Northwest Atlantic Fisheries Organization

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SCIENTIFIC COUNCIL MEETING - SEPTEMBER 1984

Report of the Scientific Council

Dartmouth and Halifax, Canada, 5-14 September 1984

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REPORT OF THE SCIENTIFIC COUNCIL

Annual Meeting, September 1984

Chairman: V. A. Rikhter

Rapporteur: V. M. Hodder

The Scientific Council and its Standing Committees on Fishery Science (STACFIS) and Publications (STACPUB) met at the Bedford Institute of Oceanography, Dartmouth, and at the Lord Nelson Hotel, Halifax, Nova Scotia, Canada, during 5-14 September 1984 to consider and report on various matters listed in the agenda (Appendix III). Representatives attended from Canada, Cuba, European Economic Community (Denmark, Federal Republic of Germany, France and the Commission), German Democratic Republic, Japan, Norway, Poland, Portugal, Spain and Union of Soviet Socialist Republics (USSR), and observers were present from Mexico and United States of America (USA). The participants listed in Appendix IV include scientists who presented papers at the Special Session on "Biology and Ecology of Squids (*Illex illecebrosus* and *Loligo pealei*) in the Northwest Atlantic", which was held on 5-7 September 1984 at the Bedford Institute of Oceanography. Scientific Council sessions during 5-12 were conducted by the Chairman (V. A. Rikhter) and the closing session was conducted by the Vice-Chairman (J. Messtorff).

The reports of the Standing Committees, as adopted by the Council at this meeting are at Appendix I (STACFIS) and Appendix II (STACPUB). Brief summaries of these reports and other matters considered by the Council are given below.

I. FISHERY SCIENCE (APP. I)

1. Special Session on the Biology and Ecology of Squids (*Illex illecebrosus* and *Loligo pealei*) in the Northwest Atlantic

The special session, convened by T. W. Rowell (Canada) and Ch. M. Nigmatullin (USSR), was held at the Bedford Institute of Oceanography on 5-7 September 1984. Twenty-four scientific papers and one oral report was presented. A biblography of the squid genus *Illex* was also distributed to participants. Two papers were keynote presentations: a comparison of the life cycles of five ommastrephid squids, and an examination of the population dynamics of short-lived species with reference to modelling approaches for squid. Papers were presented in four topic areas: life cycles and early life histories; distribution, ecology, and population modelling; feeding and predation; and maturation, ageing and methodology. The contributions added considerably to knowledge in each of the topic areas and demonstrated the progress in squid research over the past 5-6 years. The papers also provided an excellent overview of the current status of squid research and helped to elucidate critical areas and directions for future investigations.

2. Stock Assessments

The Council adopted the advice provided by STACFIS regarding further management options for the cod stock in Subdivision 3Ps, as requested by the EEC at the June 1984 Meeting. The Council noted that STACFIS had reviewed its report from the June 1984 Meeting in relation to the guidelines for assessments which were developed at the September 1983 Meeting. The Council endorsed the decision of STACFIS to continue to use the guidelines, with slight modifications. The Council also endorsed the STACFIS recommendations which are designed to improve the efficient use of time at future June meetings.

3. Environmental Research

The Council noted the continuing effort of STACFIS to identify the nature and importance of environmentally induced variation in availability and the problems that such variations cause in stock assessments and fisheries management, and endorsed the appointment of M. Stein (EEC) as Chairman of the Subcommittee on Environmental Research.

4. Ageing Techniques

The Council noted that STACFIS had reviewed progress in ageing of grenadier and supported further research in this area.

5. Other Scientific Documents

The Council noted that 41 research documents (12 deferred from the June 1984 Meeting) were presented at this meeting, 24 of which were reviewed at the special session on squids. Of the remaining 17 papers, 14 were reviewed by STACFIS and 3 papers (SCR Doc. 84/IX/95, 96, 105) were deferred to the June 1985 Meeting.

6. Special Session in September 1985

The Council adopted the program for the Special Session in September 1985 entitled "Design and Evaluation of Biological Surveys in Relation to Stock Assessments", which was developed by the Convener (J. Messtorff).

7. Further Workshop on Ageing Shrimp

The Council noted the decision of STACFIS not to sponsor a workshop on the ageing of shrimp within the next year and endorsed the recommendation of STACFIS that participants of the 1981 workshop be contacted in approximately 2 years to see if there has been sufficient progress to warrant another shrimp ageing workshop.

8. Request for Advice on Seals

The Council noted that STACFIS could assess the status of harp and hooded seals at the same time as the mid-term meeting for shrimp, scheduled for 16-22 January 1985, and noted that the Greenland Fisheries and Environmental Research Institute in Copenhagen was willing to host the mid-term meeting for assessment of seals as well as shrimp (See Section V(1) below for further details).

II. RESEARCH COORDINATION

1. Further Consideration of Reporting Requirements for Sampling Data (SCR Doc. 84/VI/23, page 73)

Procedures for the reporting of sampling data were discussed at the June 1984 Meeting but a final decision on areas and time periods for length frequencies and age-length keys was deferred to the prsent meeting when additional information was expected to be available. After reviewing the comments provided to the Secretariat by Canada, USSR and USA, the Council agreed to adopt the pre-1979 procedures and formats with flexibility to follow changes proposed by Canada for certain species/stocks (Table 1).

Table 1. Exceptions to the pre-1979 format for time and area in the submission of length and age samples. (Other species (area) data are normally reported by month and division for length samples and month and quarter for age samples.)

Species (area)	Length sample		Age sample	
	Time	Area	Time	Area
Cod and haddock (Div. 4X)	Month	Unit area[1]	Quarter	Unit area[1]
Cod (Div. 4vn, Jan-Apr) Silver hake Capelin Herring (except Div. 4WX) Shrimp (SA 0+1)	Month	Division	Month	Division
Herring (Div. 4WX)	Month	Square[2]	Month	Square[2]
Squid	Week	Division	-	-
Scallops[3]	Month	Subarea	Year	Subarea

[1] Unit areas as defined by Canadian Department of Fisheries and Oceans
[2] Squares refer to 10'×10' quadrangles
[3] Meat weight substitutes for length

III. PUBLICATIONS (APP. II)

1. STACPUB Membership

The Council requested Dr. Hatanaka to substitute for S. Kawahara, who could not be present at this meeting.

2. Review of Publications

The Council, in accepting STACPUB's review of the status of publications, agreed that the necessary revisions of Statistical Bulletin for the years 1977-1981 should be made and the volumes issued as soon as possible to avoid misleading statistics being used over a long period. The Council therefore

recommends

that the Executive Secretary take the necessary steps to make funds available for revision, publication and distribution in 1985, if possible, of 4 out of 5 volumes of Statistical Bulletin for the years 1977-1981.

3. Editorial Policy Concerning Publications

The Council agreed to the nomination by STACPUB that G. P. Ennis (Canada) be appointed Associate Editor of the *Journal of Northwest Atlantic Fishery Science* for contributions on Invertebrate Fisheries Biology.

The Council shared STACPUB's regret to the announcement by the present Editor (V. M. Hodder) that he could no longer serve as Editor of the Journal after June 1985, due to his many duties as Assistant Executive Secretary. The Council thanked Mr. Hodder for his effort and success in maintaining the Journal as a widely-recognized scientific publication of high standard. The Council requested STACPUB to undertake the necessary steps to nominate a new editor as soon as possible.

IV. COLLABORATION WITH OTHER ORGANIZAITONS

1. Twelfth Session of CWP, July 1984

The 12th Session of the Coordinating Working Party on Atlantic Fishery Statistics (CWP) was held in Copenhagen, Denmark, during 25-31 July 1984. The Session was hosted by the International Council for the Exploration of the Sea (ICES), and attending on behalf of NAFO were the Assistant Executive Secretary (V. M. Hodder) and the Chairman of STACREC (J. M. Jensen). Apart from NAFO and ICES, representatives attended form the International Commission for the Conservation of Atlantic Tunas (ICCAT), the International Commission for the Southeast Atlantic Fisheries (ICSEAF), the Food and Agriculture Organization (FAO), the Organization for Economic Cooperation and Development (OECD), the Statistical Office of the European Communites (EUROSTAT), the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF), and the FAO Western Central Atlantic Fishery Commission (WECAFC). The Session dealt with a variety of fishery statistical matters of common interest to international organizations which are responsible for the collection and publication of Atlantic fishery statistics. The report of the 12th Session is expected to be published before the end of 1984, and 250 copies have been requested for distribution at the June 1985 Meeting of the Scientific Council.

V. FUTURE SCIENTIFIC MEETINGS

1. Special Meeting in January 1985

The Council reaffirmed its earlier decision to accept the invitation of the Greenland Fisheries and Environmental Research Institute and to meet in Copenhagen, Denmark, during 16-22 January 1985 to review the status of the shrimp stocks and to provide advice requested by Canada and the EEC (SCS Doc. 84/VI/3, 4).

The Council noted that joint Canada/EEC request for advice on harp and hooded seals (SCS 84/IX/26) and agreed to undertake this task at the same time and place as the shrimp assessments, when it was indicated that the Greenland Fisheries and Enironmental Research Institute could accommodate the meeting at its laboratory in Copenhagen.

2. Meeting in June 1985

As agreed at the June 1984 Meeting, the Scientific Council, together with its Standing Committees on Fishery Science, Research Coordination and Publications and the Environmental Subcommittee, will meet at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada, during 5-20 June 1985.

3. Annual Meeting in September 1985

The Council noted that it would be preferable to have the Special Session on "Design and Evaluation of Biological Surveys in Relation to Stock Assessments" at the Bedord Institute of Oceanography, Dartmouth, Nova Scotia, to ensure the participation of all possible contributors. It was consequently decided to have the session at the Bedford Institute in the week preceeding the Seventh Annual Meeting of NAFO in September 1985, irrespective of the place of the Annual Meeting. The specific dates for the Special Session will be determined as soon as the place and time of that meeting are established by the General Council.

4. Meeting in June 1986

Considering the need for the Secretariat to arrange for meeting facilities at the Bedford Institute of Oceanography, Dartmouth, Canada, more than a year in advance of scientific meetings, the Council tentatively agreed to meet during 4-19 June 1986.

VI. OTHER MATTERS

1. Provision of Scientific Advice at Meetings in the Absence of the Sceintific Council Chairman and Vice-Chairman

The problem which arose at the Special Meeting of the Council in January 1984, when neither the Council's Chairman nor Vice-Chairman could be present, was discussed, with a view toward establishing a suitable guideline for similar situations in the future. After considering various options and in the absence of a quorum, the Scientific Council requests the Executive Secretary to submit the following proposed addition to Rule 3 of the Rules of Procedure of the Scientific Council for ratification by Contracting Parties prior to the January 1985 Meeting of the Scientific Council: "In the circumstance that both the Chairman and Vice-Chairman of the Scientific Council are absent at the time and place of a scheduled Scientific Council Meeting, a Scientific Council representative shall be appointed as interim chairman by consensus among the Scientific Council representatives, or their alternates, who are present". The rule will be number 3.7.

2 Term of Office for Subcommittee Chairman

The Scientific Council noted that the NAFO Convention defines the terms of office of the Chairman and Vice-Chairman of the Scientific Council (Article IX.2) and establishes that right of the Scientific Council to establish such Committees and Subcommittees as it considers desirable for the exercise of its duties and functions (Article IX.4). In addition, the Rules of Procedure of the Scientific Council establish a term of 2 years for Chairmen of its Standing Committees, but terms of office for Chairmen of other Committees and Subcommittees have not been established. The desirability of establishing a term of office for Chairmen of such Committees and Subcommittees was recognized. Therefore, the Scientific Council agreed to follow the same procedure for term of office of Subcommittee Chairmen as applies to Chairmen of Standing Committees (i.e. Rule 5.2 of the Scientific Council Rules of Procedure).

The Scientific Council noted the typographical error in Rule 5.2, in that 'Article X' should read 'Article IX'.

3. Procedure for Adoption of Agenda at Meetings

The Council noted that difficulties arose in the adoption of its agenda at this meeting, due mainly to coincidence of its opening session with the Special Session on Squids. In order to overcome such difficulties at future meetings, it was agreed that the agenda for any Special Session be adopted by the Scientific Council at a previous meeting and that the opening of the Scientific Council Meeting be held following the conclusion of the Special Session. At all Scientific Council Meetings, the first action shall be appointment of rapporteur and adoption of agenda.

4. Provisional Report of the June 1984 Meeting

The Council adopted its report of the June 1984 Meeting (SCS Doc. 84/VI/23) with minor amendments, which will be incorporated in the report before its publication in Scientific Council Reports for 1984.

VII. ADJOURNMENT

With the agenda of this meeting now completed, I wish to thank the Chairmen of STACFIS (J. E. Carscadden) and STACPUB (J. Messtorff), the Convener of the *ad hoc* Working Group on Assessment Guidelines (W. G. Doubleday), and the Conveners of the Special Session on Squids (T. W. Rowell and Ch. M. Nigmatullin) who did an excellent job in completing their tasks. My thanks also are extended to all participants for their cooperation and contributions which made the meeting a successful one, and to the Vice-Chairman (J. Messtorff) who chaired the closing session of the Council.

On behalf of the Council, I extend my appreciation to the Secretariat staff for their usual efficient work in organizing and servicing this meeting both at the Bedford Institute of Oceanography, Dartmouth, and at the Lord Nelson Hotel, Halifax. The meeting was adjourned at 1700 hrs on 14 September 1984.

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

Chairman: J. E. Carscadden Rapporteurs: Various

The Committee met at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, during 5-7 September 1984, and the Lord Nelson Hotel, Halifax, Nova Scotia, Canada, during 10-12 September 1984, to consider and report on various matters referred to it by the Scientific Council. The Special Session on 'Biology and Ecology on the Squids, *Illex illecebrosus* and *Loligo pealei*, in the Northwest Atlantic', matters relevant to stock assessments and the Subcommittee on Environmental Research, ageing techniques and validation studies, gear and selectivity studies and review of scientific documents were considered by STACFIS. Various participants contributed to the preparation of initial drafts of different sections of the report.

Representatives attended from Canada, Cuba, EEC (Denmark, Federal Republic of Germany, France and the Commission), German Democratic Republic, Japan, Norway, Poland, Portugal, Spain and USSR, and observers were present from Mexico and USA.

I. SPECIAL SESSION ON THE BIOLOGY AND ECOLOGY OF THE SQUIDS, *ILLEX ILLECEBROSUS* AND *LOLIGO PEALEI*, IN THE NORTHWEST ATLANTIC

1. Introduction

The Special Session, convened by T. W. Rowell (Canada) and Ch. M. Nigmatullin (USSR), was held at the Bedford Institute of Oceanography during 5-7 September 1984. Twenty-four scientific contributions and one oral report were presented, and a bibliography on the squid genus *Illex* was also distributed to participants. Two papers were keynote presentations: a comparison of the life cycle of five ommastrephid squids (SCR Doc. 84/IX/99), and an examination of the population dynamics of short-lived species with reference to modelling approaches for squid (SCR Doc. 84/IX/106). The papers were presented in four topic areas: life cycles and early life histories; distribution, ecology and population modelling; feeding and predation; and maturation, ageing and methodology. The contributions added considerably to knowledge in each of the topic areas and demonstrated the rapid progress made over the last 5-6 years. They also provided an excellent overview of the current status of squid research and helped to elucidate critical areas and directions for future research.

2. General Considerations

Early life histories, including comparisons among both closely related ommastrephids of the genus *Illex* and *Todarodes pacificus*, as well as between the much more distant myopsid (*Loligo pealei*) and sepiolid squids, provided for broad-ranging discussions of the maturation, mating, spawning and larval-juvenile characteristics of squids. In these discussions, as in other topic areas, the primary focus was on elucidating the biology and ecology of *Illex illecebrosus*. Biological and oceanographic information on the larval and juvenile distribution of *Illex* sp. over the Blake Plateau (off S. Carolina to Florida) provided insights into the likely region of transport within the Gulf Stream system and the complex oceanographic processes which might influence the rate of transport to the northeast. Laboratory studies provided additional support for pelagic spawning and for retention of egg masses and larval *Illex* in the mesopelagic zone. The likelihood of mesopelagic spawning in the Gulf Stream frontal zone combined with the documented larval capacity for vertical migration were seen to extend the area(s) of possible spawning along the Gulf Stream system. Discussion of larval and juvenile *Illex* distributions brought caution that, although the rhynchoteuthion 'Type C' larvae in areas north of Cape Hatteras have been attributed to *Illex illecebrosus*, those taken south of Cape Hatteras cannot yet be identified to the species level because *I. oxigonius* and *I. coindetii* are also common in the area. The value of standardizing taxonomic efforts through the use of a single identification center was emphasized for large-scale programs such as those conducted in recent years under the aegis of NAFO. There was also discussion of the use of opening and closing nets *versus* open nets and the place of each in relation to basic survey objectives.

It was evident that, although general patterns of both areal and bathymetric distribution can be seen for *Illex illecebrosus* during its period of on-shelf residency, the relationship of this distribution to temperature, the shelf-slope frontal zone, or other abiotic factors is unclear. Although bottom temperatures appear significant, it is likely that temperatures in other levels of the water column and (or) other abiotic or biological features also influence these patterns. It was thought that more detailed analysis of available data sets could provide further insights into 'preferred' regimes and hence into the distributional characteristics of *Illex*. In the more southern areas of *Illex illecebrosus* distribution (Cape Hatteras to Florida), the lack of a fishery and squid-directed research surveys leaves a major gap in data acquisition for what seems to be a critical area for spawning. Stomach sampling of large pelagics, such as swordfish and sailfish, were suggested as possible sources of additional information on the biology and distribution of *Illex* species in this southern area.

The application of a seasonalized von Bertalanffy growth formula with objectively fitted length-frequency data was proposed for modelling squid growth. Other methodological approaches were suggested for estimation of mortalities through length-converted catch curves and recruitment from annual catch and yield-per-recruit. The basic premise is that much can be learned from the systematic application of 'fish models' to squid problems and that the deviations from the models are likely to be instructive in themselves. It was recognized that the suggested descriptive model of the abundance fluctuation mechanism for *I. illecebrosus* has promise for further improvement. It is necessary to determine in more detail the abiotic parameters of the environment which affect population dynamics, and to seek the quantitative parameters of the model.

Discussion of food and feeding studies left little doubt that these were still in a very formative stage. Errors or potential errors in the methodology were pointed out, and it was clear that future studies should attempt to more carefully identify and quantify these errors. Currently-used gravimetric methods are very unsatisfactory, as also are the very subjective visual indexes which are sometimes used. Because squid stomach contents are often largely particulate matter in liquid, it was suggested that filtering or drying the contents might be a useful approach. Future studies would benefit substantially from work on rates of gut evacuation and from the marrying of the food and feeding studies to energetics. The impact of cannibalism remains very unclear and requires careful study if its importance is to be determined. The greatest progress is likely to result from combined field and laboratory studies.

It was clear that currently-used male maturity indexes are inadequate, particularly the criteria for full maturity, and that a more useful basis for measuring maturity may be the number of spermatophores in Needham's sac. Even this criterion would require further evaluation, because the 'accidental' release of sperm and/or spermatophores has been observed under conditions of stress. At the same time, the maturity scales used for females appear to be fully appropriate for field and laboratory studies because they cover all the periods of ontogenesis, spawning and spent stages inclusively. The reproductive-ecological scale of life cycles for *I. illecebrosus*, as worked out, can serve as the basis for comparative ecological studies at the specific and interspecific levels.

Chemical marking techniques were shown to provide excellent agreement between the number of growth increments in statoliths and time in elapsed days from marking. Feeding regime did not appear to impact ring deposition, and it is hypothesized that deposition may be controlled either by photoperiod or some intrinsic mechanism. The apparent relationship between the length of statoliths and age of *I. illecebrosus* (number of rings in statoliths) may allow use of this criterion, after additional verification, as a more rapid method of ageing. Further work is needed to develop a means of effectively relating statolith age data to more readily measurable field data (i.e. mantle length). Only a few papers dealt with the biology of *Loligo pealei*. These studies related primarily to aspects of food and feeding and general aspects of the ecology of these species. Of special interest was a yield analysis for *L. pealei* of the northeastern United States. Relative to *I. illecebrosus*, little significant new biological information on *L. pealei* was presented. The

ecological relationship between *I. illecebrosus* and *L. pealei* represents an important problem area which require further scientific investigation.

3. Objectives for Future Work

The findings of papers presented at the Special Session and their discussion allow the formulation of several main objectives for future investigations of *Illex illecebrosus*. The principle and ultimate objective is to determine the major regularities in abundance fluctuations on the basis of comprehensive studies of variability in abiotic conditions (mostly water dynamics) and in the life history of squid. The second objective, closely connected with the first, is to study the role of *I. illecebrosus* in the trophic structure of the ocean throughout the entire life cycle, with due regard to the diversity and specific features of feeding areas. This can be tackled only by conducting simultaneous work throughout the species' range in the Northwest Atlantic under a coordinated program. The latter implies establishing a uniform method of collecting and processing field material. Additionally, the need to ensure close interrelationship between field and experimental studies, such as those conducted in the aquatron, should be emphasized.

4. Other Related Matters

The participants noted the proposal of the Scientific Council that the Secretariat microfiche the ICNAF and NAFO meeting documents and expressed their support for this action. Non-governmental researchers in particular felt that this would greatly enhance the availability of much of the rapidly developing information on *Illex* and *Loligo* which these documents may contain.

In response to a request from the Guiding Group of Experts on the IOC (International Oceanographic Commission) Program of Ocean Science in Relation to Living Resources (OSLR), the participants were requested to 'consider the value of an OSLR/International Recruitment Project-oriented Program in elucidating the problems involved in recruitment variability in the squid stocks'. The participants saw positive benefits from such a project. Additionally, STACFIS considered the question of recruitment to be crucial for the management of squid stocks and noted that any increase in knowledge of factors which lead to the production of strong or weak year-classes would greatly assist in the provision of advice on squid management. STACFIS requested the Conveners of the Special Session to communicate these views to the IOC.

5. Papers Presented

The following research documents were considered at the Special Session: SCR 84/IX/97, 98, 99, 100, 101, 102, 103, 104, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, and two oral presentations were made. With regard to the possible publication by NAFO of the papers presented at the Special Session, the participants agreed that the papers should be published in a single volume. STACFIS accordingly

recommends

that STACPUB consider the matter of publication of the papers presented at the Special Session.

II. STOCK ASSESSMENT

1. Catch and Spawning Biomass Projections for Cod in Division 3Ps

Further to the assessment of this stock at the June 1984 Meeting, STACFIS undertook to meet the EEC request by examining a wider range of options than was provided earlier. Input parameters, in terms of population numbers, catch in 1983, average weights and partial recruitment factors were the same as those used previously. Also, estimates of recruitment at age 3 were the same as used earlier (81 million fish for the 1981 year-class and 55 million fish for the 1982 and 1983 year-classes).

Spawning biomass was determined by applying an average weight-at-age ogive from Canadian survey data for 1980-84 and estimates of average weight at the beginning of the year (SCR Doc. 84/IX/122).

Weight at age n at the beginning of the year was derived by taking the geometric mean of midyear weights at age $n-1$ and n. Maturity-at-age data were also available from French surveys in Div. 3Ps. The results differed from those of the Canadian surveys, mainly for ages 4-6. The difference in estimation of the spawning biomass by the two ogives was approximately 8%, with the estimate for the French data being higher. Because a target spawning biomass has not been established and the present estimates serve mainly for illustration, only the maturity ogive from the Canadian surveys was used for the projections. The maturity-at-age and weight-at-age values are as follows:

Age (years)	3	4	5	6	7	8	9	10	11	12	13	14
% mature (French data)	1	12	39	73	91	96	98	99	99	100	100	100
% mature (Canadian data)	-	3	28	63	88	97	99	100	100	100	100	100
Average weight (kg)	0.40	0.63	1.01	1.54	2.12	2.75	3.55	4.63	5.99	7.56	8.87	9.93

Projections of catch in 1985 and spawning stock biomass at the beginning of 1986 for a range of fishing mortality (fully recruited) in 1985, assuming a catch of 36,000 tons in 1984, are listed below and illustrated in Fig. 1. The approximate equilibrium spawning stock biomasses, using average weights and partial recruitment, are indicated by A and B in Fig. 1 for $F_{0.1}$ and F_{max} respectively.

Parameter	Fishing mortality (F)						
	0.10	0.15	0.20	0.25*	0.30	0.35	0.40
Catch in 1985 (000 tons)	22	32	41	51	59	68	76
Spawning biomass (000 tons) (1 January 1986)	214	205	197	189	181	173	167

* F in 1983.

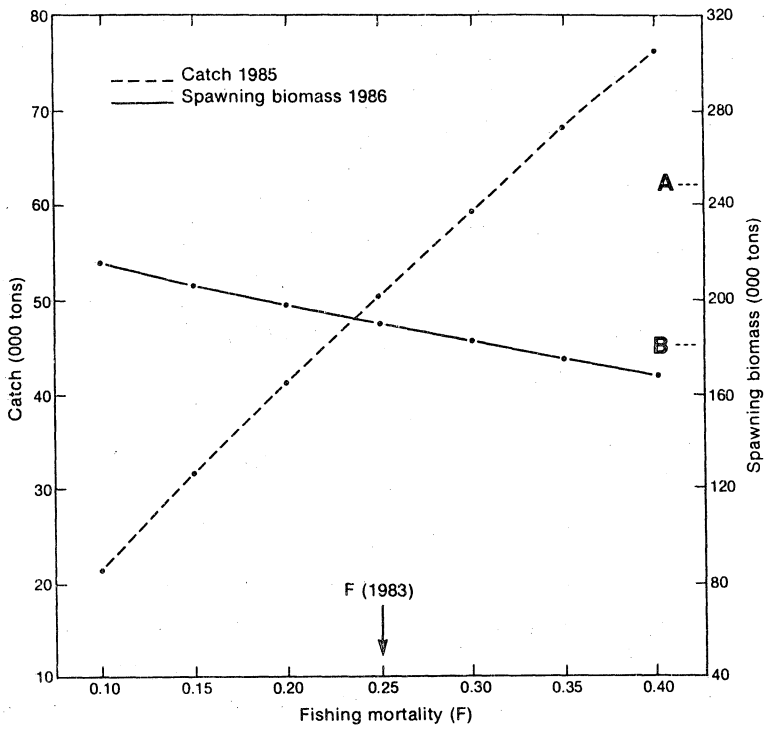

Fig. 1. Catch and spawning biomass projections in Div. 3Ps cod over a range of fully-recruited fishing mortalities (F) in 1985 and assuming a catch of 36,000 tons in 1984.

2. *Ad Hoc* Working Group on STACFIS Assessment Guidelines and Organization of June STACFIS Meetings

a) Introduction

At its June 1984 Meeting, STACFIS was not able to review thoroughly the adequacy of the guidelines for presentation of assessment advice that were adopted in September 1983 (NAFO Sci. Coun. Rep., 1983, pages 125-127). Consequently, a working group was established to carry out this review at the September 1984 Meeting. The Scientific Council added to the Working Group's mandate the task of advising on means of handling the workload of STACFIS at future June meetings, so as to reduce the time required for STACFIS assessments which involved many unscheduled night sessions in 1984.

The Working Group was convened by W. G. Doubleday with R. Wells as rapporteur. Members included J. Messtorff, V. A. Rikhter, J. Carscadden, A. Paciorkowski, D. Tremblay, J. C. Poulard, R. G. Halliday, Sv. Aa. Horsted, R. Mahon and A. T. Pinhorn. G. Gomez-Sanchez of Mexico was an observer. The Working Group met on 7 and 10 September 1984.

b) Guidelines for documentating STACFIS assessments (see Annex 1)

The descriptions of the assessments of the various stocks in the STACFIS reports of meetings in January and June 1984 conformed in general to the guidelines. It was intended to include sufficient detail to provide adequate descriptions of trends in the fisheries as well as sufficient data, or citations of data, so as to allow reconstruction of the analysis upon which advice was made. While progress was made to achieve these goals, adherence to the guidelines was not always rigorous. The descriptions of trends in the fisheries tended to be rather brief and incomplete, and in some cases there were omissions of material necessary for the precise duplication of the analysis. There were some lapses from the format required and, in a few instances, citation of the documentation used was inadequate.

Analysis of the January and June 1984 Meeting reports indicated that the guidelines were not entirely satisfactory to cover, for example, cases where the advice was not derived from a formal projection of stock size and potential catch. In some cases, the guidelines were considered somewhat ambiguous with regard to description of biological sampling from the commercial fisheries. It was noted that biological and statistical information not relevant to the assessments need not be referred to under the guidelines, since such data will be dealt with elsewhere in the STACFIS report. Because of the size of the STACFIS report, the omission of the many tables showing catch and average weight matrices, fishing mortalities and population numbers and weights was considered appropriate. However, such tables which form the basis of understanding the status of the stock, might conveniently be placed in a STACFIS research document that would be compiled at the time of the meeting. STACFIS accordingly reiterates its proposals of September 1983 (NAFO Sci. Coun. Rep., 1983, page 124), and

recommends

i) introduction of a standard list of contents for mandatory use by rapporteurs,

ii) citation of page references for information and analyses referred to in the STACFIS report, and

iii) production of a STACFIS research document at the time of the meeting for all relevant data and final analyses considered but not included in the STACFIS report or in other published form.

c) Organization of the June Meeting of STACFIS

The demanding STACFIS agenda for June 1984 could not be fully addressed in the alloted time. Consequently, several late evening sessions were held. Repeated evening sessions added to

the fatique of daily meetings and created an excessive burden on participants. Consequently, STACFIS saw the need to make more efficient use of available meeting time at future June meetings.

The Working Group noted several possibilities to accelerate the work of STACFIS without compromising the quality of its advice: firstly, more systematic preparation for the meeting would ensure that needed data were available at the start of the meeting; secondly, more structured debate with previous advice of the Committee as a point of reference would avoid repetition of unproductive analysis; and thirdly, concurrent consideration of stocks would permit more rapid resolution of the many time-consuming questions of technical details of assessments.

STACFIS agreed to the following measures to improve the efficient use of its time at future June meetings:

i) In consultation with designated experts, the Chairman of STACFIS should write, in advance of the meeting, to experts concerned with the various stock assessments, requesting them to bring specified data with them to the meeting. This does not preclude the presentation of additional relevant data.

ii) The Chairman of STACFIS should establish two *ad hoc* working groups for the duration of the June meeting. These working groups should carry out the detailed assessments for (a) cod and (b) other species, reporting their progress daily to STACFIS and requesting guidance on matters they cannot resolve themselves. STACFIS should permit its members to draw attention to serious deficiencies in working group assessments but should not be a forum for debate of assessment details. The latter should be dealt with in the working groups.

iii) The previous year's advice of STACFIS should serve as the point of reference for discussion of new data and analyses. An early decision should be taken on the justification for pursuing proposed initiatives for analyses different from those used in previous assessments.

III. ENVIRONMENTAL RESEARCH

1. Influence of Environmental Factors on the Distribution, Movements and Migration of Marine Species in the Northwest Atlantic

The *Ad hoc* Working Group, established at the June 1984 Meeting to identify ways in which the Environmental Subcommittee can further develop knowledge of this topic, met on 10 September 1984, with the following attendees: K. Drinkwater, R. Halliday and A. Pinhorn (Canada) and M. Ingham (USA).

STACFIS agreed with the Working Group that understanding the causes of recruitment variability is recognized as perhaps the fundamental problem in fisheries research at this time. Nonetheless, problems relating to environmental effects on migration and distribution can also be of importance to aspects of the work of the Council, and additional research attention appears merited. This need not necessarily detract from ongoing efforts devoted to recruitment studies.

Documentation presented at the June 1984 Meeting, and the ensuing discussion, identified a wide variety of environmental effects on migration and distribution, but most interest focussed on delineation of stock boundaries and on variation in availability. It was found to be easier to list specific problems of direct and immediate interest to the stock assessment and fisheries management process under the heading of availability than of stock delineation. Thus, problems relating to availability present the greater opportunity for focussing research attention and thus for achieving progress in understanding environmental effects.

STACFIS felt that the Council should now encourage contributions which evaluate the nature and importance of environmentally-induced variation in availability relevant to stock assessment and fishery management matters. One useful way would be the production of a bibliography of historical studies on availability problems in the Northwest Atlantic, and it was suggested that the Council request the Assistant Executive Secretary to do this for the June 1985 Meeting. Another way would be the production of a tabulation of availability-related problems currently being faced in the stock assessment and advisory work in the Northwest Atlantic. If agreed by the Council, the Chairman of STACFIS will compile such a report for the June 1985 Meeting, based on solicited contributions from scientists involved in NAFO stock assessment work, from the Canadian Atlantic Fisheries Scientific Advisory Committee, and from the U.S. National Marine Fisheries Service, Northeast Fisheries Center. Contributions would be based on stock assessment experiences in 1984. It was noted that a further suggestion to include an item on 'environmental factors affecting availability to survey gear' in the agenda for the Special Session on Biological Surveys had already been considered by the Convener of the Session on Biological Surveys (see Section VI.1.c).

2. Chairman of Environmental Subcommittee

The nomination of Mr M. Stein, Federal Republic of Germany, as Subcommittee Chairman was unanimously approved by STACFIS, and the Chairman of STACFIS agreed to notify Mr Stein of his appointment to this position.

3. Flemish Cap Research

A research document relevant to the Flemish Cap Project (SCR Doc. 84/IX/95) was deferred until the June 1985 Meeting.

IV. AGEING TECHNIQUES AND VALIDATION STUDIES

1. Ageing of Roundnose Grenadier

A verbal report was presented by J. Messtorff (EEC) on age determination of roundnose grenadier (*Coryphaenoides rupestris*) from scales. The ageing method used was demonstrated by a selection of color slides showing the growth zones on scales as they appear after impregnation with silver nitrate and being photographed or viewed under polarized light (SCR Doc. 80/VI/92). The growth zones showed up very clearly and distinctly. The same method is applied for ageing redfish by scientists of the Federal Republic of Germany. The scale samples were provided by W. Mahnke (German Democratic Republic) in persuing an exchange of otolith and scale samples for comparing results of age determinations by different methods and readers.

V. REVIEW OF OTHER SCIENTIFIC PAPERS

1. Zooplankton-Larval Herring Relations in the Eastern Coastal Gulf of Maine, 1982 (SCR Doc. 83/VI/66)

This document summarizes results of a zooplankton-larval herring survey, with emphasis on relations between copepods and herring larvae. The results showed that larval herring fed mainly on immature calanoid copepods, and that they were not feeding at an optimal rate because density of available food was low. The authors recommended that further efforts be devoted to determining age-specific mortalities and relative condition of larvae sampled over a specific egg-bed, together with estimates of larval drift, in assessing spawning success of coastal stocks of herring.

2. Larval Herring Surveys in Maine and New Brunswick Waters, 1982 (SCR Doc. 83/IX/67)

This document presents results on the distribution and drift of larval herring. Analysis of data showed a concentration of larvae in the western sector throughout the survey from October to December 1982. The location of recently-hatched larvae seemed to be more closely related to the currents retaining them than to the exact positioning of egg-beds. Three cohorts of larvae were

caught in the fall of 1982, two of which were presumably hatched late. The authors plan to continue to monitor larval abundance and to determine the patterns of larval distribution and dispersal in eastern Maine coastal waters.

3. Fecundities of Herring Spawning Populations in Gulf of Maine (SCR Doc. 83/IX/68)

Length-specific fecundities were estimated for mature female herring obtained from sampling of commercial catches along the Maine coast in 1982. No significant differences in fecundity between groups were found, indicating that spawning groups in the Gulf of Maine stock could not be differentiated by means of fecundity. By comparing historical fecundity-at-length data, the authors suggested that fecundity increases as spawning stock size declines. STACFIS observed that it would have been interesting to see maturity-at-age data, together with maturity-at-length, because it has been shown that depleted herring stocks tend to mature at earlier ages.

4. Co-occurrence of Cunner and Cod in a Temperate Fish Assemblage (SCR Doc. 84/VI/10)

Diving observations on cunner (*Tautogolabrus adspersus*) and cod (*Gadus morhua*) schools were made off Block Island, Rhode Island, USA, in July 1983. The behavioral observations suggest that heterotypic fish aggregations are an adaptive predator avoidance strategy. The occurrence of these aggregations is probably opportunistic, because the local distribution of cunner and cod does not overlap and because size-class differences preclude the formation of such aggregations. The heterotypic aggregations also may have the effect of reducing daily natural mortality rates.

5. Maximum Age of Cod in Subareas 2 and 3 (SCR Doc. 84/VI/46)

From about 400,000 age determinations of cod during 1940-83 in Subareas 2 and 3, only 8 specimens were older than 26 years. On examination of catch cruves, it appeared that age 15 and older cod experienced a total instantaneous mortality of about 0.20 higher than younger cod and the increase was considered by the author to reflect higher natural mortality upon these age-groups. STACFIS noted that the interpretation of the catch curves might be affected by the progression of dominant age-groups in the series and by any trend in the degree of error in interpreting ages.

6. Growth of Cod in Divisions 2J, 3K and 3L, 1971-83 (SCR Doc. 84/VI/90)

In the 1970's, substantial increases in growth of cod occurred in Div. 2J and 3K and more modest increases in Div. 3L. For Div. 2J and 3K, however, mean lengths of age-groups 7, 8 and 9 decreased in the 1980's. The possible effects of environmental changes upon growth were not discussed. It was noted that the biomass of cod in this area declined markedly from 1962 to 1976 and then showed a similarly rapid increase to 1980 and probably to 1982. Density-dependent growth is therefore a distinct possibility. STACFIS noted that this decrease in growth may well continue as the population biomass increases and may have the effect of decreasing the estimates of long-term sustainable yield.

7. Stomach Contents of the Atlantic Wolffish in the Northwest Atlantic (SCR Doc. 84/VI/12)

Stomach contents of Atlantic wolffish (*Anarhichas lupus*), collected in the Northwest Atlantic from West Greenland to the Scotian Shelf, were summarized according to the proportion by volume of each food item as well as frequency of occurrence of the items. Invertebrates and fish comprised 85% and 15% of the food respectively. The most important invertebrates were molluscs (especially whelks and Icelandic scallops), echinoderms (particularly brittle stars and sea urchins) and crustaceans (mainly crabs). Redfish formed the predominant fish food. Molluscs increased and echinoderms decreased with increasing size of wolffish.

8. Estimates of Discarding by the Newfoundland Offshore Fleet in 1982 (SCR Doc. 84/VI/28)

Estimates of discards by the Newfoundland offshore fleet were obtained by observers on some of the vessels. These estimates indicate only approximate levels of discards, because it was not

possible to weigh the discarded fish but merely to estimate by eye the proportions being discarded. Discards were lowest for the cod, redfish, shrimp and witch flounder fisheries, intermediate for the yellowtail flounder and Greenland halibut fisheries, and highest for the American plaice fishery.

9. Comparative Morphology of Pre-extrusion Larvae of Sharp-beaked Redfishes (SCR Doc. 84/VI/84)

Morphometric, meristic and pigmentation characteristics were recorded for late-stage pre-extrustion larvae taken from 2 adult *Sebastes mentella* and 4 adult *S. fasciatus* from Div. 3Ps. The adults were identified to species by gasbladder musculature criteria. Discriminant analysis correctly classified up to 95% of the larvae examined. STACFIS noted that the low number of adults, from which larvae were obtained, was a limiting factor in applying the criteria to larval identification in general. Also, examination of larvae at different post-extrusion stages to determine separation criteria is necessary because morphometrics and pigmentation may change as the larvae grow. Further studies along this line are encouraged.

10. Food Energy of Major Commercial Species in Georges Bank Region (SCR Doc. 84/VI/42)

The paper analyses food habits of pelagic, near-bottom and bottom species of fish on Georges Bank and in adjacent waters in relation to the formation of biomass of these groups of fish. Data are given to show that over half of the total fish stock in the surveyed area is formed at the expense of plankton food resources, about 25% of fish biomass is at the expense of nekton organisms, and only 14% through benthos.

11. Fat Content of Muscles, Gonads and Liver in Silver Hake and Red Hake (SCR Doc. 84/VI/43)

The paper analyzes the relationships between fat content of muscles and gonads and weight of liver in silver hake (*Merluccius bilinearis*) and red hake (*Urophycis chuss*) which were caught in winter on the shelf of Southern England (Hudson Canyon). It was found that fat content was proportional to weight of liver. Equations are given that permit calculation of fat reserves in the fish by using the weight of the liver.

12. Distribution of Larval Short-finned Squid in the Northwest Atlantic (SCR Doc. 84/IX/123)

A joint survey for short-finned squid (*Illex illecebrosus*) was conducted by Japan, Canada and USA during January-March 1982 aboard the Japanese research vessel *Kaiyo Maru*. Based on the data collected during the survey, the geographical and vertical distributions of larvae were reported. Larvae were widely distributed in areas between 72°W and 59°W, where temperature of the surface water was higher than 13°C, and were most abundant in the water layers above the thermocline along the northern edge of the Gulf Stream. Larval transport by the Gulf Stream and timing and location of spawning were discussed.

13. Portable Fish Measuring Station (SCR Doc. 84/VI/89)

A portable fish measuring board was demonstrated. A record is automatically entered on magnetic tape when the board is activated by a magnetic probe which can be incorporated into the handle of a fish-cutting knife. There is provision for the accumulation of additional data such as sex, maturity, etc. The board is described as portable, rugged and waterproof and has been tested under field conditions.

VI. OTHER MATTERS

1. Special Session on Design and Evaluation of Biological Surveys in Relation to Stock Assessments, September 1985

STACFIS agreed to the program proposed by the convener (J. Messtorff) as follows:

a) Survey design and operations

i) Stratified-random groundfish surveys (standard bottom trawls).

ii) Surveys designed for pelagic species (hydroacoustic surveys, midwater trawl surveys, aerial surveys).

iii) Surveys of commercially-exploited invertebrates (e.g. photographic surveys and trap surveys).

iv) Surveys of marine mammals (e.g. aerial surveys)

v) Surveys of early life stages of fish and invertebrates (e.g. eggs, larvae, juveniles) for stock assessment purposes.

b) Survey gear, performance and possible effects of catchability

i) Determination of gear parameters

ii) Variability of parameters according to towing speed, bottom conditions and topography, currents, etc.

c) Environmental factors affecting variation in catchability to survey gears

d) Evaluation of survey data

i) Survey indices

ii) Abundance and biomass estimates

iii) Reliability of survey estimates

e) Importance and value of survey data to stock assessments

STACFIS requested the convener and the Secretariat to collaborate on the preparation and distribution of the usual announcement for the Special Session as soon as possible after this meeting.

2. Possible Need for Further Workshop on Ageing Shrimp (SCS Doc. 84/VI/11)

It was agreed at the Shrimp Ageing Workshop in 1981 that research into age and growth of shrimp should continue and that another workshop be held in 2-3 years to review progress (NAFO Sci. Coun. Studies, No. 6, page 97). At the January 1984 Meeting of the Scientific Council, STACFIS reviewed the proposals from the first workshop in 1981 and recommended that the participants of the 1981 Workshop be contacted to see if there has been sufficient progress to warrant another session and that a report of the survey be made available to STACFIS at the June 1984 Meeting. During February-April 1984, a letter containing the proposal was sent to the participants of the 1981 Shrimp Ageing Workshop and to others as information became available on their interest in ageing shrimp. A number of responses to this letter were received and documented. Although only a few laboratories are actively engaged in research on ageing shrimp, there was general interest in another workshop but the general consensus was that more time was required. STACFIS agreed that hosting another shrimp ageing workshop within the next year would be premature. However, STACFIS considered that this research is important and accordingly

recommends

that participants in the 1981 Shrimp Ageing Workshop be contacted in approximately 2 years (January 1986) to see if there has been sufficient progress to warrant another shrimp ageing workshop.

3. Request for Advice on Seals

STACFIS noted that the NAFO Secretariat had received a joint request from Canada and EEC for advice from the Scientific Council on the scientific basis for management of harp and hooded seals (SCS Doc. 84/IX/26). The Committee noted that the deadline of 15 February 1985 for delivery of the advice would permit the joint request for advice on seals to be considered by STACFIS at the same time as the shrimp stocks are being considered, i.e. 16-22 January 1985. STACFIS also noted an invitation from the Greenland Fisheries and Environmental Research Institute in Copenhagen to host the meeting together with the shrimp meeting.

VII. ACKNOWLEDGEMENTS

The Chairman expressed his appreciation to T. W. Rowell and Ch. M. Nigmatullin who convened the Special Session on Squids, to W. G. Doubleday who convened the *ad hoc* Working Group on Assessment Guidelines and Organization of June STACFIS Meetings, to the rapporteurs and participants for their cooperation during the various sessions, and to the Secretariat staff for their support during the Meeting.

ANNEX 1. REVISED GUIDELINES FOR REPORTING STACFIS ASSESSMENTS

1. Introduction

The 'introduction' should review in detail the fishing activity in the most recent year, putting recent events in the context of trends over the most recent decade. Ancillary information not explicitly used in the assessment should be documented in this section.

a) Description of fishery

- dates and location
- changes in area fished during the year
- composition of fishing fleets
- gears
- regulations affecting gears, by-catch, etc.

b) Nominal catches

- historical nominal catches and TACs for the last ten years must be included in the STACFIS report
- monthly, gear and/or country breakdowns of nominal catches may be referenced in the STACFIS report but should not normally be presented in full there.

c) Anecdotal information relevant to the asessment

2. Input Data

Both the data used in the assessment and the methods by which the results are calculated should be documented in the STACFIS Report or in page references to cited literature. The survey designs, sampling methods, grouping and other combination of data must be unambiguously described. The years and weighting factors used in averaged data should be stated.

a) Commercial fishery data

- fishing effort and CPUE
- length and age composition
- biological information useful for assessments: sex ratios, maturity stages, stomach contents, parasites
- discarded catches: weights, length distribution
- by-catches: weight and length distribution by species

b) Data from research surveys

- distribution, movements, migrations
- tagging experiments
- abundance estimates: trawling, acoustic and photographic surveys
- other research surveys: recruit-precruit (eggs, larvae, 0-group), experimental fishing
- selectivity studies
- length and age compositions
- biological data: sex ratio, maturity, fecundity, food and feeding, multispecies association, parasitism, ecological data (communities, ecosystems, etc.)

c) Environmental data

- temperature, salinity, clines
- winds, currents
- ice conditions

3. Estimation of Parameters

In all cases, the underlying mathematical model must be stated or cited. The method of estimation (e.g. unweighted least squares regression) must be unambiguously stated or cited, together with the input data (see Section 2 above).

a) Sequential population analysis (SPA)

- partial recruitment values
- natural mortality (and any immigration or emigration rates)
- fishing mortality (F) for the last year and oldest age
- correlations of various assessment parameters with survey data and other independent estimates of abundance (commercial catch rates, survey catch rates, survey biomass estimates, etc.)

b) General production model

- model parameters and standard errors

c) Growth curve

- model parameters and standard errors

d) Yield-per-recruit

- partial recruitment values
- natural mortality rates
- weights-at-age
- other model parameters

e) Pooling of abundance estimates

- formula used and weighting factors
- resulting index

f) Mark and recapture estimates

- mortality rates of marked animals
- catchabilities of marked and unmarked animals
- rates of tag loss, immediate and long-term
- mixing of marked and unmarked animals
- non-reporting of tags
- stock abundance

4. Assessment Results

Detailed results of assessment calculations must be reported in research documents or in the STACFIS Report. Where results may be of direct interest to commissioners, they should be summarized in tabular and/or graphical form, where feasible, in addition to the detailed tables. Final tabular data calculated by STACFIS, which is too voluminous for inclusion in the STACFIS report, must be included in a STACFIS research document.

a) Sequential population analysis (SPA)

- population numbers at age
- fishing mortality at age
- biomass at age
- total biomass and biomass of exploitable stock (specify date)
- recruiting year-classes: numbers and calculations of geometric mean, if required for prognosis input

b) Yield-per-recruit

- specific fishing mortalities (F_{max} and $F_{0.1}$)
- yield per recruit and exploitable biomass per recruit for a systematic series of F values including F_{max} and $F_{0.1}$

c) General production analysis

- maximum sustainable yield and fishing effort
- yield at 2/3 MSY effort and associated fishing effort

5. Prognoses

Relevant conclusions, projections and general prognoses should be clearly stated, and without reference to technical terms, whenever possible.

a) General biological information

- future implications of observed trends in catches and catch rates
- implications of biological information regarding year-class size, exploitation rates and stock abundance at present and in future
- implications of observed trends in fishing effort, fleet composition, etc., on future exploitation rates
- implications of research data regarding recent exploitation rates and current and future stock abundance

b) General production model

- current fishing effort in relation to f(MSY) and 2/3 f(MSY)
- projected catch at f(MSY) and 2/3 f(MSY)
- implications of model calculations (e.g. strong recruitment forecasts from young-fish surveys)

c) Catch projections

- table of input parameters

Age	Number (initial year)	Catch or F (initial year)	Weight (initial and subsequent years)	Partial Recruitment

- natural mortality rate (input)
- F or catch for projected years (input)
- recruitment for projected years (input)
- table of catch-at-age by number and weight for each year
- table of population-at-age by number and weight for each year
- total catch in weight
- total population biomass (and other biomass estimates, as relevant)
- average fishing mortality rate by year (specify weighting scheme)

6. Other Regulatory Measures

This section should document the basis for advice formulated on regulatory measures such as mesh sizes and seasons. Quotation and citation of input data, parameter estimates and conclusions should be consistent with the guidelines of Sections 2-5 above, with appropriate adaptation where needed.

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

Chairman: J. Messtorff Rapporteur: Sv. Aa. Horsted

The Committee met at NAFO Headquarters in the Bedord Institute of Oceanography, Dartmouth, and at the Lord Nelson Hotel, Halifax, Nova Scotia, Canada, on 8 and 11 September respectively. The following members attended one or both sessions: J. Messtorff (Chairman), R. G. Halliday and A. T. Pinhorn (Canada), Sv. Aa. Horsted (EEC), and H. Hatanaka substituted for S. Kawahara (Japan). J. E. Carscadden substituted for A. T. Pinhorn at the first session. The Executive Secretary (J. C. E. Cardoso) and the Assistant Executive Secretary (V. M. Hodder) attended both sessions.

1. Review of Scientific Publications Since June 1983

At its meeting in June 1984, the Committee reviewed the scientific publications since June 1983, and reference is made to the report of that meeting (SCS Doc. 84/VI/23, App. III). Further information was given by the Assistant Executive Secretary at the present meeting.

a) Journal of Northwest Atlantic Fishery Science

i) Volume 4 (Guide to the early stages of marine fishes in the western North Atlantic, Cape Hatteras to the southern Scotian Shelf, by M. P. Fahay) has received very wide and positive critique and was selling very well outside the usual group of subscribers to NAFO publications.

ii) Volume 5(2) is in preparation, with nine contributions having been reviewed and accepted. The volume is expected to be ready for distribution before the end of the year. It was noted that 19 other contributions are under review for future issues.

b) NAFO Scientific Council Studies

Number 7 was completed in August 1984 and has been circulated.

c) NAFO Scientific Council Reports

Provided that no further meetings of the Scientific Council will take place during 1984, the reports of the meetings in January, June and September are likely to be published and circulated by the end of the year.

d) NAFO Statistical Bulletin

Volume 32 for 1982 has been further delayed due to the need for catch statistics from some joint-venture fishing to be finalized. It is hoped that the volume will be ready for circulation by November 1984.

Catches from joint-venture arrangements in 1980 and 1981 also added further complications to the revision of the Statistical Bulletin for these two years. The recommended revision and issue of complete revised editions of Statistical Bulletin for the years 1977-81 was discussed. It was noted that if the necessary funds were available, it would be possible to issue four of these volumes in 1985, whereas one (for 1980) was expected to be issued in 1984. Holding the view that the revision and issue of these volumes should be made as soon as possible to avoid misleading statistics being used over a long period, the Committee

recommends

that the Executive Secretary take the necessary steps to make funds available for revision, publication and distribution in 1985, if possible, of four out of five volumes of Statistical Bulletin for the years 1977-1981.

The Committee noted that the corrected data are available as computer printouts upon request to the Secretariat pending the publication of the revised volumes.

e) List of Fishing Vessels, 1983

Reports have now been received from 14 countries and some further reports are expected during the present meeting. The Assistant Executive Secretary anticipated that the list would be ready for circulation before the end of the year or early in 1985.

f) Index and List of Titles of Meeting Documents

The provisional list for 1984 could be available early next year, but, since this list would be the last part of the 5-year index for 1980-84, it is proposed that the 5-year index of meeting documents be compiled and issued in early 1985 (probably March). It was decided that the volume, labelled NAFO, would be issued as No. 4 so as to continue the series (No. 1-3) issued under the aegis of ICNAF. An index and list of titles of Journal and Studies papers for 1980-84 will be prepared as a summary document for the June 1985 Meeting.

g) Sampling Yearbook

All indexes of samples covering the two 6-year periods (1967-72 and 1973-78) were now compiled. The Committee decided that the indexes should be published as one volume rather than two.

2. Editorial Policy Regarding Scientific Council Publications

a) Editorial Board for the Journal

i) As agreed by the Committee at its June 1984 Meeting, the Assistant Executive Secretary had been in contact with some scientists that were proposed as possible candidates for Associate Editor for Invertebrate Fisheries Biology. Dr. G. P. Ennis (Canada) was willing to accept the nomination, and the Committee

recommends

that Dr. G. P. Ennis (Canada) be appointed Associate Editor of the Journal of Northwest Atlantic Fishery Science for contributions on Invertebrate Fisheries Biology.

ii) By letter of 21 June 1984, the Editor of the Journal (V. M. Hodder) had announced that after 1984 he would no longer be able to undertake the voluntary job as Editor in addition to his many duties as Assistant Executive Secretary.

The Chairman expressed the Committee's understanding and its regret of this decision and thanked Mr. Hodder for his great effort and his success in ensuring a widely-recognized scientific publication of high standard. The Committee agreed that for practical reasons the editor should preferably be from a place where he could maintain close (and cheap) contact with the Secretariat. About a dozen names were brought forward as possible candidates for a new editor. The Chairman will contact these people to obtain their views, and the Committee will discuss the matter at its meeting in June 1985. Until then, Mr. Hodder is willing to continue as editor.

b) Review of Guidelines and Terms of Reference for Editors and Associate Editors

The Committee reviewed the guidelines as set out in Annex 1 of the report of the June 1981 Meeting of STACPUB (Redbook 1981, page 77). Taking into account that in the near future the Editor may not be the same person as the Assistant Executive Secretary, who implements the Scientific Council's publication policy, the third sentence in Annex 1 should therefore be revised to read "The Editor will be responsible to STACPUB for implementation of Scientific Council editorial policy". Consideration of Annex 2 (Terms of reference for Journal editors) was deferred to the June 1985 Meeting of the Committee.

3. Production of Microfiche

The Executive Secretary reported that, as recommended by STACPUB in June 1984, he had included the necessary item for production of 30 sets of microfiche copies of ICNAF scientific documents in his budget estimates for 1985 to be considered by STACFAD at the present Annual Meeting of NAFO. In his presentation of the budget estimates, the Executive Secretary would underline that these funds were a short-term investment and would be returned within 2-3 years by the sale of microfiche sets. Positive response from laboratories interested in the microfiche would probably increase as the charge for a full set of the microfiche was now estimated to be about 750 dollars (Can.).

4. Papers for Possible Publication

The Assistant Executive Secretary reported that, following the decision of the Committee at its June 1984 Meeting, SCR Doc. 84/34, 65 and 87 on 0-group silver hake surveys were now being combined into a joint analysis by the authors, and SCR Doc. 84/VI/79 and 88 were being revised but as separate papers. SCR Doc. 84/VI/70 (review of oceanic environmental conditions during 1983), consideration of which was deferred to the present meeting of the Committee, was discussed, and it was agreed that this paper should be published in Scientific Council Studies.

The Committee reviewed the scientific papers submitted to the present meeting of the Scientific Council, including papers for the Special Session on squids. The Committee found that for the following documents the author(s) should be invited to submit their papers with possible revisions for publication: SCR Doc. 84/IX/97, 99, 100, 101, 102, 103, 104, 106, 108, 110, 111, 112, 113, 114, 115 and 118. It was proposed that SCR Doc. 84/IX/98, 107, 109, 116, 119, 120 and 121, and the undocumented contributions by C. F. E. Roper and by D. Webber and R. O'Dor should be circulated to and reviewed by STACPUB members when the completed and/or revised papers become available. SCR Doc. 84/IX/117 should be revised by the author to the satification of the conveners of the Special Session before its possible publication. It was noted that SCR Doc. 84/IX/123 was already submitted for publication in one of the NAFO series. Because this paper considers research on squids, the Committee agreed that the paper should preferably be published in the special volume together with the other squid papers.

The Committee noted that, although some of the papers submitted to the Special Session on squids would not normally be considered for publication by themselves, a special volume of Studies containing all or nearly all contributions to the Special Session could be considered. Such a special volume should have an introduction and review of sections by topics. The Conveners of the Special Session should be invited to cooperate with the Editor in the preparation of such a volume. It was decided that the deadline for submission of papers referred for further consideration by STACPUB members (SCR Doc. 84/IX/98, etc., as listed above) would be 30 November 1984, whereas the deadline for submission of revised manuscripts already nominated for publication by the Committee would be the end of the year.

Consideration of SCR Doc. 84/IX/95 and 105 was deferred to the June 1985 Meeting of the Committee, while the Assistant Executive Secretary would receive comments on SCR Doc. 84/IX/96 by STACPUB members after this paper had been presented later on in STACFIS at the present meeting of the Scientifi Council.

5. Role and Scope of Scientific Council Studies

Following its proposal at the June 1984 Meeting to review the role and scope of the Scientific Council Studies series at the present meeting, the Committee noted that this publication seems to cover three categories of contributions: (i) papers on a specific topic, e.g. papers presented at symposia or special sessions; (ii) manuals such as the Groundfish Survey Manual and review papers such as review of environmental conditions; and (iii) papers selected from those presented to Scientific Council or submitted directly to the editor but not deemed of sufficient scope or of a standard suitable for the Journal of Northwest Atlantic Fishery Science.

Some members expressed concern that Studies was not proving a sufficiently attractive vehicle for authors to publish their papers. Some members indicated that the Special Publication series should be reinstituted for symposia-proceedings type publication. The Committee, however, generally agreed that consideration of this item deserved broader discussion in the most-involved laboratories. It was, therefore, decided to consider this matter further at the June 1985 Meeting of the Committee. The Scientific Council representatives will be reminded of this matter well in advance of the June 1985 Meeting.

6. Acknowledgements

The Chairman thanked all members for their active participation in the meetings and the Secretariat for their efficiency in supporting the Committee's work.

APPENDIX III. SCIENTIFIC COUNCIL AGENDA - SEPTEMBER 1984

1. Opening (Chairman: V. A. Rikhter)
   a) Appointment of rapporteur
   b) Adoption of agenda
   c) Plan of work

2. Fishery Science (Chairman: J. Carscadden)
   a) Special Session on "Biology and Ecology of the Squids, *Illex illecebrosus* and *Loligo pealei*, in the Northwest Atlantic" (Conveners: T. W. Rowell and Ch. M. Nigmatullin)
      i) Early life histories and their relation to oceanic processes
      ii) Size distribution and cohort components related to the life cycle
      iii) Sexual maturity and growth
      iv) Large-scale and micro-scale distributional characteristics in relation to environmental conditions
      v) Age validation techniques
      vi) Predator-prey relationships
      vii) Sampling methodology
      viii) Biological implications to management
   b) Stock assessments
      i) Consideration of further management options for the cod stock in Subdiv. 3Ps, as requested by the EEC in June 1984
      ii) Working group (Convener: W. G. Doubleday) on evaluation of guidelines for documenting STACFIS assessments (including excessive workload of STACFIS and efficient means of handing future assessments at June meetings)
   c) Environmental research
      i) Matters relevant to Flemish Cap Project
      ii) Working group on influence of environmental factors on distribution, movements and migration of marine species in the Northwest Atlantic
      iii) Appointment of Subcommittee Chairman
   d) Ageing techniques and validation studies (deferred from June 1984 Meeting)
   e) Gear and selectivity studies (deferred from June 1984 Meeting)
   f) Review of some research documents not considered at the June 1984 Meeting (SCR Doc. 83/66, 67, 68; SCR 84/10, 12, 28, 42, 43, 46, 84, 89, 90)
   g) Other matters
      i) Development of topical outline relevant to the theme for the special session in September 1985, namely "Design and Evaluation of Biological Surveys in Relation to Stock Assessments"
      ii) Feasibility of holding another workshop on ageing shrimp, based on solicited comments of participants in the 1972 Workshop

3. Research Coordination
   a) Further consideration of reporting requirements for sampling data of 1979 and subsequent years (SCS Doc. 84/23, App. II)

4. Publications (Chairman: J. Messtorff)
   a) Editorial policy regarding Scientific publications
      i) Review of guidelines and terms of reference for editors and associate editors
      ii) Appointments to Editorial Board (associate editor and editor)
   b) Progress report on microfiche proposal
   c) Papers for possible publication
   d) Other matters

5. Collaboration with Other Organizations
   a) Preliminary report on CWP Session held at Copenhagen, Denmark, 25 July-1 August 1984

6. Adoption of Reports

   a) Standing Committee on Fishery Science (STACFIS) (this meeting)

   b) Standing Committee on Publications (STACPUB) (this meeting)

   c) Provisional report of Scientific Council Meeting, June 1984 (SCS Doc. 84/VI/23, excluding Appendices)

7. Review of Future Meeting Arrangements

   a) Assessment of shrimp stocks (deferred from June 1984 Meeting and scheduled for 16-22 January 1985 at Copenhagen, Denmark) and seals (joint request by Canada and the EEC).

   b) Meeting of Scientific Council and its Committees in June 1985 (tentatively scheduled for 5-20 June at Dartmouth, Canada)

   c) Annual Meeting in September 1985 (including special session on "Design and Evaluation of Biological Surveys in Relation to Stock Assessments")

   d) Tentative dates for June 1986 Meeting.

8. Other Matters

   a) Provision of scientific advice at mid-term meetings by STACFIS in absence of Scientific Council Chairman and Vice-Chairman

   b) Term of office for Subcommittee Chairman

   c) Procedure for adoption of agenda at meetings

9. Adjournment

APPENDIX IV. LIST OF PARTICIPANTS

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* Attended Special Session on Squids only.

APPENDIX V. LIST OF RESEARCH AND SUMMARY DOCUMENTS

A. RESEARCH (SCR) DOCUMENTS

SCR No.	Ser. No.	Title	Author(s)
84/IX/95	N890	USSR ichthyoplanton investigations within the framework to the Flemish Cap Project in 1978-1983.	V. P. Serebryakov A. V. Astafjeva A. K. Chumakov V. K. Aldonov
84/IX/96	N891	A contribution to by-catch levels of Greenland halibut (*Reinhardtius hoppoglossoides* Walb.) in the roundnose grenadier (*Coryphaenoides rupestris* Gunn.) directed fishery in NAFO Subarea 2.	P. Ernst
84/IX/97	N894	Yield analysis for the long-finned squid, *Loligo pealei* (LeSueur)	A. M. T. Lange M. P. Sissenwine E. D. Anderson
84/IX/98	N895	Comparative life history adaptations of some myopsid and sepiolid squid.	W. C. Summers
84/IX/99	N896	A comparative description of the life cycles of five Ommastrephid squids fished by Japan: *Todarodes pacificus*, *Illex illecebrosus*, *Illex argentinus*, *Nototodarus sloani sloani and Nototodarus sloani gouldi.*	H. Hatanaka S. Kawahara Y. Uozumi S. Kasahara
84/IX/100	N897	Influence of oceanographic factors on cephalopod distributions and life cycles: a review.	M. L. Coelho
84/IX/101	N898	Evaluation of male reproductive features in *Illex illecebrosus* for maturity staging.	M. L. Coelho R. K. O'Dor
84/IX/102	N899	Properties of *Illex illecebrosus* egg masses potentially influencing larval oceanographic distribution.	R. K. O'Dor N. Balch
84/IX/103	N900	Feeding habits of the squid, *Todarodes sagittatus*, in the North Norwegian waters.	A. Breiby M. Jobling J. H. Sundet
84/IX/104	N901	Statolith length and increment number for age determination in squid *Illex illecebrosus* (LeSueur, 1821) (Cephalopoda: ommastrephidae).	C. C. Morris F. A. Aldrich
84/IX/105	N902	Changes in population structure and abundance of spiny dogfish off the northeast coast of the United States.	G. T. Waring
84/IX/106	N903	The population dynamics of short-lived species, with emphasis on squids.	D. Pauly
84/IX/107	N904	A bibliography of the ommastrephid squid genus *Illex*.	N. Balch
84/IX/108	N905	Predation by Atlantic cod (*Gadus morhua*) on short-finned squid (*Illex illecebrosus*) off eastern Newfoundland and in the northeastern Gulf of St. Lawrence.	G. R. Lilly D. R. Osborne
84/IX/109	N906	Distribution of maturing *Illex illecebrosus* relative to the shelf-slope water front of the northeastern United States.	A. M. T. Lange M. C. Ingham C. A Price
84/IX/110	N907	Development of an ageing technique for short-finned squid (*Illex illecebrosus*).	E. G. Dawe R. O'Dor P. H. Odense G. V. Hurley
84/IX/111	N908	Larval and juvenile distribution of the short-finned squid (*Illex illecebrosus*) in relation to the Gulf Stream frontal zone in the Blake Plateau and Cape Hatteras area.	T. W. Rowell R. W. Trites E. G. Dawe

SCR No.	Ser. No.	Title	Author(s)
84/IX/112	N909	Variation in length-weight relationships, condition, and feeding spectrum of short-finned squid (*Illex illecebrosus*) at Holyrood, Newfoundland.	E. G. Dawe
84/IX/113	N910	Changes in the distribution and biological characteristics in the Scotian Shelf popualtion of *Illex illecebrosus* over the 1980-1983 period.	T. W. Rowell J. H. Young J. C. Poulard J. P. Robin
84/IX/114	N911	Feeding and food consumption on long-finned squid (*Loligo pealei*) and short-finned squid (*Illex illecebrosus*) in Subareas 5 and 6, Northwest Atlantic.	R. O. Maurer R. E. Bowman
84/IX/115	N912	Distribution and peculiarities of allometric growth of larval *Illex* in the Norhtwest Atlantic.	Yu. M. Froerman T. S. Dubinina
*84/IX/116	N913	Life cycle and mechanism of abundance fluctuations in *Illex illecebrosus*.	Yu. M. Froerman
84/IX/117	N914	On feeding of two squid species in the Northwest Atlantic.	V. I. Vinogradov
84/IX/118	N915	Distribution, abundance and size structure of arrow squid (*Nototodarus* sp.) off New Zealand.	R. H. Mattlin R. E. Scheibling E. C. Forsch
*84/IX/119	N916	Reproductive biology and scale of maturity stages of the reproductive system of male squid (*Illex illecebrosus*).	Ch.M. Nigmatullin R. M. Sabirov Yu. M. Froerman
* 84/IX/120	N917	Reproductive biology and scale of maturity stage of reproductive system of female squid (*Illex illecebrosus*).	R. N. Burukovsky Yu. M. Froerman Ch.M. Nigmatullin
* 84/IX/121	N918	Squid resources of the Gulf of Mexico and South Atlantic Coast of the United States.	G. L. Voss
84/IX/122	N921	Estimates of age at maturity for cod in subdivision 3Ps.	C. A. Bishop
84/IX/123	N922	Geographical and vertical distribuiton of larval stage short-finned squid (*Illex illecebrosus*) in the Northwest Atlantic.	H. Hatanaka A. M. T. Lange T. Amaratunga

B. SUMMARY (SCS) DOCUMENTS

SCS No.	Ser. No.	Title	Author(s)
84/VI/23	N885	Provisional report of Scientific Council, 6-21 June 1984.	NAFO
84/IX/24	N892	German Democratic Republic research report for 1983.	P. Ernst
84/IX/25	N919	Polish research report, 1983.	A. J. Paciorkowski
84/IX/26	N927	Joint Canada-EEC request for advice on harp and hooded seals.	L. S. Parsons E. Gallagher
84/IX/27	N928	Cuban research report, 1983.	R. Dominguez
84/IX/28	N929	Report of the Scientific Council, Annual Meeting, September 1984.	NAFO

* Complete manuscripts not yet available for distribution.