

PART F

Scientific Council Annual Meeting, 15-19 September 2003

CONTENTS

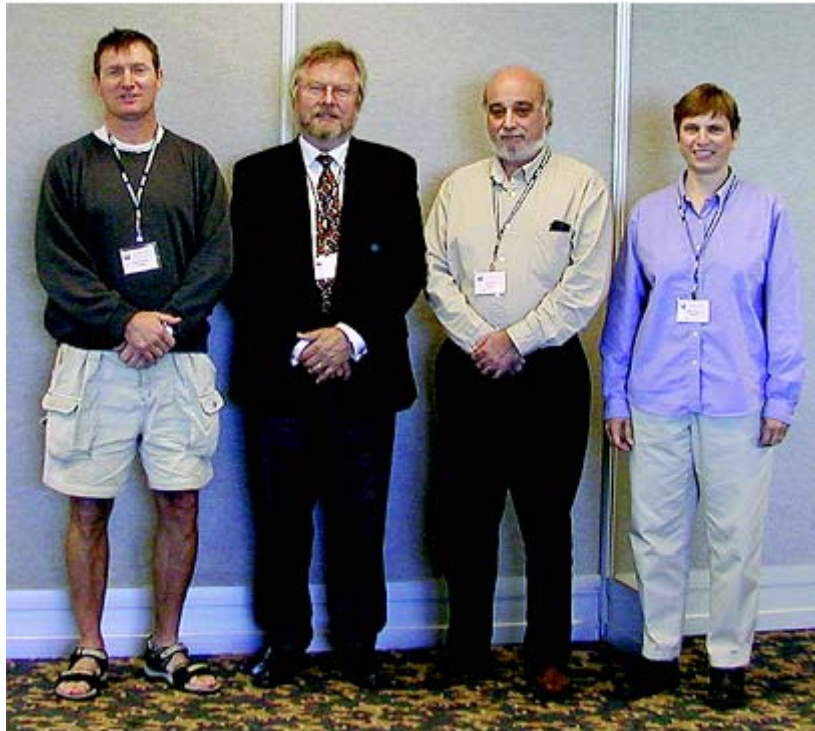
	Page
Report of Scientific Council Meeting, 15-19 September 2003.....	367
ANNEX 1. Report of Scientific Council Special Session "Workshop on Mapping and Geostatistical Methods for Fisheries Stock Assessment", 10-12 September 2003	379
Workshop Agenda	380
List of Participants	383
Appendix I. Report of Standing Committee on Fisheries Science (STACFIS)	387
Appendix II. Report of Standing Committee on Research Coordination (STACREC)	389
Appendix III. Report of Standing Committee on Publications (STACPUB)	393



Participants of Scientific Council Meeting, 15-19 September 2003.

Left to Right: Tissa Amaratunga, Dorothy Auby, Igor Sigaev, Bruce Atkinson, Ray Bowering, Don Stansbury, David Kulka, Arni Nicolajsen, Manfred Stein, Peter Rioux, Unnur Skuladottir, Antonio Avila de Melo, Ralph Mayo, Bill Brodie, Lisa Hendrickson, Antonio Vazquez, Jean-Claude Mahé, Joanne Morgan, Ricardo Alpoim, Fernando Gonzalez-Costas, Chris Allen, Hilario Murua, Fred Serchuk, Konstantin Gorchinsky, Taro Ichii.

Missing: Vladimir Babayan, Enrique De Cárdenas, Susana Junquera, Leonid Kokovkin, Dave Orr, Sergey Rebik, Toomas Saat, Vladimir Shibanov



The Chairs, Scientific Council Meeting, 15-19 September 2003 (left to right): D. E. Stansbury, Chair STACFIS
M. Stein, Chair STACPUB; R. K. Mayo, Chair Scientific Council; M. J. Morgan, Vice-Chair Scientific Council and
Chair STACREC.



Scientific Council in session, 15-19 September 2003.

SCIENTIFIC COUNCIL ANNUAL MEETING, 15-19 SEPTEMBER 2003

Chair: Ralph K. Mayo

Rapporteur: Tissa Amaratunga

I. PLENARY SESSIONS

The Scientific Council met at the Holiday Inn Harbourview, Dartmouth, Nova Scotia, Canada, during 15-19 September 2003. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), Estonia, European Union (France, Germany, Portugal and Spain), Iceland, Japan, Russian Federation, Ukraine and United States of America.

The Executive Committee met prior to the opening session of the Council, and the Provisional Agenda, plan of work and other related matters were discussed. The Council noted the Scientific Council "Workshop on Mapping and Geostatistical Methods for Fisheries Stock Assessment" was successfully conducted during 10-12 September 2003. The Chair extended appreciation to the conveners.

The opening session of the Council was called to order at 1000 hours on 15 September 2003.

The Chair welcomed everyone to Dartmouth, Nova Scotia, Canada, and to this venue for the Meeting. The Deputy Executive Secretary was appointed rapporteur. The Chair thanked the Canadian hosts for the facilities and support offered for the meeting.

The Provisional Agenda was **adopted** as presented, noting some additional items may be addressed subject to Fisheries Commission requests during the course of this meeting.

The Council noted the Provisional Agenda for the Scientific Council Meeting on shrimp during 5-11 November 2003 in Dartmouth, Nova Scotia, Canada, was circulated 3 September 2003.

The Council and its Standing Committees met through 15-18 September 2003 as needed. At its sessions on 18 September 2003, the Council considered and **adopted** the reports of the Standing Committees (STACFIS, STACREC, STACPUB).

The concluding session was called to order at 1030 hours on 19 September 2003 when the Council addressed other outstanding agenda items. The Scientific Council then considered and **adopted** its report of this meeting.

The meeting was adjourned at 1150 hours on 19 September 2003.

The Reports of the Standing Committees as **adopted** by the Council are appended as follows: Appendix I – Report of Standing Committee on Fisheries Science (STACFIS), Appendix II – Report of Standing Committee on Research Coordination (STACREC), and Appendix III – Report of Standing Committee on Publications (STACPUB).

The Report of the Scientific Council Workshop "Mapping and Geostatistical Methods for Fisheries Stock Assessment" is presented at Annex 1 of this Scientific Council Report.

The Agenda, List of Research (SCR) and Summary (SCS) Documents, List of Representatives and Advisers/Experts of this meeting are given in Part H this volume.

The Council's considerations on the Standing Committee Reports, and other matters addressed by the Council follow in Sections II-XIII.

II. REVIEW OF SCIENTIFIC COUNCIL RECOMMENDATIONS FROM JUNE 2003

The Council noted that recommendations made by the Scientific Council in 2003 will be addressed as needed under relevant agenda items at this meeting.

The Scientific Council decided that relevant recommendations from each Scientific Council Meeting should be transmitted by mail from the Chair of Scientific Council to the Chairs and Executive Secretary of the other Constituent Bodies for attention and appropriate action.

III. FISHERIES SCIENCE

The Council **adopted** the Report of the Standing Committee on Fisheries Science (STACFIS) as presented by the Chair, Don E. Stansbury. The full report of STACFIS is at Appendix I.

IV. RESEARCH COORDINATION

The Council **adopted** the Report of the Standing Committee on Research Coordination (STACREC) as presented by the Chair, M. Joanne Morgan. The full report of STACREC is at Appendix II.

The **recommendations** made by STACREC for the work of the Scientific Council as **endorsed** by the Council are as follows:

1. STACREC reviewed the draft FAO Partnership Arrangement but noted the difficulty in doing so without legal expertise and given the short time period. STACREC **recommended** that *a draft version of Annex 2 (the section most pertinent to NAFO) of the FIRMS Partnership Arrangement should be prepared in advance of the June 2004 Scientific Council Meeting for review at that meeting.*
2. STACREC discussed a proposal to archive data utilized in stock assessments, on a regular basis, in a standardized format and common location. The importance of the ability to reproduce stock assessments was emphasized. STACREC **recommended** that *the Designated Experts would be asked to place electronic versions of their stock assessment data (including time series of catch, survey indices, numbers at age, catch at age, weights at age, and maturity at age) on the server, in formats currently available, at the Scientific Council meetings. The data files provided should be annotated and include all survey indices available and catches in aggregate form. The Secretariat will archive these data following Scientific Council Meetings and make them available to members of the Scientific Council thereafter.*
3. STACREC noted the tuna data were not required for the work of the Scientific Council, and STACREC **recommended** that *the Secretariat need not report tuna catches in the data tabulations prepared at NAFO and that CWP (and FAO) will be informed that tuna catches will no longer be recorded in the STATLANT 21 data.*

V. PUBLICATIONS

The Council **adopted** the Report of the Standing Committee on Publications (STACPUB) as presented by the Chair, Manfred Stein. The full report of STACPUB is at Appendix III.

The **recommendations** made by STACPUB for the work of the Scientific Council as **endorsed** by the Council are as follows:

1. STACPUB noted that it is important that papers from the Deep Sea Fisheries Symposium be published as far as possible in advance of another symposium on deep-sea fisheries scheduled for late-2003 in New Zealand. Recognizing the delays to date were as a result of a special situation, STACPUB **recommended** that *the 23 papers currently ready be placed on the NAFO Website by the beginning of October 2003, as part of Volume 31, ensuring a 2003 publication date.*

2. STACPUB **recommended** that *hard copy and web versions of Scientific Council Studies No. 37 be issued shortly.*
3. STACPUB **recommended** that *for the Scientific Council Reports, the Secretariat return to printing its reports on a calendar year basis, and that color printing be used where warranted in Scientific Council Reports. The Scientific Council Reports for calendar year 2003 should therefore be printed as the next "Redbook".*
4. STACPUB was informed that all Journal and Studies issues have been scanned and are available on CD. STACPUB **recommended** that *all scanned versions of the Journal and Studies be placed on the NAFO website as soon as possible, as this is a vital reference tool for users.*
5. Scientific Council Studies contains publications such as workbooks and workshop reports, and STACPUB concluded that this material must be made available in print. Therefore, STACPUB **recommended** that *Scientific Council Studies continue to be produced in printed versions recognizing the number of hard copies has been reduced.*

VI. RESPONSE TO SPECIAL REQUEST FROM FISHERIES COMMISSION

1. Update on advice for northern shrimp in Divisions 3LNO and Division 3M

Scientific Council reviewed the updated information available for Div. 3LNO and Div. 3M shrimp. Based on this review, Scientific Council concluded that there is no basis to change its advice for 2004.

This advice was submitted to the Fisheries Commission during the course of this meeting.

VII. REVIEW OF FUTURE MEETING ARRANGEMENTS

1. Scientific Council Meeting on Shrimp, November 2003

The Scientific Council noted the Provisional Agenda for the meeting of 5 -11 November 2003 was circulated on 3 September 2003 in accordance with the Rules of Procedure. The meeting will be held at NAFO Headquarters in Dartmouth. The Council noted that the meeting will have a LAN System wired to a server.

2. Scientific Council Meeting, 3-17 June 2004

The Scientific Council reconfirmed that its meeting of 3-17 June 2004 will be held at Alderney Landing, Dartmouth, Nova Scotia, Canada. The Council again emphasized that a LAN System, with technical support present throughout the meeting, was required for its work at the meeting.

3. Special Session, 8-10 September, and Annual Meeting, 13-17 September 2004

The NAFO Annual Meeting is scheduled for 13-17 September 2004, when Scientific Council conducts its meeting. The Scientific Council Special Session, the Symposium on "*The Ecosystem of the Flemish Cap*" will be held during 8-10 September 2004. The venue will be Dartmouth, Nova Scotia, Canada. The Council emphasized the space and facilities for this Symposium should be similar to what was used for the "*Pandalid Shrimp Fisheries*" Symposium held in September 1999 at the Holiday Inn, Dartmouth.

The Council again noted a LAN System with technical support is needed for the 13-17 September 2004 Scientific Council Meeting.

4. **Scientific Council Meeting on Shrimp, October/November 2004**

NAFO/ICES Secretariat Discussions on 2004 Shrimp Assessment Meeting

During its meeting of June 2003, the Scientific Council stated the following:

"Taking into account the Council Meeting of November 2004 may include the ICES request to assess northern shrimp stocks in the Northeast Atlantic, the Scientific Council considers it premature to tentatively set dates for the 2004 northern shrimp assessment meeting. The dates and venue of the 2004 meeting will be discussed by the Council at the November 2003 Meeting. In the interim, the Chair of Scientific Council will communicate with the Chair of ACFM to initiate discussion on the roles and responsibilities of both parties and the NAFO Secretariat will communicate with the ICES Secretariat to develop protocols for institutional arrangements. A report of these activities will be discussed by Scientific Council at the September 2003 Meeting."

Following NAFO and ICES Secretariat discussions, Scientific Council agreed to the following.

It is proposed that ICES participants of Working Groups assessing Pandalid shrimp stocks will come to the October/November 2004 NAFO Scientific Council Meeting on northern shrimp assessments. The NAFO and ICES shrimp stocks will be assessed during the course of the STACFIS sessions. The ICES assessment reports will be incorporated by stock in the STACFIS Report (e.g. in a special section titled "Shrimp Stocks for which ICES-ACFM provides advice").

The NAFO Scientific Council will conduct its business as usual, and provide management advice only on the usual NAFO stocks (i.e. those requested by Fisheries Commission and NAFO Coastal States). ICES participants who are from NAFO Contracting Parties will be welcome to participate in the Scientific Council discussions.

The relevant ICES section from the STACFIS report will be forwarded to ACFM to develop scientific advice, with the understanding that ICES experts addressed all issues regarding the ICES stocks, and were supported in the assessments by the NAFO experts present at the meeting. Should there be any additional data considered by ACFM after the Scientific Council shrimp meeting (e.g. new survey results), these data should be transmitted to STACFIS in a timely manner.

It is proposed that a formal request for STACFIS to do these ICES assessments can be sent by ACFM to Scientific Council, in the same manner that Scientific Council conversely employs for requests on harp and hooded seals.

As proposed at previous discussions, the NAFO and ICES Secretariats find the dates 27 October to 5 November 2004, \pm one or two days, to be most acceptable for the 2004 shrimp assessment meeting. Considering the NAFO practice of alternating shrimp meeting venues between NAFO Headquarters one year and away the next, the 2004 meeting is proposed to be held at ICES Headquarters. The NAFO Secretariat would provide the services as usual for conducting this Scientific Council Meeting, and preparing its report.

5. **Scientific Council Meeting, June 2005**

The Council agreed to the tentative date 2-16 June 2005 for this meeting to be held at the Alderney Landing, Dartmouth, Nova Scotia, Canada.

VIII. FUTURE SPECIAL SESSIONS

1. **Proposal for Special Session 2004**

The co-convenors Antonio Vazquez and Joanne Morgan reported significant progress in planning a session on "The Ecosystem of the Flemish Cap" to be held 8-10 September 2004, in advance of the 13-17 September 2004 Annual Meeting. A search of the literature indicates that substantial research activity has been devoted to the study of the Flemish Cap. Since 1972 more than 400 papers have been published in the scientific literature on

the topic. These papers have encompassed such diverse areas as oceanography, plankton, general biology and life history.

The co-convenors propose the following topics for inclusion in the Symposium: a) oceanography of the Flemish Cap, including description of any trends, the interactions between species and their environment, and oceanographic linkages with other areas, b) the isolation of the Flemish Cap or its connection to surrounding areas including studies on tagging, genetics, parasites and comparisons of biological parameters, c) general biology of species on the Flemish Cap, d) ecology of species on the Flemish Cap including studies of niche overlap, species assemblages and diet studies, e) the development of fisheries for species on the Flemish Cap and their effect on the system.

The Council was informed an announcement of the Symposium and Call for Papers should be ready by the end of September 2003. The participation of keynote speakers will be actively pursued. It is anticipated that papers from the Symposium will be published in a special volume of the *Journal of Northwest Atlantic Fishery Science*. A progress report for preparation for this Symposium will be presented at the June 2004 Meeting of Scientific Council.

2. **Topics for Special Session in 2005**

The Council reviewed a detailed outline for a proposed Symposium on "*The Incorporation of Environmental Information into Marine Stock Assessments*" presented by Eugene Colbourne (Chair, STACFEN). The Council noted the concern expressed by the STACFEN Chair that there were other Symposia with similar or related topics taking place elsewhere, and that further consideration was necessary on whether this may limit the available information and likely contributions for this Symposium.

Recognizing the progress made within the Working Group on Reproductive Potential (see also the Studies Issue No. 37 and the forthcoming NAFO Journal issue on the subject), the Council also considered the possibilities of developing a Symposium on the Reproductive Potential of Fish.

The Council agreed that a Symposium on either subject would be premature for September 2005. However, it was agreed further discussion on both subjects, as well as other topics, should take place during the June 2004 Scientific Council Meeting for a Scientific Council Symposium to be held in 2006.

IX. NAFO WORKING GROUPS OR WORKSHOPS

1. **Update on Activities of NAFO WG on Reproductive Potential**

The Council was pleased to note the NAFO Journal issue with 9 papers proposed by the Working Group on Reproductive Potential would be published shortly with a publication date of 2003. It was noted that the Studies No. 37 containing information on the Reproductive Potential databases was published on CD. The hard copy and web versions of both these publications will be ready soon.

The Chair of the NAFO Working Group on Reproductive Potential, Ed A. Trippel, conveyed to the Council that the activities since June 2003 primarily focused on making arrangements for the next meeting planned for 15-18 October 2003 at Woods Hole, Massachusetts, USA. The agenda has been circulated to address the ToR as discussed at the Scientific Council Meeting of June 2003.

2. **ICES/NAFO WG on Harp and Hooded Seals**

The Council noted a complete update on the "*Workshop to Develop Improved Methods for Providing Harp and Hooded Seal Harvest Advice*" sponsored by the joint ICES/NAFO Working Group on Harp and Hooded Seals (WGHARP), hosted by the US National Marine Fisheries Service in Woods Hole, MA, USA, 11-13 February 2003, will be presented at the June 2004 Scientific Council Meeting.

X. SCIENTIFIC COUNCIL WORKING PROCEDURES AND PROTOCOL

1. Timetable and Frequency of Assessments

The following schedule of Scientific Council assessments reflects decisions that some stocks should be reviewed on a multi-year basis, with monitoring during the interim years.

Since 1999, the Scientific Council has agreed to the following overall schedule (+ is assessment year, *i* is interim monitor, 0 is no assessment) subject to the Fisheries Commission and Coastal State requests for advice and concurrence:

Stock	1999	2000	2001	2002	2003	2004	2005
<i>Current schedule</i>							
MULTI-YEAR ASSESSMENTS							
American plaice in Div. 3LNO	+	<i>i</i>	+	+	+	<i>i</i>	+
Cod in Div. 3NO	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>	+
Redfish in Div. 3LN	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>	+
Witch flounder in Div. 2J3KL	+	+	+	<i>i</i>	+	<i>i</i>	+
Redfish in Div. 3M	+	+	+	+	+	<i>i</i>	+
Roughhead grenadier in SA 2+3	+	+	<i>i</i>	0	+	<i>i</i>	+
Redfish in SA 1	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>	+
Other fish in SA 1	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>	+
Cod in Div. 3M	+	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>
American plaice in Div. 3M	+	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>
Witch flounder in Div. 3NO	+	+	<i>i</i>	+	<i>i</i>	+	<i>i</i>
Yellowtail flounder in Div. 3LNO	+	+	+	+	<i>i</i>	+	<i>i</i>
<i>Illex</i> Squid in Subareas 3 and 4	+	+	+	+	<i>i</i>	+	<i>i</i>
Roundnose grenadier in SA 0+1	+	<i>i</i>	<i>i</i>	+	<i>i</i>	<i>i</i>	+
Capelin in Div. 3NO	+	+	+	+	+	<i>i</i>	+
ANNUAL ASSESSMENTS							
Greenland halibut in SA2 and Div 3KLMNO	+	+	+	+	+	+	+
Northern Shrimp in Div. 3M	+	+	+	+	+	+	+
Northern Shrimp in Div. 3LNO	+	+	+	+	+	+	+
Northern Shrimp in SA 0+1	+	+	+	+	+	+	+
Northern Shrimp in Denmark Strait	+	+	+	+	+	+	+

Scientific Council reviewed the timetable and, noting that most of the multi-year assessments covered a 2-year period, discussed the possibility of extending the assessment period for some stocks. Discussions on specific stocks will take place at the June 2004 Scientific Council Meeting.

2. Revised Precautionary Approach Framework

A revised framework was developed at the NAFO Scientific Council Workshop on the Precautionary Approach to Fisheries Management during 31 March-4 April 2003 as described in SCS Doc. 03/05. The framework proposed at the Workshop was subsequently reviewed at the June and September 2003 Scientific Council meetings and was adopted by Scientific Council after some revisions. The framework includes a more flexible set of management strategies and courses of action as well as reference point definitions that take account of the agreed roles and responsibilities of the Scientific Council and the Fisheries Commission as given in FC Doc. 98/2.

a) Proposed NAFO Precautionary Approach Framework

The following is the proposed revised NAFO Precautionary Approach Framework developed at the 2003 Scientific Council Workshop on the Precautionary Approach to Fisheries Management as modified by the Council at the June and September 2003 Meetings. For stocks where the Scientific Council can conduct risk analyses, the security margins (F_{buf} and B_{buf}) will be based on the risk levels specified by the Fisheries Commission. For stocks where risk analyses are not possible, the Fisheries Commission will specify the security margins.

The Council agreed that this complete revised version should be issued as NAFO SCS Doc 03/23 shortly.

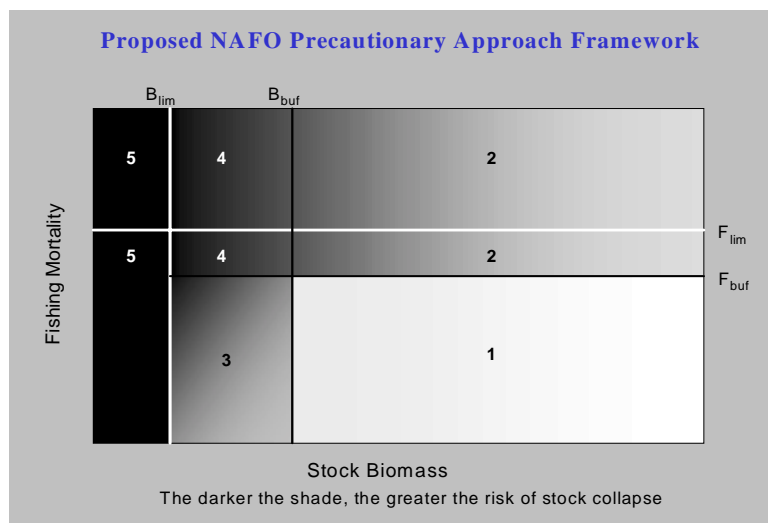


Fig. 1. Schematic depicting a revision to the proposed NAFO PA framework adopted by the Scientific Council in September 2003.

Fishing Mortality Reference Points

F_{lim} = A fishing mortality rate that should only have a low probability¹ of being exceeded. F_{lim} cannot be greater than F_{msy} . If F_{msy} cannot be estimated, then an appropriate surrogate may be used instead.

F_{buf} = A fishing mortality rate below F_{lim} that is required in the absence of analyses of the probability that current or projected fishing mortality exceeds F_{lim} . In the absence of such analyses, F_{buf} should be specified by managers and should satisfy the requirement that there is a low probability¹ that any fishing mortality rate estimated to be below F_{buf} will actually be above F_{lim} . The more uncertain the stock assessment, the greater the buffer zone should be. In all cases, a buffer is required to signify the need for more restrictive measures.

When the stock is above B_{buf} and fishing mortality is below F_{buf} , a flexible fishing mortality rate will be selected by managers to achieve desired management objectives, subject only to the constraints defined by the limit and buffer reference points. In particular, a target F should be chosen to ensure that there is a low probability¹ that F exceeds F_{lim} , and a very low probability² that biomass will decline below B_{lim} within the foreseeable future³.

¹ low probability might be defined as # 20%, but the actual level should be specified by managers

² very low probability might be defined as # 5-10%, but the actual level should be specified by managers

³ foreseeable future might be defined as 5-10 years, but the actual time horizon should be specified by managers

Stock Biomass Reference Points

B_{lim} = A biomass level, below which stock productivity is likely to be seriously impaired, that should have a very low probability² of being violated.

B_{buf} = A stock biomass level above B_{lim} that is required in the absence of analyses of the probability that current or projected biomass is below B_{lim} . In the absence of such analyses, B_{buf} should be specified by managers and should satisfy the requirement that there is a very low probability² that any biomass estimated to be above B_{buf} will actually be below B_{lim} . The more uncertain the stock assessment, the greater the buffer zone should be. In all cases, a buffer is required to signify the need for more restrictive measures.

Management strategies and courses of action are as follows:

MANAGEMENT STRATEGIES AND COURSES OF ACTION (TIME HORIZONS AND ACCEPTABLE RISK LEVELS SPECIFIED BY MANAGERS)	
Zone 1	Safe Zone: Select and set fishing mortality from a range of F values that have a low ¹ probability of exceeding F_{lim} in a situation where stock biomass (B) has a very low ² probability of being below B_{lim} . In this area, target reference points are selected and set by managers based on criteria of their choosing (e.g. stable TACs; socio-economic considerations).
Zone 2	Overfishing Zone: Reduce F to below F_{buf} .
Zone 3	Cautionary F Zone: The closer stock biomass (B) is to B_{lim} , the lower F should be below F_{buf} to ensure that there is a very low ² probability that biomass will decline below B_{lim} within the foreseeable future ³ .
Zone 4	Danger Zone: Reduce F to below F_{buf} . The closer stock biomass (B) is to B_{lim} , the lower F should be below F_{buf} to ensure that there is a very low ² probability that biomass will decline below B_{lim} within the foreseeable future ³ .
Zone 5	Collapsee Zone: F should be set as close to zero as possible.

Key features of the framework include:

- There must be a very low probability² that management actions result in projected biomass dropping below B_{lim} within the foreseeable future³. Below B_{lim} , fishing mortality should be kept as close to zero as possible.
- The fishing mortality limit should be no higher than F_{msy} . There should be a low probability¹ that realized fishing mortality will exceed F_{lim} .
- Fishing mortality targets are flexible, as long as they remain in Zone 1 of Fig. 1.
- If a stock assessment generates a current or projected biomass with some probability distribution, operationally the biomass distribution would be evaluated against B_{lim} . In other words, a risk analysis will provide the probability that current or projected biomass is below B_{lim} . If no probability distribution of biomass is available, but a value for B_{lim} exists, Fisheries Commission should establish a buffer zone (B_{buf}), against which the biomass would be evaluated. The same procedure should be used to establish a fishing mortality buffer (F_{buf}). If biomass is in the zone between B_{lim} and B_{buf} , action to reduce F below F_{buf} is required to ensure that there will be a very low probability² that biomass declines below B_{lim} in the foreseeable future³.

The revised framework attempts to address the managers' concerns as follows:

1) Prescribed harvest control rules (no fishing) below B_{lim} or B_{buf}

The new framework allows fishing below B_{buf} , subject to constraints such as ensuring a very low probability² that biomass will fall below B_{lim} in the foreseeable future³. However, below B_{lim} , fishing mortality should be as close to zero as possible.

2) A fishing mortality limit at F_{msy} :

Reasons for continuing to advise that $F_{lim} = F_{msy}$ are:

- Perhaps most importantly, F_{msy} as a limit is in conformance with the Precautionary Approach as described in several United Nations agreements (in particular, Annex II of the United Nations Straddling Stocks Agreement).
- Fishing somewhat below F_{msy} results in a relatively small loss in average catch, but a large increase in average biomass (which, in turn, results in a decreased risk to the fish stock, an increase in CPUE, and a decrease in the costs of fishing).
- Traditional bio-economic models indicate that the fishing mortality associated with maximum economic yield (F_{mey}) is usually considerably less than F_{msy} .
- Ensuring no major stock is fished harder than the single-species F_{msy} has often been recommended as a good first step towards ecosystem-based management. Ecosystem-based management will likely require even more conservative fishing mortality targets than "traditional" single-species-based management.

3) The perception of a linear decrease in fishing mortality from the biomass target to the biomass buffer:

- There is a range of options open to managers in this part of the framework (for example, no reduction in F is prescribed if stock biomass is above B_{buf} and F is below F_{buf}). Managers also decide on the levels of B_{buf} and F_{buf} in those cases where the risk of biomass being below B_{lim} or the risk of fishing mortality being above F_{lim} cannot be provided.

4) No consideration of the desirability for stable TACs:

- This is a difficult concept to capture in a simple schematic such as Fig. 2; however, considerable flexibility exists for managers in setting target F levels. Stable TACs are easier to achieve if the fishery remains in Zone 1. Furthermore, maintenance of biomass well above B_{lim} will minimize the instability caused by fishery closures.

5) No consideration of multi-species situations:

- Although the proposed PA Framework is focused on single species, ensuring that no individual species is fished harder than the single-species F_{msy} has frequently been suggested as a first step towards satisfying several important and common ecosystem objectives. In addition, two other aspects of multi-species management were considered in the proposed revision of the PA Framework. First, the de-emphasis of B_{msy} avoids the problem of the impossibility of maintaining all stocks in a multi-species assemblage simultaneously at their respective single-species B_{msy} levels. Second, by replacing the requirement that fishing mortality be zero when biomass is below B_{lim} with a requirement that fishing mortality to be as close to zero as possible in this situation, there is now recognition of the need for a certain amount of flexibility to account for technical interactions that result in unavoidable by-catch of depleted species.

b) **Limit Reference Point Study Group (LRP)**

At the Scientific Council Workshop on the Precautionary Approach held March-April 2003 it was noted that it is the responsibility of Scientific Council to calculate LRPs. Given that a number of approaches for LRPs have been discussed in the literature, it was recognized that there is a need to review the strengths and weaknesses of these alternative approaches and to make recommendations to Scientific Council on which are the most appropriate for defining LRPs. These recommendations are needed for stocks ranging from data-rich to data-poor and with a range of life-history parameters.

As a result Scientific Council **recommended** that *a Study Group on the estimation of limit reference points be established. Peter Shelton (Canada) was named as a co-Chair with other co-Chairs to be selected, and the Co-Chairs explore with colleagues possible themes for a Study Group working session in 2004.*

The following are the Terms of Reference for the Study Group:

- Review the properties of alternative LRPs, including the ability to quantify risk, and determine strengths and weaknesses of various alternatives.
- Provide guidance regarding the most appropriate approaches for stocks ranging from data rich to data poor and for a range of life-history strategies
- Provide example applications to Subarea 2 + Div. 3KLMNO Greenland halibut, Div. 3LNO yellowtail flounder and Div. 3LNO Thorny skate based on existing and recent biological, fisheries and survey data; recent stock assessments; and management measures. Other example stocks may also be explored.

c) **Possible Joint FC/SC Meeting**

The Council noted there could be a possible Intersessional Joint FC/SC Meeting on the Precautionary Approach. The Scientific Council discussed the possible remit for such a meeting and agreed the Chair of the Scientific Council will consult with the Chair of the Fisheries Commission, and work with the Chair(s) of the Joint Working Group to develop a work plan for that meeting.

XI. ELECTION OF STACFIS CHAIR

The Nominating Committee consisting of Joanne Morgan (Canada), Fred Serchuk (USA) and Antonio Vazquez (Spain) as appointed by the Chair, was requested to submit any nomination(s) for the office of the Chair of the Standing Committee on Fishery Science (STACFIS). Hilario Murua (EU-Spain) was nominated by the Committee. The Council elected him by unanimous consent.

XII. OTHER MATTERS

1. **Consideration of Memorandum of Understanding with ICES**

Scientific Council reviewed the submission with respect to "Memorandum of Understanding Between the Northwest Atlantic Fisheries Organization (NAFO) and The International Council for the Exploration of the Sea (ICES)" and the following text was agreed to:

Recognizing that the Northwest Atlantic Fisheries Organization (NAFO) hereinafter called "the Organization", exists to promote the conservation and optimum utilization of the fishery resources of the Northwest Atlantic area within a framework appropriate to the regime of extended Coastal State jurisdiction over fisheries, and accordingly to encourage international cooperation and consultation with respect to these resources; whose object is to contribute through consultation and cooperation to the optimum utilization, rational management and conservation of the fishery resources of the NAFO Convention Area.

Recognizing that the International Council for the Exploration of the Sea, hereinafter called "the Council", exists to (a) promote and encourage research and investigations for the study of the sea particularly related to the living resources thereof; (b) draw up programmes required for this purpose and to organize, in agreement with its Contracting Parties, such research and investigations as may appear necessary; (c) publish or otherwise disseminate the results of this work; and (d) provide scientific information and advice to Member Country governments, and the regulatory commissions with which cooperative relationships have been established. In order to carry out these tasks appropriately and efficiently the Council seeks, *inter alia*, to establish and maintain mutually agreed working arrangements with other international organizations which have related objectives.

Recognizing that the Scientific Council of the Organization is that body within the Organization that is most closely aligned with the Council as regards work activities and objectives, and that past collaborations have been of mutual benefit to the Organization and the Council.

Recognizing that there are mutual benefits to be gained, the Organization and the Council have, therefore, agreed to the following Memorandum of Understanding to be implemented through the Scientific Council of the Organization:

1. The Organization and the Council will encourage
 - a) reciprocal consultations and regular contact between the Organization and the Council on matters of common interest in the field of marine scientific research and related aspects, particularly those involving studies in the North Atlantic Ocean and its adjacent seas, and which fall within their respective competence;
 - b) regular exchanges between the Organization and the Council of information, documents, and publications relating to programme and project plans and to the results of activities of mutual interest, joint or otherwise;
 - c) joint activities, including the establishment of joint subsidiary bodies or other suitable arrangements as required, the study and reporting on matters of common interest, and the support of those programmes which are of joint concern and benefit.
2. The Organization and the Council will invite each other to be represented at their meetings that are of common interest, to the extent that this is possible within their respective working procedures.
3. The terms of this Memorandum of Understanding may be revised upon mutual agreement by the Organization and the Council. Either may withdraw from the Understanding at any time subject to giving one year's written notice.
4. Recognizing and fully respecting their various mandates, policies and priorities, the signatories agree that this Memorandum of Understanding shall enter into force upon signature and shall remain in force except for conditions as pursuant to Clause 3 above.

Signed:

President
International Council for the
Exploration of the Sea

President
Northwest Atlantic Fisheries Organization

Date: September, 2003

Date: September, 2003

2. Other Business

The Scientific Council again nominated Fernando Gonzalez-Costas (EU-Spain) to represent the Scientific Council at the ICES North Western Working Group Meetings of 2004.

XIII. ADOPTION OF REPORTS

1. Consideration of Report of the Geostatistics Workshop of 10-12 September 2003

The co-conveners, David Kulka and Lisa Hendrickson, of the Geostatistics Workshop held during 10-12 September 2003, presented a complete report of the meeting. The Council noted a summary is at Annex 1 of this Scientific Council Report, and the complete report will be published as SCS Doc. 03/22.

The Council noted the success of the Workshop and extended its appreciation to the co-conveners.

2. Committee Reports STACFIS, STACREC, STACPUB

The Council at its meetings on 18 September 2003 considered and **adopted** the reports of its Standing Committees, STACFIS, STACREC and STACPUB. These reports are given in Appendix I, II and III, respectively.

3. Report of Scientific Council

The Council at its concluding session on 19 September 2003 considered and **adopted** its own report.

XIV. ADJOURNMENT

The Chair thanked the members of the Scientific Council for their contributions during this meeting, noting especially the work of the Committee Chairs. Appreciation was extended to the NAFO Secretariat for their support during the meeting. Noting that this meeting concludes 6 consecutive years in different offices within the Scientific Council, the Chair extended sincere appreciation to all of the members of the Scientific Council over the past years for the hard work and spirit of cooperation that characterizes the Scientific Council. The Chair also noted that many Scientific Council officers will change at the end of this meeting, and thanked the outgoing officers for their hard and dedicated work and extended the incoming officers the best wishes. There being no other business, the meeting was adjourned at 1150 hours on 19 September 2003.

ANNEX 1. REPORT OF SCIENTIFIC COUNCIL SPECIAL SESSION

WORKSHOP ON MAPPING AND GEOSTATISTICAL METHODS FOR FISHERIES STOCK ASSESSMENT

10-12, September, 2003

The Scientific Council of the Northwest Atlantic Fisheries Organization held a Special Session, "*Workshop on Mapping and Geostatistical Methods for Fisheries Stock Assessment*", at the Holiday Inn in Dartmouth, Nova Scotia during 10-12 September 2003. The Workshop was convened by David Kulka (Canada) and Lisa Hendrickson (USA) and the instructors were: Dr. Nicolas Bez (Centre de Géostatistique, Fontainebleau, France), Dr. Reiner Schlitzer (Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany), and Jerry Black, Dr. Mark Simpson, and David Kulka (Department of Fisheries and Oceans, Canada). There were 28 participants from Canada, Denmark (Faroe Islands and Greenland), Estonia, the European Union (France, Germany, Portugal, and Spain), the Russian Federation, and the United States of America. The agenda (see below), relevant literature citations and links to the software utilized in the workshop were posted on the NAFO website prior to the workshop.

Lectures pertaining to geostatistical concepts and methods were presented and followed by hands-on exercises that incorporated survey and fisheries data from the Grand Banks. The objective of the workshop was to provide participants with a basic understanding of geostatistical concepts and methods, as well as the tools to apply this knowledge to fisheries stock assessment using freeware mapping and geostatistical software.

Data visualization and analysis techniques were presented using the GIS (Geographical Information System) software packages of SPANS, ACON and Ocean Data View. Participants viewed demonstrations of the software and completed hands-on exercises. Geostatistical concepts and methods, particularly related to kriging, were also presented and participants learned the basics of using the "R" software package (freeware) and conducted geostatistical analyses using routines prepared by programmers at the Centre de Géostatistique as well as those developed during the workshop.

The impetus for the workshop was an unfamiliarity of many Scientific Council members with a Voronoi analysis of yellowtail flounder distribution on the Grand Banks. As a result of the workshop, Scientific Council members now have a better understanding of basic geostatistical concepts and methods; particularly kriging. In addition, the workshop provided members with freeware software tools and hands-on exercises that can be applied to geo-referenced data from the NAFO region in the future.

Participants discussed how they might apply the knowledge gained at the workshop. A recommendation was made to investigate institutionalization of the mapping and geostatistical analyses presented by accessing them via an internet site, such as the GMBIS website, which already provides a mechanism for mapping any geo-referenced data set. However, it was also noted that the time commitment and programming knowledge required represent potential obstacles to implementation. Multiple participants expressed positive feedback about the workshop, particularly with respect to covering such a complex topic, in a short time span, in an understandable way and with the use of data from the Grand Banks in the vicinity of the NRA. Workshop participants felt that the knowledge gained at the workshop would now allow them to apply geostatistical analyses in their stock assessments.

A full Report on the Workshop containing descriptions of methodology and example analyses will be published as NAFO SCS Doc. 03/22 and made available on the NAFO Website.

WORKSHOP AGENDA**DAY 1**

0800-0900 **Establish LAN connections and download software**

0900-0930 **Introduction**

Workshop Objectives, Agenda and Introduction of Instructors (D. Kulka/L. Hendrickson)

0930-1000 **Overview**

Workshop overview and brief history of geostatistics use in fisheries stock assessment (N. Bez)

- Data visualization (mapping techniques)
- Interpolation techniques - Point to Surface Transformation (i.e. Contouring, Voronoi, Potential Mapping, Kriging)
- Overlay modeling
- Geostatistics

Data Visualization

1000-1015 **Overview of mapping** (D. Kulka)

The value of visualization of biological and environmental data in the marine context will be reviewed. Spatial data structure will be described and illustrated.

1015-1035 *Break*

1035-1200 **Use of ACON software** (J. Black)

Participants will use ACON software (freeware) to map and analyze NAFO survey data. Transformation and visualization of point patterns to surface distributions will be examined. Tessellation methods such as plotting Voronoi polygons and the use of Delauney triangulation will be described.

1200-1330 *Lunch*

1330-1430 **SPANS software demonstration** (D. Kulka)

Key functions in SPANS (Spatial Analysis System), a GIS, will be demonstrated. Potential mapping, a point to surface transformation will be demonstrated. Potential mapping provides an optimal interpolated estimate for locations that were not sampled. The resulting classified surface (raster) facilitates analyses not possible with the original point data.

1430-1500 **Generalized Additive Models** (M. Simpson)

1500-1520 *Break*

1520-1830 **Use of Ocean Data View software** (R. Schlitzer)

Participants will use Ocean Data View software to map and analyze NAFO survey data. This exercise will involve exploration and visualization of oceanographic and other geo-referenced profile or sequence data.

DAY 2**Geostatistics**0830-1030 **Surface Overlay and Data Modelling** (D. Kulka)

Demonstration of overlaying surfaces and modeling to examine spatial relationships or to calculate spatial statistics. Examples will include species co-occurrence, habitat preferences and biomass calculations using NAFO data.

1030-1050 *Break*1050-1200 **Why should we use geostatistics?** (N. Bez)

- Sampling Theory (Cochran, 1977) is based on the assumption that the sample values can be modeled as independent and identically distributed random variables. Each of these concepts will be discussed. When this framework is not consistent with the characteristics of either the sampling or the data, one alternative method is to use geostatistics.
- Modeling and use the use of autocorrelation present in the sample values of a given variable. Kriging will be presented as a method to allow weighting of the data according to a) spatial structure, b) relative location in space, and c) position relative to the point or the polygon to be estimated.
- Analysis of spatially-correlated (multivariate geostatistics)

1200-1330 *Lunch*1330-1530 **The variogram** (N. Bez)

- Background on variance
- Decomposition of the variance into distance bins
- Random Functions
- Variogram definition
- Estimation of the variogram in practice
- Models
- Properties
- Interpretation of the spatial structure

1530- 1550 *Break*1550- 1730 **Estimation and interpretation of experimental variograms** (N. Bez)

- Exercises using R (freeware version of Splus) and geostatistical routines.

DAY 30830- 1030 **The variogram, continued** (N. Bez)

- The variogram as a tool to compute variances
- Nugget effect and the reduction of variance
- Cases where statistics is relevant (pure nugget effects)
- Weighted variograms

Kriging

- Principles
- Equations
- Kriging properties
- Illustrations
- Difference between the variable and its kriging
- Kriging weights
- Local estimation as opposed to global estimations

1030- 1050 *Break*

1050-1200 **Kriging exercises** (N. Bez)

Objectives include modeling the variograms and using them for kriging. Changes in the output maps by varying the variogram parameters will be examined.

1200- 1330 *Lunch*

1330-1530 **Elements of the transitive geostatistical approach** (N. Bez)

- Center of Gravity and Inertia to summarize survey maps and to describe a series of survey data.
- Elements of global estimation (estimation variances, survey design, etc.)
- Presentation of alternative software (EVA, Isatis)

1530-1550 *Break*

1550-1615 **Comparison of Techniques to solve a Practical Fisheries Problem**

1615-1700 **Wrap-up discussion**

LIST OF PARTICIPANTS

Co-conveners:

Lisa Hendrickson
National Marine Fisheries Service, NEFSC
166 Water St.,
Woods Hole, MA 02543
USA
Phone: +508-495-2285
Fax: +508-495-2393
E-mail: lisa.hendrickson@noaa.gov

David W. Kulka
Science, Oceans & Envir. Br., Newfoundland &
Labrador Region, P.O. Box 5667
St. John's, NL A1C 5X1
Canada
Phone: + 709-772-2064
Fax: + 709-772-5469
E-mail: kulkad@dfo-mpo.gc.ca

Canada

Bowering, W.R. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: + 709-772-2054 – Fax: + 709-772-4105 – E-mail: boweringr@dfo-mpo.gc.ca

Brodie, W.B. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-3288 – Fax: +709-772-4105 – E-mail: brodieb@dfo-mpo.gc.ca

Dwyer, K.S. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-0573 – Fax: +709-772-4188 – E-mail: dwyerk@dfo-mpo.gc.ca

Maddock Parsons, D. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-7703 – Fax: + 709-772-4188 – E-mail: parsonsd@dfo-mpo.gc.ca

Morgan, M. J. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-2261 – Fax: +709-772-4105 – E-mail: morganj@dfo-mpo.gc.ca

Orr, D. C. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-7343 – Fax: +709-772-4105 – E-mail: orrd@dfo-mpo.gc.ca

Simpson, M.R. Aquatic Resour. Div., DFO Newfoundland & Labrador, P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-5314 – Fax: +709 772-5469 – E-mail: simpsonmr@dfo-mpo.gc.ca

Stansbury, D.E. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador, P. O. Box 5667, St. John's, NL A1C 5X1
Phone: +709-772-0559 – Fax: +709-772-4105 – E-mail: stansburyd@dfo-mpo.gc.ca

Walsh, S.J. Science, Oceans & Envir. Br., DFO Newfoundland & Labrador., P.O. Box 5667, St. John's, NL A1C 5X1
Phone: +709 772-5478 – Fax: +709 772-4105 – E-mail: walshs@dfo-mpo.gc.ca

Black, J.A. Invertebrate Fish. Div., Mar. Fish Div., Fisheries & Oceans, P. O. Box 1006, Dartmouth, NS B2Y 4A2
Phone: +902 426-2950 – Fax: +902 426-1506 – E-mail: blackj@mar.dfo-mpo.gc.ca

Branton, R.M. Marine Fisheries Division, Fisheries & Oceans, P. O. Box 1006, Dartmouth, NS B2Y 4A2
Phone: +902 426-3537 – Fax: +902 426-1506 – E-mail: brantonb@mar.dfo-mpo.gc.ca

Estonia

Saat, T. Estonian Marine Institute, 18b Viljandi Road, EE-3600 Tallinn
Phone: +372 6267 402 – Fax: +372 6267 417 – E-mail: tsaat@sea.ee

Faroe Islands

Nicolajsen, A. Fiskorannsoknarstovan, Noatun, Postboks 3051, FR-1100, Torshavn
Phone: +298 345 3900 – Fax: +298 35 3901 – E-mail: arninic@frs.fo

France

Bez, N. Centre de Géostatistique, Ecole des Mines de Paris, 35 rue Saint Honoré, 77305 Fontainebleau
Phone: +33 1 6469 4956 Fax: +33 1 6469 4705 – E-mail: nicolas.bez@ensmp.fr

Germany

Schlitzer, R. Alfred Wegener Institute for Polar & Marine Research, Columbusstrasse, 27568 Bremerhaven
Phone: +49 471 4831 1559 – E-mail: rschlitzer@awi-bremerhaven.de

Stein, M. Institut für Seefischerei, Palmaille 9, D-22767 Hamburg
Phone: +49 40 38905 174 – Fax: +49 40 38905 263 – E-mail: stein.ish@bfa-fisch.de

Greenland

Wieland, K. Greenland Institute of Natural Resources, P. O. Box 570, DK-3900, Nuuk
Phone: +299 32 1095 - Fax: +299 32 5957 - E-mail: wieland@natur.gl

Portugal

Avila de Melo, A. Inst Instituto Nacional de Investigacao Agrária e das Pescas (INIAP/IPIMAR),
Av. de Brasilia, 1449-006 Lisbon, Portugal
Phone: +351 21 302 7000 – Fax: +351 21 301 5948 – E-mail: amelo@ipimar.pt
Alpoim, R. Instituto Nacional de Investigacao Agrária e das Pescas (INIAP/IPIMAR),
Av. de Brasilia, 1449-006 Lisbon, Portugal
Phone: +351 21 302 7000 – Fax: +351 21 301 5948 – E-mail: ralpoim@ipimar.pt

Russian Federation

Babayan, V.K. Russian Federal Research Institute of Fisheries & Oceanography (VNIRO), 17, V. Krasnoselskaya
Moscow, 107140
Phone: +70 95 264 6983 – Fax: +70 95 264 9183 – E-mail: vbabayan@vniro.ru
Gorchinsky, K.V. Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO),
6 Knipovich St., Murmansk 183763
Phone: +7 (8152) 47 2532 – Fax: +7 (8152) 47 3331 – E-mail: inter@pinro.ru
Kokovkin, L. Representative Russian Federation on Fisheries, 47 Oceanview Dr., Bedford, N.S., Canada B4A 4C4
Phone: +902 832-9225 – Fax: +902 832-9608 – E-mail: rusfish@ns.sympatico.ca
Shibanov, V.N. Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO),
6 Knipovich Street, Murmansk 183763
Phone: +7 8152 47 26 14 – Fax: +7 8152 47 33 31 – E-mail: inter@pinro.ru
Sigaev, I.K. Atlantic Scientific Research Institute of Marine Fisheries and Oceanography (AtlantNIRO)
5 Dmitry Donskoy Street, Kaliningrad 23600
Phone: +70 112 22 5547 – Fax: +70 112 21 9997 – E-mail: west@atlant.baltnet.ru

Spain

Gonzalez-Costas, F. Instituto Español de Oceanografía, Aptdo 1552, E-36280 Vigo (Pontevedra), Spain
Phone: +34 9 86 49 2111 – Fax: +34 9 86 49 2351 – E-mail: fernando.gonzalez@vi.ieo.es
Vazquez, A. Instituto de Investigaciones Marinas, Eduardo Cabello 6, 36208 Vigo
Phone: +34 9 86 23 1930 – Fax: +34 9 86 29 2762 – E-mail: avazquez@iim.csic.es

USA

Mayo, R.K. National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543
Phone: +508-495-2310 - Fax: +508-495-2393 - E-mail: ralph.mayo@noaa.gov
Serchuk, F.M. National Marine Fisheries Service, NEFSC, 166 Water St., Woods Hole, MA 02543
Phone: +508 495 2245 – Fax: +508 495 2258 – E-mail: fred.serchuk@noaa.gov

NAFO SECRETARIAT

Tissa Amaratunga, Deputy Executive Secretary
Dorothy Auby, Office Secretary
Forbes Keating, Administration Officer & Meeting Coordinator
Stan Goodick, Finance Officer
Cindy Kerr, Fisheries Information Officer

SECRETARIAT ASSISTANTS (Wireless LAN)

Janes, T. Scientific Programmer, Data Administrator, Scientific Computing Section, DFO Newfoundland &
Labrador Reg., P. O. Box 5667, St. John's, NL Canada A1C 5X1
Phone: +709-772-2014 – Fax: +709-772-5315 –E-mail: janest@dfo-mpo.gc.ca
Rioux, P. Technical Support Analyst, DFO Newfoundland & Labrador Reg., P. O. Box 5667, St. John's, NL
Canada A1C 5X1
Phone: +709-772-6150 – Fax: +709-772-5315 –E-mail: riouxp@dfo-mpo.gc.ca



Participants of Workshop on "Mapping and Geostatistical Methods for Fisheries Stock Assessment, 10-12 September 2003.

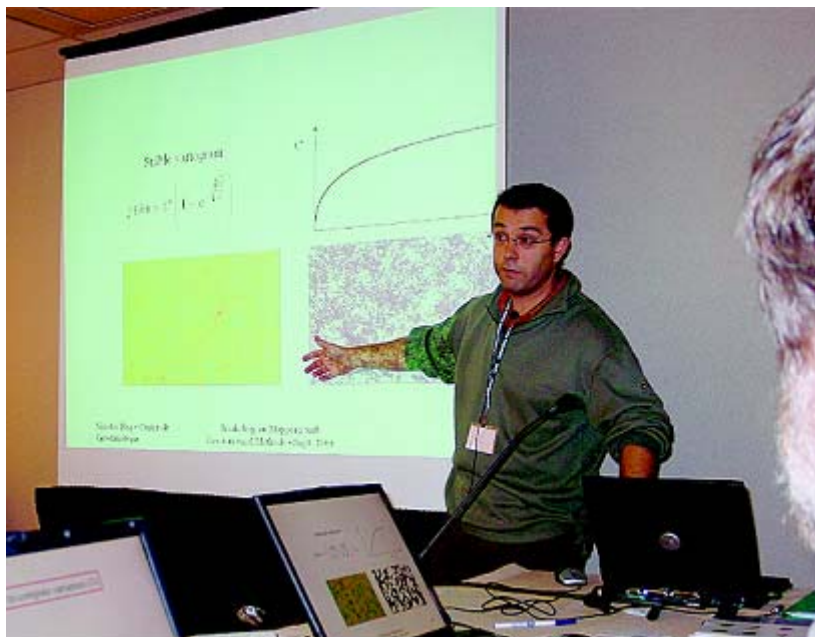
Left to Right: Dave Kulka, Bill Brodie, Kai Wieland, Cindy Kerr, Steve Walsh, Don Stansbury, Mark Simpson, Karen Dwyer, Dawn Maddock Parsons, Ralph Mayo, Jerry Black, Dave Orr, Lisa Hendrickson, Ricardo Alpoim, Fred Serchuk, Antonio Avila de Melo, Dorothy Auby, Reiner Schlitzer, Joanne Morgan, Nicolas Bez, Bob Branton, Toomas Saat, Arni Nicolajsen, Ray Bowering, Antonio Vazquez, Manfred Stein, Igor Sigae, Vladimir Shibanov, Konstantin Gorchinsky, Vladimir Babayan.

Front Centre: Fernando Gonzalez-Costas

Missing: Tissa Amaratunga, Leonid Kokovkin



Left to Right: Mark Simpson – Instructor (Department of Fisheries and Oceans, Canada), David Kulka – Co-convenor/Instructor (Department of Fisheries and Oceans, Canada), Jerry Black – Instructor (Department of Fisheries and Oceans, Canada) Dr. Nicolas Bez – Instructor (Centre de Géostatistique, Fontainebleau, France), Dr. Reiner Schlitzer – Instructor (Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany) and Lisa Hendrickson – Co-convenor (USA).



Nicolas Bez giving overview and brief history of Geostatistics used in fisheries stock assessment.

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

Chair: Don E. Stansbury

Rapporteur: Don Stansbury

I. OPENING

The Committee met at the Holiday Inn Harbourview, Dartmouth, Canada during 15-19 September 2003, to consider and report on matters referred to it by the Scientific Council. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), Estonia, European Union (France, Germany, Portugal and Spain), Iceland, Japan, Russian Federation, Ukraine and United States of America.

The Chair, D. E. Stansbury (Canada), opened the meeting by welcoming participants. The Provisional Agenda was reviewed and **adopted** with no modifications.

II. NOMINATION OF DESIGNATED EXPERTS

STACFIS reviewed the list of Designated Experts for the stocks, which have to be assessed and for which management advice is requested. The final nomination of the Designated Experts will be conducted through the normal confirmation process between the various national institutes and the Secretariat. The nominations to date by STACFIS for the 2004 assessments are:

- From the Instituto de Investigaciones Marinas, Eduardo Cabello, 6, 36208 Vigo, Spain
[Phone: +34 9 86 23 1930 – Fax: +34 9 86 29 2762 –E-mail: avazquez@iim.csic.es]
- for Cod in Div. 3M Antonio Vazquez
- From the Fish, Resour. – AZTI Foundation, Herrera Kaia,Portualde z/g, 20110 Pasaia, Basque Country, Spain [Phone: +34 9 43 00 48 00 – Fax: +34 9 43 00 48 01 – E-mail: hmurua@pas.azti.es]
- for Roughhead grenadier in SA 2+3 Hilario Murua
- From the Instituto Nacional de Investigacao Agrária e das Pescas (INIAP/IPIMAR), Av. de Brasilia, 1449-006 Lisbon, Portugal
[Phone: +351 21 302 7000 – Fax: +351 21 301 5948 – E-mail: listed below]
- for American plaice in Div. 3M Ricardo Alpoim ralpoim@ipimar.pt
Redfish in Div. 3M Antonio Avila de Melo amelo@ipimar.pt
- From the Greenland Institute of Natural Resources, P. O. Box 570, DK-3900 Nuuk, Greenland
[Phone: +299 32 1095 – Fax: +299 32 5957 – E-mail: listed below]
- for Northern shrimp in SA 0+1 Carsten. Hvingel hvingel@natur.gl
Redfish in SA1 Helle Siegstad helle@natur.gl
Other Finfish in SA1 Helle Siegstad helle@natur.gl
Northern shrimp in Denmark Strait Carsten Hvingel hvingel@natur.gl
- From the Danish Institute for Fisheries Research, Charlottenlund Slot, DK-2920, Charlottenlund, Denmark
[Phone: +45 33 96 33 00 – Fax: +45 33 96 33 33 – E-mail: olj@dfu.min.dk]
- for Roundnose grenadier in SA 0+1 Ole Jørgensen
Greenland halibut in SA 0+1 Ole Jørgensen

- From the Marine Research Institute, Skulagata 4, P. O. Box 1390, 121 - Reykjavik, Iceland
[Phone: +354 552 0240 – Fax: +354 562 3790 – E-mail: unnur@hafro.is]

for Shrimp in Div. 3M

Unnur Skúladóttir

- From Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), 6 Knipovich Street, Murmansk, 183763, Russia
[Phone: +7 8152 47 25 32 – Fax: +7 8152 47 3331 – E-mail: inter@pinro.ru]

for Capelin in Div. 3NO

Konstantin V. Gorchinsky

For the following stocks the nomination of Designated Experts has been deferred to October 2003, and the Secretariat was requested to contact the necessary national institutes well in advance of this:

for Greenland halibut in Div. 1A
Squid in SA 3+4
Cod in Div. 3NO
American Plaice in Div. 3LNO
Witch flounder in Div. 3NO
Witch flounder in Div. 2J3KL
Yellowtail flounder in Div. 3LNO
Greenland halibut in SA 2+3KLMNO
Roundnose grenadier in SA 2+3
Shrimp in Div. 3LNO
Elasmobranchs

III. OTHER MATTERS

1. Review of SCR and SCS Documents

There were no SCR or SCS documents to review.

2. Other Business

An errata sheet was circulated to Scientific Council and Fisheries Commission to correct figures in the November 2002 STACFIS report on Northern Shrimp in Div. 3M. STACFIS noted these corrections will appear on NAFO website only.

There being no other business, the Chair extended particular gratitude to the Secretariat for their assistance and support not only for work at the meetings but throughout the year. Acknowledgements were also given to the chair of Scientific Council for his overall leadership for the past two years and all participating members for their cooperation in conducting their assessments. The meeting was adjourned.

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

Chair: M. Joanne Morgan

Rapporteur: Lisa C. Hendrickson

The Committee met at the Holiday Inn Harbourview, Dartmouth, Nova Scotia, during 15-18 September 2003 to discuss matters pertaining to statistics and research referred to it by the Scientific Council. Representative attended from Canada, Denmark (in respect of the Faroe Islands and Greenland), Estonia, European Union (France, Germany, Portugal and Spain), Iceland, Japan, the Russian Federation, Ukraine and the United States of America. The Deputy Executive Secretary was in attendance.

1. Opening

The Chair opened the meeting by welcoming the participants. Lisa C. Hendrickson (USA) was appointed rapporteur. The Provisional Agenda as presented was **adopted**.

2. Fisheries Statistics

a) Progress Report on Secretariat Activities in 2002/2003

i) Acquisition of STATLANT 21A and 21B reports for recent years

The Deputy Executive Secretary informed the Committee that there have been some STATLANT data submissions since June 2003. It was noted that the 2000 STATLANT 21B data submissions are almost complete.

Noting recent recommendations regarding submission of wolffish data by species, STACREC was informed that no new STATLANT 21B have been submitted, and that wolffish catches in the Provisional Monthly catch reports are still not being reported by species. It was decided to continue to monitor wolffish reporting and to decide at the June 2004 Committee Meeting whether additional steps are required to implement species-specific reporting.

ii) Publication of statistical information

The update on acquisition of STATLANT 21B data showed that the 2000 data are mostly complete, and the Statistical Bulletin could be published shortly.

b) CWP Intersessional Meeting in 2004

In June 2003, Scientific Council **recommended** that *the Deputy Executive Secretary attend the CWP Intersessional Meeting to be held in 2004*. Due to budgetary constraints noted by STACFAD during this meeting STACREC was informed the Deputy Executive Secretary would be unable to attend. STACREC recognizes the continued importance of the CWP to the business of NAFO, and STACREC anticipates that the Deputy Executive Secretary will attend future meetings.

3. Research Activities in 2003/2004

STACREC noted and reviewed the listings of Biological Sampling Data and survey activities in 2003 to early-2004 prepared by the NAFO Secretariat. These listings, usually published as Tables 3, 4 and 5 in the June report of STACREC, were found to be well reviewed and updated, and STACREC agreed the reports of research activities would be now published in SCS Doc. 03/20.

STACREC discussed the new process of reviewing these Tables prior to the September Meeting. It was agreed that this process increased the accuracy of the tables and should be continued in future years.

4. **FAO Fisheries Global Information System (FIGIS)**

- a) The Deputy Executive Secretary presented an overview of a meeting that he attended; the Ad Hoc Meeting on the Establishment of the Fisheries Resources Monitoring System (FIRMS) that was held 30 June-1 July 2003 at FAO headquarters in Rome, Italy. The meeting was also attended by representatives of fisheries organizations and programs, many of whom have previously participated in the development of the FIRMS Partnership Arrangement.

Two key objectives of the meeting were to:

- Develop a final version of the Partnership Arrangement, followed by procedures for the establishment of the FIRMS Partnership (an attachment to the Arrangement).
- Address the issue of the Rules of Procedure for a FIRMS Steering Committee (FSC), in terms of both content and future development.

The full text of the draft document was addressed in conceptual, technical, legal and administrative detail. The Articles and structural arrangement of the Partnership Arrangement were reviewed and revised. There was agreement by the end of the meeting that the meeting had been highly successful in developing a final draft.

Meeting participants revised the draft Rules of Procedure for the FSC and recognized that the text might be entirely replaced at the first meeting of the FSC or heavily adapted to meet the overall Partnership's needs.

STACREC reviewed the draft FAO Partnership Arrangement but noted the difficulty in doing so without legal expertise and given the short time period. STACREC **recommended** that *a draft version of Annex 2 (the section most pertinent to NAFO) of the FIRMS Partnership Arrangement should be prepared in advance of the June Scientific Council Meeting for review at that meeting.*

- b) Intersessional review (since June 2003) of the information proposed for immediate dissemination through the FIGIS website resulted in the discovery of many errors. The consensus of those involved in the review was that this information should not be put on the FIGIS website at this time. This decision was relayed to the FIGIS program manager at FAO, Marc Taconet.

5. **NAFO Observer Program**

- a) **Update on Meeting of STACTIC 16-20 June, Copenhagen**

There was extensive discussion of the Observer Program at the June STACTIC Meeting (FC Doc. 03/5). To date, a discussion of the Scientific Council recommendation made at its June 2003 Meeting has not occurred in STACTIC.

6. **Archival of Data Utilized in Stock Assessments**

STACREC discussed a proposal to archive data utilized in stock assessments, on a regular basis, in a standardized format and common location. The importance of the ability to reproduce stock assessments was emphasized. STACREC **recommended** that *the Designated Experts would be asked to place electronic versions of their stock assessment data (including time series of catch, survey indices, numbers at age, catch at age, weights at age, and maturity at age) on the server, in formats currently available, at the Scientific Council meetings. The data files provided should be annotated and include all survey indices available and catches in aggregate form. The Secretariat will archive these data following Scientific Council Meetings and make them available to members of the Scientific Council thereafter.*

7. Other Matters

a) Review of SCR and SCS Documents

There were no documents to review.

b) Other Business

The Deputy Executive Secretary informed STACREC that there is incomplete reporting of tuna catches in the STATLANT 21 data reports being submitted to NAFO. It was also noted that other international commissions dealing with tuna, such as ICCAT, receive the complete tuna reports and those data are more valuable to tuna data users. STACREC noted the tuna data were not required for the work of the Scientific Council, and STACREC **recommended** that *the Secretariat need not report tuna catches in the data tabulations prepared at NAFO and that CWP (and FAO) will be informed that tuna catches will no longer be recorded in the STATLANT 21 data.*

c) Acknowledgements

The Chair thanked the participants for their valuable contributions to the Committee. Special thanks were extended to the rapporteur and to the Deputy Executive Secretary and staff of the NAFO Secretariat for their invaluable assistance in preparation and distribution of documents. There being no other business, the Chair closed the September 2003 STACREC Meeting.

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

Chair: Manfred Stein

Rapporteur: Bill Brodie

The Committee met at the Holiday Inn, Dartmouth, Nova Scotia, Canada, on 15, 16, and 18 September 2003, to consider and report on publication-related topics and various matters referred to it by the Scientific Council. Representatives attended from Canada, Denmark (in respect of Faroe Islands and Greenland), Estonia, European Union (France, Germany, Portugal, Spain), Iceland, Japan, the Russian Federation, Ukraine and the United States of America. The Executive Secretary and Deputy Executive Secretary were in attendance.

1. Opening

The Chair opened the meeting by welcoming the participants. The agenda as presented in the Provisional Agenda was **adopted**. Bill Brodie (Canada) was appointed rapporteur.

2. Review of Recommendations from June 2003

There were no recommendations by the Committee in June 2003.

3. Review of Scientific Publications

a) Papers from June 2003 Meeting

The Committee did not propose any papers from the June 2003 Meeting for further publication considerations.

b) Status of the 2001 "Deep-sea Fisheries" Symposium

Volume 31 of the NAFO Journal contains papers from the Symposium on "*Deep-sea Fisheries*". To-date 23 papers, including an abstract, are final and ready to print and 11 are being prepared into galleys.

STACPUB noted that it is important for these papers to be published as far as possible in advance of another symposium on deep-sea fisheries scheduled for late-2003 in New Zealand. Recognizing the delays to date were as a result of a special situation, STACPUB **recommended** that *the 23 papers currently ready be placed on the NAFO Website by the beginning of October 2003, as part of Volume 31, ensuring a 2003 publication date*. Other papers should be added as they become available, and the Deputy Executive Secretary noted that the 11 papers currently being prepared into galleys should also be ready for the 2003 time-frame.

c) Information from the 2002 Elasmobranch Symposium

A special Volume containing papers from the Symposium on "*Elasmobranch Fisheries: Managing for Sustainable Use and Biodiversity Conversation*". A total of 50 papers have been received at the Secretariat and sent during January and February 2003 to proceedings co-editors for review. One paper has been withdrawn by author and 2 have been rejected. To date 5 papers have been received for preparation of galleys. This issue was initially suggested for publication by late-2003, but likely to be much later.

d) Status of Invitational Papers

There were no requests or suggestions for invitational papers thus far in 2003.

e) Other Reviews

Journal Volume 32 is being published on the NAFO website. There have been 7 miscellaneous papers received at the Secretariat for this publication. The 4 edited papers received at Secretariat to date from the Associate Editors are being published in the Journal.

On the **NAFO STATLANT Statistical Data**, STACPUB was informed that catches by country, species and Division are available on the NAFO website as text files for 1960-2002. Information is the most up-to-date available at the Secretariat and is updated as new information become available.

Studies Number 37: the publication on *Availability of Data for Estimating Productive Potential for Selected Stocks in the Northwest Atlantic*, was completed in August, 2003. Information was collected on a total of 53 stocks or stock complexes from both the northeast and northwest Atlantic. A series of tables was compiled that provide an overview of the availability of basic information, evaluate the quality of information and provide references to this information. This publication was distributed on CD to all Committee members. STACPUB **recommended** that *hard copy and web versions of Scientific Council Studies No. 37 be issued shortly.*

Concerning **NAFO Scientific Council Reports**, STACPUB was informed that the *NAFO Scientific Council Reports 2002* (Redbook) volume (323 pages) containing reports of the 2002 meetings of the Scientific Council in June, September and November was published and distributed in January 2003 and also placed on the NAFO website.

A new initiative at the Secretariat proposes to replace the calendar year publication schedule by the period 1 September of one year to 31 August of the next year. An example of this is demonstrated at this September 2003 Meeting with the publication of the *NAFO Scientific Council Reports 2002-2003* and issued as a new "Redbook" hard copy for the 2003 Annual Meeting participants.

Although cost savings were expected with this new schedule, STACPUB expressed concerns with the proposed change. One of the main concerns was that the new schedule would break the continuity of discussions within Scientific Council during a calendar year, e.g. issues carried over from June to September in a given year would appear in different "Redbooks". It was also noted that Scientific Council Meetings do not operate on the same schedule as Fisheries Commission or General Council, and that Scientific Council Reports therefore require a different printing schedule. Other concerns with the new schedule relate to calendar listings of SCR and SCS documents, lack of time to check and make revisions to the June Scientific Council Report prior to printing of the "Redbook" before the September meeting. The new initiative also proposed to eliminate using color printing in some of the reports where necessary. STACPUB **recommended** that *for the Scientific Council Reports, the Secretariat return to printing its reports on a calendar year basis, and that color printing be used where warranted in Scientific Council Reports. The Scientific Council Reports for calendar year 2003 should therefore be printed as the next "Redbook".*

4. Considerations of NAFO Website

a) Status of implementation of Journal and Council Studies on Website

STACPUB was informed that all Journal and Studies issues have been scanned and are available on CD. STACPUB **recommended** that *all scanned versions of the Journal and Studies be placed on the NAFO website as soon as possible, as this is a vital reference tool for users.*

b) "Restricted site" for Scientific Council

STACPUB concluded that there was no need for a "restricted site" for its use on the NAFO Website.

5. Editorial Matters Regarding Scientific Publications

a) Review of Editorial Board

At the June 2003 meeting, the STACPUB Chair requested Committee members to propose a replacement to the position of Associate Editor for Invertebrates. Dr. James R. Weinberg of the National Marine Fisheries Service, Woods Hole, USA was nominated to assume these duties. STACPUB approved the nomination and extended its appreciation to Dr. Weinberg, along with thanks to Fred Serchuk for his timely

follow-up on this matter. STACPUB also extended sincere thanks to Dr. Volker Siegel for his dedicated work in this position to date.

b) **Progress Report of Publications of Reproductive Potential WG (Journal and Studies)**

A special Volume 33 containing 9 peer-reviewed articles by members of the "Working Group on Reproductive Potential" is being prepared. Galleys have been prepared for 2 papers and the other galleys will be completed shortly. It is anticipated that this publication will be available late-2003.

c) **Progress Report of Publication on 2002 STACFEN Mini-Symposium on Decadal Trends**

The special volume containing papers from the 2002 STACFEN Mini-Symposium on Decadal Trends identified eight papers for consideration. Six (6) papers have been received and sent to co-editors for review, 2 papers have not been submitted by authors yet. The co-editors anticipated that all papers will be available in late-2003.

6. **Other Matters**

- a) STACPUB was presented with an overview of NAFO publication status and strategy, given by the Executive Secretary. A number of changes were proposed to allow improved service. The Secretariat is ready to implement electronic publishing in 2003 with resulting savings in costs and labor. At present, about 30% of publishing tasks within the Secretariat are devoted to editorial work, about 60% are related to document formatting, and about 10% related to production of the final products. The first strategy is to reduce costs and labor, and the second strategy is to improve quality of electronic publications. STACPUB agreed with the proposal to maintain the *status quo* for publishing the Journal. However, STACPUB did not agree with a proposal to make the Scientific Council Studies available only as an electronic version. Scientific Council Studies contains publications such as workbooks and workshop reports, and STACPUB concluded that this material must be made available in print. Therefore, STACPUB **recommended** that *Scientific Council Studies continue to be produced in printed versions recognizing the number of hard copies has been reduced*. Final versions of Scientific Council Documents, statistical bulletins, and sampling yearbooks would be fully electronic publications, but paper copies of SCR and SCS documents would be made available at Scientific Council Meetings as required.
- b) Website usage was reported for August 2003 (new website) compared to the period January to March 2003 (old website). There was an increase in visits in August over previous levels. The redesigned website has likely contributed to the increased web visits. STACPUB noted that it would be helpful to put a list of NAFO publications on the website. In addition, SCR and SCS documents should be placed on the web, for as many years as electronic versions exist.
- c) The issue of charging registration fees for Scientific Council Symposia, to offset publication costs of Journal and Studies related to the symposia, was raised. STACPUB agreed to place this on its agenda for June 2004.
- a) STACPUB noted that announcements of the 2004 Scientific Council Symposium "*The Ecosystem of the on Flemish Cap*" should contain a statement concerning publication of papers presented at the Symposium.

There being no other matters, the Chair closed the meeting by thanking the participants for their contributions and co-operation, the rapporteur for taking the minutes, and the NAFO Secretariat for their assistance.