PART B

Scientific Council Annual Meeting, 7-13 September 1996

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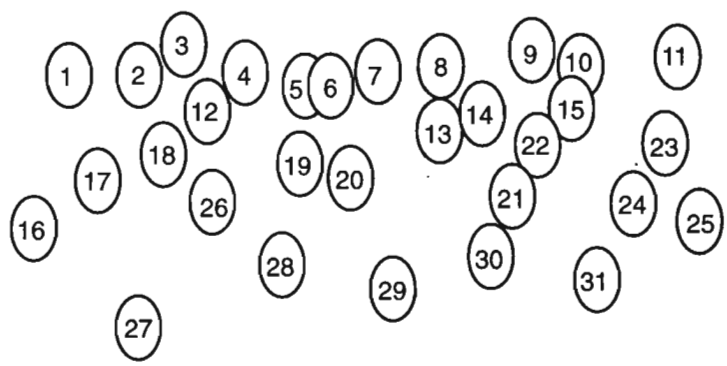


1. L. Motos
2. A. Avila de Melo
3. P. Rago
4. D. G. Parsons
5. E. de Cárdenas
6. J. Sigurjonsson
7. D. Power
8. W. B. Brodie
9. G. Stefansson
10. M. A. Showell
11. D. E. Pearce
12. D. B. Atkinson
13. C. M. Jones
14. K. Bruce
15. F. M. Serchuk
16. O. Folmer
17. A. Vazquez
18. M. L. Godinho
19. M. Sissenwine
20. A. Nicolajsen
21. L. O'Brien
22. D. Briand
23. K. Yokawa
24. J. Casey
25. H. Okamura
26. U. Skúladóttir
27. S. Junquera
28. H. Siegstad
29. W. R. Bowering
30. M. Stein
31. H. P. Cornus

Participants of Scientific Council Meeting, 7–13 September 1996

REPORT OF SCIENTIFIC COUNCIL

Annual Meeting, 7-13 September 1996

Chairman: W. R. Bowering Rapporteur: T. Amaratunga

I. PLENARY SESSIONS

The Scientific Council met at the Shuvalov Palace, St. Petersburg, Russia during 7-13 September 1996. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), European Union (Denmark, France, Germany, Portugal, Spain and United Kingdom), Iceland, Japan, Russian Federation and the United States of America. The Executive Secretary and Assistant Executive Secretary were in attendance.

The Executive Committee met briefly before the opening to discuss the plan of work.

The opening session of the Council was called to order at 1005 hr on 7 September 1996.

The Chairman welcomed everyone to this 18th Annual Meeting and to St. Petersburg, Russia. The Assistant Executive Secretary was appointed rapporteur.

The provisional agenda was **adopted** noting the assessment of shrimp stock in Div. 3M will be completed before the Fisheries Commission Meeting of 10 September 1996, and any other requests which could be forthcoming from the concurrent Fisheries Commission Meeting could be undertaken as needed.

The Council was informed that J. Casey (EU-United Kingdom), the elected STACFIS Chairman for the 2-year term beginning at the end of this Annual Meeting, could not undertake the position because of new commitments at his Institute. The Chairman, having consulted the Executive Committee, proposed that a new election would be most practical in June 1997 when most of the Council representatives would be present and when the Council was not preoccupied with the busy Annual Meeting activities. For the interim period, it was proposed that:

- the present STACFIS Chairman (W. B. Brodie) undertake the STACFIS work at the November 1996 Meeting,
- the Vice-Chairman and STACPUB Chairman (H. P. Cornus) undertake the STACFIS work of the June 1997 Meeting, and
- the STACFEN Chairman (M. Stein) undertake the STACPUB work, in addition to the STACFEN work, of the June 1997 Meeting.

The Council agreed to these interim measures, and extended its appreciation to the interim Chairmen willing to undertake this additional work. The Council extended its good wishes to J. Casey in his new commitments at his Institute.

The session was adjourned at 1030 hr on 7 September 1996.

The Council reconvened at 1620 hr on 9 September 1996 to review the summary report of the stock assessment on shrimp in Div. 3M. The report as given in Section VI (Management Advice and Responses to Special Requests for the Fisheries Commission) below was accepted by the Council.

The session was adjourned at 1725 hr on 9 September 1996.

The Council reconvened at 0905 hr on 10 September 1996 to consider the report of the 4-6 September 1996 Workshop on 'Assessment of Groundfish Stocks Based on Bottom Trawl Survey Results', and a progress report of the arrangements for the Symposium of September 1997 on 'What Future for Capture Fisheries', presented by the convener H. Lassen (EU-Denmark). A proposal for a Symposium for September 1998 was discussed and endorsed.

The session was adjourned at 0945 hr on 10 September 1996.

The Council reconvened briefly through 10-13 September 1996 particularly to consider requests from the concurrent Fisheries Commission sessions and discuss outstanding items in the agenda. These are reported in relevant sections below.

Due to the concurrence of the meetings of the Scientific Council and the Fisheries Commission Workshop (7-8 September 1996) on the 'Compatibility and Applicability of Discard/Retention Rules for Conservation and Utilization of Fishery Resources in the Northwest Atlantic', the Vice-Chairman of Scientific Council (H. P. Cornus) represented the Council at this Fisheries Commission Workshop. He repeated the advice given by Scientific Council since 1992 on this topic and answered questions from the Workshop participants on scientific matters. A summary of this Workshop is given in a Fisheries Commission report (NAFO FC Doc. 96/4).

The concluding session was called to order at 0900 hr on 13 September 1996. The Council considered and **adopted** the Reports of the Standing Committees STACFEN, STACFIS, STACREC and STACPUB and then **adopted** the Scientific Council Report of this meeting.

The meeting was adjourned at 1006 hr on 13 September 1996.

The reports of the Standing Committees are appended as follows: Appendix I - Report of the Standing Committee on Fisheries Environment (STACFEN), Appendix II - Report of Standing Committee on Fishery Science (STACFIS), Appendix III - Report of Standing Committee on Research and Coordination (STACREC), Appendix IV - Report of Standing Committee on Publications (STACPUB). The report of the Special Session Workshop on 'Assessment of Groundfish Stocks Based on Bottom Trawl Survey Results' which was held 4-6 September 1996, immediately prior to this Annual Meeting, is presented at Annex 1 of the Scientific Council Report, while Annex 2 gives the announcement of the 1997 Symposium on 'What Future for Capture Fisheries'.

Brief summaries of the Standing Committee Reports and other matters considered by the Scientific Council are given below in Sections II-X. The Agenda, List of Research (SCR) and Summary (SCS) Documents, and the List of Participants of this meeting are given in Part D, this volume.

II. FISHERIES ENVIRONMENT (see STACFEN report, App. I)

The Council welcomed the STACFEN report as presented by the Chairman M. Stein (EU-Germany). The Council noted STACFEN reviewed its Chairman's summary on environmental conditions in the Northwest Atlantic in 1995, and information arising out of the Workshop on the analysis of bottom trawl survey data held during 4-6 September, 1996. The Committee's list of national representatives for reporting oceanographic data was updated as listed in the STACFEN report.

III. FISHERY SCIENCE (see STACFIS report, App. II)

1. Opening

The Council accepted the report of STACFIS as presented by the Chairman, W. B. Brodie (Canada). The Council noted the Committee addressed the assessment of shrimp in Div. 3M, and other requests referred to it by the Council.

2. Matters Related to Stock Assessments

a) Assessment of Shrimp in Division 3M

The Council noted that STACFIS evaluated the status of shrimp in Div. 3M as reported in the STACFIS report in Appendix II. The Council agreed summary and conclusions are presented in Section VI of this report.

3. Arrangements for Conducting Stock Assessments in 1997

a) Updated list of Designated Experts

The Council concurred with the changes proposed by STACFIS to the List of Designated Experts, and requested the Secretariat to confirm the availability of the nominees.

4. Other Matters

The Council noted the review of one SCR Document deferred from the June 1996 Meeting dealing with the Greenland halibut fishery in Cumberland Sound.

IV. RESEARCH COORDINATION (see STACREC report, App. III)

1. **Opening**

The Council welcomed the report of STACREC as presented by the Chairman, D. Power (Canada), observing that all matters referred to it by the Council were addressed.

2. **Fisheries Statistics**

a) **Progress Report on Secretariat Activities in 1996**

The Council agreed with STACREC concerns on the lack of STATLANT 21A and B data for 1993, 1994 and 1995. Reiterating the need to receive data on a timely basis, the Council noted these concerns will be addressed by the General Council during this Annual Meeting.

The Council was particularly concerned with the delays in publishing the Statistical Bulletins, but noted that France (SP) data would be available shortly and that USA data would be ready by the end of 1996 to enable the publication soon thereafter of the 1993 Statistical Bulletin.

b) **Report of the Inter-Agency Consultation Relative to the CWP 17th Session**

The Council noted the Assistant Executive Secretary had attended the Coordinating Working Party on Fisheries Statistics - Intersession Consultation (CWP-ISC) in Rome, Italy, 9-11 July 1996, and a summary of the meeting report was presented to STACREC.

The Council was informed of the progress report on statistical activities of NAFO presented to CWP-ISC.

The Council noted that access to STATLANT data on the Internet via the World Wide Web (WWW) was an important topic which will be discussed at the 17th Session of CWP. In relation to this, the Council endorsed the view that STATLANT data were public domain, but when data are released to the public a *proviso* would have to be clearly stated to denote those data that were considered preliminary in nature.

The Council agreed with STACREC that it would be preferable for the NAFO Secretariat to create and maintain an independent WWW site rather than participate in a collaborative effort with other agencies, and, **recommended** that *the Secretariat prepare a report on technical and financial considerations in creating and maintaining a web site for statistical data, for consideration at the June 1997 Meeting of the Scientific Council.*

The Council agreed with the STACREC views relative to the application of the International Whaling Commission (IWC) for membership in CWP, and also concurred that information be requested from CWP that will clarify the criteria required to evaluate potential membership in CWP.

c) **Reporting of Catches of *Pandalus borealis***

The Council noted the discussion by STACREC on the reporting criteria for northern shrimp. In order that proper codes are applied to the STATLANT data, the Council endorsed the **recommendation** that statistical agencies report these catches by species, as follows: *Pandalus borealis* (Northern prawn, PRA, code 632), or *Pandalus montagui* (Aesop shrimp, AES, code 633). In situations where identification to the species level is unknown, then *Pandalus* spp. (Pandalid shrimps, PAN, code 639) be used.

3. **Review of Research Documents**

The Council noted that STACREC reviewed four SCR Doc. and summarized the information.

4. **Other Matters**

a) **Descriptions of Fishing Effort**

The Council agreed that the current definition of fishing effort for gillnets (fixed) in NAFO STATLANT 21B forms required change to reflect soak time and, accordingly, **recommended** that *the definition of the fishing effort measures for gillnets (fixed) be changed to read 'length of net expressed in 100 meter units multiplied by the number of soak days per haul'.*

The Council noted that in preparation for the CWP 17th Session in Hobart, Tasmania in 3-7 March 1997, in addition to matters relating to the CWP-ISC reported above by STACREC, there was a need to review definitions of fishing effort for several other passive gear types and agreed that further comments on suitability be solicited from Council members.

V. PUBLICATIONS (see STACPUB *report*, App. IV)

The Council received the STACPUB report as presented by the Chairman, H. P. Cornus (EU-Germany), and made specific note of the following items.

1. **Review of Scientific Publications**

The Council acknowledged that the publication of papers from the September 1993 Symposium is envisaged for October 1996. It noted with pleasure that this issue has been brought to an end.

Papers from the September 1995 Symposium and those for a Studies volume on Div. 3M Shrimp are in the review or final editorial stages. It is expected that the publications may be finished in 1996. Also the Studies Number 25 (Flemish Cap: Selected Environmental and other Papers) has been published and mailed.

2. **Promotion and Distribution of Scientific Publications**

The invitational paper by Halliday and Pinhorn had been received in July 1996 and a single the volume of the *Journal of Northwest Atlantic Fishery Science* is due to be printed shortly. The Council endorsed the STACPUB proposal to promote and advertise this volume by a special flyer to attract the interest of people dealing with the history of fishery management.

3. **Editorial Matters**

The Council was informed that changes in the Editorial Board of the Journal had been addressed in the June 1996 Meeting of STACPUB.

4. **Review of Papers for Possible Publication**

The Council was informed that the material from the 1996 September Workshop is planned to be published in the Scientific Council Studies. STACPUB reviewed 23 SCR Documents from the 1996 September Meeting and 5 papers deferred from the June 1996 Meeting, and nominated 3 for publication consideration. Also, 21 papers listed during the June 1996 meeting which dealt with cod in Div. 2J+3KL were reviewed for possible publication. The latter ones were considered suitable to be published in a single volume of Studies.

VI. MANAGEMENT ADVICE AND RESPONSES TO SPECIAL REQUESTS FROM THE FISHERIES COMMISSION

1. **Assessments**

The Council reviewed the STACFIS assessment of shrimp in Div. 3M and the Council agreed summary and advice is as follows:

Shrimp in Division 3M

Background: The fishery for shrimp on Flemish Cap only began in April, 1993, although its occurrence in the area has been known for many years.

Fishery and Catches: This multi-national fishery produced catches as follows:

Year	Catch (tons)
1993	28 000
1994	24 000
1995	33 000
1996 (to August)	33 000

The estimate of catch to the end of 1996 is about 50 000 tons.

Since 1993, the proportion of males in the catches increased such that they dominated the catches of 1995 and 1996.

The fishery was unregulated in 1993. Sorting grates and a related by-catch regulation were introduced in 1994. Effort regulations were implemented in 1996.

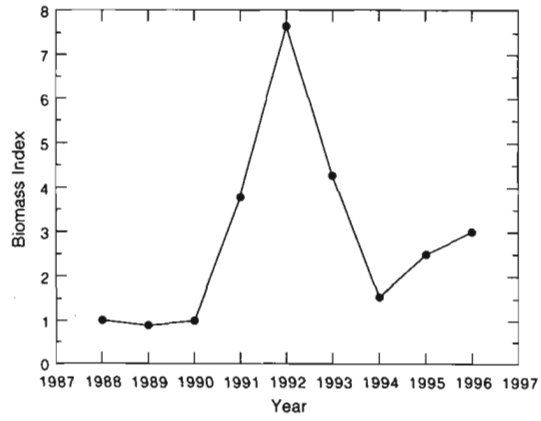
Data: Catch, effort and biological sampling data were available from the trawlers of several nations. A time series of biomass estimates was produced from catches of shrimp taken in EU groundfish surveys in Div. 3M from 1988 to 1996. Biological samples of shrimp also were obtained during the surveys. Oceanographic data were obtained from Canadian surveys on Flemish Cap in the summers of 1993, 1995 and 1996.

Assessment: No analytical assessment was available and the fishing mortality is unknown. Evaluation of the status of the stock was based on the interpretation of commercial fishery data (catch, effort and catch rates), the time series of research biomass indices and biological data from both sources.

Commercial CPUE: The catch-rate data for the female component of the commercial catches indicate a 70% decline between 1993 and 1996.

Recruitment: The 1988 year-class was strong, dominating in the surveys of the early-1990s and yielding high catch rates in the first year of the fishery. All year-classes produced since 1988, except the 1993 year-class, have been much weaker. The 1993 year-class contributed substantially to the 1995 catches and dominated the fishery in 1996. The 1994 year-class appears weak from both data sources.

Biomass: Only indices of biomass were available from the EU surveys. It is believed that these indices reflect the general changes in the age 3+ component of the stock over time.



State of the Stock: The 1988 year-class no longer contributes to the fishery which, in 1996, was largely dependent on the 1993 year-class. The continuation of a fishery which targets male shrimp as young as age 2 is undesirable because the harvest of males reduces future spawning potential. Data from both the fishery and research survey in 1996 showed that the 1993 year-class was much stronger than was evident in the 1995 assessment and that the 1994 year-class appears weak. The decline in catch rates of large, female shrimp from 1993 to 1996 is considered to be a reasonable reflection of the trend in the spawning stock biomass.

Recommendations: Despite the strength of the 1993 year-class, concerns expressed in 1995 for the continued decline of the spawning stock are still warranted, given the high level of exploitation on the 1993 year-class in 1995 and 1996 and evidence to suggest that the 1994 year-class is weak. Therefore, any fishing permitted in 1997 will be directed at what remains of the 1993 year-class, which is expected to change sex between 1996 and 1997. No projection of the residual biomass for this year-class in 1997 is available. A significant reduction in fishing intensity is necessary to arrest the apparent continued decline in the female component of the stock and to conserve males. Therefore, if a fishery is permitted in 1997, catches should be kept at the lowest possible level.

Special Comments: The effort regulations imposed in 1996 did not reduce the exploitation of the shrimp resource in Div. 3M. Catch and effort in 1996 attained record high levels.

Redfish by-catches were high in 1993 and 1994. In 1994, sorting grates with 28 mm bar spacings were required. Spacings were reduced to 22 mm in 1995 and 1996 and by-catch levels were much lower. It is not clear, however, if the reduction was due entirely to changes in bar spacing or to a reduction in redfish abundance.

Sources of Information: SCR Doc. 96/87, 88, 90, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 104.

2. Special Requests from Concurrent Fisheries Commission Meeting

a) Request on Witch Flounder Stocks in Div. 2J and 3KL

The Scientific Council was requested to: *review the status of the witch flounder stock in Div. 2J+3KL and to provide estimates of the current size of the stock together with a description of recent trends.*

The following was the response from Scientific Council:

Data from Canadian surveys indicate a decline in biomass of about 95% from the early-1980s to the present. These data also showed a shift in distribution to deeper water and toward the NAFO Regulatory Area in Div. 3L since the late-1980s. Trends in biomass in the Regulatory Area are not known at present, although Canadian deepwater surveys indicate an increase in catch per set from 1994 to 1995.

It was acknowledged that the Canadian surveys, which generally did not fish at depths beyond 1 000 m, did not cover the full distribution of the stock. Although catches in the Canadian fishery declined by about 90% from 1990 to 1993, more detailed information from the fisheries by EU-Spain in the deep water areas of the Regulatory Area, and by Canada inside the 200 mile line, was not available at this meeting.

It was **recommended** that *fishery data for witch flounder in Div. 2J+3KL be made available for review at the June 1997 Meeting.*

b) Request to Evaluate a Catch Reduction for Shrimp in Division 3M

In the absence of a specified recommended catch level (further to assessment above), the Scientific Council was requested to: *evaluate whether a reduction of the total catch to 33 000 tons is likely to lead to a continuation of the present over-exploitation situation.*

In response to this request from Fisheries Commission regarding shrimp in Division 3M, Scientific Council advised there is an extremely high risk that a catch of 33 000 tons in 1997 will lead to a continuation of the present over-exploitation situation.

In order to respond to this Fisheries Commission request, Council considered the relative size of the important year-classes (1988 and 1993) as well as their realized and potential yield to the fishery. The approach required several assumptions which need further investigation and it was **recommended** that, *regarding shrimp in Div. 3M, research be conducted on methods of comparative year-class analysis as a basis for evaluating alternative catch levels.*

c) Request in Relation to Report of the Fisheries Commission Workshop on 'Compatibility and Applicability of Discard/Retention Rules for Conservation and Utilization of Fishery Resources in the Northwest Atlantic'.

i) The Scientific Council was requested to comment on the last paragraph of the Workshop report which stated:

Some discussion took place on possible ways in which the Fisheries Commission could manage fisheries according to alternative models. Measures concerning gear technology and changing fishing area (observers on board) fit in the current management strategy. Annual closures of fishing areas seem also feasible. However, temporary closures of areas on the basis of prefixed trigger levels should be examined carefully. In the first place the determination of the areas as well as the commencement and duration of temporary closures should be based on scientific advice (test fishing?) and decided by the Fisheries Commission. These measures should be non-discriminatory and not affect the capacity of Contracting Parties to exploit the allocated quotas. Finally, the cost/benefit of such measures should be examined.

The Scientific Council considered the measure of closing an area to protect juvenile fish. Scientific Council recognized that at present it is unable to quantify the effects of closing an area to fishing. However some of the benefits of a closed area would be that it could

act as a natural refuge and help to increase juvenile survival. Species with well defined nursery area(s) should benefit from a closed area through enhanced juvenile survival resulting in a probable increase in the contribution of adults to the fishable stock. It was concluded that if such a measure were to be successful, it would have to be a year-round closure to all gears likely to catch juveniles of that species, as seasonal or fleet-specific closures have generally not been successful in other areas. A closed area would require a precise definition of the species to be protected, careful definition of the boundaries with regard to species distribution (adults and juveniles) and a thorough understanding of the fisheries which would be affected.

More traditional measures like improved selectivity of fishing gear and rules for changing fishing area can also contribute to the protection of juveniles of regulated species. However the Council noted that these measures have not been fully successful in the past in controlling fisheries in the NAFO Regulatory Area due to lack of enforcement. A closed area if implemented would not replace other management measures for affected fisheries, but it could be considered in conjunction with these measures.

More details are given in relation to the request of the Fisheries Commission to review further measures to protect juvenile fish of regulated species, e.g. area/seasonal closures, which were addressed by the Council during the June 1996 Meeting (SCS Doc. 96/16; item IX.1.b).

ii) The Scientific Council was requested to: *comment on how NAFO observers could play a more efficient role in collecting more complete information on discards.*

The Scientific Council noted that in order to collect appropriate data, the following sampling scheme should be followed whenever circumstances permit:

1. For every haul, estimates of the total catch by species in terms of weight, and in addition estimates of discards by species in terms of weight, should be recorded.

2. The first and every subsequent 10^{th} haul should be sampled in detail by species, providing in addition to weights of the sample measured also numbers at length representing the part of the catch to be landed and the part of the catch discarded.

3. Whenever the fishing site is changed by a distance of more than 5 naut. mile, the cycle described in 1. and 2. start again.

4. The relevant data must be made available to the Scientific Council in time, before the annual June assessment meeting, in order to be incorporated into the assessments.

VII. REVIEW OF FUTURE MEETING ARRANGEMENTS

1. Scientific Council Meeting on Northern Shrimp, November 1996

The Council reconfirmed that the meeting on northern shrimp assessments, shrimp in SA 0+1 and in Denmark Strait will be held during 15-18 November 1996, at NAFO Headquarters, 192 Wyse Road, Dartmouth, Nova Scotia, Canada.

The Council endorsed the view that an *ad hoc* Working Group should be formed to consider the data and assessment methods for shrimp in Div. 3M. It was agreed that the Working Group on Shrimp in Div. 3M should meet during 19-20 November 1996, at NAFO Headquarters, immediately after the assessment meeting of northern shrimp, so as to include the experts on shrimp who will be present.

The Council noted that the provisional agenda for these meetings will be circulated to Contracting Parties during this Annual Meeting.

2. **June 1997 Meeting of Scientific Council**

The Council observed that, with 2 new Coastal State Contracting Parties (France, in respect of St. Pierre and Miquelon and USA) as well as new requests anticipated from the Fisheries Commission, the Council would need additional time for its June 1997 Meeting. The Council accordingly agreed to revise the meeting dates to 4-19 June 1997, to include Thursday , 19 June 1997 (to the previously announced tentative dates of 4-18 June 1997).

3. **Special Session and Annual Meeting, September 1997**

The Council noted the 19th Annual Meeting being hosted by Canada will be held 15-19 September 1997 at Hotel Newfoundland, St. John's, Newfoundland.

Noting the considerable amount of work involved in the assessment of shrimp in Div. 3M, and the need to provide advice in advance of the Annual Meeting of the Fisheries Commission, the Council discussed the options available for its meeting. The Council agreed that three additional days before the Annual Meeting would be needed, and accordingly scheduled its September 1997 meetings as follows:

- The meeting of the Scientific Council will begin on Sunday, 7 September 1997. The shrimp in Div. 3M assessments will be carried out during 7-9 September 1997.

- The Scientific Council Special Session which will be the Symposium on 'What Future for Capture Fisheries' will be held 10-12 September 1997 as originally announced.

- The Scientific Council will then reconvene during 15-19 September 1997.

While the Symposium venue will be the Fisheries and Marine Institute of Memorial University, St. John's, Newfoundland, and the Scientific Council Meeting of 15-19 September 1997 will be as announced at Hotel Newfoundland, the Council noted the location for its Meeting of 7-9 September 1997 will need to be determined subject to space availability.

4. **June 1998 Meeting of Scientific Council**

The Council agreed on the tentative dates of 3-18 June 1998.

VIII. FUTURE SPECIAL SESSIONS

1. **Progress Report on Symposium of September 1997**

The convener Hans Lassen (EU-Denmark) visited NAFO Headquarters at the end of June 1996 for three days to work with the Assistant Executive Secretary, T. Amaratunga, on further developing the 1997 Symposium on 'What Future for Capture Fisheries'. During this meeting the Symposium program was finalized and a number of invited speakers were contacted. The responses, all very prominent in their fields, were very positive and for most of the talks definite or tentative commitments were received. Scientists and managers from International Organizations as well as individual countries like Canada, Faroe Islands, Iceland, EU, Korea, Japan and USA have promised to contribute to the Symposium.

It is planned to request visual presentations from fisheries and oceanographic laboratories which work in the NAFO area. The laboratories will be invited to present their work in the NAFO area in one or more videos. Such videos could include gear research, work on research vessels, laboratory experiments etc. This invitation will be sent out immediately after the Annual Meeting.

As agreed at the June 1996 Meeting, the invitation by the Fisheries and Marine Institute of Memorial University, Newfoundland, was accepted, and contacted with respect to hosting the Symposium. The dates are fixed for 10-12 September 1997 , and logistic arrangements are progressing well.

The Symposium program was described to the Council and circulated to all participants during this 1996 Annual Meeting.

2. **Review of Proposal(s) for Special Session in 1998**

The Council endorsed the proposal for the 1998 Special Session titled 'Variations in Maturation, Growth, Condition and Spawner Biomass Production in Groundfish'. It was agreed that this Special Session should be convened by J. Morgan (Canada) with co-conveners from the United States of America and European Union, to be selected following further consultations.

IX. OTHER BUSINESS

There was no other business addressed by the Council.

X. ADOPTION OF REPORTS

1. **Report of the Workshop of 4-6 September 1996** (see Annex 1)

The Scientific Council Special Session was held as the Workshop on 'Analysis of Results from Bottom Trawl Surveys', 4-6 September 1996, convened by H. Lassen (EU-Denmark) at Shuvalov Palace, St. Petersburg, Russia. The Council noted it was well attended with 39 participants. The Workshop was a hands-on session using lap-top computers brought to the meeting by the scientists. The Workshop introduced bootstrap and Generalized Additive Model methods to the survey analysis. There was an interest in exploring the possibility of using environmental data as predictors for catch results, and methods helping with such analyses were presented. Finally, data from 6 surveys were re-analyzed using these methods.

The Council reviewed and **adopted** the report of the Workshop as presented by the Convener. The report is given at Annex 1.

The Scientific Council endorsed the **recommendation** of the Workshop that an updated Workbook should be published in the *NAFO Scientific Council Studies* series.

2. **Committee Reports of Present Meeting**

The Council at its concluding session on 13 September 1996, **adopted** the reports of its Standing Committees (STACFEN, STACFIS, STACREC and STACPUB). These reports are given in Appendix I, II, III and IV, respectively. It then **adopted** its own Report of Scientific Council, 7-13 September 1996 Meeting.

XI. ADJOURNMENT

The Chairman of the Council thanked members for their hard work during the meetings, especially D. G. Parsons (Canada), the Designated Expert for Div. 3M shrimp, and the Chairmen of the Committees (W. B. Brodie, H. P. Cornus, D. Power and M. Stein). A special thanks was extended to W. B. Brodie, STACFIS Chairman, who completed his term at the end of this meeting. He further thanked the Secretariat for continued help and effort, in particular the Assistant Executive Secretary who coordinated the secretarial work and acted as rapporteur to the Scientific Council. There being no further business, he wished everyone a safe journey home, and adjourned the meeting.

Workshop on "Assessment of Groundfish Stocks Based on Bottom Trawl Survey Results" in progress during 4-6 September 1996

Participants of Special Session of the Scientific Council, 4-6 September 1996 (from left to right)

J. J. Hunt, H. Hovgard, H. Lassen, H. P. Cornus, D. B. Atkinson, E. de Cárdenas, S. J. Walsh, M. A. Showell, F. Serchuk, H.-J. Rätz, L. Motos, A. Avila de Melo, A. Vazquez, S. J. Smith, P. S. Gasjukov, W. B. Brodie, W. R. Bowering, S. Junquera, D. G. Parsons, M. L.Godinho, M. Stein, K. Bruce, V. A. Rikhter, H. Okamura, V. Volkova, L. O'Brien, A. A. Vaskov, K. Yokawa, O. Folmer, J. Casey, O. R. Godø, I. K. Sigaev, C. M. Jones, P. Rago, H. Yamada

ANNEX 1. REPORT OF THE WORKSHOP ON ASSESSMENT OF GROUNDFISH STOCKS BASED ON BOTTOM TRAWL SURVEY RESULTS

The Workshop on 'Assessment of Groundfish Stocks Based on Bottom Trawl Survey Results' with H. Lassen (EU-Denmark) as convener was held during 4-6 September 1996, at Shuvalov Palace, St. Petersburg, Russia.There were 39 participants in total from Canada, Denmark, Germany, Greenland, Faroe Islands, Japan, Norway, Portugal, Russia, Spain, United Kingdom and the United States of America.

The meeting was opened by W. R. Bowering (Canada), Chairman Scientific Council. The report prepared by the convener follows.

Introduction

The importance of abundance survey data for fish stock assessment has been increasing. There are serious problems with the quality of the catch statistics, and several important stocks assessed by the Scientific Council are under moratoria. In these cases, abundance survey data are the only available reliable source of information on stock status. The Scientific Council is fortunate that there are extensive survey data available for most of the important fish stocks in the Regulatory Area.

The standard approach used by the Scientific Council in assessing fish stocks has been based on VPA tuning techniques, mainly ADAPT. This and similar techniques, however, are based on the catch data to establish the absolute stock level, while the survey and commercial CPUE results are used to establish the relative level of abundance between years and age groups. Therefore when catch data are either unreliable or when there are no catches taken from the stocks, the estimation procedure must be changed to allow direct derivation of absolute estimates from survey results. This requires that surveys should produce absolute estimates instead of the indices presently derived and this requires progress in sampling gear research.

Analysis of Bottom Trawl Surveys

New methods for analyzing survey results have appeared in the fisheries scientific literature in recent years. These methods are built on the statistical resampling theory (bootstrapping) which has been developed in the theoretical statistical literature after Efron (1979). These methods are very demanding in computer power and have therefore only become of practical use in recent years with the easy access to powerful computers. Even the machines available to fisheries scientists today are often stretched to their limit when such methods are applied.

Modern statistical techniques are often linked closely to a particular software. These software are commercial products and a presentation of the techniques almost unavoidably have to make explicit references to the software; for example in the Workbook for this Workshop, reference is made to S-PLUS and to the SURFER software. S-PLUS is a general purpose statistical analysis software while SURFER is designed for spatial interpolation.

At this Workshop the S-PLUS software was used for the bootstrap hands-on session and for the Generalized Additive Models (GAM) analysis, while the SURFER software was used for the spatial interpolation of environmental observations. The Scientific Council was grateful for the support given by the firm behind S-PLUS (StatSci, a Division of Mathsoft, Inc., Seattle, WA, USA). They allowed the use of their software free of charge for the duration of the Workshop and also made available five manuals of the S-PLUS program.

The Workshop was restricted to bottom trawl survey data and had the following objectives:

a) To further the Council's assessments by improving on analyses of fish distributions observed during abundance surveys. The relation between distribution of fish and the environmental condition during the survey be given special attention.

b) To further the work on how to assess stocks under moratoria, i.e. assessment of fish stocks based on survey data only.

c) To present an overview of techniques available for these types of analyses. The lecturing material be considered for publication in NAFO Studies/Journal.

The Workshop was built around three hands-on sessions and four keynote presentations. Stephen Walsh (Canada) set the stage for the Workshop with a review on estimating efficiency of sampling trawls to derive survey abundance indices. The topics of the Workshop were introduced by two overview lectures by Stephen Smith (Canada) who dealt with fish abundance estimation, and Manfred Stein (EU-Germany) who dealt with estimation of the geographical distribution of environmental parameters. Finally, Loretta O'Brien (USA) introduced the GAM concept.

Three hands-on sessions were presented; 1) by Stephen Smith, on estimation of over-all abundance and its variance using bootstrapping techniques supplemented by H. J. Rätz (EU-Germany) investigating the power of temperature and salinity for predicting catch results, 2) by Manfred Stein, estimation of the geographical distribution of environmental parameters which may be used for abundance estimation, and 3) by Loretta O'Brien and Paul Rago (USA), integrating CPUE results with observations of environmental parameters to obtain a better estimate of abundance and its variance using GAM.

After the theme presentations and accompanying hands-on sessions, a number of study groups were established on the last day to carry out case studies. These were based on data brought to the Workshop and included data ranging from shrimp surveys in West Greenland to groupers and grunters in the East China Sea. Problems with highly influential observations were seen in many of these examples and the methods presented in the Workbook appeared useful in identifying these observations and elucidating their influence on the final abundance estimates.

The potential usefulness of environmental data to improve the abundance estimate, i.e. providing estimates with less variance, was stressed on several occasions during the Workshop.

The Workshop was concluded with a general discussion on the last afternoon, attempting to identify common features in data from fish surveys. Some of these features, e.g. the rare but significant occurrence of very high catches, have major impact on the estimates and their variance. Recognizing that no firm recommendation on the best use of these techniques could be made at this time, it was suggested that discussions should continue within the Standing Committees of Scientific Council, particularly STACFIS and STACREC. It seemed, however, that the estimation of confidence limits (CI) could better be approached using resampling techniques rather than calculating the traditional CI based of normal theory (mean $\pm$ t $\times$ standard error).

The Workbook that was available in draft form was considered useful and it was **recommended** that *the Workbook from the Workshop, after the contributions had been revised by the authors, should be published in the NAFO Scientific Council Studies series.*

The Workshop also proposed that the NAFO Scientific Council should take an active role in distributing computer programs representing new analytical approaches to fish stock assessment. For this purpose, it was furthermore suggested that establishing a website at the NAFO Secretariat with either the programs or at least information of how to obtain such programs, would be a valuable extension of the services available through the NAFO Secretariat.

The Chairman of the Scientific Council thanked the convener and the contributors to the Workshop for an excellent job and closed the Workshop at 1715 hr on Friday, 6 September 1996.

Program

Wednesday, 4 September 1996

09:00-10:00	Registration
10:00-10:30	Welcome by the Scientific Council Chairman W. R. Bowering. Introduction and objective of the Workshop by Convener, Hans Lassen.
10:30-11:30	**Keynote Speaker**: S. J. Walsh, Department of Fisheries and Oceans, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland, Canada A1C 5X1 Estimating efficiency of sampling trawl to derive survey abundance indices: A review of problems and progress. (11:30-11:45 Coffee)
11:45-12:45	**Keynote Speaker**: S. Smith, Department of Fisheries and Oceans, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada B2Y 4A2

Overview of statistical techniques available for the analysis of data from bottom trawl surveys. The difference between the survey design and the model of fish distribution and availability. Deriving estimates of absolute biomass and abundance from bottom trawl surveys. (12:45-14:30 Lunch)

14:30-18:00 **Hands-on Session**, S. Smith, Chairman: Application of some statistical techniques. This session will include a brief presentation of a survey from which the data have been extracted. (16:00-16:15 Coffee)

Thursday, 5 September 1996

09:00-12:30 **Hands-on Session**, S. Smith and H. J. Rätz, Chairmen: Continuation of application of some statistical techniques. This session will include Accuracy and Precision, and the effect of design. The session will be concluded by a general discussion. (11:00-11:15 Coffee) (12:30-14:00 Lunch)

14:00-15:00 **Keynote Speaker**: M. Stein, Bundesforschunganstalt für Fisherei, Hamburg, Republic of Germany

Overview of the environmental aspects of the analysis of fish stocks using bottom trawl surveys. Estimation of geographical distribution of fish and its relation to environmental parameters observed during the surveys.

Invited Lecturer: H. J. Rätz, Bundesforschunganstalt für Fisherei, Hamburg, Republic of Germany

15:00-18:00 **Hands-on Session**, H-J. Rätz and M. Stein, Chairmen: Modelling with environmental data. This session will include spacial analysis. Concluded by a general discussion. (16:00-16:15 Coffee)

H. Lassen: Introduction to the Friday's session on case studies brought to the Workshop by the participants.

Friday, 6 September 1996

09:00-12:30 **Invited Lecturers**: L. O'Brien and P. Rago, NEFC, Woods Hole, MA, USA

Hands-on Session, L. O'Brien and P. Rago, Chair: Introduction to the use of Generalized Additive Models for estimating relative abundance (stratified mean number-per-tow) accounting for environmental conditions of temperature and depth. Application of the model using S-Plus and-on session. This session will be concluded by a general discussion. (11:00-11:15 Coffee) (12:30-14:00 Lunch)

14:00-15:30 **Hands-on Session**, Instructors - H. Lassen, S. Smith, H. J. Rätz, L. O'Brien, P. Rago: Case studies brought to the Workshop by the participants. (15:30-15:45 Coffee)

15:45-17:00 Discussion on "What is the state of the art of assessing a demersal fish stock based on bottom trawl data only", and identify research requirements.

17:00-17:30 Conclusion and closure of the Workshop.

List of Participants

CONVENER

Lassen, H. Danish Institute for Fisheries Research, Charlottenlund Slot, DK-2920 Charlottenlund, Denmark
Phone: +45 33 96 3352 - Fax: +45 33 96 3333 - E-mail: hl@dfu.min.dk

CANADA

Bruce, K. Fisheries Research Branch, 200 Kent Street, Station 1256, Ottawa, Ontario K1A 0E6
Phone: +613-990-0279/80 - Fax: +613-954-0807 -
E-mail: kathryn.bruce@ncr.ottwpo.dfo-mpo.x400.gc.ca

Atkinson, D.B. Northwest Atlantic Fisheries Centre, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709-772-2052 - Fax: +709-772-4188 - E-mail: atkinson@athena.nwafc.nf.ca
Bowering, W.R. Northwest Atlantic Fisheries Centre, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709-772-2054 - Fax: +709-772-4188 - E-mail: bowering@athena.nwafc.nf.ca
Brodie, W.B. Northwest Atlantic Fisheries Centre, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709-772-3288 - Fax: +709-772-4188 - E-mail: brodie@athena.nwafc.nf.ca
Parsons, D.G. Northwest Atlantic Fisheries Centre, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709-772-2093 - Fax: +709-772-4105 - E-mail: parsons@athena.nwafc.nf.ca
Power, D. Northwest Atlantic Fisheries Centre, P. O. Box 5667, St. John's, Newfoundland A1C 5X1
Phone: +709-772-4935 - Fax: +709-772-4188 - E-mail: power@athena.nwafc.nf.ca
Walsh, S.J. Northwest Atlantic Fisheries Centre, Groundfish Division, Box 5667, St. John's, Nfld.
Phone: +709 772-5478 - Fax: +709 772-4188 - E-mail: walsh@athena.nwafc.nf.ca
Showell, M.A. Marine Fish Div., Dept. of Fisheries & Oceans, Box 1006, Dartmouth, N.S. B2Y 4A2
Phone: +902-426-3501 - Fax: +902-426-7750 - E-mail: m_showell@bionet.bio.dfo.ca
Smith, S.J. Marine Fish Div., Dept. of Fisheries & Oceans, Box 1006, Dartmouth, N.S. B2Y 4A2
Phone: +902 426-3317 - Fax: +902 426-1506 - E-mail: s_smith@bionet.bio.dfo.ca
Hunt, J.J. Biological Station, Dept. of Fisheries and Oceans, St. Andrews, New Brunswick E0G 2X0
Phone: +506 529-8854 - Fax: +506 529-5862 - E-mail: hunt@wolves.sta.dfo.ca

DENMARK

Hovgard, H. Danish Inst. for Fisheries Res., Charlottenlund Castle, DK-2920 Charlottenlund
Phone: +45 33 96 3358 - Fax: +45 33 96 3333 - E-mail: hoh@dfu.min.dk

GERMANY

Cornus, H.P. Institut fur Seefischerei, Palmaille 9, D-22767, Hamburg
Phone: +49 40 38905194 - Fax: +49 40 38905263 -
E-mail: internet: 100565.1223@compuserve.com
Rätz, H.J. Institut fur Seefischerei, Fischkai 35, D-27572 Bremerhaven
Phone: +49 4717 3473 -Fax: +49 471 73127
Stein, M. Institut fur Seefischerei, Palmaille 9, D-22767, Hamburg
Phone: +49 40 38905174 - Fax: +49 40 389095263 -
E-mail: internet: 100565.1223@compuserve.com

GREENLAND

Folmer, O. Greenland Institute of Natural Resources, P O Box 570, 3900 Nuuk
Phone: + 299 21095 - Fax: +299 25957 - E-mail: Folmer@natur.centadm.gh.gl

FAROE ISLANDS

Nicolajsen, A. Fiskorannsoknarstovan, Noatun, Postboks 3051, FR-110 Torshaven
Phone: +298 15092 - Fax: +298 18264 - E-mail: arni.nicolajsen@frs.fo

JAPAN

Okamura, H. National Research Institute of Far Seas Fisheries, 7-1 Orida 5 Chome,
Shimizu-shi, Shizuoka, 424
Phone: +81 543-36-6014 - Fax: +81 543-35-9642 - E-mail: okamura@enyo.affrc.go.jp
Yokawa, K. National Research Institute of Far Seas Fisheries, 7-1 Orida 5 Chome,
Shimizu-shi, Shizuoka, 424
Phone: + 81 543-36-6058 - Fax: +81 543-35-9642 - E-mail: yokawa@enyo.affrc.go.jp
Yamada, H. Seikai National Fisheries Research Institute, 49 Kokubu-machi, Nagasaki 850
Phone: +81 958 22 8158 - Fax: +81 958 21 4494 - E-mail: yamada@snf.affrc.go.jp

NORWAY

Godø, O.R. Institute of Marine Research, P. O. Box 1870, N-5024 Bergen
Phone: +47 552 38375 - Fax: +47 552 38387 - E-mail: olavrune@imr.no

PORTUGAL

Avila de Melo, A. Inst. Portugues de Investigacao Maritima (IPIMAR), Alges-Praia, 1400 Lisbon
Phone: +3511 301 7361/0814 - Fax: +351 1301 5948

Godinho, M.L. Inst. Portugues de Investigaçao Maritima (IPIMAR), Alges-Praia, 1400 Lisbon
Phone: +3511 301 7361/0814 - Fax: +351 1301 5948

RUSSIA

Gasjukov, P. S. Atlantic Scientific Research Institute of Marine Fisheries and Oceanography, 5 Dmitry Donskoy St., Kaliningrad, 236000
Phone: +70 112 225257 - Fax: +70 112 219997

Rikhter, V. A. Atlantic Scientific Research Institute of Marine Fisheries and Oceanography, 5 Dmitry Donskoy St., Kaliningrad, 236000
Phone: +70 112 225547 - Fax: +70 112 219997

Sigaev, I.K. Atlantic Scientific Research Institute of Marine Fisheries and Oceanography, 5 Dmitry Donskoy St., Kaliningrad, 236000
Phone: +70 112 225547 - Fax: +70 112 219997

Gavrilov, E.N. Polar Res. Inst. of Marine Fish. & Oceanography (PINRO), 6 Knipovich St., Murmansk 183763
Phone: +47 789 10423 - Fax: +48 789 10518 - E-mail: pinro@imr.no

Shevelev, M.S. Polar Res. Inst. of Marine Fish. & Oceanography (PINRO), 6 Knipovich St., Murmansk 183763
Phone: +47 789 10423 - Fax: +48 789 10518 - E-mail: pinro@imr.no

Vaskov, A.A. Polar Res. Inst. of Marine Fish. & Oceanography (PINRO), 6 Knipovich St., Murmansk 183763
Phone: +47 789 10423 - Fax: +48 789 10518 - E-mail: pinro@imr.no

Volkova, V. Polar Res. Inst. of Marine Fish. & Oceanography (PINRO), 6 Knipovich St., Murmansk 183763
Phone: +47 789 10423 - Fax: +47 789 10518 - E-mail: pinro@imr.no

SPAIN

De Cárdenas, E. Instituto Espanol de Oceanografia, Apartado de Correos 240 - Promontorio de San Martin, E-39080 Santander
Phone: +34 42 275033 - Fax: +34 42 275072 - E-mail: cendrero@ccaix3.unican.es

Junquera, S. Instituto Espanol de Oceanografia, P. O. Box 1552, 36279 Vigo
Phone: +34 86 492111 - Fax: +34 86 492351 - E-mail: insovigo@cesga.es

Motos, L. AZTI, Fish & Food Technological Institute, Fisheries Resources, Satrustegi ib. 8, 20008 Donostia - San Sebastian, Basque Country
Phone: +34 43 214124 - Fax: +34 43 212162 - E-mail: lorenzo@rp.azti.es

Vazquez,A. Instituto de Investigaciones Marinãs, Muelle de Bouzas, Vigo
Phone: +34 86 231930 - Fax: +34 86 292762 - E-mail: avazquez@iim.csic.es

UNITED KINGDOM

Casey, J. MAFF, Directorate of Fisheries Research, Fisheries Laboratory, Pakefield Rd., Lowestoft (Suffolk), England NR33 OHT
Phone: +44 1502 524251 - Fax: +44 1502 524511 - E-mail: j.casey@dfr.maff.gov.uk

UNITED STATES OF AMERICA

Jones, C.M. Old Dominion University, 1034 W 45th St., Norfolk, Virginia 23529-0456
Phone: +757-683-4497 - E-mail: jones@estuary.amrl.odu.edu

O'Brien, L. National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543
Phone: +508 495 2273 - Fax: +508 495 2393 - E-mail: lobrien@whsun1.wh.whoi.edu

Rago, P. National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543
Phone: +508 495 2464 - Fax:+ 508 495 2393 - E-mail: prago@whsun1.who.whoi.edu

Serchuk, F. National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543
Phone: +508 495 2245 - Fax: +508 495 2258 - E-mail: fserchuk@whsun1.wh.whoi.edu

ANNEX 2

NOTICE

What Future for Capture Fisheries

A Shift in Paradigm: Visioning Sustainable Harvests from the Northwest Atlantic in the Twenty-first Century

Hosted by the Scientific Council of the Northwest Atlantic Fisheries Organization (NAFO)

10–12 September 1997

St. John's, Newfoundland, Canada

Objectives

1. Present the international profile of NAFO – a model of international collaborative research, management and cooperation.
2. Undertake a visioning exercise of sustainable international fisheries cooperation and management for the twenty-first century.
3. Examine shifts in the traditional capture fisheries and new livelihoods for the coastal community.
4. Produce a book based on the outcome of the Symposium – commemorating 500 years of Northwest Atlantic livelihoods based on harvesting the Sea.

Opening Session:

Keynote The NAFO model of international collaborative research, management and cooperation.

Keynote The legal framework within which capture fisheries will operate in the future – Development of UNCLOS 1982, Agenda and FAO code of conduct of responsible fishing.

Keynote Sustainability – ecological impact from fisheries – the political environmental issue and how this may affect the future of capture fisheries.

Session 1 – History of Fishing the Northwest Atlantic

1. History of fisheries in the Northwest Atlantic – the 500 year perspective.
2. The history of fisheries management and the scientific advice – the ICNAF/NAFO history from end of World War II to the present.

Session 2 – Management Approaches – Caring for the Future Resources

1. Trends in international cooperation in fisheries – monitoring, surveillance and control.
2. Controlling marine fisheries 50 years from now – satellite surveillance or a changed regime – can economy and biology cooperate?

Session 3 – Fisheries Research: Perspectives for the Twenty-first Century

1. What can technology offer the future fisheries scientist – possibilities for obtaining better estimates of fish stock abundance by observations from the sea.
2. What can technology offer the future fisheries scientist – laboratory and aquaria technology – possibilities for obtaining better understanding of the stock structure (eg DNA technology).
3. Where is fisheries science heading – special emphasis on fish stock assessment work.
4. What can information technology and science offer – will we be able to process the mass of data future technology will enable us to collect?
5. Integrating fisheries observations with environmental data – towards a better understanding of conditions for fish in the sea.

Session 4 – Sustainable Livelihood for the Coastal Community

1. Aquaculture and marine fisheries – will capture fisheries remain competitive?
2. Impact on coastal livelihood from future changes in production and demand for fish.
3. The future for fishery dependent communities – Faroe Islands.
4. The future for fishery dependent communities – fishery dependent regions of the European Union.

Session 5 – The Future for Capture Fisheries

1. The future economy of capture fisheries – which sectors will be economically viable?
2. Capture fisheries and the environment issue – implications for the viability of future capture fisheries.
3. The future consumer market for fish – will there be a place for capture fisheries?
4. The capture technology of the future – large trawlers with sea going factories or small vessels of the Coastal State?
5. Development in fish food technology – implications for capture fisheries.

Concluding Discussion – What future for fisheries in the North Atlantic.

This Symposium is being held in conjunction with 19th Annual Meeting of NAFO and the Cabot 500th Anniversary Celebration in St. John's, Newfoundland, Canada. For further information, please contact.

Convener

Hans Lassen
Danish Institute for Fisheries Research
Charlottenlund Slot
DK 2920 Charlottenlund
Denmark

Telephone: +45 33 96 33 57
Fax: +45 33 96 33 33
E-mail: hl@dfu.min.dk

NAFO Secretariat

Tissa Amaratunga, Assistant Executive Secretary
Northwest Atlantic Fisheries Organization (NAFO)
P. O. Box 638
Dartmouth, Nova Scotia
Canada B2Y 3Y9

Telephone: (902) 469-9105
Fax: (902) 469-5729
E-mail: nafo@fox.nstn.ca

APPENDIX I. REPORT OF STANDING COMMITTEE ON FISHERIES ENVIRONMENT (STACFEN)

Chairman: M. Stein Rapporteur: J. Casey

The Committee met at the Shuvalov Palace, St. Petersburg, Russia on 9 September 1996, to consider and report on environment-related topics referred to it by the Scientific Council. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), European Union (Denmark, Germany, Portugal, Spain and United Kingdom), Iceland, Japan, Norway, Russia and the United States of America.

The Committee reviewed the following documents: SCR Doc. 96/83, 84, 85, 86 and 103.

1. **Chairman's Introduction: report of activities**

The Chairman welcomed members to the third meeting of STACFEN and reported that as agreed in the previous STACFEN meeting in June 1996, an overview of the environmental conditions in the Northwest Atlantic in 1995 would be presented to the Fisheries Commission on 10 September. The Chairman gave a summary of what he intended to present to the Fisheries Commission for comment by the Committee (SCR Doc. 96/83).

2. **Review of Oceanographic Information from the Workshop of 4-6 September 1996** (SCR Doc. 96/103)

A short paper comparing geostrophic currents with the distribution of cod off West Greenland was presented to the Committee. The study had been suggested during discussions at the Workshop on analysis of bottom trawl survey data. The paper reported on observations which indicated that there may be a relationship between physical and topographical oceanographic features and the occurrence of cod, and that if such a relationship was persistent, it may be important to take this into account in the design of future trawl surveys off West Greenland.

3. **Review of Research Documents**

Three research documents (SCR Doc. 96/84, 85 and 86) were reviewed by the Committee. The papers which were deferred from the June 1996 meeting of STACFEN reported on the Joint Russian/German Data Evaluation of ICNAF/NAFO Oceanographic data. An evaluation of Russian and German data sets for the Davis Strait/Labrador Sea area revealed that temperatures in the area declined markedly in the early-1970s. The magnitude of the change in temperature varied with depth and the decline occurred earlier off West Greenland than in the waters off Labrador. The data showed the influence of North Atlantic water in the northern area off West Greenland, and data from the ocean weather ship *BRAVO* indicated a constant increase in temperature at 2 000 m depth up to 1974 when the data series ended. The data further showed the thermal influence on the density stratification and a strong salinity anomaly in these years. The data are to be investigated further to determine whether any salinity anomalies prior to the 1970s can be detected. Preliminary indications are that a strong signal occurred in the late-1950s. The scientists involved in the evaluation (M. Stein, Germany and V. A. Borovkov, Russia) plan to meet on two occasions in 1996-97 and the results of their analyses will be reported to STACFEN at its meetings in 1997.

4. **National Representatives**

The Chairman reported that he had been notified of the names of the EU-Spain, EU-UK and Japanese national representatives responsible for reporting data to MEDS, but that the Portuguese representative remained unknown. It was agreed that the participant from EU-Portugal would inform the NAFO Secretariat of the relevant representative by the June 1997 meeting of the STACFEN. STACFEN recorded the representative notifications as: for EU-Spain - J. Gil, for EU-UK - L. J. Rickards and for Japan - H. Okamura.

5. **Other Matters**

There being no other matters for discussion, the Chairman closed the meeting by thanking participants and the staff of the Secretariat for their contributions and co-operation.

STACFIS Meeting, 7-13 September 1996

STACFIS Meeting, 7-13 September 1996

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

Chairman: W. B. Brodie Rapporteurs: Various

The Committee met at the Shuvalov Place, St. Petersburg, Russia, at various times during 7-13 September 1996, to consider and report on matters referred to it by the Scientific Council, particularly those pertaining to the provision of scientific advice on certain finfish and invertebrate marine stocks. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), European Union (Denmark, France, Germany, Portugal, Spain and United Kingdom), Iceland, Japan, Russian Federation and the United States of America. The Executive Secretary and Assistant Executive Secretary were in attendance.

I. OPENING

The Chairman opened the meeting by welcoming participants. The agenda was adopted and a plan of work developed for the meeting.

II. STOCK ASSESSMENTS

1. **Shrimp in Division 3M** (SCR Doc. 96/87, 88, 90, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 104)

a) **Introduction**

The shrimp fishery in Div. 3M began in late-April, 1993, when two Canadian offshore vessels were granted exploratory permits for the area. Initial catch rates were favourable and, shortly thereafter, fishing activity increased to include about 50 vessels in early-July but subsequently declined over the remainder of the 1993 year. Only 4 vessels were reported fishing shrimp at the end of December 1993. Fishing continued into 1994 at low intensity. Activity increased over winter to 17 vessels by late-February and remained near that level until early-April 1994, decreasing thereafter. From mid-April to mid-June, the number of vessels increased from 7 to 47 and then decreased steadily to 3 at the end of the 1994 year. In 1995, vessel activity was low throughout the January-March period but increased substantially from 7 vessels in early-April to 71 by late-July, declining to 6 during the last week of December 1995. From 8 to 12 vessels fished for shrimp in Div. 3M from early-January to mid-February, 1996. This was followed by a sharp increase over the next 20 weeks to 91 vessels during the first week of July 1996. Numbers remained high, thereafter, but declined to about 70 vessels by mid-August 1996.

STACFIS estimated catches were approximately 28 000 tons in 1993, 24 000 tons in 1994 and 33 000 tons in 1995 (preliminary). Catch statistics (to August) indicate removals of about 33 000 tons so far in 1996 resulting from a large increase in effort. This likely will result in a total catch of about 50 000 tons by the end of the year. Vessels from as many as 14 nations have participated since 1993. Preliminary catches (tons) by nation and year are given below.

	1993	1994	1995	1996[1]
Canada	3 724	1 041	970	920
EU/Denmark	800	400	200	
EU/Portugal			150	
EU/Spain	240	300	158	50
Estonia		1 081	2 092	1 166
Faroe Islands	8 545	6 567	5 987	6 452
Greenland	3 788	2 276	2 403	1 067
Iceland	2 243	2 300	7 623	16 017
Latvia		300	350	1 362
Lithuania		1 225	675	1 489
Norway	7 183	8 460	9 534	1 323
Russia	300	300	2 838	2 715
Honduras	1 265			
St. Vincent		75		
Total	28 088	24 325	32 980	32 561

[1] STACFIS estimate to August.

b) **Input Data**

i) **Commercial fishery data**

Information from the fleets of several nations showed that the spatial distribution of effort differed between years. Vessels displaced effort to the west and southwest portions of the Flemish Cap in 1994 and 1995, compared to 1993 but returned to the eastern slope in 1996. Further, fishing occurred in much shallower depths in both 1995 and 1996.

The use of double trawls (two complete trawls towed simultaneously by the same vessel) apparently had occurred as early as 1993. This technology has been reported for some vessels from Faroe Islands, Iceland, Greenland and Norway. STACFIS noted that the effort was doubled for CPUE calculations for Greenlandic and Icelandic vessels only but should be adjusted appropriately for all fleets.

Total fishing effort (hours fished) was calculated by dividing the total catch in each year by the standardized CPUE for the Icelandic fleet.

	1993	1994	1995	1996
Catch (tons)	28 000	24 000	33 000	50 000[1]
CPUE (kg/hr)	370	235	269	210
Effort (hours)	76 000	102 000	123 000	238 000

[1] Estimated catch to end of 1996.

Data from nations which provided both catch and effort estimates showed that unstandardized catch rates were substantially lower in 1994 than in 1993. There was stabilization or slight improvement in the 1995 CPUEs over the 1994 values but these remained lower than those of 1993. The 1996 rates were the lowest observed for all fleets. Standardized rates for Canada and Norway, addressing differences due to seasonality and fishing power, showed trends similar to those of the unstandardized estimates. Not all nations report catch and/or effort and it was noted that the Hail system might be useful as an alternative effort index. The system, however, is incomplete at present.

Size composition data from commercial sampling by Canada, Faroe Islands and Iceland in 1993 showed that large, female shrimp dominated the catches by number and weight. Samples from the same nations in 1994 indicated that males were much more prevalent in the catches than in the previous year. Canadian, Norwegian and Greenlandic data for 1995 showed a further increase in the importance of the male component. Catches of all nations that provided sampling data for the 1996 fishery showed the predominance of a single size group of male shrimp throughout the area and year.

Sampling data showed the occurrence of three size groups of males in both 1993 and 1994 but only two in 1995 and 1996. An additional size group of small female shrimp was evident in the latter two years and it was concluded that a change in the age at sex inversion had occurred.

Average shrimp density estimates were derived based on 4 754 commercial trawl hauls of Faroese vessels made between May, 1993 and September, 1994. Density in the areas fished by the Faroese fleet declined from 2.03 g/sq m in 1993 to 1.24 g/sq m in 1994. No density estimates were available for 1995.

Data on shrimp discarding from the Canadian and Greenlandic fisheries showed that discard levels remained low, as in previous years, indicating that shrimp of all sizes were being retained.

Strong year-classes of redfish occur only sporadically in the Northwest Atlantic, every 6-10 years on Flemish Cap. The 1989 year-class was relatively strong and by-catch in 1993 consisted primarily of small redfish (14 cm). Canadian observer data indicated levels of 9

and 13% of the total catch weight in May and June, 1993, increasing to 44% in July. By-catches of this year-class were still high in 1994 (up to 32% in April), despite the mandatory use of sorting grates, and occurred in large numbers at 17-18 cm. In 1995 and 1996, redfish by-catch was much lower, increasing from <1% in March to 4.7% in June 1995 and, in 1996, they comprised 1% or less of the total catch in all months from March to June. Redfish was also the most dominant by-catch species taken by Greenland in 1994, 1995 and 1996. Although redfish by-catch was much lower in 1995 and 1996, it is not clear whether this was due to the reduction of maximum bar spacings from 28 mm in 1994 to 22 mm in 1995 or to the absence of strong redfish recruitment.

STACFIS addressed the by-catch issue at its June 1996 Meeting and concluded that the probability of recovery of redfish, cod and American plaice stocks on Flemish Cap will increase if the by-catch in the shrimp fishery is kept low in future years (NAFO SCS Doc. 96/16, pages 63-67).

ii) **Research survey data**

Oceanographic data were obtained from the Flemish Cap during a Canadian survey conducted in July 1996 and compared to long-term (1961-90) average conditions and those of 1993 and 1995. The colder than normal temperatures experienced over the continental shelf and on the Flemish Cap since the late-1980s continued in 1996 with some warming compared to 1993 and 1995, especially in depths greater than 50 m. Chlorophyll measurements indicated a delayed and/or extended plankton bloom compared to shelf waters. The water column was well-oxygenated, as seen in both 1993 and 1995, and current measurements continued to show the presence of the anticyclonic gyre around the Flemish Cap. It was noted that information on the circulation might be useful, in future, to evaluate whether or not recruitment of shrimp results from local retention or is produced elsewhere.

EU groundfish surveys were conducted on Flemish Cap from 1988 to 1996. Trawlable biomass estimates of shrimp were calculated from the catches obtained using a groundfish bottom trawl. Relative shrimp biomass from 1991 to 1993 was substantially higher than during the 1988-90 and 1994-96 periods. The 1994 estimate is likely biased downward due to a larger meshed liner in the codend of the trawl. The recent biomass level (1994-96) is 2 to 3 times higher than the level observed during the 1988-90 period.

Year	Biomass Index (t)	Average catch per mile (kg)	Standard Error
1988	2 164	1.54	± 0.28
1989	1 923	1.37	± 0.24
1990	2 139	1.53	± 0.21
1991	8 211	5.83	± 0.71
1992	16 531	11.75	± 1.86
1993	9 256	6.57	± 1.04
1994	3 337	2.37	± 0.35
1995	5 413	3.85	± 0.44
1996	6 502	4.62	± 0.34

The surveys also showed that biomass in most years was highest in the western, northern and northeastern parts of the Flemish Cap and in depths ranging from about 250 to 550 m. In 1994 and 1995, proportionately more biomass was found in western and southwestern areas while catch-per-tow in some eastern strata declined substantially, consistent with the westward shift in fishing effort. Fishing by some fleets in 1996 returned to the eastern slopes where the survey showed an improvement of shrimp catches over the previous two years.

Age interpretation of the size distributions from the 1988 to 1994 surveys and the 1993 and 1994 commercial fishery samples identified the 1988 year-class as strong. This year-class contributed substantially to the fishery in the first two years but apparently declined in

importance in 1994. The recruitment of the 1991 year-class helped maintain catch rates in the 1994 fishery. In 1995, the 1988 year-class was no longer important to the fishery and, although catches were dominated in numbers by the 1992 and 1993 year-classes, the latter was not well represented in the survey. The 1993 year-class was dominant in both the research survey and commercial fishery catches in 1996. Size distributions from the survey showed that the 1993 year-class was dominant throughout the survey area.

c) **Assessment Results**

The research and commercial fishery data of recent years show that several changes have occurred on Flemish Cap related to the distribution, abundance and demographic structure of the shrimp resource. Catches have been maintained at a high level (about 33 000 tons to August 1996, projected to 50 000 tons at year's end) due to increasing effort and an expansion of the fishing grounds to target smaller shrimp in shallower water. Catch rates were noticeably lower in 1994 than in 1993. The 1995 rates stabilized or improved slightly in some cases but remained below 1993 levels. The 1996 values were the lowest reported for all fleets. The aggregated CPUE data are difficult to interpret as an index of abundance due to the major changes in fishing pattern between years.

The composition of the shrimp catches has also changed over time. The percentage of males (numbers) increased from about 40% in 1993 to 65% in 1994 and 75% in 1995. In 1996, the fishery was largely dependent (about 70% of the catch in numbers) on the full recruitment of the 1993 year-class which was also heavily fished in 1995. The large females in 1994 were the remains of the 1988 year-class which did not contribute significantly to the fishery in subsequent years. The decline in catch rates of large female shrimp from 1993 to 1996 (ages 5+) is considered to be a reasonable reflection of the trend in the spawning biomass. The catch rate-at-age data suggest that the 1996 spawning stock is about 30% of the level observed in 1993. A decline was also evident, but not so pronounced, from the survey data for the same period. Further, there has been a decrease in the age of sex reversal, as evidenced in the replacement of a component of large male shrimp by one of small females, which might be reflective of the decrease in spawning stock abundance.

The 1993 year-class, produced by a healthy spawning biomass (mainly the 1988 year-class), was strong but has already been subjected to two years of intensive fishing. If the 1994 year-class is weak, as indicated in the 1996 research survey and commercial fishery data, then any fishery in 1997 will largely depend on what remains of the 1993 year-class. Although STACFIS was not able to predict the residual biomass of this year-class in 1997, it was agreed that a fishery based on a single year-class increases the risk of causing further damage to the stock. STACFIS also noted the high level of uncertainty associated with the assessment of the shrimp stock on Flemish Cap. Uncertainty in recruitment prediction has become evident since there was no indication of the 1993 year-class before it entered the fishery in 1995. Lacking estimates of stock size, there is uncertainty regarding the exploitation rate on the 1993 year-class and the total stock. Also, there is uncertainty regarding stock and recruitment and the mechanisms of recruitment in this area. Therefore, the need for caution in the assessment and management of the stock is critical.

d) **Research Recommendations**

For shrimp in Div. 3M, it is **recommended** that:

- *A single, catch and effort data set should be developed to standardize the CPUE, addressing differences in fleets, seasons, areas, depths, trawl types, etc.*

- *Catch in numbers and weight and by sex and/or age should be estimated by all nations fishing shrimp in Div. 3M. These criteria also apply to research survey data.*

- *A directed research survey for shrimp on Flemish Cap should be initiated with a primary goal of obtaining a reliable recruitment index, given that the EU survey does not provide reliable estimates of shrimp at age 2. The survey would also provide extensive data on the distribution and demography of the shrimp stock throughout the area. Hydrographic information should be collected, including data on currents, in conjunction with the survey.*

e) **Other Matters**

STACFIS discussed the possibility of moving the assessment of shrimp in Div. 3M from the Annual Meeting in September to the special meeting on shrimp held in November each year. Several advantages of such a move were noted:

- more within-season data from the fishery would be available for consideration in assessing the status of the stock;
- the meeting would be attended by several more shrimp biologists from other nations (e.g. Canada, United States, Greenland/Denmark);
- the November timing would be suitable for the analysis and presentation of data from a new Canadian survey on Flemish Cap using a small-meshed shrimp trawl; and
- the Annual Meeting is not considered by many as the optimal setting for conducting stock assessments.

STACFIS agreed that the Fisheries Commission should be asked if such a change in the timing of the meeting is possible.

III. ARRANGEMENTS FOR CONDUCTING STOCKS ASSESSMENTS IN 1997

1. **List of Designated Experts**

The list of Designated Experts for 1996 was reviewed and the following were tentatively identified for the 1997 assessments:

- From the Science Branch, Northwest Atlantic Fisheries Centre, Department of Fisheries and Oceans, P. O. Box 5667, St. John's, Newfoundland A1C 5X1, Canada
[Telefax: +709 772-4188 - E-mail: Surname@athena.nwafc.nf.ca]

for	Cod in Div. 3NO	M. B. Davis
	Redfish in Div. 3LN	D. Power
	American plaice in Div. 3LNO	M. J. Morgan
	Witch flounder in Div. 3NO	W. R. Bowering
	Yellowtail flounder in Div. 3LNO	S. J. Walsh
	Greenland halibut in SA 2 + Div. 3KL	W. B. Brodie
	Roundnose grenadier in SA 2+3	D. B. Atkinson
	Shrimp in Div. 3M	D. G. Parsons

- From the Instituto de Investigaciones Marinas, Muelle de Bouzas, 36208 Vigo, Spain
[Telefax: +34 86 292762 - Tel No.: +34 86 231930 - E-mail: avazquez@iim.csic.es]

for	Cod in Div. 3M	A. Vazquez

- From the Instituto Espanol de Oceanografia, Centro Oceanografico de Cantabria, Aptdo 240, 39080 Santander, Spain [Telefax: +34 9 42 275072 - Tel. No.: +34 9 42 275033 - E-mail: cendrero@ccaix3.unican.es]

for	American plaice in Div. 3M	E. de Cárdenas

- From the Institute Portugues de Investigacao Maritina (IPIMAR), Alges-Praia, 1400 Lisbon, Portugal
[Phone: +3511 301 7361/0814 - Fax: +351 1301 5948]

for	Redfish in Div. 3M	A. Avila de Melo

- From the Greenland Institute of Natural Resources, P. O. Box 570, DK-3900 Nuuk, Greenland
[Telefax: +299 25957 - Tel No.: +299 21095 - E-mail: helle@natur.centadm.gh.gl]

for Northern shrimp in SA 0+1 H. Siegstad

- From the Greenland Institute of Natural Resources, Tagensvej 135, 1, DK-2200 Copenhagen N, Denmark [Telefax: +45 358 21850 - Tel No.: +45 318 54444 - E-mail: grfidmc@inet.uni.c.dk]

for	*Roundnose grenadier in SA 0+1*	O. Jørgensen
	Wolffish in SA 1	O. Jørgensen
	Greenland halibut in SA 0+1	O. Jørgensen
	Greenland halibut in Div. 1A	O. Jørgensen

- From the Institut fur Seefischerei, Fischkai 35, D-27572 Bremerhaven, Germany [Telefax: +49 471 73127 - Tel No.: +49 471 73473]

for Redfish in SA 1 H. J. Rätz

- From the Marine Fish Division, Department of Fisheries and Oceans, Bedford Institute of Oceanography, P. O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada [Telefax: +902 426-7827 - Tel No.: +902 426-2937 - E-mail: m_showell@bionet.bio.dfo.ca]

for Silver hake in Div. 4VWX M. A. Showell

- From the Marine Research Institute, Skulagata 4, P. O. Box 1390, 121 - Reykjavik, Iceland [Telefax: +354 562 3790 - Tel No.: +354 552 0240- E-mail: unnur@hafro.is]

for Northern shrimp in Denmark Strait U. Skúladóttir

- From Distant-water Groundfish Section, National Research Institute of Far Sea Fisheries, Fishery Agency, 7-1, Orido 5 Chome, Shimizu-shi, Sizuoka 424, Japan [Telefax: +81 54 3359642 - Tel No.: +81 54 3340715 - E-mail: yokawa@enyo.affrc.go.jp]

for Squid in SA 3+4 K. Yokawa

- From Polar Research Institute of Marine Fisheries and *Oceanography* (PINRO), 6 Knipovich Street, Murmansk, 183763, Russia [Telefax: +47 789 10518 - Tel No.: +47 789 10423 - E-mail: pinro@imr.no]

for Capelin in Div. 3NO V. Shibanov

The Secretariat was requested to confirm the availability of the Designated Experts from their respective laboratories. Confirmation of Designated Experts is requested by 1 January 1997 and no response by that time will be taken to mean no objection to the nomination.

IV. OTHER MATTERS

1. Review of SCR Document 96/71, Greenland Halibut Fishery in Cumberland Sound

STACFIS reviewed available documentation to update information on the Greenland halibut fishery in Cumberland Sound, Baffin Island. This information would normally have been included in the annual June review of the status of Greenland halibut in SA 0 + Div. 1B-1F, but was received too late to be considered during the June 1996 Meeting.

The document reviewed by STACFIS showed the fishery for Greenland halibut in Cumberland Sound began in 1986 and expanded rapidly so that annual catches were about 400 tons by 1992. Catches have been maintained at this level since, although they declined to 300 tons in 1995 because of a delay in the start of the fishery due to ice conditions. The fishery is prosecuted by fishing longlines through the ice, typically from February through May in depths of 750-950 m.

In the early years, single lines were fished and retrieved by hand winches, but more recently power winches have come into use, and more than one longline is fished simultaneously. Soak times were about 1-3 hours

until 1991, after which time this gradually increased to about 7-9 hours in 1995. Analysis of the soak time data indicates that there are no benefits gained from soak times greater than about 10 hours.

A standardized catch-rate series was derived taking into account changes in the number of hooks used, number of longlines fished and soak time. Although catch rates varied significantly between years, there was no temporal trend.

The age distribution of the catches has not changed since the beginning of the fishery, but the mean size- and mean weight-at-age of the catches have both declined. The authors express some concern about this as the declines coincided with increases in catch and effort. The declines may have been due to selective removal of the larger fish from each age group, but STACFIS noted that it was not possible, from the data presented, to determine if a systematic increase in the proportion of males in the catches may also have contributed to this observation. The document did note that males only constitute about 3% of the catches. Growth was determined to be linear over the size (age) range caught. Most of the fish were either immature or not in spawning condition.

Some research has been conducted in the area. During summer 1994 a stratified trawling survey was conducted in an area outside the fishing grounds. Density estimates ranged from 0.0 kg/sq km in depths less than 275 m, to 2 678 kg/sq km at 900 m. Lengths ranged from 18-98 cm, and there was an approximate 50:50 ratio between males and females. Immature fish dominated at 72% by number in the samples.

Experimental longlining and gillnetting were also carried out on the fishing grounds during the summer of 1994. Catch rates were about 15 times lower than in the same area during the winter fishery. This was interpreted to indicate summer movement away from the area or off the bottom.

The authors indicated that one of the most important issues regarding this resource was its apparent relationship to Greenland halibut in Davis Strait. To determine possible relationships, some tagging work has been carried out during both winter and summer, but has been largely unsuccessful to date due to difficulties in tagging sufficient numbers of fish. Other experiments are planned. Also, alloenzyme, meristic and morphometric analyses are being done.

2. Other Business

There being no other business, the Chairman thanked the participants and the Secretariat for their work during the meeting, and STACFIS adjourned.

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

Chairman: D. Power Rapporteur: M.A. Showell

The Committee met at the Shuvalov Palace, St. Petersburg, Russia on 9-13 September 1996, to discuss various matters pertaining to statistics and fisheries research in the Regulatory Area, as referred to it by the Scientific Council. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), European Union (Denmark, France, Germany, Portugal, Spain and United Kingdom), Japan, Iceland, Russia Federation and the United States of America.

1. Opening

The Chairman opened the meeting by welcoming participants. M. A. Showell (Canada) was appointed rapporteur.

2. Fisheries Statistics

a) Progress Report on Secretariat Activities in 1996

i) Acquisition of STATLANT 21 data

The Secretariat reminded the Committee that STATLANT 21A data for 1994 and 1995, and STATLANT 21B data for 1993 to 1995 had still not been received from several countries. STACREC reiterated its concern over delays in reporting by some countries, and noted that rules regarding timeliness of reporting had been introduced by which Contracting Parties are bound. STACREC noted this issue was on the agenda of the September meeting of the General Council.

Outstanding submissions for both STATLANT 21A and 21B data are given in the Table below.

List of STATLANT 21A and 21B reports which have not been submitted.

STATLANT 21A		STATLANT 21B		
1994	1995	1993	1994	1995[1]
Cuba	Cuba	Faroe Islands	Cuba	
Korea	Estonia	France (SP)	Denmark	
Lithuania	Faroe Islands	USA	Great Britain	
USA	Lithuania		Faroe Islands	
	USA		France (SP)	
			Greenland	
			Korea	
			Lithuania	
			Norway	
			USA	

[1] Information not available at present time.

ii) Publication of statistical information

The Secretariat reported that it was still unable to proceed with the publication of the 1993 Statistical Bulletin due to delays in submission by the Faroe Islands, France (SP), and the United States of America. The representative for France (SP) reported that the data for 1993 and subsequent years would be made available shortly[1]. The representative for the

[1] The Secretariat received these data in October.

USA expressed regret for inconvenience over delays in submission of the 1993 STATLANT 21B data, which would be made available by the end of 1996. The USA submission will make up a large proportion of the SA 5 and 6 statistics, and for this reason it was agreed that publication of the 1993 Statistical Bulletin should be delayed until this information arrives.

The Secretariat reported that conversion of the NAFO database to Microsoft Access format was complete. This new format will provide increased flexibility in responding to short-notice requests for information, as well as facilitate processing of new information.

b) **Report of the Inter-Agency Consultation Relative to the CWP 17th Session**

The Secretariat reported on the results of the Coordinating Working Party on Fisheries Statistics (CWP) Intersession Consultation (CWP-ISC) held 9-11 July 1996 at FAO headquarters in Rome, Italy, attended by the Assistant Executive Secretary. Progress of intersessional developments in the statistical activities of NAFO was reported.

Specific items addressed at CWP-ISC that related directly to the work of the Scientific Council were reported to STACREC. The Committee was informed that further details were available from the Secretariat in the report of CWP-ISC issued by the CWP Secretary in September 1996.

STACREC noted the CWP-ISC was informed that the Scientific Council had recommended that the NAFO Assistant Executive Secretary, T. Amaratunga, and the Chairman of STACREC, D. Power (Canada), would attend the CWP 17th Session 3-7 March 1997, in Hobart, Tasmania. The Council had also invited Japan to nominate a national representative to attend the Session, and STACREC welcomed the confirmation that K. Yokawa will be the representative.

According to new statutes, the CWP no longer restricts its remit to the Atlantic Ocean, and two agencies had applied for membership - the South Pacific Commission (SPC) and the International Whaling Commission (IWC). STACREC expressed reservations over the inclusion of the IWC, although it was suggested the IWC may have valuable historical catch records. STACREC questioned whether there was a need for international standardization of these data by the CWP, and will request clarification on criteria to evaluate potential membership through correspondence with the CWP.

Access to STATLANT data through the Internet via the World Wide Web (WWW) was noted as an important topic which will be discussed at the CWP 17th Session. STACREC considered that STATLANT data were public domain, but noted that when data are released to the public a *proviso* would have to be clearly stated to denote those data that were considered preliminary in nature.

STACREC noted that a cautionary note should accompany any information provided through WWW access - that these data are received as officially reported statistics and that different data may have been used in stock assessments.

STACREC agreed that it would be preferable for the NAFO Secretariat to create and maintain an independent WWW site rather than participate in a collaborative effort with other agencies, and **recommended** that *the Secretariat prepare a report on technical and financial considerations in creating and maintaining a web site for statistical data, for consideration at the June 1997 meeting.*

c) **Reporting of Catches for *Pandalus borealis***

STACREC noted that *Pandalus borealis* has been reported in the Statistical Bulletin as both "northern deepwater prawn" and "pink (= pandalid) shrimp". With recent significant catches of *P. montagui* taken in Div. 0B, there is likely confusion in the interpretation of data coded as 639 (pink = Pandalid shrimp). To clarify this situation, STACREC **recommended** that *statistical agencies report these catches by species, as follows: Pandalus borealis (Northern prawn, PRA, code 632), or Pandalus montagui (Aesop shrimp, AES, code 633). In situations where identification to the species level is unknown, then Pandalus spp. (Pandalid shrimps, PAN, code 639) be used.*

3. **Review of Research Documents**

STACREC reviewed SCR Documents not considered by other Standing Committees and the following summaries were prepared.

a) **Age structure of Roughhead Grenadier (*Macrourus berglax*) on Flemish Cap, 1995** (SCR Doc. 96/58)

The paper provided ageing results for roughhead grenadier from EU surveys in 1995 and 1996 which indicate a similar growth rate for both males and females. However, females were found to attain older ages.

b) **Review of Russian Bottom Trawl Surveys in the NAFO Subareas 0, 2, 3 for 1961-1995** (SCR Doc. 96/89)

The paper provided information on trawl surveys carried out by Russia (and USSR) in the NAFO area during the last 35 years. All the years of investigations were conventionally divided into 4 periods: 1954-60, 1961-70, 1971-82, 1983-95, during which changes in methods for trawl surveys were done, as well as when collecting biological data and calculating stock assessments.

A short description of the investigations was given in the paper, and problems pertaining to the difficulties of conducting the trawl surveys, mainly during the recent period, were considered.

c) **Technique of Russian Trawl-acoustic Survey of the Barents Sea Bottom Fish and Mechanisms to Improve it** (SCR Doc. 96/91)

Trawl surveys of Barents Sea bottom fish have been conducted since 1982, while trawl-acoustic surveys in October-December have been since 1986, by a minimum of two research vessels equipped with the latest hydroacoustic instruments, computer, trawl and hydrographic facilities. Abundance estimates of the main commercial species, flatfish and catfish are assessed during trawl survey; and the abundance and biomass of cod, haddock and redfish are estimated during trawl-acoustic survey. The surveys are conducted by hydroacoustic tracks taking into account long-term mean distribution of commercial fish, and stations positioned in random for complete and uniform coverage of the area. Density of fish distribution was estimated by local areas. For sampling and processing of primary information, special software packages were developed and used. Special attention was given to calibration and intercalibration of EK-500 echo-sounders during the survey.

Trawl-acoustic survey data in 1995 were used for separation of echo-intensities by species of cod, haddock, and redfish *S. mentella* and *S. marinus*. Calculations of abundance and biomass of cod and haddock were done taking into account length-weight relationship derived by analysis of regression.

d) **On Methods of Estimation of Acoustic Shadow Zone When Assessing Groundfish Stocks** (SCR Doc. 96/92)

There are several factors preventing the estimation of the fish concentrations density near the seabed with sufficient range of accuracy, the main ones of which are the influence of acoustic shadow zone of echo-sounder to the possibility of fish detection and the response of fishes themselves to the noise of the moving vessel. The way of estimation of geometrical parameters of such shadow zone and corresponding coefficients K_{shad} for the bottom channel of echo-integration system are described, irrespective of its type. Four equations are given to estimate effective values of acoustic shadow zone in dependence of fish distribution near the seabed, water parameters and specifications of equipment used. An experimental approach to algorithms developed was made during trawl-acoustic survey for cod and haddock in the Barents Sea in October-December 1995. Estimated values of correction coefficients of shadow zone varied in average from $K_{shad} = 1.5$ to $K_{shad} = 20$ relative to shadow area values in the bottom channel of 2 m width.

4. Other Matters

a) Descriptions of Fishing Effort

In preparation for the CWP 17th session, STACREC at its June 1996 meeting, circulated definitions of fishing effort as they apply to STATLANT 21B and requested feedback as to current applicability. One response was received, pertaining to fixed gillnet. It was noted that the current definition of fishing effort for this gear given as "length of net expressed in 100 meter units multiplied by the number of times cleared" does not include a reflection of soak time. A proposal suggested that this be changed to "length of net in 100 meter units multiplied by the number of soak days per haul". It was noted that a change of the definition of fishing effort for this type of gear was most applicable to fisheries in the NAFO regulatory area. STACREC **recommended** that *the definition of the fishing effort measure for gillnets (fixed) be changed to read 'length of net expressed in 100 meter units multiplied by the number of soak days per haul'*. The Secretariat will inform appropriate statistical agencies of this change, as modifications to data aggregation procedures may be required.

STACREC noted that the definition of fishing effort for several other passive gear types, did not appear to be current, and agreed that further comments on suitability be solicited .

b) Acknowledgements

The Chairman expressed his thanks to the Secretariat, the rapporteur and all participants for their assistance in compiling the information necessary for the meeting.

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

Chairman: H. P. Cornus Rapporteur: M. Stein

The Committee met at the Shuvalov Palace, St. Petersburg, Russia on 10 and 12 September 1996. In attendance were H. P. Cornus (EU-Germany, Chairman), V. A. Rikhter (Russia), M. Stein (EU-Germany), A. Vazquez (EU-Spain) and the Assistant Executive Secretary (T. Amaratunga).

1. Review of Scientific Publications

a) Status of Papers from September 1993 Symposium

The Assistant Executive Secretary informed the Committee that all papers have been processed, and galleys have been sent to the authors. Publication is envisaged for October 1996. The Committee noted with pleasure that this issue has been brought to an end.

b) Status of Publication on Division 3M Shrimp

The papers will undergo review process in the week after the annual meeting and completion of publication is envisaged for the end of the year.

c) Status of Papers from September 1995 Symposium

The Committee was informed that all papers sent out for review are back to the conveners of the Symposium (G.B. Stenson, Canada and J. Sigurjonsson, Iceland). The papers are in the final editorial process with the editors.

d) Other Publications

The Committee noted that Scientific Council Studies Number 25 (Flemish Cap Selected Environmental and Other Papers) has been published and mailed.

2. Promotion and Distribution of Scientific Publications

a) Invitational Papers

The Assistant Executive Secretary informed the Committee that the invitational paper by Halliday and Pinhorn (Canada) was received in July 1996. Galleys have been prepared and the volume (*Journal of Northwest Atlantic Fishery Science*) is due to be printed. The Committee emphasized the need to promote and advertise this volume by a special flyer, to attract the interest of people dealing with the history of fishery management.

The status of the invitational paper by Sv. Aa. Horsted (EU-Denmark) is presently unknown to the Committee. It was proposed that STACPUB Chairman contact the author and look for possible ways to finalize this paper.

The Committee discussed the potential for other invited papers. V. A. Rikhter (Russia) indicated his interest to prepare an invitational paper.

3. Editorial Matters

a) Future Changes in the Editorial Board

The Committee was informed that the questions in respect to the changes of the Editorial Board had been settled in the June 1996 meeting of STACPUB. Guidelines had been sent to the new members of the Editorial Board. It was considered worthwhile to send these guidelines also to the standing members of the Editorial Board. Further to that, there was no new information.

b) **Other Considerations**

There was no new information on editorial matters for consideration.

4. **Review of Papers for Possible Publication**

a) **Consideration of Material from the Workshop, 4-6 September 1996**

The Committee noted that the Workbook material from the Workshop will be published in the *NAFO Scientific Council Studies*, and a deadline 1 November 1996 had been set to the authors to submit any revisions.

b) **Other Papers Presented at the September 1996 Meeting**

The Committee reviewed the SCR Doc. and nominated the following 3 papers for consideration for publication in the Scientific Council Studies: SCR Doc. 96/89, 91, 92. The paper SCR Doc. 96/87 was also discussed for potential publication in the *NAFO Scientific Council Studies*. The Committee felt, however, that a five year overview paper on Flemish Cap oceanography would be more appropriate and that STACPUB Chairman should write to the author on this matter.

c) **Papers on Divisions 2J+3KL Cod Deferred from the June 1996 Meeting**

STACPUB members reviewed the 21 SCR Doc. deferred from the June meeting. Three papers were considered to have the potential for primary publication. The Committee proposed that J. Morgan (Canada) be requested to take the responsibility as co-ordinator for this Special Issue on Northern Cod. STACPUB agreed that a submission date for the final manuscripts be set as 30 November 1996.

d) **Papers not Considered at the June 1996 Meeting**

With respect to SCR Doc. 96/16 which was not considered during the June 1996 Meeting, STACPUB was informed that the authors had planned to submit this paper to primary literature outside the NAFO publication series. It was proposed that the authors be contacted to elucidate this question further.

e) **Papers on Environmental Data on Germany/Russia Project**

The Committee was informed that papers on the Russian/German Data Evaluation project were made available to STACFEN and that one out of these papers is in the review process for publication in *NAFO Scientific Council Studies*.

5. **Other Matters**

The Committee discussed ways to facilitate the reviewing of SCR Documents during its meetings. It was noted that the present form of requesting the authors to indicate intentions of possible publication, works sufficiently well and that there was no need to change this procedure.

The Chairman closed the meeting by expressing thanks to STACPUB members, and to the Assistant Executive Secretary and his staff for expedient action in the publication process.