use of remote sensing methods (e.g. satellite-tracked buoys, etc.) for continuously registering various marine environmental factors (conditions) may also provide possible applications in the field of fishery science. In order to obtain more information about these new techniques, STACREC

recommends

*that a special session with invited lectures on remote sensing methods and their possible application to fishery science be arranged during the meeting of the Scientific Council in September 1981, and that Dr R. Trites be asked to convene this session.*

The Committee noted the desirability of documenting a review of environmental conditions for the 1970-79 period, and

recommends

*that a special session to review environmental conditions in the 1970-79 decade be held at the time of the September 1981 Meeting of the Scientific Council, and that a convener be appointed at the forthcoming September 1980 Meeting of the Council.*



#### IV. TAGGING ACTIVITIES

##### 1. Review of Tagging Activities in 1979

Tagging activities in 1979, as reported to the Secretariat, were reviewed (SCS Doc. 80/VI/7). It was also noted that the document contained a list of USSR activities in 1976-78. Several members of the Committee indicated that they found this type of compilation very useful and urged that the previously-agreed procedure of reporting tagging activities to the Secretariat for information and distribution to other member countries be continued.

#### V. OTHER MATTERS

##### 1. Adjournment

The Chairman expressed his appreciation to Dr W. G. Doubleday and Mr E. J. Sandeman for convening the sessions dealing with biological surveys and environmental studies, and to Mr J. S. Beckett and Mr T. Rowell for convening working group sessions on the scientific observer program and on squid research. He thanked the rapporteurs and all participants for their cooperation during the meeting, and to the Secretariat for their usual efficient work.

ANNEX 1. REPORT OF AD HOC WORKING GROUP ON THE INTERNATIONAL SCIENTIFIC OBSERVER PROGRAM

Convener: J. S. Beckett (Canada)

The Working Group, with participation by representatives of Canada, European Economic Community and Poland, and the Chairman of the Scientific Council, met on 2 June 1980 at NAFO Headquarters, Dartmouth, Nova Scotia, to fulfil its mandate from the 1979 Annual Meeting regarding the development of specific requirements for data collection (*NAFO Proc.* 1979, page 115). The Convener noted that the timing of the meeting, originally scheduled to be held during the time of the February 1980 Meeting of the Scientific Council, was deferred at the request of Canada.

The Working Group took notice of its terms of reference and agreed to use them as the basis of its agenda. These were (i) to review recent sampling data collection and identify specific data needs by stock and area; (ii) to recommend what data should be collected, as a minimum, by an observer on board a vessel, and to identify other data that could be collected should the particular situation permit, with due attention to the need to avoid revealing details on the commercial aspects of fishing operations; (iii) to develop the format of data collection; and (iv) to recommend procedures for the transmittal and dissemination of the scientific data.

1. Review of Recent Data and Identification of Specific Needs

The Working Group examined the analyses of sampling efficiency for 1978 data, prepared by the Secretariat (SCS Doc. 80/VI/13), and noted that, whereas the level of sampling on an aggregated basis might appear to have exceeded the minimum level established some years ago by STACRES (*ICNAF Redbook* 1974, page 71), there were in fact major deficiencies in many stock/vessel class/country/quarter categories. It was apparent that these deficiencies reflected, in many cases, the difficulties of assigning national scientific observers to the fishing fleets on a year-long basis. Taking into account the bilateral nature of the international observer scheme, the Working Group

recommends

*that bilateral parties involved in the International Observer Program identify the appropriate fisheries to be covered.*

2. Data to be Collected

The data collected are to be used for scientific purposes only. Access to relevant fishing records and the cooperation of the vessel's crew will be necessary for the observer to collect these data.

a) Vessel identification

There was considerable discussion as to whether vessels should be identified on the data sheets. It appeared that such identification would not cause problems because the data are to be used strictly for scientific purposes. However, it was agreed that, if identification becomes a difficulty in gaining acceptability of the record forms, vessel characteristics (tonnage, length and horsepower) should be substituted.

b) Fishing gear

The gear used should be identified by type using the NAFO abbreviations, particular attention being given to special modifications. It was suggested that "off-bottom" trawls should be identified by the provision of appropriate coding.

c) Mesh size

The actual mesh size was recognized as an important element of the data and must be recorded. The use of a codend liner and the type of topside chafing gear should be recorded. For gears other than towed gears, the appropriate measure (e.g. hook size for line gears) will be substituted.

d) Set data

It was concluded that the observer should maintain a complete set record rather than only the data that might not be recorded in the fishing logs of the vessels, as the scientific analyses could be significantly delayed if the essential material was distributed between two separate data bases. The set record should include: the position, time and water depth at the start and end (when available) of each set; the fishing depth of the gear (different from bottom depth for such gears as midwater trawl and drift nets); the speed of tow; and other measures of fishing effort as applicable to the particular gear used.

e) Catch composition

Estimates of the catch by weight should be recorded for each species, together with estimates of the quantities reduced by species and discarded by species. The quantity reduced is especially important where vessel catch is calculated from production or where size sampling is only possible after the catch has been sorted into the portions to be processed and reduced and/or discarded.

f) Biological sampling

This should be carried out for all commercial species at a suggested frequency of one sample per day, irrespective of species. Recognizing that NAFO commercial fishery length and age sampling forms are not suitable for work ("tally") sheets, observers should be free to use the work forms to which they are accustomed prior to transferring the summed data to the NAFO forms. When it is not possible to sample the total catch, sampling of discards and fish destined for reduction, in addition to retained catches, should be sampled for length and age composition by species.

g) Other observations

The observer should record observations appropriate to a fuller understanding of the scientific data, including such items as gear handling techniques to increase escapement of small fish through the trawl meshes at the surface, comments on fish loss during hauling, observations on the viability of escaping and discarded fish, gear loss or damage if significant to catch rate considerations, and the presence of other fishing vessels. Some of these observations might be made directly on the set data sheets, whereas others of a more general nature might be included in a short summary report, prepared by the observer and copied (as with other data records) to the captain upon request. This report should note the general area of fishing activity, the number of observations made, and difficulties experienced in carrying out the purposes of the program due to vessel configuration, etc., particularly where suggestions can be made for the benefit of observers in similar future situations. The observer should also collect ancilliary scientific data, such as weather, water temperatures (if vessel equipped to measure), whale sightings, etc.

3. Format of Data Collection

A suggested data record for set details is appended (Attachment 1). Development of the final format should be coordinated by the Secretariat, and the instructions for completing the form should include the provision of a copy for the vessel's captain.

4. Procedures for Transmittal and Dissemination of the Data

Vessel captains are, under the program, entitled to obtain copies of whatever records they wish. The complete data record should be sent to the designated scientific institution in the country of the vessel. Biological sampling data should be sent to the NAFO Secretariat for incorporation in its data base. Length frequency data should be forwarded to the Secretariat within 60 days after the observer returns to his home base. Age-length keys should be received by the Secretariat as they become available but not later than 30 April of the year following the calendar year of collection. The responsibility for age reading should be included in the bilateral agreement.



NOTES FOR COMPLETION

In order to facilitate data-processing, it is essential that all of the information required for each sample be entered in the appropriate spaces on the form.

1. Year. Record the last digits of the calendar year in the space provided at the top of the form.
2. Country, Vessel name, Side number, and National registration number should always be recorded to ensure proper identification of the samples.
3. Gear. Record the appropriate abbreviation for the gear type used, based on the ICNAF Gear Classification for reporting sampling data. In the case of otter trawls used in certain fisheries (e.g. squid), special modifications to the gear (e.g. off-bottom chain, off-bottom bobbin, etc.) should be indicated in a note at the bottom of the form. The primary abbreviations are as follows:

OTB - Bottom otter trawl (side and stern	LL - Longlines (set)
OTM - Midwater otter trawl (side and stern	LHP - Handlines and pole-lines
PTB - Bottom pair trawl (2 boats)	FPN - Uncovered pound nets
PTM - Midwater pair trawl (2 boats)	FWR - Weirs, barriers, fences, etc.
SN - Seine net (Danish and Scottish seines)	DRB - Boat dredges
SB - Beach seines	HAR - Harpoons
PS - Purse seines	MISC - Miscellaneous (e.g. cast-nets and dip-nets)
GN - Gillnets (set and drift	
4. Mesh size. In the case of trawls, seine nets, gillnets and poundnets, record the actual mesh size; for line gears record the hook size; and for dredges record the ring size.
5. Chafer. Indicate type in use, if any, and whether a liner fitted.
6. Date. Record the month and day for each sample taken by observers at sea. In the case of port sampling on a trip basis, record the month and day of landing.
7. Time of set. Use Greenwich Mean Time.
8. NAFO Division. Record the appropriate division (or subdivision, where applicable).
9. Fishing depth (m). Indicate the mean fishing depth.
10. Species caught. Record the name of the species sampled, supplemented by the NAFO 3-alpha code.
11. Directed species. Indicate with check (✓) the species which was intended as directed catch.
12. L/A sample taken. Indicate whether a length (L) or age (A) sample was taken, and indicate number of fish sampled.

APPENDIX III. REPORT OF STANDING COMMITTEE ON PUBLICATIONS (STACPUB)

Chairman: R. G. Halliday

Rapporteur: V. M. Hodder

The Committee met at Dartmouth, Nova Scotia, Canada, in three sessions during 3-13 June 1980, to consider and report on matters referred to it by the Scientific Council (Agenda section D). The members in attendance were: J. Messtorff (EEC), J. P. Minet (EEC), A. T. Pinhorn (Canada), V. A. Rikhter (USSR), and A. Paciorkowski (Poland) was appointed to replace P. Kolarov (Bulgaria) who was not present at this meeting of the Council. The Chairman of the Scientific Council (R. H. Letacconnoux) also attended the sessions.

1. Consideration of Publication Requirements

a) Statistical Bulletin and Sampling Yearbook

The Committee reaffirmed its recommendations of the 1979 Annual Meeting that these publications be continued on a regular basis with the same color of cover and in the same general format as the corresponding ICNAF publications, except that they will be designated as NAFO publications, with a note on the title page of each indicating that previous volumes in the series were issued as ICNAF publications. The first issue of NAFO Statistical Bulletin will be Vol. 29 and the first issue of NAFO Sampling Yearbook will be Vol. 24, with revisions to their contents as agreed by STACREC.

b) List of Fishing Vessels

Noting the recommendation of STACREC that the triennial publication of this series should be continued, STACPUB agreed that the cover and general format should remain unchanged, except that it be designated as a NAFO publication starting with List of Fishing Vessels for 1980, to be issued in 1981. It was noted that the Fisheries Commission may wish to express its opinion on the content and propose some changes.

c) Reports of Scientific Council Meetings

The Committee agreed that the color of the cover (red) and the general format of presenting the reports should be continued as in the ICNAF Redbook series, except that it will be designated as a NAFO publication entitled "Scientific Council Report", which will be issued annually and contain the reports of all Scientific Council meetings held within the calendar year. Since this series will be issued in December of each year, the calendar year to which the reports apply is sufficient to identify each issue. The only exception will be the first issue which will contain the reports of all Scientific Council meetings held in 1979 and 1980. It was suggested that the list of participants should be arranged so that the participants can be identified with the particular meetings which they attended.

d) Other scientific publications and editorial policy relating to them

At the first Annual Meeting in June 1979, it was agreed that the Scientific Council of NAFO required publications which fulfilled the roles that the Research Bulletin, Selected Papers, and Special Publications played for STACRES of ICNAF, but all decisions on the nature and form of these publications were deferred to this Annual Meeting. In preliminary discussion, it was agreed that decisions on the successors to these ICNAF publications and on editorial policy were closely interrelated and should be considered together. Discussion centered on the nature of a suitable primary publication, but there was insufficient time at this meeting to make considered decisions on what were viewed as matters of great importance to the work of the Scientific Council. Consequently, it was agreed that STACPUB should meet again at the time of the September 1980 Meeting of the Council to resolve the question of publication policy and that the STACPUB members should come prepared to discuss the following matters:

- i) the sectors of the scientific community to be served by Scientific Council publications and hence the scope of a primary journal;
- ii) suitable titles for a primary and a secondary publication;
- iii) the suitability of various editorial arrangements;
- iv) scope of, and methods for, solicitation of papers;
- v) desirability and methods of expanding distribution; and

vi) factors affecting costs associated with the proposals brought forward.

As an interim measure, and noting that sufficient papers were now in hand for publication in 2-3 months, it was agreed that these should be published in an issue similar to the ICNAF Research Bulletin, continuing the numbering of that series but designating the issue as a NAFO publication.

2. Status of Working Papers

The Committee viewed with concern the continued practice of some scientists in presenting substantial data and analyses as working papers. It was emphasized that all data analyses relevant to the advice provided by the Scientific Council should be available for public viewing and therefore presented as research documents. Thus, the relevant research documents dealing with assessments and the report of the Scientific Council should be sufficient for providing the basis of reconstructing the final analyses on which the advice is based.

The Working Paper series, as initially intended, was established to provide a means for the rapid communication of ideas which emerge from the discussions during the meeting or of pieces of relevant information not otherwise contained in research documents. As such, working papers, because they are not available to the public, must not be referred to in meeting reports or in research documents. STACPUB strongly emphasizes that, if the working paper series is continued, there should be strict adherence to the purpose for which it was initially intended.

3. Papers Nominated for Possible Publication

The members of STACPUB individually reviewed all research documents presented to the November 1979, February 1980 and June 1980 Meetings of the Scientific Council. Following discussion on the merits of each, STACPUB requested the Secretariat to invite the authors of the following documents to submit suitably revised manuscripts for consideration with a view to possible publication in one of the NAFO publication series: SCR 79/XI/1; 80/II/1, 5, 22, 28, 29, 30; 80/VI/51, 71, 76, 77, 90, 97, 98, 99, 105, 112. It was noted that about half of these papers would require substantial revision, and that their acceptance for publication would ultimately depend on the quality of the revised manuscripts.

4. Adjournment

The Chairman thanked the Committee members for their interest and cooperation and expressed his appreciation to the support rendered by the Secretariat.

APPENDIX IV. RULES OF PROCEDURE FOR THE SCIENTIFIC COUNCIL (REVISED ON 13 JUNE 1980)

REPRESENTATION

Rule 1

- 1.1 Each Contracting Party shall notify the Executive Secretary as far as possible in advance of any meeting of the names of its representatives, alternates, experts and advisers who will attend.
- 1.2 The Scientific Council may invite any non-Member Government and any international, public or private, organization to be represented at meetings of the Scientific Council or its subsidiary bodies by an observer or observers.

VOTING

Rule 2

- 2.1 Observers, experts and advisers may address plenary or subsidiary body meetings, but shall not be entitled to vote under Article X, paragraph 2.
- 2.2 Votes, in accordance with Article X, paragraph 2, shall be taken by a show of hands, by roll call, in the English alphabetical order of the names of the Contracting Parties, or by ballot, as determined by the Chairman.
- 2.3 In the case of an emergency between meetings, a vote may be taken by mail or other means of communication.

CHAIRMAN AND VICE-CHAIRMAN

Rule 3

- 3.1 The Chairman and Vice-Chairman shall take office at the conclusion of the annual meeting at which they are elected.
- 3.2 The powers and duties of the Chairman shall be:
  - a) to declare the opening and closing of each meeting;
  - b) to preside at meetings;
  - c) to rule on points of order, subject to the right of any representative to request that any ruling of the Chairman shall be submitted to the Scientific Council for decision by vote;
  - d) to call for and announce the results of votes, under Article X, paragraph 2;
  - e) to determine, after consultation with the Executive Secretary, the provisional agenda for the annual and special meetings;
  - f) to arrange for the appointment of the members of subsidiary bodies as required;
  - g) to sign a report of the proceedings of each meeting of the Scientific Council, for transmission to Contracting Parties, their representatives, and others concerned;
  - h) generally, to make such decisions and give such directions to the Executive Secretary as will ensure, especially in the interval between meetings, that the business of the Scientific Council is carried out efficiently and in accordance with the decisions; and
  - i) to act as Chairman of the Executive Committee.
- 3.3 The powers and duties of the Vice-Chairman shall be:
  - a) to exercise the powers and duties prescribed for the Chairman when he is unable to act; and
  - b) to act as Chairman of the Publications Committee.
- 3.4 If the office of the Chairman is vacated, the Vice-Chairman shall become Chairman for the balance of the term.
- 3.5 The Chairman, or Vice-Chairman when acting as Chairman, shall not vote under Article X, paragraph 2, and another representative of his delegation shall exercise this function.
- 3.6 If the offices of the Chairman and Vice-Chairman are vacated, the Chairman of the Standing Committee on Fisheries Science shall exercise the powers and duties prescribed for the Chairman, and the first order of business at the next meeting shall be the election of a Chairman and Vice-Chairman for the balance of the term.



ORDER OF BUSINESS

Rule 4

- 4.1 A provisional agenda for each annual or special meeting of the Council or any of its subsidiary bodies shall be prepared by the Executive Secretary, in accordance with the instructions from the Chairman, or the Chairman of the relevant subsidiary body, and be dispatched by the Executive Secretary to all Contracting Parties, their representatives, and invited observers, not less than 60 days before the date fixed for the opening of the meeting.
- 4.2 Except as provided in paragraph 4.3, the subject matter of a request for scientific advice from a coastal state, in accordance with Article VII, or from the Fisheries Commission, in accordance with Article VIII, shall be included in the provisional agenda for the relevant meeting of the Scientific Council. A memorandum containing the terms of reference prescribed in Article VII shall be circulated by the Executive Secretary to the representatives of all Contracting Parties, together with the corresponding provisional agenda.
- 4.3 The Scientific Council, by unanimous vote, may waive the necessity of the 60-day advance notice of the subject matter of a request for scientific advice.

COMMITTEES

Rule 5

- 5.1 There shall be the following standing committees:
  - a) The Standing Committee on Fisheries Science which shall:
    - i) provide a forum for consultation and cooperation among the Contracting Parties with respect to the study, appraisal and exchange of scientific information and views relating to the fisheries of the Convention Area, including environmental and ecological factors affecting these fisheries; and
    - ii) provide scientific advice as required, in accordance with the provisions of Article VI(c) and VI(d) of the Convention.
  - b) The Standing Committee on Research Coordination which shall:
    - i) develop and recommend to the Scientific Council policies and procedures for the collection, compilation, and dissemination of statistical and sampling information on the living resources and fisheries of the Convention Area and environmental information from oceanographic investigations;
    - ii) coordinate the compilation and maintenance of statistics and records and their dissemination, including liaison with coastal states in the Convention Area;
    - iii) coordinate the planning and execution of international cooperative research in cooperation with coastal states in the Convention Area; and
    - iv) encourage and promote cooperation among the Contracting Parties in scientific research designed to fill gaps in knowledge pertaining to matters identified by the Standing Committee on Fisheries Science.
  - c) The Standing Committee on Publications which shall:
    - i) develop, coordinate and keep under review the publication and editorial policy and procedures of the Scientific Council and make recommendations thereto on these matters; and
    - ii) be chaired by the Vice-Chairman, and consist of five other members appointed by the Scientific Council.
- 5.2 Except as provided in paragraph 5.1, each Standing Committee shall consist of scientists, one from each Contracting Party, who may be assisted by experts and advisers, and have a Chairman who shall be elected by the Scientific Council, in accordance with the provisions of Article X, paragraph 2, to serve for two years. The Executive Secretary shall be an *ex officio* member, without vote.
- 5.3 There shall be an Executive Committee, composed of the Chairman and Vice-Chairman of the Scientific Council and the Chairmen of the Standing Committees. The Executive Secretary shall be an *ex officio* member of the Executive Committee. This Committee shall keep under general review the planning and execution of the Scientific Council's program and ensure that the Scientific Council's organization effectively and efficiently meets the needs of the scientific program, facilitate coordination with other organizations, and provide advice to the Chairman of the Scientific Council on

- a) the timetable for the work of the Committees and Working Groups, and
  - b) input by the Scientific Council to the work of the General Council.
- 5.4 The Scientific Council may establish such other subsidiary bodies as required.
- 5.5 Except as provided in these Rules, each subsidiary body shall establish its own Rules of Procedure.

SECRETARIAT

Rule 6

- 6.1 The Scientific Council and its subsidiary bodies shall, in the exercise of their functions and duties, use the services of the Secretariat.
- 6.2 The Executive Secretary shall prepare and transmit the provisional agendas in accordance with Rule 4.1.
- 6.3 The Executive Secretary shall receive the credentials of representatives and observers at annual and special meetings and report thereon to the Scientific Council as required.

LANGUAGE

Rule 7

- 7.1 English shall be the official and working language of the Scientific Council and its subsidiary bodies, but, if desired, any other language may be used, on condition that persons doing so will provide interpreters. All official publications and communications of the Scientific Council shall be in English.

RECORDS AND REPORTS

Rule 8

- 8.1 Summary records of each plenary and other session shall be drafted and distributed as soon as possible to the participants by the Executive Secretary.
- 8.2 Summary minutes of the proceedings of the meetings of all subsidiary bodies shall be furnished to the Scientific Council by the Executive Secretary.
- 8.3 Summary records, reports, resolutions, recommendations, and other decisions adopted shall be transmitted as soon as possible after each meeting to the Contracting Parties, their representatives, and observers, by the Executive Secretary.
- 8.4 An annual report containing the proceedings of each meeting of the Scientific Council, together with reports of all subsidiary bodies, and such other information as considered desirable, shall be prepared by the Chairman, in consultation with the Executive Secretary, and published.

FINANCIAL

Rule 9

- 9.1 The Scientific Council shall not incur any expenditure except in accordance with a budget approved by the General Council.

APPENDIX V. AGENDA OF JUNE 1980 MEETING OF SCIENTIFIC COUNCIL

- A. Opening (Chairman: MR R. H. Letaconnoux)
1. Appointment of rapporteurs
  2. Adoption of agenda
  3. Plan of work
  4. Election of Vice-Chairman, following resignation of Dr A. S. Seliverstov
- B. Fisheries Science (Chairman of STACFIS: Dr G. H. Winters)
1. General review of catches and fishing activity in 1979
  2. Stock Assessments
    - a) Stocks lying completely outside the Canadian 200-mile fishery zone in Subarea 3, as required by the Fisheries Commission:
      - i) Cod (3M)
      - ii) Redfish (3M)
      - iii) American plaice (3M)
    - b) Stocks lying within or partly within the Canadian 200-mile fishery zone in Subareas 2, 3 and 4 for which advice on the scientific basis for management in 1981 has been requested by Canada (Annex 1):
      - i) Cod (2J+3KL, 3NO)
      - ii) Redfish (3LN)
      - iii) Silver hake (4VWX)
      - iv) American plaice (3LNO)
      - v) Witch flounder (2J+3KL, 3NO)
      - vi) Yellowtail flounder (3LNO)
      - vii) Greenland halibut (2+3KL)
      - viii) Roundnose grenadier (2+3)
      - ix) Argentine (4VWX)
      - x) Capelin (2+3K, 3LNO)
      - xi) Squid-*Illex* (3+4)
    - c) Stocks within the EEC fishery zone in Subarea 1 for which advice on the scientific basis for management in 1981 has been requested by the EEC (Annex 2):
      - i) Cod (1)
      - ii) Redfish (1)
      - iii) Wolffish (1)
    - d) Stocks overlapping the Canadian and EEC fishery zones in Subareas 0 and 1 for which advice on the scientific basis for management in 1981 has been requested by Canada and the EEC (Annex 1 and 2):
      - i) Greenland halibut (0+1)
      - ii) Roundnose grenadier (0+1)
      - iii) Shrimp (0+1)
    - e) Other matters relevant to assessments
      - i) Uniform mesh size for silver hake and squid fisheries in Subarea 4 (*ICNAF Redbook* 1979, page 51 and 83)
      - ii) Commencement date for squid fishery in Subareas 3 and 4 (*ICNAF Redbook* 1979, page 59; SCS Doc. 80/II/1, page 21)
  3. Gear and Selectivity
    - a) Selection studies on silver hake and squid-*Illex* (*ICNAF Redbook* 1979, page 51)

- b) Selection studies on Greenland halibut (*ICNAF Redbook* 1979, page 57)
  - c) Other selectivity studies
  - d) Gear studies
4. Ageing Techniques and Validation Studies
- a) Further progress on ageing silver hake
  - b) Guidelines for cod otolith interpretation
  - c) Further progress on ageing squid from statoliths
  - d) Progress in redfish age validation studies
  - e) Ageing and validation studies on other species
5. Fisheries Science Items for Consideration at future meetings of the Scientific Council
- a) Larval herring studies in Gulf of Maine-Georges Bank area, 1970-79
  - b) Evaluation of the scientific advice provided for management of the Northwest Atlantic fish stocks, with particular reference to cod
  - c) Review of Flemish Cap research program
  - d) Review of environmental conditions, 1970-79
6. Other Matters
- C. Research Coordination (Chairman of STACREC: Dr A. S. Seliverstov)
1. Statistics and Sampling
- a) CWP activities relevant to NAFO
    - i) Operation of the STATLANT system
    - ii) Development of standard world list of 3-alpha species identifiers
    - iii) Compendium of statistical standards for fishing vessels, fishing gear and fishing effort
    - iv) Conversion factors
    - v) Agenda for 10th session of CWP
  - b) Fishery statistics
    - i) Problems relating to acquisition of 1977 and 1978 fishery statistics and effect on publication of Statistical Bulletin
    - ii) Adequacy of national reporting
      - advance statistics for mid-term assessments
      - STATLANT 21A and 21B reports
    - iii) Review of statistical requirements
    - iv) Review of data processing procedures
    - v) Consideration of tabular format for NAFO Statistical Bulletin
  - c) Sampling program
    - i) Implementation of sampling data base
    - ii) Status of Sampling Yearbook for 1977
    - iii) Efficiency of sampling in 1978
    - iv) Acquisition of Greenland halibut sampling data for previous years
    - v) Partial length measurement for grenadiers
    - vi) Review of reporting requirements for sampling data (Forms CF-1 and CF-2)
    - vii) Acquisition and processing of detailed 1979 data
  - d) Reports on national statistical systems
  - e) Scientific observer program (Working Group Convener: Mr J. Beckett)

- f) List of fishing vessels for 1977 and 1980
- g) Other matters

2. Biological Surveys

- a) Review of survey activity in 1979 and proposed surveys in 1980
- b) Review of proposed manual on groundfish surveys (revised draft to be prepared by the editor)
- c) Review of survey stratification schemes
- d) Progress in improving survey methods
- e) Feasibility of developing common species codes for survey data
- f) Special survey needs
  - i) Intensification of surveys for cod stocks in Div. 3M, 3N and 3O
  - ii) Status of shrimp surveys in Subareas 0 and 1
- g) Other matters

3. Environmental Studies

- a) Review of environmental conditions in 1979
- b) Review of MEDS progress report for 1979/80
  - i) Inventory of 1979 oceanographic data
  - ii) Data received and processed for 1979
  - iii) Progress in acquiring USSR historical data for 1975
  - iv) Involvement with Flemish Cap Project
  - v) National representatives for reporting oceanographic data to MEDS
- c) Report of Flemish Cap Working Group regarding detailed plans for a well coordinated research program for 1980, and progress to date in implementing the 1980 program
- d) Preliminary review of report of Task Force on Larval Herring Program relating to recommendations and plans for future research in Gulf of Maine-Georges Bank area
- e) Status of other cooperative research projects (e.g. off-shelf distribution of larval and juvenile *Illex*)
- f) Other matters

4. Review of Tagging Activities

- a) Report on tagging activities in 1979
- b) Other studies

5. Other Matters

D. Publications (Chairman of STACPUB: Dr R. G. Halliday)

1. Consideration of Publication Requirements

- a) Statistical Bulletin (Vol. 29 for 1979)
- b) Sampling Yearbook (Vol. 24 for 1979)
- c) Selected Papers
- d) Research Bulletin
- e) List of Fishing Vessels
- f) Reports of Scientific Council Meetings (Redbook?)

2. Editorial Policy Relating to Publications
  3. Other Matters
- E. Collaboration with Other Organizations
1. NAFO Participation in 10th Session of CWP (July 1980)
  2. Proposed ICNAF/ICES study on redfish in West and East Greenland areas (objectives, terms of reference, etc.)
- F. Review of Rules of Procedure (SCS Doc. 80/VI/2)
- G. Adoption of Committee Reports
1. Standing Committee on Fisheries Science
  2. Standing Committee on Research Coordination
  3. Standing Committee on Publications
- H. Future Scientific Meetings
- I. Other Business
1. Approval of Report of February 1980 Meeting
- J. Adjournment

Canadian Request for Advice on the Scientific Basis for Management  
in 1981 of Certain Stocks in Subareas 0 to 4

Canada requests that the Scientific Council, at its meeting in advance of the 1980 NAFO Annual Meeting, provide advice on the scientific basis for management of the following stocks in 1981:

Cod (Div. 2J and 3KL; Div. 3N and 3O)  
Redfish (Div. 3N and 3O)  
American plaice (Div. 3L, 3N and 3O)  
Witch flounder (Div. 2J, 3K and 3L; Div. 3N and 3O)  
Yellowtail flounder (Div. 3L, 3N and 3O)  
Greenland halibut (Subarea 2 and Div. 3KL)  
Roundnose grenadier (Subareas 2 and 3)  
Silver hake (Div. 4V, 4W and 4X)  
Argentine (Div. 4V, 4W and 4X)  
Capelin (Subarea 2 and Div. 3K; Div. 3LNO)  
Squid (Subareas 3 and 4)

It is further suggested that, subject to the concurrence of the other coastal state concerned, the Scientific Council, prior to the 1980 Annual Meeting of NAFO, provide advice on the scientific basis for management in 1981 of the following stocks:

Shrimp (Subareas 0 and 1)  
Greenland halibut (Subareas 0 and 1)  
Roundnose grenadier (Subareas 0 and 1)

Although capelin (2+3K and 3LNO stocks) and squid (Subareas 3-4) were considered at the February 1980 Meeting of the Scientific Council, it is requested that the Standing Committee on Fisheries Science, at its June 1980 Meeting, consider whether the analyses conducted in February are sufficient to provide the basis for advice on management in 1981 and whether reconsideration of the status of these stocks after completion of the 1980 fishery, but in advance of the 1981 fishery, would provide significant improvements in the basis for advice on management.

Canada requests the Scientific Council to consider the following options in assessing and projecting future stock levels for those stocks listed above and for the Flemish Cap (Div. 3M) stocks:

- a) For those stocks subject to analytical dynamic-pool type assessments, the status of the stock should be reviewed and management options evaluated in terms of their implications of fishable stock size in both the short and the long term. In those cases where present spawning stock size is a matter of scientific concern in relation to the continuing productive potential of the stock, management options should be evaluated in relation to spawning stock size. As a general reference point, the implications of continuing to fish at  $F_{0.1}$  in 1981 and subsequent years should be evaluated. The present stock size should be described in relation to those observed historically and to those to be expected at the  $F_{0.1}$  level. Management options for arriving at the latter stock size on a shorter time scale should be developed. Opinions of the Scientific Council should be expressed in regard to stock sizes, catch rates, and TACs implied by these management strategies for 1981 and the long term.
- b) For those stocks subject to general production-type assessments, the status of the stock should be reviewed and management options evaluated in the way described above to the extent possible. In this case, the general reference point should be the level of fishing effort ( $\Xi F$ ) which is two-thirds that calculated to be required to take the MSY catch in the long term.
- c) For those resources on which only general biological and/or catch data are available, no standard criteria on which to base advice can be established. The evidence on stock status should, however, be weighed against a strategy of optimum yield management and maintenance of stock biomass at levels of about two-thirds that of the virgin stock.

8 April 1980

Dr A. W. May  
Assistant Deputy Minister for Atlantic Fisheries  
Department of Fisheries and Oceans  
Ottawa, Canada

EEC Request for Advice on the Scientific Basis for Management  
in 1981 of Certain Stocks in Subareas 0 and 1

The EEC requests the Scientific Council to provide advice for the following stocks, subject to the concurrence of the other coastal state concerned in the case of joint stocks:

- a) Stocks occurring both in the EEC and Canadian fisheries zones: Greenland halibut, roundnose grenadier, and shrimp in Subareas 0 and 1.
- b) Stocks occurring in the EEC fishery zone: cod, redfish and catfish (=wolffish) in Subarea 1.

For the above-mentioned stocks, the present state of exploitation should be reviewed and options for management in 1981 given. Where possible, these should be expressed graphically in terms of catch in 1981 and the size of the spawning stock biomass on 1 January 1982, for a range of values of F which covers at least -50% to +25% of F in 1979.

For cod in Subarea 1, it is requested that catches for each year up to and including 1983 and spawning stock biomasses for each year up to and including 1984 are calculated for maintaining F at the following levels from 1981 onwards:  $F = 0.1$ ,  $F = 0.2$ ,  $F = F_{0.1}$  and  $F = 0.6$ . For 1980, F will be that value needed to take the TAC. All values of F refer to that on the most heavily exploited age-groups.

Advice is requested on the effects on the stock of redfish in Subarea 1 of by-catches of that species in the shrimp fishery and on the stock of cod in Subarea 1 of by-catches of that species in the fishery for catfish, and on measures which might be adopted to minimize by-catches of both these species.

28 March 1980

Mr M. Marcussen, Head of Division  
Directorate General for Fisheries  
Commission for the European Communities  
Brussels, Belgium



APPENDIX VI. LIST OF PARTICIPANTS

CANADA

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APPENDIX VII. LIST OF DOCUMENTS PRESENTED TO THE FEBRUARY AND JUNE 1980 MEETINGS  
OF THE SCIENTIFIC COUNCIL

A. RESEARCH DOCUMENTS

<u>SCR Doc. No.</u>	<u>Serial No.</u>	<u>Title</u>	<u>Author(s)</u>
80/II/1	N027	The observation of growth rings in statoliths from the ommastrephid squid, <i>Illex illecebrosus</i>	G. V. Hurley & P. Beck
80/II/2	N028	Population structure of <i>Illex illecebrosus</i> on the Scotian Shelf in the summer of 1979	C. Maxim
80/II/3	N029	Stock assessment of <i>Illex illecebrosus</i> in Division 4W based on the area-density method	C. Maxim
80/II/4	N030	Capelin ( <i>Mallotus villosus</i> ) catch, effort, and biological characteristics in the Romanian fishery in Division 2J, September-October 1979	C. Maxim
80/II/5	N031	An examination of criteria for the short-term forecasting of inshore abundance of squid ( <i>Illex illecebrosus</i> ) at Newfoundland	G. V. Hurley
80/II/6 (Rev.)	N032	The Faroese longline fishery on the Flemish Cap cod in 1979	K. Hoydal
80/II/7	N034	Biomass estimates of squid ( <i>Illex illecebrosus</i> ) in Divisions 4VW, 1979	A. Mari & R. Dominquez
80/II/8	N040	Outline of Japanese squid fishery in Subareas 3 and 4 in 1979	H. Hatanaka & T. Sato
80/II/9	N041	Estimation of the abundance index for <i>Illex</i> based on Japanese fishery operations along the edge of the Scotian Shelf, 1979	R. Nagai & Y. Uozumi
80/II/10	N042	Assessment of the cod stock in Divisions 3NO	A. Vazquez & M. G. Larraneta
80/II/11	N043	Biomass estimate and biological characteristics of the squid ( <i>Illex illecebrosus</i> ) on St. Pierre and Burgeo Banks (Subdivision 3Ps) in the autumn of 1979	H. Dupouy & J. C. Poulard
80/II/12	N044	Catch, effort and biological characteristics of squid ( <i>Illex illecebrosus</i> ) in the French fishery in Subareas 3 and 4, 1979	J. P. Minet & H. Dupouy
80/II/13	N045	Analytical and acoustic assessments of the capelin stock in Subarea 2 and Division 3K, 1979	J. E. Carscadden & D. S. Miller
80/II/14	N046	An acoustic survey of capelin ( <i>Mallotus villosus</i> ) in Divisions 3LNO, 1979	D. S. Miller & J. E. Carscadden
80/II/15	N047	An alternate method of assessing the capelin stock in Divisions 2J+3K, using SCAM and catch-per-unit effort	J. E. Carscadden & G. H. Winters
80/II/16	N048	An indirect method of estimating maturation rates of cohorts of capelin	G. H. Winters, J. E. Carscadden & D. S. Miller
80/II/17	N049	Distribution, biomass and length frequencies of squid ( <i>Illex illecebrosus</i> ) in Divisions 4TVWX from Canadian research vessel surveys: an update for 1979	P. A. Koeller
80/II/18	N050	Observations on the squid ( <i>Illex illecebrosus</i> ) and silver hake ( <i>Merluccius bilinearis</i> ) fisheries on the Scotian Shelf in 1979	D. E. Waldron & A. Sinclair

SCR Doc. No.	Serial No.	Title	Author(s)
80/II/19 (Rev. 2)	N051	Winter distribution of juvenile silver hake from research cruises on the Scotian Shelf, 1966-1980	J. S. Scott
80/II/20	N052	Age validation of silver hake, <i>Merluccius bilinearis</i>	J. J. Hunt
80/II/21	N053	Assessment of the silver hake ( <i>Merluccius bilinearis</i> ) stock in Divisions 4VWX, using provisional 1979 data	D. Clay
80/II/22 (Rev.)	N054	Statoliths as a possible tool for squid age determination	M. Lipinski
80/II/23 + Corr.	N055	Assessment of the squid ( <i>Illex illecebrosus</i> ) stock in Division 4W by area-density method	M. Lipinski
80/II/24	N056	Assessment of the cod stock in Divisions 3NO	S. Gavaris
80/II/25	N057	Assessment of the cod stock in Division 3M	S. Gavaris
80/II/26	N058	Estimation of total mortality of cod on the Flemish Cap in 1978 and 1979 from Canadian reserach vessel survey data	R. Wells
80/II/27	N059	Distribution and abundance of cod on the Flemish Cap, January 1980	R. Wells
80/II/28	N060	Changes in the size and age composition of the cod stock in Division 3M during 1959-79	R. Wells
80/II/29	N061	Sequential observations on gross digestive processes of <i>Illex illecebrosus</i>	I. C. Wallace, R. K. O'Dor & T. Amaratunga
80/II/30	N062	Growth and maturation patterns of the short-finned squid ( <i>Illex illecebrosus</i> ) on the Scotian Shelf	T. Amaratunga
80/II/31	N063	Preliminary estimates of predation by the short-finned squid ( <i>Illex illecebrosus</i> ) on the Scotian Shelf	T. Amaratunga
80/II/32	N064	A review of the <i>Illex</i> fishery in Subareas 3 and 4, with special reference to 1978 and 1979 FLASH data	M. Roberge & T. Amaratunga
80/II/33	N072	Tagging studies on squid ( <i>Illex illecebrosus</i> ) in the Newfoundland area	G. V. Hurley & E. G. Dawe
80/II/34	N065	Breakdown of 1979 squid catches in Subarea 3 and Division 4R, with length and sex compositions from offshore and and Newfoundland inshore commercial samples	P. C. Beck, E. G. Dawe & J. Drew
80/II/35	N066	Assessment of the short-finned squid ( <i>Illex illecebrosus</i> ) in Subarea 3 for 1979	E. G. Dawe & P. C. Beck
80/II/36	N067	Biomass estimates of young <i>Illex illecebrosus</i> (LeSueur, 1821) from a survey in Subareas 3 and 4 in March-April 1979	Yu. M. Froerman
80/II/37 + Corr.	N068	Abundance estimation of <i>Illex illecebrosus</i> on the Scotian Shelf in 1979	J. H. Young & T. Amaratunga
80/II/38	N069	Summary of joint Canada/USSR research program on short-finned squid ( <i>Illex illecebrosus</i> ), 16 February to 4 June 1979: spawning stock and larval survey	T. Amaratunga, T. Rowell & M. Roberge
80/II/39	N070	Factors affecting fecundity and larval distribution in the squid, <i>Illex illecebrosus</i>	R. K. O'Dor, E. Vessey & T. Amaratunga
80/II/40	N071	Summary of joint Canada/Japan research program on short-finned squid ( <i>Illex illecebrosus</i> ), 23 October to 29 November 1979: emigration and biology	T. Amaratunga, M. Roberge, J. Young & Y. Uozumi

<u>SCR Doc. NO.</u>	<u>Serial NO.</u>	<u>Title</u>	<u>Author(s)</u>
80/II/41	N073	Cod abundance and biomass in Divisions 3N0 and 3M according to data from groundfish trawl surveys during 1977-79	V. A. Chekhova, A. K. Chumakov & A. I. Postolaky
80/II/42	N074	Assessment of capelin stocks in Divisions 3LN0 in May-June 1979	V. A. Ermolchev, S. M. Kavalev, V. S. Mamylov & A. S. Seliverstov
80/II/43	N075	Results of USSR investigations on capelin in Divisions 2J and 3K, autumn 1979	V. A. Bakanev
80/II/44	N076	Modelling of fish schools for calibration of the echo-integrator	V. A. Ermolchev, S. M. Kovalev & V. S. Mamylov
80/II/45	N077	Estimation of natural mortality of Newfoundland capelin using the Icelandic method	J. E. Carscadden & D. S. Miller
80/II/46	N078	Estimation of stock and allowable catch of silver hake ( <i>Merluccius bilinearis</i> ) off Nova Scotia in Divisions 4VWX for 1980	A. S. Noskov
80/II/47	N079	Hydrocortisone and corticosterone in the reproductive organs of <i>Illex illecebrosus</i> (LeSueur, 1821)	S. M. Nikitina & N. P. Kudikina
80/II/48 (Rev.)	N080	On the effect of mesh size increase in the trawl codend on silver hake fishing mortality rate in Divisions 4VWX	V. A. Rikhter
80/II/49	N081	Assessment of the cod stock in Divisions 3N0	C. A. Bishop
80/VI/50	N087	On feeding of long-finned squid ( <i>Loligo pealei</i> ) juveniles in Subareas 5 and 6	A. N. Vovk & L. A. Khvichiya
80/VI/51	N088	Age and size of spiny dogfish ( <i>Squalus acanthias</i> ) from the Northwest Atlantic Ocean	V. T. Soldat
80/VI/52	N089	Note on deep-sea trawling beyond the limits of the Canadian 200-mile zone	K. G. Konstantinov
80/VI/53	N090	Investigations of epipelagic resources beyond the limits of the Canadian 200-mile zone	V. A. Poletayev
80/VI/54	N091	Some results of the USSR oceanographic investigations in accordance with the Flemish Cap project in 1979	B. P. Kudlo & V. A. Borovkov
80/VI/55	N092	Water temperature and strength of cod year-classes on the Flemish Cap	K. G. Konstantinov
80/VI/56	N093	Peculiarities of zooplankton distribution in the Flemish Cap area in 1978	N. V. Plekhanova
80/VI/57	N094	Preliminary results of the ichthyoplankton survey carried out on the Flemish Cap in May-July 1978	A. I. Postolaky
80/VI/58	N096	Hydrographic conditions on Hamilton Inlet Bank (Div. 2J) in early December 1979	M. Stein
80/VI/59	N098	Water temperature in the Newfoundland and Labrador areas in 1979	V. V. Burmakin
80/VI/60	N099	The effect of atmospheric circulation on the strength of cod year-classes off Labrador	V. A. Borovkov
80/VI/61	N100	State of the cod stocks off Labrador	A. I. Postolaky
80/VI/62	N101	Distribution and abundance of redfish larvae against thermal conditions on Flemish Cap in April 1978	S. Grimm, A. Furtak, J. Wysocki & M. Baranowski

<u>SCR Doc.</u> <u>NO.</u>	<u>Serial</u> <u>NO.</u>	<u>Title</u>	<u>Author(s)</u>
80/VI/63	N102	Status of the cod stock in Divisions 2J+3KL in 1978	R. Wells
80/VI/64	N110	Bottom temperatures on the Continental Shelf and Slope south of New England during 1979	R. W. Crist & J. L. Chamberlin
80/VI/65	N111	Variation in the shelf water front position in 1979 from Georges Bank to Cape Romain	J. E. Hilland
80/VI/66	N112	Water column thermal structure across the shelf and slope southeast of Sandy Hook, New Jersey in 1979	M. M. Hughes & S. K. Cook
80/VI/67	N113	Anticyclonic warm core Gulf Stream eddies off the northeastern United States during 1979	J. Fitzgerald & J. L. Chamberlin
80/VI/68	N114	Sea-surface temperature in the northwestern Atlantic in 1979	D. R. McLain & M. C. Ingham
80/VI/69	N117	The selectivity of bottom trawls in fishing Greenland halibut in the central Labrador and Baffin Island area	K. N. Nkieshin & A. S. Gorshkova
80/VI/70	N118	Feeding and food relations of some fish species in the Labrador and Newfoundland areas	T. N. Turuk & A. I. Postolaky
80/VI/71	N123	Gillnet selectivity and a re-analysis of case studies of several species of marine and anadromous fish	D. Clay
80/VI/72 (Rev.)	N124	Subarea 1 cod: data for 1979 and early 1980, and estimates of stock and yield for 1980-82	Sv. Aa. Horsted
80/VI/73	N126	Preliminary data on the Faroese longline fishery for cod on Flemish Cap, January-April 1980	K. Hoydal
80/VI/74	N127	Estimation of the stock size and allowable catch of silver hake ( <i>Merluccius bilinearis</i> ) in Divisions 4VWX for 1981	A. S. Noskov
80/VI/75	N128	Assessment of total allowable catch of redhake from Georges Bank (5Ze) for 1981	V. A. Rikhter
80/VI/76 (Rev.)	N129	Mesh size assessment for cod in Subarea 1	J. M. Jensen
80/VI/77 (Rev.)	N130	The wolffish fishery at West Greenland	E. Smidt
80/VI/78 (Rev.)	N131	Distribution of short-finned squid and some groundfish species in Division 4W from data obtained by USSR observers during the 1979 fishing season	V. A. Rikhter, Yu. S. Grinkov & V. F. Turok
80/VI/79	N133	Evidence for using otoliths to age redfish	W. D. McKone & W. Legge
80/VI/80 (Rev.)	N134	Assessment of redfish in Divisions 3LN	W. D. McKone
80/VI/81	N135	Assessment of the cod stock in NAFO Divisions 2J+3KL	S. Gavaris
80/VI/82	N136	Comparative histological and visual observations on oogenesis and sexual maturity of the Greenland halibut in Northern Labrador waters	S. J. Walsh & W. R. Bowering
80/VI/83 (Rev.)	N137	Weight length relationships of roundnose grenadier in SA 0+1 and 2+3	D. B. Atkinson
80/VI/84 (Rev.)	N138	Length measurements of roundnose grenadier ( <i>Marcrochirus rupestris</i> ) in the Northwest Atlantic	D. B. Atkinson
80/VI/85	N139	Greenland halibut and witch flounder on the Flemish Cap (Division 3M)	W. R. Bowering & J. Baird

<u>SCR Doc. NO.</u>	<u>Serial NO.</u>	<u>Title</u>	<u>Author(s)</u>
80/VI/86	N140	Summary of discarding and estimates of the total removals by Canadian trawlers in the American plaice fishery of Divisions 3LNO during 1978 and 1979	S. C. Stevenson
80/VI/87 (Rev.)	N141	Silver hake ( <i>Merluccius bilinearis</i> ) in Divisions 4VWX: A stock assessment and estimate of the total allowable catch (TAC) for 1981	D. Clay & D. Beanlands
80/VI/88 (Rev.)	N142	An update of the Flemish Cap redfish assessment	C. A. Gavaris
80/VI/89	N143	Dynamics and assessment of the Labrador-Northeast Newfoundland cod stock complex (Divisions 2J and 3KL)	J. P. Minet, A. Forest & J. C. Poulard
80/VI/90	N145	Fish eggs and larvae from the Flemish Cap Bank area	V. P. Serebryakov
80/VI/91	N146	On the method and results of age determination of redfish in Subarea 1	K. Kosswig
80/VI/92	N147	A contribution on the age and growth of roundnose grenadier ( <i>Coryphaenoides rupestris</i> GUNN) at West Greenland (NAFO Subarea 1)	K. Kosswig
80/VI/93	N148	Results of 1979 spring and fall bottom-trawl surveys with the R/V <i>Anton Dohrn</i> in Subareas 5 and 6 with special emphasis on pelagic species	H. Dornheim & H. C. Boyar
80/VI/94 (Rev.)	N149	An Assessment of yellowtail flounder in Divisions 3LNO	W. B. Brodie & T. K. Pitt
80/VI/95 (Rev.)	N150	The witch fishery on the southern Grand Bank (Divisions 3NO)	W. R. Bowering
80/VI/96 (Rev.)	N151	Stock assessment and abundance of Greenland halibut in the Canadian North Atlantic Subareas 2 and Divisions 3K and 3L)	W. R. Bowering
80/VI/97	N152	Some data on feeding of certain Newfoundland haddock populations at different depths and seasons	S. G. Podrazhanskaya V. P. Shestov
80/VI/98	N153	Effect of abiotic factors on distribution of young shortfin squid, <i>Illex illecebrosus</i> (LeSueur, 1821)	P. P. Fedulov & Yu. M. Froerman
80/VI/99	N154	Results of Soviet investigations of the biology of the Atlantic saury, <i>Scomberesox saurus</i> (Walbaum), in the Northwestern Atlantic	Yu. I. Dudnik V. K. Zilanov, V. D. Kudrin, V. A. Nesvetov & A. A. Nesterov
80/VI/100	N155	Assessment of the roundnose grenadier stocks in Subareas 0+1 and 2+3	D. B. Atkinson
80/VI/101	N156	Some recent changes in the status of the cod stock in Divisions 2J+3KL	R. Wells & C. A. Bishop
80/VI/102	N157	Report on groundfish survey of the <i>Walter Barth</i> in Subarea 2 during autumn 1979	U. Berth & B. Vaske
80/VI/103	N159	Hydrographic conditions in Divisions 2G, 2H and 2J in 1978 and 1979	N. Verch
80/VI/104	N160	Results of the juvenile herring and groundfish survey of German Democratic Republic in Divisions 5Z and 6A in the spring of 1979	K. Lambert, N. Schultz & N. Verch
80/VI/105	N161	An age validation study of redfish, <i>Sebastes marinus</i> (L.) from the Gulf of Maine-Georges Bank region	R. K. Mayo, V. M. Gifford & A. Jearld, Jr.

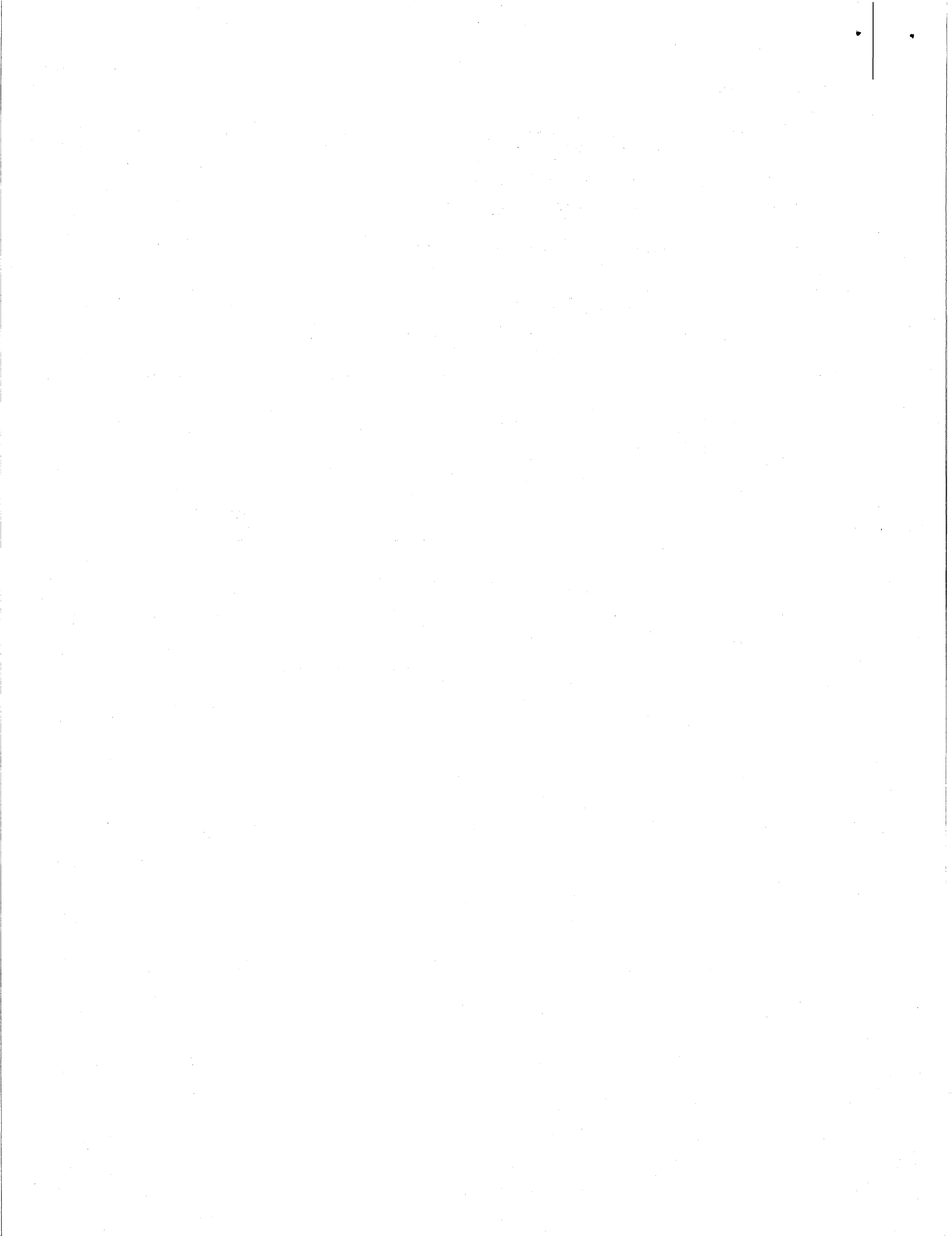
<u>SCR Doc. No.</u>	<u>Serial No.</u>	<u>Title</u>	<u>Author(s)</u>
80/VI/106	N162	A review of catch, effort and estimated removals at age for the 1980 silver hake fishery on the Scotian Shelf	D. E. Waldron & B. M. Wood
80/VI/107	N163	Recent trends in the argentine ( <i>Argentina silus</i> ) fishery	A. Sinclair
80/VI/108 (Rev.)	N164	Estimates of stock biomass and long-term mortality of the northern witch flounder stock (Divisions 2J+3KL)	W. R. Bowering & J. Baird
80/VI/109 (Rev.)	N165	Estimation of the yield per recruit with 60 and 90 mm mesh codends in the Divisions 4VWX silver hake fishery	D. Clay & R. Halliday
80/VI/110 (Rev.)	N166	Assessment of American plaice on the Grand Bank	T. K. Pitt & W. B. Brodie
80/VI/111	N167	A statistical description of recruitment in 18 selected fish stocks	R. C. Hennemuth, J. E. Palmer & B. E. Brown
80/VI/112	N168	Separation of sharp beaked redfish, <i>Sebastes fasciatus</i> and <i>S. mentella</i> , by the morphology of extrinsic gasbladder musculature	I-hsun Ni
80/VI/113	N169	Some further analyses of Subarea 1 cod	A. Schumacher, J. Messtorff, Sv. Aa. Horsted & P. Kannevorff

B. SUMMARY DOCUMENTS

<u>SCS Doc. No.</u>	<u>Serial No.</u>	<u>Title</u>	<u>Author(s)</u>
80/II/1	N036	Provisional report of the Scientific Council, Lisbon Portugal, 5-13 February 1980	
80/VI/2	N097	Results of analysis of the Rules of Procedure for the Scientific Council by the General Council's <i>ad hoc</i> Working Group on Rules of Procedure	NAFO Secretariat
80/VI/3	N103	Romanian research report for 1979	Cornelia Maxim, Constantin Maxim & Ionel Staicu
80/VI/4	N104	Sealing statistics for the Northwest Atlantic, 1979	Assistant Executive Secretary
80/VI/5	N105	<i>Ad hoc</i> inter-agency consultation on Atlantic fishery statistics, Warsaw, Poland, 28-29 September 1979	Secretary of CWP
80/VI/6 (Rev.)	N106	Provisional list of conversion factors for selected Northwest Atlantic species	NAFO Secretariat
80/VI/7	N107	Tagging activities reported for the Northwest Atlantic in 1979 and Supplementary data for 1976-78	Assistant Executive Secretary
80/VI/8	N108	Provisional list of sampling data for 1978	NAFO Secretariat
80/VI/9	N109	Report of <i>ad hoc</i> Working Group on the Flemish Cap Project, January 1980	
80/VI/10	N115	Notes on international classifications and definitions	CWP Secretary



<u>SCS Doc. No.</u>	<u>Serial No.</u>	<u>Title</u>	<u>Author(s)</u>
80/VI/11	N116	Historical catches of selected species by stock area and country for the period 1969-78	Assistant Executive Secretary
80/VI/12	N119	Japanese research report for 1979	T. Sato & H. Hatanaka
80/VI/13	N120	Efficiency of sampling the major fisheries of the Northwest Atlantic in 1978	NAFO Secretariat
80/VI/14	N121	Notes on the inter-agency 3-alpha identifiers for species items in fish catch and landings data	CWP Secretary
80/VI/15	N122	Provisional agenda for the Tenth Session of the Coordinating Working Party on Atlantic Fishery Statistics	Assistant Executive Secretary
80/VI/16	N125	Preliminary report of the Larval Herring Task Force, Woods Hole, USA, 28 April-1 May 1980	
80/VI/17 (Rev.)	N132	Denmark (Greenland) research report for 1979	Sv. Aa. Horsted
80/VI/18	N144	USSR research report for 1979	K. G. Konstantinov & A. S. Noskov
80/VI/19	N158	German Democratic Republic research report for 1979	S. Möller & H. Schultz
80/VI/20	N170	Revised outline of NAFO Sampling Program	Assistant Executive Secretary
80/VI/21	N171	Report on statistical activities and publications 1979/80	Assistant Executive Secretary
80/VI/22	N172	France research report, 1979	J. P. Minet
80/VI/23	N173	Cuban research report, 1979	E. Valdes & A. Mari
80/VI/24	N174	Polish research report, 1979	A. J. Paciorkowski
80/VI/25	N175	Provisional report of the Scientific Council, Dartmouth, Nova Scotia, 3-13 June 1980	



APPENDIX VIII. TRIBUTE TO L. R. DAY UPON HIS RETIREMENT

Mr Lew Day: On this occasion of your retirement in a few days, I address you not only as a civil servant of our international organization but also as a friend who has served ICNAF and now NAFO since 1963. From about 1940 until that time you worked as a biologist, moving from fresh to salt water, starting with salmon and then continuing with herring but also producing papers on such diverse topics as redbfish larvae and the big white shark. However, you devoted a great amount of work to the herring and published many papers on that species.

During these years, you have also experienced the problems of managing a biological station, having reached the position of Assistant Director at St. Andrews, a post which you had upon joining ICNAF in 1963. I am sure that when you decided to be a candidate for the position of Executive Secretary, being vacated by Dr E. Poulsen, you did not enter the competition merely as another job but rather as a position where you could play a role in promoting cooperation among countries fishing in the Northwest Atlantic.

As a scientist, you have always understood the needs of the Organization and particularly those of your scientific colleagues engaged in a perpetual hunt for more numerous and detailed data. You have closely followed the work of STACRES, taking note of the evolution in research and forecasting future needs. Always smiling, calm and efficient, surrounded by a staff apparently chosen along the same criteria, your favorite expression in response to any request was "no problem". Over the years you have developed an efficient system, being able in a short time to transform reams of plain paper into documents and meeting reports, even though the scientists were not always satisfied with their content.

Scientists are always in pursuit of good data to use in elaborating concepts and methodology, but in fisheries science data of good quality are often not easily obtained. However, in their difficult quest for information required to provide good scientific advice, the ICNAF/NAFO scientists have always received the total support of the Secretariat and the benefit of a good system of coordination and dissemination of information among the fisheries research institutes participating in the work of ICNAF. In doing so, you perfectly reflect what Dr Needler called "the spirit of ICNAF". For the scientists, that spirit was the expression of a collective effort for the promotion of marine research through friendly competition and good will among the participants. In that respect, your personal qualities have played an important role, which we all sincerely appreciate.

On behalf of all members of the Scientific Council, let me thank you very sincerely and wish you and Mrs Day the best for the years to come. We wish you good health, good friends and good days in St. Andrews.

13 June 1980

R. H. Letaconnoux, Chairman  
Scientific Council of NAFO

Northwest Atlantic



Fisheries Organization

Serial No. N175

NAFO SCS Doc. 80/VI/25  
(Revised Addenda)

SCIENTIFIC COUNCIL MEETING - JUNE 1980

Revisions and Addenda to Provisional Report of the Scientific Council,  
Dartmouth, Canada, 3-13 June 1980

The Scientific Council at its meeting in September 1980, reviewed and adopted the provisional report of its meeting in June 1980 (SCS Doc. 80/VI/25) with the following revisions and addenda:

1. Insert the following 3 paragraphs under "General Fishery Trends" on page 3:

"Details of provisional nominal catches in the Northwest Atlantic for 1979 are given in NAFO SCS Doc. 80/IX/27, which was prepared after the June 1980 Meeting of the Council, the delay being due to the absence of data for some countries at that time.

"The total nominal catch of all species (except seaweeds) in Subareas 0 to 5 was about 2.97 million tons in 1979, an increase from 2.84 million tons in 1978. The total catch of "groundfish" species increased from 1.14 million tons in 1978 to 1.24 million tons in 1979 (9%); within this group, increases were noted for cod (20%) in Subareas 1, 3 and 4, for redfish (10%) in Subareas 2 and 3, for yellowtail flounder (25%) in Subareas 3 and 5, for Greenland halibut (10%) in Subareas 1 and 4, and decreases occurred for haddock (12%) in Subareas 4 and 5, for silver hake (16%) in Subarea 5, for witch flounder (18%) in Subarea 3, and for roundnose grenadier (42%) in Subarea 3. The total catch of pelagic species declined from 605,000 tons in 1978 to 577,000 tons in 1979 (5%), due largely to a decline for herring (18%) in Subarea 4, although increases were noted for mackerel (18%) in Subarea 4 and for menhaden (8%) in Subareas 5 and 6. For the "other fish" category, the total catch declined from 177,000 tons in 1978 to 128,000 tons in 1979 (28%), due entirely to a major decrease for capelin (65%) in Subarea 3. The total catch of "invertebrate" species increased from 916,000 tons in 1978 to 1,024,000 tons in 1979 (12%), with increases noted for squids (61%) in Subareas 3, 4 and 5, for clams (13%) in Subarea 6, and for shrimp (15%) in Subareas 1, 2 and 4, and a decrease for scallops (9%) in Subareas 5 and 6.

"With respect to the nominal catches of all species by subarea, increases were recorded for Subarea 0 (1,000 to 2,000 tons), Subarea 1 (128,000 to 170,000 tons), Subarea 3 (575,000 to 620,000 tons), Subarea 4 (724,000 to 729,000 tons), Subarea 5 (529,000 to 557,000 tons) and Subarea 6 (801,000 to 816,000 tons), and a decrease for Subarea 2 (77,000 to 72,000 tons)."

2. Add the following sentence at the end of paragraph c(i) near the top of page 9:

"such a paper or papers must be submitted to the NAFO Secretariat at least 30 days before the commencement of the Scientific Council meeting during which the paper will be expected to be considered."

3. Insert the following 8 paragraphs and Table 1 under the section "Fishery Trends" on page 11:

"1. General Trends for the NAFO Area

Provisional nominal catches in the Northwest Atlantic for 1979, as compiled from the STATLANT 21A returns of 16 countries with some preliminary data for four others, are summarized in Table 1, together with similar data for 1978. It is important to note that the 1979 catch figures in this section of the report may differ slightly from those used in Section II, because complete statistics for some of the countries noted above were not available when the stock assessments were carried out.

The total nominal catch of all finfish and invertebrates increased from 2.84 million tons in 1978 to about 2.97 million tons in 1979 (5%), after having declined from 2.96 million tons in 1977 and 3.43 million tons in 1976. The total groundfish catch increased from 1.14 million tons in 1978 to 1.24 million tons in 1979 (9%), largely due to increases for cod (20%), redfish (10%), yellowtail flounder (25%), and Greenland halibut (10%), with declines noted for haddock (12%), silver hake (16%) and roundnose grenadier (42%). The total pelagic fish catch declined from 605,000 tons in 1978 to 577,000 tons in 1979 (5%), due mostly to a decline for herring (18%). Catches for the "other fish" category decreased significantly from 177,000 tons in 1978 to 128,000 tons in 1979 (28%) due almost entirely to a decline for capelin (65%). The total catch

of invertebrates increased from 916,000 tons in 1978 to 1,024,000 tons in 1979 (12%) due mainly to increases for squid (61%), clams (13%) and shrimp (14%).

Table 1. Nominal catches (000 tons) for 1978 and 1979<sup>1</sup>. (The symbol + indicates less than 500 tons.)

Species	SA 0		SA 1		SA 2		SA 3		SA 4		SA 5		SA 6		Total	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Atlantic cod	-	-	38	51	34	26	192	249	164	197	48	50	+	+	476	573
Haddock	-	-	+	+	-	-	1	1	33	29	27	24	-	+	61	54
Atlantic redfishes	+	+	8	9	12	17	68	76	30	28	14	15	-	-	132	145
Silver hake	-	-	-	-	-	-	+	+	48	52	27	10	12	11	87	73
Red hake	-	-	-	-	-	-	-	-	1	+	5	7	1	2	7	9
Pollock	-	-	-	+	-	-	1	1	23	28	22	19	+	+	46	48
American plaice	-	-	6	6	+	+	58	56	19	19	10	11	+	+	93	92
Witch flounder	-	-	-	-	1	+	11	8	7	7	3	3	+	+	22	18
Yellowtail flounder	-	-	-	-	-	-	17	19	2	2	11	16	+	1	30	38
Greenland halibut	1	1	11	18	7	6	32	29	7	10	+	-	-	58	64	
Other flounders	-	-	1	1	+	+	1	1	6	6	15	14	10	14	33	36
Roundnose grenadier	-	+	6	7	5	5	15	3	-	+	-	-	-	26	15	
White hake	-	-	-	-	+	+	4	3	9	11	4	3	+	+	17	17
Wolffishes	-	-	6	17	+	+	2	2	2	2	1	1	+	+	11	22
Other groundfish	-	-	6	5	1	+	2	1	9	9	11	12	8	7	37	34
Atlantic herring	-	-	+	+	+	+	28	32	217	146	51	65	+	+	296	244
Atlantic mackerel	-	-	-	-	-	+	14	15	12	16	1	1	1	1	28	33
Atlantic menhaden	-	-	-	-	-	-	-	-	-	-	43	59	220	226	263	285
Other pelagic fish	-	-	-	-	-	-	+	1	4	3	7	5	7	6	18	15
Capelin	-	-	+	+	11	11	74	13	10	9	-	-	-	-	95	33
Other finfish	-	+	12	22	2	+	5	8	16	5	10	11	37	32	82	95
Squids	-	-	-	-	+	+	41	89	53	72	8	29	20	6	122	196
Clams	-	-	-	-	-	-	-	+	4	3	30	31	207	238	241	272
Scallops	-	-	-	-	-	+	+	+	8	12	153	140	73	61	234	213
Other molluscs	-	-	-	-	-	-	-	-	2	2	9	9	172	170	183	181
Shrimp	+	1	34	36	4	6	+	-	7	9	+	+	+	+	45	52
Other crustaceans	-	-	-	-	-	-	9	13	31	39	17	18	32	38	89	108
Other invertebrates	-	-	-	-	-	-	-	-	-	+	1	2	1	+	2	2
All species	1	2	128	170	77	72	575	620	724	729	529	557	801	816	2835	2966

"2. Subarea 0

The total nominal catch of all species increased from 1,000 tons in 1978 to about 2,000 tons in 1979, Greenland halibut being the main species taken.

"3. Subarea 1

The total nominal catch of all species increased from 128,000 tons in 1978 to 170,000 tons in 1979 (33%). Significant increases were noted for cod (34%), Greenland halibut (64%), and wolffishes (183%). The catch of unspecified finfish increased from 18,000 tons to 27,000 tons (50%) and represented 20% of the total finfish catch in the subarea.

"4. Subarea 2

The total nominal catch of all species declined slightly from 77,000 tons in 1978 to 72,000 tons in 1979 (9%), due mainly to a decrease for cod (23%) although an increase was noted for redfish (42%). The capelin catch remained at the low level of 11,000 tons as in 1978.

"5. Subarea 3

The total nominal catch of all species increased from 575,000 tons in 1978 to 620,000 tons in 1979 (8%). Significant increases for cod (30%), redfish (12%), herring (14%) and squid (117%) were largely offset by a large decline for capelin from 74,000 tons in 1978 to 14,000 tons in 1979. The catch of flounders declined by about 10% from 1978 to 1979.

"6. Subarea 4

The total nominal catch of all species (except seaweeds) increased from 724,000 tons in 1978 to 729,000 tons in 1979 (1%). Increases were noted for cod (20%), silver hake (8%), pollock (22%), mackerel (33%), squid (36%) and other invertebrates (25%), but these were mostly offset by decreases for haddock (12%), redfish (8%) and herring (33%). The seaweed harvest at 34,000 tons in 1979 was slightly less than 36,000 tons in 1978.

"7. Subarea 5

The total nominal catch of all species increased from 529,000 tons in 1978 to 557,000 tons in 1979 (5%). Increases were noted for cod (4%), redfish (7%), red hake (40%), yellowtail flounder (45%), herring (28%), menhaden (37%) and squids (262%), whereas decreases occurred for haddock (11%), silver hake (63%), pollock (14%) and scallops (9%).

"8. Subarea 6

The total nominal catch of all species increased from 801,000 tons in 1978 to 816,000 tons in 1979 (2%). Increases occurred for flounders (40%), menhaden (3%) and clams (15%), but these were largely offset by decreases for silver hake (8%), squids (70%) and scallops (16%)."

4. On lines 3 and 4 at the top of page 13, delete the phrase "similar to those in the 1960's (300,000-400,000 tons)", and insert the phrase "of some hundred thousand tons".

5. Insert the following in Table 1 on page 35:

Sub-area	Div.	Country	Month	Type of Survey	No. of sets
5	YZ	Poland	10	Apex predator studies	11
			11	Larval herring and plankton	33
6	ABC	Poland	10	Apex predator studies	17
			11	Shark sonic tagging	-

6. Insert the following in Table 2 on pages 36 and 37:

Country	Type of Survey	Area	Dates	Year
Canada (N)	Hydrography, ichthyoplankton	3M	Apr 2-14	1980
	Groundfish random-stratified (3 cruises)	3LNO	Apr 10-Jun 3	
	Groundfish survey (deepwater)	3LNO	Apr 29-May 15	
	Salmon tagging	3LNO	May 7-Jun 2	
	Hydrography, ichthyoplankton	3M	May 17-Jun 9	
	Squid survey	3LNO	Jun 4-24	
	Capelin survey	3LN	Jun 11-Jul 7	
	Greenland halibut tagging	3K	Jun 26-Jul 16	
	Shrimp survey	2GHJ	Jul 9-Aug 4	
	Hydrography, plankton	3LM	Jul 18-Aug 12	
	Groundfish, shrimp (acoustics)	4RS	Aug 27-Sep 8	
	Juvenile flatfish	4R	Aug 27-Sep 9	
	Groundfish random-stratified	4RS	Sep 5-22	
	Greenland halibut, hydrography	0-2	Sep 10-Oct 2	
	Juvenile flatfish	3LN	Sep 29-Oct 10	
	Groundfish random-stratified	2J+3K	Oct 4-21	
	Capelin survey	2+3K	Oct 23-Nov 18	
	Shrimp survey	4RST	Nov 4-21	
	Groundfish random-stratified	2J+3K	Nov 20-Dec 9	
	Squid survey	2J+3K	Nov 27-Dec 12	
	Groundfish random-stratified	4RS+3Pn	Jan 5-26	1981
	" " "	3M	Jan 28-Feb 18	
	Squid survey	G. Stream	Feb 20-Mar 11	
	Groundfish random-stratified	3Ps	Mar 2-12	
	Cod tagging	3KL	Mar 12-30	

Country	Type of Survey	Area	Dates	Year
Poland	Groundfish	5Z	Feb 11-16	1980
	Ichthyoplankton	5YZ	Feb 18-26	
	"	5Z, 6A	Feb 28-Mar 10	
	Apex predator studies	6ABC	Mar 10-30	
	Ichthyoplankton	5Z	Sep-Oct	1981