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**AGENDA I - SCIENTIFIC COUNCIL MEETING, MARCH - APRIL 2010**

- I. Opening (Chair: Ricardo Alpoim)
  1. Appointment of Rapporteur
  2. Adoption of Agenda
  3. Attendance of Observers
  4. Plan of Work
- II. Review of relevant previous discussions held by Scientific Council.
- III. Formulation of Advice (Annex 1)
  1. Request from Fisheries Commission
    - a) SCAA as an MSE Operating Model
- IV. Other Matters
  1. Other Business
- V. Adoption of Report
- VI. Adjournment

**AGENDA II - SCIENTIFIC COUNCIL MEETING, 3-16 JUNE 2010**

- I. Opening (Scientific Council Chair: Ricardo Alpoim)
  1. Appointment of Rapporteur
  2. Presentation and Report of Proxy Votes (by Executive Secretary)
  3. Adoption of Agenda
  4. Attendance of Observers
  5. Appointment of Designated Experts
  6. Plan of Work
  7. Housekeeping issues
- II. Review of Scientific Council Recommendations in 2009
- III. Fisheries Environment (STACFEN Chair: Gary Maillet)
  1. Opening and Appointment of Rapporteur
  2. Review of Recommendations
  3. Climatic and Environmental Conditions in 2009
  4. Invited speaker
  5. Review of Integrated Science Data Management Report
  6. Ocean Climate and Physical, Biological and Chemical Oceanographic Studies
  7. Interdisciplinary studies
  8. Update of the on-line annual ocean climate status summary
  9. Environmental indices (implementation in the assessment process)
  10. Recommendations based on environmental conditions
  11. National Representatives
  12. Other Matters
    - a) ICES/NAFO Hydrobiological Symposium
  13. Adjournment
- IV. Publications (STACPUB Chair: Margaret Treble)
  1. Opening
  2. Appointment of Rapporteur
  3. Adoption of Agenda
  4. Review of Recommendations in 2009
  5. Review of Publications
    - a) Annual Summary
    - b) Guidelines for SCR documents
    - c) Document Search Feature for the web
  6. Other Matters
    - a) Application to the Thompson Web of Knowledge
    - b) Webstats
    - c) General Editor's report JNAFS
  7. Adjournment
- V. Research Coordination (STACREC Chair: Carsten Hvingel)
  1. Opening
  2. Appointment of Rapporteur
  3. Review of Previous Recommendations
  4. Fishery Statistics
    - a) Catches used by STACFIS
      - i) Process for the compilation of catches
      - ii) Use of term "catch" in reports
      - iii) STATLANT figures in reports and catch tables
    - b) Progress report on Secretariat activities in 2009/2010
      - i) STATLANT 21A and 21B
      - ii) Codes for invertebrates
  5. Research Activities
    - a) Biological sampling
      - i) Report on activities in 2009/2010
      - ii) Report by National Representatives on commercial sampling conducted

- iii) Report on data availability for stock assessments (by Designated Experts)
    - b) Biological surveys
      - i) Review of survey activities in 2009 (by National Representatives and Designated Experts)
      - ii) Surveys planned for 2010 and early 2011
        - The international bottom survey (organized by EU-Spain)
        - Other surveys
    - c) Stock assessment spreadsheets – update
    - d) Other research activities
  - 6. Cooperation with other Organizations
    - a) CWP
  - 7. Review of SCR and SCS Documents
  - 8. Other Matters
    - a) Tagging activities
    - b) Manual of groundfish surveys
    - c) Sponge guide
    - d) Other business
      - i) Data sharing
      - ii) Research and data needs
  - 9. Adjournment
- VI. Fisheries Science (STACFIS Chair: Joanne Morgan)
- 1. Opening
  - 2. General Review
    - a) Review of Recommendations in 2007 and 2009
    - b) General Review of Catches and Fishing Activity
  - 3. Stock Assessments
    - a) Certain Stocks in Subareas 2, 3 and 4; as Requested by the Fisheries Commission with the Concurrence of the Coastal States (Annex 1)
      - i) Thoroughly assessed stocks (Annex 1: Items 1-6):
        - American plaice in Div. 3LNO
        - Greenland halibut in SA2+Div. 3KLMNO (1 year)
        - Thorny skate in Div. 3LNOPs
        - Redfish in Div. 3LN
        - Cod in Div. 3M
        - Cod in Div. 3NO
        - Redfish in Div. 3O
        - Witch flounder in Div. 2J3KL
        - Northern shortfin squid in SA3+4
      - ii) Monitored stocks<sup>2</sup> (Item 2):
        - American plaice in Div. 3M
        - Witch flounder in Div. 3NO
        - Yellowtail flounder in Div. 3LNO
        - Redfish in Div. 3M
        - White hake in Div. 3NO
        - Capelin in Div. 3NO
    - b) Certain Stocks in Subareas 0 and 1, as Requested by Denmark (Greenland) (Annex 3):
      - i) Thoroughly assessed stocks
        - Greenland halibut in Div. 1A inshore (Item 4)
      - Monitored stocks:
        - Redfish in SA1 (Item 2)
        - Other finfish in SA1 (Item 2)
        - Roundnose grenadier in Subareas 0 and 1 (Item 1)
        - Demersal redfish and other finfish (American plaice, Atlantic wolffish, spotted wolffish and thorny skate) in Subarea 1 (Item 2)

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<sup>2</sup> Monitored stocks to be provided in the agreed format (NAFO Sci. Coun. Rep., 2005, Part A, Appendix IV, 2.i)

- c) Stocks Overlapping the Fishery Zones in Subareas 0 and 1, as Requested by Canada and by Denmark (Greenland) (Annexes 2 and 3 respectively):
    - i) Thoroughly assessed stocks:
      - Greenland halibut in the offshore area of Divisions 0A+IAB and Divisions 0B+IC-F (Annex 2, Item 1-2; Annex 3, Item 3)
    - d) Other stocks:
      - i) Thoroughly assessed stocks:
        - Roughhead grenadier in Subareas 2 and 3
  - 4. Other Matters
    - a) FIRMS Classification for NAFO Stocks
    - b) Other Business
  - 5. Adjournment
- VII. Management Advice and Responses to Special Requests
- 1. Fisheries Commission (Annex 1)
    - a) Request for Advice on TACs and Other Management Measures for 2010 (Item 1-6)
      - i) Greenland halibut in SA 2 and Div. 3KLMNO
    - b) Request for Advice on TACs and Other Management Measures for 2010 and 2011 (Item 2-6)
      - American plaice in Div. 3LNO
      - Cod in Div. 3M
      - Cod in Div. 3NO
      - Redfish in Div. 3LN
      - Redfish in Div. 3O
      - Thorny skate in Div. 3LNOPs
      - Witch flounder in Div. 2J3KL
      - Northern shortfin squid in SA3+4
      - Northern shrimp in Div. 3LNO (Item 1 of FC Request from 2009)
    - c) Monitoring of Stocks for which Multi-year Advice was provided in 2008 or 2009 (Item 2-6)
      - American plaice in Div. 3M
      - Capelin in Div. 3NO
      - Redfish in Div. 3M
      - White hake in Div. 3NO
      - Witch flounder in Div. 3NO
      - Yellowtail flounder in Div. 3LNO
    - d) Special Requests for Management Advice
      - i) The Precautionary Approach (Item 4-5)
      - ii) Evaluation of Rebuilding and Recovery Plans (Item 6)
      - iii) Div. 3NO Cod bycatch reduction measures (Item 7)
      - iv) VME Fishery Impact Assessments (Item 8)
      - v) Seamount closures (Item 9)
      - vi) American plaice in Div. 3LNO (Item 12)
      - vii) Future Management of Div. 3M shrimp (Item 13)
      - viii) Management Strategy Evaluations (Item 14)
      - ix) Mesh size in mid-water trawls for redfish (deferred from 2009)
  - 2. Coastal States
    - a) Request by Denmark (Greenland) for Advice on Management in 2011 (Annex 3)
      - i) Roundnose grenadier in SA 0 and 1 (Item 1)
      - ii) Redfish and other finfish in SA 1 (Item 2)
      - iii) Greenland halibut in Div. 1A inshore (Item 4)
    - b) Request by Canada and Denmark (Greenland) for Advice on Management in 2011 (Annex 2 & 3)
      - i) Greenland halibut in SA 0 and 1 (Annex 2: Item 1 and 2; Annex 3: Item 3)
  - 3. Scientific Advice from Council on its own Accord
    - a) Oceanic (pelagic) redfish
    - b) Roughhead grenadier in SA 2 and 3
- VIII. Review of Future Meetings Arrangements
- 1. Scientific Council and Special Session, Sep 2010
  - 2. Scientific Council, Oct/Nov 2010

3. Scientific Council, Jun 2011
  4. Scientific Council, Sep 2011
  5. Scientific Council, Oct/Nov 2011
  6. Scientific Council Working Groups
    - a) WG on EAFM
    - b) WG on Reproductive Potential
  7. NAFO/ICES Joint Groups
    - a) NIPAG, 20-27 Oct 2010
    - b) WGDEC, Mar 2011
    - c) `WGHARP, Aug 2011
    - d) NIPAG, Oct/Nov 2011
- IX. Arrangements for Special Sessions
1. Topics for future Special Sessions
    - a) Bayesian Methods Workshop, 2010
    - b) ICES/NAFO Decadal Biological Symposium, 2011
- X. Meeting Reports
1. Report from WGHARP, Aug 2009
  2. Special Session in 2009: Symposium on “Rebuilding Depleted Fish Stocks” Nov 2009
  3. Working Group on EAFM, Feb 2010
  4. Working Group on Reproductive Potential, Mar 2010
  5. Report from WGDEC, Mar 2010
  6. Report of FC WG MSE, Jan and FC WG FMS May 2010
  7. Meetings attended by the Secretariat
- XI. Review of Scientific Council Working Procedures/Protocol
1. General Plan of Work Annual Meeting, September 2010
  2. Structure of Scientific Council
  3. *Ad hoc* Fisheries Commission requests
  4. Timing of shrimp advice
  5. Other Matters
- XII. Other Matters
1. Designated Experts
  2. Update on the redrafting of the CEM
  3. Stock Assessment spreadsheets
  4. Meeting Highlights for NAFO Website
  5. Merit Awards
    - a) Scientific Merit Award
    - b) Chair's Merit Award
  8. Other Business
    - a) Budget
    - b) Capacity-building in Ocean Affairs and the Law of the Sea
    - c) TXOTX
- XIII. Adoption of Committee Reports
1. STACFEN
  2. STACREC
  3. STACPUB
  4. STACFIS
- XIV. Scientific Council Recommendations to General Council and Fisheries Commission
- XV. Adoption of Scientific Council Report
- XVI. Adjournment

**AGENDA III - SCIENTIFIC COUNCIL MEETING, 20-24 SEPTEMBER 2010**

- I. Opening (Chair: Ricardo Alpoim)
  1. Appointment of Rapporteur
  2. Adoption of Agenda
  3. Attendance of Observers
  4. Plan of Work
- II. Review of Scientific Council Recommendations
- III. Research Coordination (STACREC Chair: Carsten Hvingel)
  1. Opening
  2. Fisheries Statistics
    - a) Progress Reports on Secretariat Activities
      - i) Review of STATLANT 21
    - b) Gear Codes
  3. Research Activities
    - a) Surveys Planned for 2010 and Early-2011
  4. External Cooperation
    - a) ICES Strategic Initiative on Stock Assessment Methods (SISAM)
  5. Review of Recommendations
  6. Other Matters
    - a) Review of SCR and SCS Documents
    - b) Other Business
- IV. Fisheries Science (STACFIS Chair)
  1. Opening
  2. Interim Monitoring Updates
    - a) Northern Shrimp in Div. 3M
    - b) Northern Shrimp in Div. 3LNO
  3. Nomination of Designated Experts
  4. Other Matters
    - a) Review of SCR and SCS Documents
    - b) Other Business
- V. Special Requests from the Fisheries Commission
  1. From September 2009
    - a) Update on Advice for Northern Shrimp in Division 3M (Item 1)
    - b) Advice for Northern Shrimp in Divisions 3LNO (Item 1)
  2. Deferred from June 2010 Scientific Council meeting
    - a) Evaluation of rebuilding and recovery plans (Item 6)
    - b) Future management of Div. 3M shrimp (Item 13)
    - c) Mesh size in mid-water trawls for redfish (Item 13 of 2009 FC request)
  3. Ad hoc requests from current meeting
    - a) Seamounts
    - b) Shrimp
- VI. Meeting Reports
  1. WGEAFM, February 2010
  2. FC WGMSE
  3. Meetings Attended by the Secretariat
    - a) UN Meeting on Capacity Building, June 2010
    - b) ASFA Board Meeting, July 2010
- VII. Review of Future Meeting Arrangements
  1. Scientific Council, October 2010
  2. Scientific Council Meeting, June 2011
  3. Annual Meeting, September 2011
  4. Scientific Council, October 2011
  5. Scientific Council, June 2012
  6. Scientific Council Working Groups
    - a) WGEAFM, December 2010

- b) WGRP, March-April 2011
- 7. ICES/NAFO Joint Groups
  - a) NIPAG, October 2010
  - b) WGDEC, March 2011
  - c) WGHARP, August 2011
  - d) NIPAG, 2011
- VIII. Future Special Sessions
  - 1. Topics for Future Special Sessions
    - a). ICES/NAFO Hydrobiological Symposium, May 2011
    - b) Future Special Sessions
- IX. Scientific Council Working Procedures and Protocol
  - 1. Timetable and Frequency of Assessments
- X. Other Matters
  - 1. Coastal State request from Greenland - harp seals
  - 2. VMEs on the Corner Seamount
  - 3. SC Coordinator position.
  - 4. The October meeting of Scientific Council and NIPAG
- XI. Adoption of Reports
  - 1. Committee Reports of STACREC and STACFIS
  - 2. Report of Scientific Council
- XII. Adjournment

**AGENDA IV - SCIENTIFIC COUNCIL MEETING 20–27 OCTOBER 2010**

- I. Opening (Chair: Ricardo Alpoim)
  1. Appointment of Rapporteur
  2. Adoption of Agenda<sup>1</sup>
  3. Attendance of Observers
  4. Plan of Work
- II. Review of Recommendations in 2009 and in 2010
- III. NAFO/ICES *Pandalus* Assessment Group
- IV. Formulation of Advice (see Annexes 1–3)
  1. Request from Fisheries Commission (Items 1 and 10 of Annex 1a)
    - a) Northern shrimp (Div. 3M)
    - b) Northern shrimp (Div. 3LNO)
    - c) PA Reference points for shrimp in Div. 3LNO
    - d) Distribution of shrimp in Div. 3LNO
    - e) Effect of 5 000 t catch on shrimp abundance in Div. 3M
  2. Requests from Coastal States (Item 1 of Annex 2 and Items 5 and 6 of Annex 3a)
    - a) Northern shrimp (Subareas 0 and 1)
    - b) Northern shrimp (in Denmark Strait and off East Greenland)
- V. Other Matters
  1. Catch and effort analysis using VMS data
  2. Stock Classifications
  3. Coordination with ICES Working Groups on Shrimp Stock Assessments
  4. SC/NIPAG Meeting, October 2011
  5. Working Group on Reproductive Potential, April 2011
  6. NAFO Special Session, May 2011
  7. SC/NIPAG Meeting, October 2012
  8. Future Special Sessions
  9. Other Business
- VI. Adoption of Scientific Council and NIPAG Reports
- VII. Adjournment

**Annex 1a. Fisheries Commission's Request for Scientific Advice on Management in 2011 and Beyond of Certain Stocks in Subareas 2, 3 and 4 and Other Matters**

Mindful of the desire to move to a risk-based approach in the management of fish stocks, Fisheries Commission with the concurrence of the Coastal State as regards to the stocks below which occur within its jurisdiction, requests the Scientific Council, in the provision of advice, to provide a range of management options as well as a risk analysis for each option as outlined in the provisions below, rather than a single TAC recommendation.

1. The Fisheries Commission with the concurrence of the Coastal State as regards the stocks below which occur within its jurisdiction, requests that the Scientific Council, at a meeting in advance of the 2010 Annual Meeting, provide advice on the scientific basis for the management of the following fish and invertebrate stocks or groups of stocks in 2011:

- Northern shrimp in Div. 3M, 3LNO
- Greenland halibut in SA 2 and Div. 3KLMNO

Noting that SC will meet in October of 2009, FC requests SC to update its advice for 2010, as well as to provide advice for 2011, for both shrimp stocks referenced above.

2. The Fisheries Commission with the concurrence of the Coastal State as regards the stocks below which occur within its jurisdiction, requests that the Scientific Council, at a meeting in advance of the 2010 Annual Meeting, provide advice on the scientific basis for the management of the following fish stocks according to the following assessment frequency (unless Fisheries Commission requests additional assessments):

Two-year basis	Three-year basis
American plaice in Div. 3LNO	American plaice in Div. 3M
Capelin in Div. 3NO	Cod in Div. 3NO
Cod in Div. 3M	Northern shortfin squid in SA 3+4
Redfish in Div. 3LN	Redfish in Div. 3O
Redfish in Div. 3M	Witch flounder in Div. 2J+3KL
Thorny skate in Div. 3LNOPs	Witch flounder in Div. 3NO
White hake in Div. 3NOPs	
Yellowtail flounder in Div. 3LNO	

To continue this schedule of assessments, the Scientific Council is requested to conduct the assessment of these stocks as follows:

In 2010, advice should be provided for 2011 and 2012 for thorny skate in Div. 3LNOPs, for redfish in Div. 3LN and for cod in Div. 3M and for 2011, 2012 and 2013 for redfish in Div. 3O, for cod in Div. 3NO, and for witch flounder in Div. 2J+3KL.

- In 2008, advice was provided for 2009, 2010 and 2011 for cod in Div. 3M, American plaice in Div. 3M, witch flounder in Div. 3NO, and northern shortfin squid in SA 3+4. These stocks will be next assessed in 2011. For cod in Div. 3M, the Scientific Council conducted full assessments and provided advice in 2008 and 2009 for this stock.
- In 2009, advice was provided for 2010 and 2011 for American plaice in Div. 3LNO, yellowtail flounder in Div. 3LNO, redfish in Div. 3M, white hake in Div. 3NO and capelin in Div. 3NO. These stocks will next be assessed in 2011. [see also item 12 for an additional request for American plaice in 3LNO]

The Fisheries Commission requests the Scientific Council to continue to monitor the status of all these stocks annually and, should a significant change be observed in stock status (e.g. from surveys) or in bycatches in other fisheries, provide updated advice as appropriate.

3. The Commission and the Coastal State request the Scientific Council to consider the following in assessing and projecting future stock levels for those stocks listed above. These evaluations should provide the information necessary for the Fisheries Commission to consider the balance between risks and yield levels, in determining its management of these stocks:

- a) The preferred tool for the presentation of a synthetic view of the past dynamics of an exploited stock and its future development is a stock assessment model, whether age-based or age-aggregated.

b) For those stocks subject to analytical-type assessments, the status of the stocks should be reviewed and catch options evaluated in terms of their implications for fishable stock size in both the short and long term. As general reference points, the implications of fishing at  $F_{0.1}$  and  $F_{2009}$  in 2011 and subsequent years should be evaluated. The present stock size and spawning stock size should be described in relation to those observed historically and those expected in the longer term under this range of options.

c) For those stocks subject to general production-type assessments, the time series of data should be updated, the status of the stock should be reviewed and catch options evaluated in the way described above to the extent possible. In this case, the level of fishing effort or fishing mortality ( $F$ ) required to take two-thirds MSY catch in the long term should be calculated.

d) For those resources for which only general biological and/or catch data are available, few standard criteria exist on which to base advice. The stock status should be evaluated in the context of management requirements for long-term sustainability and the advice provided should be consistent with the precautionary approach.

e) Spawning stock biomass levels considered necessary for maintenance of sustained recruitment should be recommended for each stock. In those cases where present spawning stock size is a matter of scientific concern in relation to the continuing reproductive potential of the stock, options should be offered that specifically respond to such concerns.

f) Information should be provided on stock size, spawning stock sizes, recruitment prospects, fishing mortality, catch rates and catches implied by these management strategies for the short and the long term in the following format:

I. For stocks for which analytical-type assessments are possible, graphs should be provided of all of the following for the longest time-period possible:

- historical yield and fishing mortality;
- spawning stock biomass and recruitment levels;
- catch options for the year 2011 and subsequent years over a range of fishing mortality rates (for as many years as the data allow)
- ( $F$ ) at least from  $F_{0.1}$  to  $F_{max}$ ;
- spawning stock biomass corresponding to each catch option;
- yield-per-recruit and spawning stock per recruit values for a range of fishing mortalities.

II. For stocks for which advice is based on general production models, the relevant graph of production as a function of fishing mortality rate or fishing effort should be provided. Age aggregated assessments should also provide graphs of all of the following for the longest time period possible:

- exploitable biomass (both absolute and relative to  $BMSY$ )
- yield/biomass ratio as a proxy for fishing mortality (both absolute and relative to  $FMSY$ )
- estimates of recruitment from surveys, if available.

III. Where analytical methods are not attempted, the following graphs should be presented, for one or several surveys, for the longest time-period possible:

- time trends of survey abundance estimates, over:
  - an age or size range chosen to represent the spawning population
  - an age or size-range chosen to represent the exploited population
  - recruitment proxy or index for an age or size-range chosen to represent the recruiting population.
- fishing mortality proxy, such as the ratio of reported commercial catches to a measure of the exploited population.

For age-structured assessments, yield-per-recruit graphs and associated estimates of yield-per-recruit based reference points should be provided. In particular, the three reference points, actual  $F$ ,  $F_{0.1}$  and  $F_{max}$  should be shown.

4. Noting the Precautionary Approach Framework as endorsed by Fisheries Commission, the Fisheries Commission requests that the Scientific Council provide the following information for the 2010 Annual Meeting of the Fisheries Commission for all stocks under its responsibility requiring advice for 2011:

a) the limit and precautionary reference points as described in Annex II of the UN Fisheries Agreement indicating areas of uncertainty (for those stocks for which precautionary reference points cannot be determined directly, proxies should be provided);

b) the stock biomass and fishing mortality trajectory over time overlaid on a plot of the PA Framework (for those stocks where biomass and/or fishing mortality cannot be determined directly, proxies should be used);

c) information regarding the current Zone the stock is within as well as proposals regarding possible harvest strategies which would move the resource to (or maintain it in) the Safe Zone, including medium term considerations and associated risk or probabilities which will assist the Commission in developing the management strategies described in paragraphs 4 and 5 of Annex II in the Agreement.

5. The following elements should be taken into account by the Scientific Council when considering the Precautionary Approach Framework:

a) References to “risk” and to “risk analyses” should refer to estimated probabilities of stock population parameters falling outside biological reference points.

b) Where reference points are proposed by the Scientific Council as indicators of biological risk, they should be accompanied by a description of the nature of the risk associated with crossing the reference point such as recruitment overfishing, impaired recruitment, etc.

c) When a buffer reference point is proposed in the absence of a risk evaluation in order to maintain a low probability that a stock, measured to be at the buffer reference point, may actually be at or beyond the limit reference point, the Scientific Council should explain the assumptions made about the uncertainty with which the stock is measured.

d) Wherever possible, short and medium term consequences should be identified for various exploitation rates (including no fishing) in terms of yield, stability in yield from year to year, and the risk or probability of maintaining the stock within, or moving it to, the Safe Zone. Whenever possible, this information should be cast in terms of risk assessments relating fishing mortality rates to the trends in biomass (or spawning biomass), the risks of stock collapse and recruitment overfishing, as well as the risks of growth overfishing, and the consequences in terms of both short and long term yields.

e) When providing risk estimates, it is very important that the time horizon be clearly spelled out. By way of consequence, risks should be expressed in timeframes of 5, 10 and 15 years (or more), or in terms of other appropriate year ranges depending on stock specific dynamics. Furthermore, in order to provide the Fisheries Commission with the information necessary to consider the balance between risks and yield levels, each harvesting strategy or risk scenario should include, for the selected year ranges, the risks and yields associated with various harvesting options in relation to  $B_{lim}$ ,

6. Many of the stocks in the NAFO Regulatory Area are well below any reasonable level of  $B_{lim}$  or  $B_{buf}$ . For these stocks, the most important task for the Scientific Council is to inform on how to rebuild the stocks. In this context and building on previous work of the Scientific Council in this area, the Scientific Council is requested to evaluate various scenarios corresponding to recovery plans with timeframes of 5 to 10 years, or longer as appropriate. This evaluation should provide the information necessary for the Fisheries Commission to consider the balance between risks and yield levels, including information on the consequences and risks of no action at all.

a) information on the research and monitoring required to more fully evaluate and refine the reference points described in paragraphs 1 and 3 of Annex II of the Agreement; these research requirements should be set out in the order of priority considered appropriate by the Scientific Council;

b) any other aspect of Article 6 and Annex II of the Agreement which the Scientific Council considers useful for implementation of the Agreement's provisions regarding the precautionary approach to capture fisheries; and

c) propose criteria and harvest strategies for new and developing fisheries so as to ensure they are maintained within the Safe Zone.

d) Provide, at its annual meeting in 2010, an overview of strategies to recover depleted fish stocks in the Northwest Atlantic, taking into account the proceedings of the NAFO co-sponsored “ICES PICES UNCOVER Symposium on Rebuilding Depleted Fish Stocks - Biology, Ecology, Social Science and Management Strategies” which is to take place November 3-6 2009 in Warnemünde, Germany.

7. Noting the FC Rebuilding Plan for 3NO cod adopted in September 2007, Fisheries Commission requests Scientific Council to advise, before September 2010, on possible measures the Commission may consider to ensure bycatch of cod is kept at the lowest possible level.

8. Recognizing the initiatives on vulnerable marine ecosystems (VME) through the work of the WGFMS, and with a view to completing fishery impact assessments at the earliest possible date, the Scientific Council is requested to provide the Fisheries Commission at its next annual meeting in 2010:

a) guidance on the content of fishing plans/initial assessments for the purpose of evaluating significant adverse impacts on VMEs and identify viable risk evaluation methodologies for the standardized assessment of fishery impacts.

b) In light of the use of existing encounter protocols in tandem with the closed areas for corals and sponges:

i. assess new and developing methodologies that may inform the Fisheries Commission on any future review of the thresholds levels

ii. review and report on new commercial bycatch information as it becomes available, and.

iii. in light of i.) review the ability of the current encounter threshold values of 60 kg live coral and 800 kg sponge to detect new VME areas as opposed to cumulative catches of isolated individuals.

9. Recognizing that areas closed to all bottom fishing activities for the protection of vulnerable marine ecosystems as defined in Article 15, including inter alia:

- Fogo Seamounts 1
- Fogo Seamounts 2
- Orphan Knoll
- Corner Seamounts
- Newfoundland Seamounts
- New England Seamounts

and associated protocols for vessels conducting exploratory fishing in those areas, expire on December 31, 2010.

Mindful of the call for review of the above measures based on advice from the Scientific Council, Fisheries Commission requests that Scientific Council:

a) Review any new scientific information on the Fogo Seamounts 1, Fogo Seamounts 2, Orphan Knoll, Corner Seamounts, Newfoundland Seamounts and New England Seamounts which may support or refute the designation of these areas as vulnerable marine ecosystems.

b) Review any exploratory fishing activity on the seamounts in the context of significant adverse impact to vulnerable marine ecosystems and review current exploratory fishing data collection protocols operating in the seamount closure areas as defined in Article 15 for their usefulness in providing scientific information.

c) Review the potential for significant adverse impact of pelagic, long-line and other fishing gear types other than mobile bottom gear on seamount vulnerable marine ecosystems.

10. With respect to Northern shrimp (*Pandalus borealis*) in Div. 3LNO, noting the NAFO Framework for Precautionary Approach and recognizing the desire to demonstrate NAFO's commitment to applying the precautionary approach, Fisheries Commission requests the Scientific Council to :

a) identify  $F_{msy}$

b) identify  $B_{msy}$

c) provide advice on the appropriate selection of an upper reference point for biomass (e.g.  $B_{buf}$ )

Fisheries Commission also requests the Scientific Council to provide information on the effect of the following catch levels in 2011 of 24,000t, 27,000t and 30,000t on the projected SSB and provide risk analyses where possible.

11. In considering the possible contribution of fishery catches to changes in stock size of 3M shrimp, it is noted that catches are summed by calendar year, but the surveys are executed in the summer. Is the temporal distribution of shrimp catches through the year well enough known to allow partial contribution of year's catches to stock-size changes to be calculated? On average, what fraction of the year's catches is taken before the execution of the survey?

12. Noting the scientific advice provided in 2009 on American Plaice in Div. 3LNO, that the stock is estimated to increase and will likely surpass  $B_{lim}$  by 2010 under all fishing mortality scenarios considered (except for  $F_{lim}$ ), Fisheries Commission requests the Scientific Council to conduct a full assessment in 2010, provide catch, biomass, and fishing mortality projections where possible, for as many years as the data will allow, at the following levels of fishing mortality:  $F=0$ ;  $F_{0.1}$ ; and  $F_{2009}$ , in addition to any projections that SC would find useful and provide a risk analysis as outlined in paragraph 5.

#### **Annex 1B. Request to the Scientific Council for Scientific Advice on Future Management of 3M Shrimp**

[13.] From the intersessional meeting of the NAFO Fisheries Commission in London, 16. November 2009:

The Fisheries Commission, at its intersessional meeting, noted that whereas the Scientific Council in its advice to the Fisheries Commission contained in Report of the Scientific Council Meeting, 21 – 29 October 2009 reiterated its September 2009 recommendation for 2010 and 2011 that the fishing mortality be set as close to zero as possible, the current Effort Allocation Scheme for 3M Shrimp Fishery allows for a high effort in the fishery.

Conscious of the efforts to reach agreed management measures based on the best available science, and challenges contained to reach consensus on the scope of possible adjustments of the current Effort Allocation Scheme or any specific quota allocation, the Fisheries Commission requests the Scientific Council to explore other possible mechanisms to assist in achieving the objective of sustainable management of the 3M shrimp, including but not limited to further seasonal or spatial closure of the fishery, gear modification, any additional requirements for scientific data reporting needed from the fisheries, or any other conservation or technical measure appropriate to achieving the objective.

The Fisheries Commission further requests the Scientific Council to explore the viability and usefulness of a second annual scientific survey in the spring season.

The Fisheries Commission requests the Scientific Council to consider these issues and report back to the Fisheries Commission at the Annual Meeting of NAFO in 2010.

#### **Annex 1C. Request to Scientific Council**

[14.] Following the FC Working Group on Greenland Halibut Management Strategy Evaluation (WGMSE) in January, 2010:

Scientific Council is requested to review and comment on the set of plausible operating models to be used in the evaluation of harvest control rules for Greenland halibut in Subarea 2 + Div. 3KLMNO by the FC WG. Two assessment methods are under consideration for conditioning operating models, SCAA and XSA. The operating models conditioned on SCAA should be reviewed by SC to determine their plausibility. A set of operating models conditioned on XSA have already been agreed by SC as plausible representations of the real system (NAFO SCR 09/37). If there are any changes or additions to these XSA-based operating models, SC should also review these.

All the operating models will be based on the same input data as the current base XSA model (CAV – current assessment view).

The use of SCAA in the MSE should be reviewed by the SC. The run referenced as "SCAA w. XSA data" in Figure 7 of SCR Doc 09/25 which used almost identical inputs to the current base XSA model, and the associated documents provide all specifications of the approach. For review purposes, these documents together with two further variants of the SCAA2 run will be provided. Both these variants will use exactly the same inputs to the current base XSA model, with one estimating the slope of selectivity at large age and the other setting this slope to

be flat. Requests for possible further analyses regarding SCAA will be developed, if necessary, at the May meeting of the Working Group.

Recognizing the SC work schedule, SC is requested to conduct this review as soon as possible.

**Annex 1d. Fisheries Commission's Request for Scientific Advice on Management in 2012 and beyond of Certain Stocks in Subareas 2, 3 and 4 and other matters (Paragraphs 1, 3, 4, 5, 13, 14 and 15 only).**

1. The Fisheries Commission with the concurrence of the Coastal State as regards to the stocks below which occur within its jurisdiction ("Fisheries Commission") requests that the Scientific Council provide advice in advance of the 2011 Annual Meeting, for the management of Northern shrimp in Div. 3M, 3LNO in 2012.

Noting that Scientific Council will meet in October of 2010 for 2012 TAC advice, Fisheries Commission requests the Scientific Council to update its advice on shrimp stocks in 2011 for 2012 TAC.

Fisheries Commission further requests that SC provide advice in accordance to Annex 1.

3. With respect to Northern shrimp (*Pandalus borealis*) in Div. 3LNO, noting the NAFO Framework for Precautionary Approach and recognizing the desire to demonstrate NAFO's commitment to applying the precautionary approach, Fisheries Commission requests the Scientific Council to :

a) identify  $F_{msy}$

b) identify  $B_{msy}$

c) provide advice on the appropriate selection of an upper reference point for biomass (e.g.  $B_{buf}$ )

4. The Scientific Council is requested to provide updated information on the proportion of the 3LNO shrimp stock that occurs in 3NO.

5. With respect to 3M shrimp, the Scientific Council estimated in 2009 a proxy for  $B_{lim}$  as 85% decline from the maximum observed index levels, this is 2600 t of female biomass. In 2009 the Scientific Council estimated biomass to be below  $B_{lim}$  and recommended fishing mortality to be set as close to zero as possible.

In 2009 estimated catches reached 5000 t. The Fisheries Commission decided on a 50% effort reduction in 2010 and provisional estimated catches up to September 2010 reached 1000 t. In its 2010 advice, the Scientific Council estimated biomass to be above  $B_{lim}$ , but reiterated its previous advice to set fishing mortality as close to zero as possible. The Fisheries Commission requests the Scientific Council to evaluate if the current level of catches is compatible with stock recovery, given that improvements in biomass levels were observed through current level of catches.

13. Mindful of the NEREIDA mission, the international scientific effort led by Spain to survey the seafloor in the NAFO Regulatory Area,

Recognizing that the Coral and Sponge Protection Zones closed to bottom fishing activities for the protection of vulnerable marine ecosystems as defined in Chapter 1 Article 16 Paragraph 3 is in place until December 31, 2011,

Mindful of the call for review of the above measures based on advice from the Scientific Council, Fisheries Commission requests that Scientific Council review any new scientific information on the areas defined in Chapter 1 Article 16 Paragraph 3 which may support or refute the designation of these areas as vulnerable marine ecosystems. In the event that new information is not available at the time of the Fisheries Commission meeting in September 2011, prepare an overview of the type of information that will be available and the timeline for completion.

14. Noting the response from the Scientific Council in June 2010 regarding simulation modeling in a GIS framework: "To apply this model to the NRA, an agreed upon set of gear descriptions and tow duration/lengths for each fishing fleet segment would need to be created. Further estimation of retention efficiencies of the different commercial gears and indirect effects of fishing will be needed to model effects of serious adverse impacts."

The Fisheries Commission requests that the Scientific Council: 1) acquire the requisite data and apply the model to the extent possible to the NRA, and 2) consider whether the SASI model used by the US New England Fisheries Council should be incorporated into the aforementioned GIS framework as a means of integrating significant adverse impacts into the approach.

15. Recognizing the initiatives on vulnerable marine ecosystems (VME) through the work of the WGFMS, and with a view to completing and updating fishery impact assessments, the Scientific Council is requested to provide the Fisheries Commission at its next annual meeting in 2011: 1) guidance on the timing and frequency of fishing plans/assessments for the purpose of evaluating significant adverse impacts on VMEs; 2) a framework for developing gear/substrate impact assessments to facilitate reporting amongst the Contracting Parties.

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**Annex 2. Canadian Request for Scientific Advice on Management in 2011 Of Certain Stocks  
in Subareas 0 to 4**

1. Canada requests that the Scientific Council, at its meeting in advance of the 2010 Annual Meeting of NAFO, subject to the concurrence of Denmark (on behalf of Greenland), provide advice on the scientific basis for management in 2011 of the following stocks

Shrimp (Subareas 0 and 1)

Greenland halibut (Subareas 0 and 1)

The Scientific Council has noted previously that there is no biological basis for conducting separate assessments for Greenland halibut throughout Subareas 0-3, but has advised that separate TACs be maintained for different areas of the distribution of Greenland halibut. The Council is therefore, subject to the concurrence of Denmark (on behalf of Greenland) as regards Subarea 1, to provide an overall assessment of status and trends in the total stock area throughout its range and comment on its management in Subareas 0+1 for 2011, and to specifically:

- a) advise on appropriate TAC levels for 2011, separately, for Greenland halibut in the offshore area of Divisions 0A+1AB and Divisions 0B+1C-F. The Scientific Council is also asked to advise on any other management measures it deems appropriate to ensure the sustainability of these resources.
  - b) with respect to shrimp, it is recognized that the Council may, at its discretion, delay providing advice until later in the year, taking into account data availability, predictive capability, and the logistics of additional meetings.
2. Canada requests the Scientific Council to consider the following options in assessing and projecting future stock levels for Shrimp and Greenland halibut in Subareas 0 and 1:
    - a) For those stocks subject to analytical-type assessments, the status of the stock should be reviewed and management options evaluated in terms of their implications for fishable stock size in both the short and long term. The implications of no fishing as well as fishing at  $F_{0.1}$ , and  $F_{2009}$  in 2011 and subsequent years should be evaluated in relation to precautionary reference points of both fishing mortality and spawning stock biomass. The present stock size and spawning stock size should be described in relation to those observed historically and those to be expected in the longer term under this range of fishing mortalities, and any other options Scientific Council feels worthy of consideration under the NAFO Precautionary Approach Framework.
 

Opinions of the Scientific Council should be expressed in regard to stock size, spawning stock sizes, recruitment prospects, catch rates and catches implied by these management strategies for the short and long term. Values of  $F$  corresponding to the reference points should be given. Uncertainties in the assessment should be evaluated and presented in the form of risk analyses related to  $B_{lim}$  ( $B_{buf}$ ), and  $F_{lim}$  ( $F_{buf}$ ), as per the NAFO Precautionary Approach Framework.
    - b) For those stocks subject to general production-type assessments, the time series of data should be updated, the status of the stock should be reviewed and management options evaluated in the way described above to the extent possible. Management options should be within the NAFO Precautionary Approach Framework.
    - c) For those resources for which only general biological advice and/or catch data are available, few standard criteria exist on which to base advice. The stock status should be evaluated in the context of the management

requirements for long-term sustainability and management options evaluated in the way described above to the extent possible. Management options should be within the NAFO Precautionary Approach Framework.

d) Presentation of the results should include the following:

- I. For stocks for which analytical-type assessments are possible:
  - A graph of historical yield and fishing mortality for the longest time period possible;
  - A graph of spawning stock biomass and recruitment levels for the longest time period possible. The biomass graph should indicate the stock trajectory compared to  $B_{lim}$ ;
  - Graphs and tables of catch options for the year 2011 and subsequent years over a range of fishing mortality rates (F) at least from  $F=0$  to  $F_{0.1}$  including risk analyses;
  - Graphs and tables showing spawning stock biomass corresponding to each catch option including risk analyses;
  - Graphs showing the yield-per-recruit and spawning stock per recruit values for a range of fishing mortalities.
  
- II. For stocks for which advice is based on general production models, the relevant graph of production on fishing mortality rate or fishing effort.

In all cases, the reference points,  $F=0$ , actual F, and  $F_{0.1}$  should be shown. As well, Scientific Council should provide the limit and precautionary reference points as described in the NAFO Precautionary Approach Framework, indicating areas of uncertainty (when reference points cannot be determined directly, proxies should be provided).

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### **Annex 3a. Denmark (Greenland) Request for Scientific Advice on Management in 2011 of Certain Stocks in Subarea 0 and 1**

1. In the Scientific Council report of 2009, scientific advice on management of Roundnose grenadier in Subarea 0+1 was given as a 3-year advice (for 2009, 2010 and 2011). Denmark, on behalf of Greenland, requests the Scientific Council to continue to monitor the status of Roundnose grenadier in Subarea 0+1 annually and, should significant change in stock status be observed (e.g. from surveys), the Scientific Council is requested to provide updated advice as appropriate.
2. Advice for redfish (*Sebastes spp.*) and other finfish (American plaice (*Hippoglossoides platessoides*), Atlantic wolffish (*Anarhichas lupus*), spotted wolffish (*A. minor*) and thorny skate (*Amblyraja radiata*)) in Subarea 1 was in 2008 given for 2009-2011. Denmark, on behalf of Greenland, requests the Scientific Council to continue to monitor the status of Redfish (*Sebastes spp.*) and other finfish in Subarea 1 annually and, should significant change in stock status be observed (e.g. from surveys), the Scientific Council is requested to provide updated advice as appropriate.
3. Subject to the concurrence of Canada as regards Subarea 0+1, the Scientific Council is requested to provide advice on appropriate TAC levels for 2011, separately, for Greenland halibut in the offshore area of Divisions 0A+1AB and Divisions 0B+1C-F. The Scientific Council is also asked to advise on any other management measures it deems appropriate to ensure the sustainability of these resources.
4. Advice for Greenland halibut in Subarea 1A inshore was in 2008 given for 2009-2010. Denmark, on behalf of Greenland, requests the Scientific Council to provide advice on the scientific basis for the management of Greenland halibut in Subarea 1A inshore for 2011-2012.
5. Subject to the concurrence of Canada as regards Subarea 0+1, Denmark, on behalf of Greenland, further requests the Scientific Council of NAFO before December 2010 to provide advice on the scientific basis for management of Northern shrimp (*Pandalus borealis*) in Subarea 0 and 1 in 2011, and as many years forward as data allow.

6. Further, the Council is requested to advise, in co-operation with ICES, on the scientific basis for management of Northern shrimp (*Pandalus borealis*) in Denmark Strait and adjacent areas east of southern Greenland in 2011, and as many years forward as data allow.

On behalf of  
The Agency of Fisheries, Hunting and Agriculture  
Sincerely  
Emanuel Rosing  
Director-General

**Annex 3b. Denmark (Greenland) Request for Scientific Advice on Management on the proportion of the Northwest Atlantic harp seal population summering In Greenland**

Greenland receives scientific and management advice on large whales, small whales and seals from the North Atlantic Marine Mammal Commission (NAMMCO). Greenland put forward the following request to the NAMMCO Scientific Committee at the 18th Annual Council meeting in 2009: *The Scientific Committee is requested to evaluate how a projected increase in the total population of Northwest Atlantic harp seals might affect the proportion of animals summering in Greenland.*

The Scientific Committee replied in the scientific report from the 17th meeting 2010 of the NAMMCO Scientific Committee: *The Scientific Committee has no tradition of establishing Working Groups on harp seals. It therefore recommends that Greenland forward the request to ICES/NAFO.*

1. The Scientific Committee is requested to evaluate how a projected increase in the total population of Northwest Atlantic harp seals might affect the proportion of animals summering in Greenland. The Scientific Council is also asked to advise on any other management measures it deems appropriate to ensure the sustainability of these resources.

On behalf of  
The Department of Fisheries, Hunting and Agriculture  
Sincerely  
Amalie Jessen  
Head of Office

## LIST OF RESEARCH AND SUMMARY DOCUMENTS 2010

### SCR Documents

Doc No.	Serial No	Author	Title
SCR Doc 10/01	N5746	D. Butterworth & R. Rademeyer	Greenland Halibut SCAA Robustness Tests
SCR Doc 10/02	N5748	V. Paramonov	Infestation of beaked redfish <i>Sebastes mentella</i> by copepod <i>Sphyrion lumpi</i> in the different regions of fishing in the opened part of North Atlantic.
SCR Doc 10/03	N5749	V. Paramonov	Pigmented patches of beaked redfish <i>Sebastes mentella</i> in the different regions of fishing in the opened part of North Atlantic.
SCR Doc 10/04	N5750	M. Ribergaard	Oceanographic Investigations off West Greenland 2009
SCR Doc 10/05	N5751	Stein and Akimova	Climatic Conditions around Greenland - 2009
SCR Doc 10/06	N5752	K. Zwanenburg, T. Horsman, E. Kenchington	Preliminary Analysis of Biogeographic units for the Scotian Shelf
SCR Doc 10/07	N5753	F.J. Murillo, E. Kenchington, C. Gonzalez, and M.Sacau	The Use of Density Analyses to Delineate Significant Concentrations of Pennatulaceans from Trawl Survey Data
SCR Doc 10/08	N5757	Diana González-Troncoso, Esther Román and Xabier Paz	Results for Greenland halibut and American plaice of the Spanish survey in NAFO Div. 3NO for the period 1997-2009
SCR Doc 10/09	N5758	D. González-Troncoso, C. Gonzalez and X. Paz	Atlantic cod and Yellowtail flounder indices from the Spanish Survey conducted in Divisions 3NO of the NAFO Regulatory Area
SCR Doc 10/10	N5759	Diana González-Troncoso, C. Gonzalez and Xabier Paz	Biomass and length distribution for Roughhead grenadier, Thorny skate and White hake from the surveys conducted by Spain in NAFO 3NO
SCR Doc 10/11	N5762	O.A. Jørgensen	Survey for Greenland Halibut in NAFO Divisions 1C-1D, 2009
SCR Doc 10/12	N5765	B. Petrie and R. G. Pettipas	Physical Oceanographic Conditions on the Scotian Shelf and in the eastern Gulf of Maine (NAFO areas 4V,W,X) during 2009
SCR Doc 10/13	N5766	G. Maillet	Seasonality of phytoplankton abundance derived from satellite data in the northwest Atlantic during 1998 to 2009
SCR Doc 10/14	N5767	Peter Yoon, Luc Bujold, Bruce Bradshaw, Jenny Chiu, Bob Keeley	Integrated Science Data Management - NAFO Report 2009
SCR Doc 10/15	N5768	Esther Román, Concepción González-Iglesias and Diana González-Troncoso	Results for the Spanish Survey in the NAFO Regulatory Area of Division 3L for the period 2003-2009
SCR Doc 10/16	N5770	E. B. Colbourne, J. Craig, C. Fitzpatrick, D. Senciall, P. Stead and W. Bailey	An Assessment of the Physical Oceanographic Environment on the Newfoundland and Labrador Shelf in NAFO Subareas 2 and 3 during 2009
SCR Doc 10/17	N5771	L. Yashayaev and B.J.W. Greenan	Environmental conditions in the Labrador Sea in 2009
SCR Doc 10/18	N5773	Esther Román, Ángeles Armesto and Diana González-Troncoso	Results for the Atlantic cod, roughhead grenadier, redfish, thorny skate and black dogfish of the Spanish Survey in the NAFO Div. 3L for the period 2003-2009
SCR Doc 10/19	N5774	B. J. W. Greenan, I. Yashayaev, E. J. H. Head, W. G. Harrison, K. Azetsu-Scott, W. K. W. Li, J. W. Loder and Y. Geshelin	Interdisciplinary oceanographic observations of Orphan Knoll
SCR Doc 10/20	N5776	A.A. Pavlenko, and M. V. Pochtar	Some aspects of choosing the optimal mesh size in codends in beaked redfish fishery in Div. 3M of the NAFO Regulatory Area

SCR Doc 10/21	N5779	B. P. Healey	Greenland halibut ( <i>Reinhardtius hippoglossoides</i> ) in NAFO Subarea 2 and Divisions 3KLMNO: Stock Trends based on annual Canadian Research Vessel survey results during 1978-2009.
SCR Doc 10/22	N5780	Alfonso Pérez-Rodríguez and Mariano Koen-Alonso	Standardization of time series for the EU bottom trawl Flemish Cap survey: Estimation of conversion factors between RV <i>Cornide de Saavedra</i> and RV <i>Vizconde de Eza</i>
SCR Doc 10/23	N5781	Antonio Vázquez	Results from Bottom Trawl Survey on Flemish Cap of June-July 2009
SCR Doc 10/24	N5782	M.R. Simpson and C.M. Miri	Assessment of Thorny Skate ( <i>Amblyraja radiata</i> Donovan, 1808) in NAFO Divisions 3LNO and Subdivision 3Ps
SCR Doc 10/25	N5783	A. M. Ávila de Melo 1 and R. Alpoim	The 2nd Take of 2008 Assessment of Redfish in NAFO Divisions 3LN: Going Further on the Exploratory Analysis of ASPIC Formulations
SCR Doc 10/26	N5784	R.M. Rideout, D. Maddock Parsons, D. Power and M.J. Morgan	An Assessment of the Status of Redfish in NAFO Division 3O
SCR Doc 10/27	N5785	D. Maddock Parsons	Witch Flounder in NAFO Divisions 2J, 3K and 3L
SCR Doc 10/28	N5786	A. M. Ávila de Melo, R. Alpoim, and Diana González Troncoso	An ASPIC Based Assessment of Redfish ( <i>S. mentella</i> and <i>S. fasciatus</i> ) in NAFO Divisions 3LN (Is a Retrospective Biased Assessment Necessarily Useless in Terms of Scientific Advice?)
SCR Doc 10/29	N5787	Diana González-Troncoso, Xabier Paz and Concepción González	Results for redfish from the Spanish Surveys conducted in the NAFO Regulatory Area of Divisions 3NO, 1995 - 2009
SCR Doc 10/30	N5788	Rasmus Nygaard and Ole A. Jørgensen	Biomass and Abundance of Demersal Fish Stocks off West Greenland Estimated from the Greenland Shrimp Survey, 1988-2009.
SCR Doc 10/31	N5789	L. C. Hendrickson and M. A. Showell	Assessment of Northern Shortfin Squid ( <i>Illex illecebrosus</i> ) in Subareas 3+4 for 2009
SCR Doc 10/32	N5790	Fernando González-Costas	An assessment of NAFO roughhead grenadier Subarea 2 and 3 stock
SCR Doc 10/33	Not issued		
SCR Doc 10/34	N5792	O.A. Jørgensen	Assessment of the Greenland Halibut Stock Component in NAFO Subarea 0 + Division 1A Offshore + Divisions 1B-1F
SCR Doc 10/35	N5793	W. B. Brodie, D. Power, and B.P.Healey	The Canadian fishery for Greenland halibut in SA 2 + Div. 3KLMNO, with emphasis on 2009.
SCR Doc 10/36	N5794	Antonio Vázquez and Mónica Mandado	Random Retrospective Pattern in Fish Stock Assessment
SCR Doc 10/37	N5795	Mariano Koen-Alonso, Pierre Pepin, and Fran Mowbray	Exploring the role of environmental and anthropogenic drivers in the trajectories of core fish species of Newfoundland-Labrador marine community
SCR Doc 10/38	N5796	M. Stein	The AO-Index, what can it tell us?
SCR Doc 10/39	N5797	K.S. Dwyer, M.J. Morgan, D. Maddock Parsons, W.B. Brodie, and B.P. Healey	An assessment of American plaice in NAFO Div. 3LNO
SCR Doc 10/40	N5799	B.P. Healey and J.-C. Mahé	An Assessment of Greenland Halibut ( <i>Reinhardtius hippoglossoides</i> ) in NAFO Subarea 2 and Divisions 3KLMNO
SCR Doc 10/41	N5800	Diana González-Troncoso and Antonio Vázquez	Assessment of the Cod Stock in NAFO Division 3M
SCR Doc 10/42	N5801	D. Power, J. Morgan, E.F. Murphy, J. Bratley and B. Healey	An Assessment of the Cod Stock in NAFO Divisions 3NO

SCR Doc 10/43	N5802	Rasmus Nygaard, Bjarne Lybert and Jesper Boje	An Assessment of the Greenland Halibut Stock Component in NAFO Division 1A Inshore
SCR Doc 10/44	N5804	J.-C. Mahe	Greenland Halibut in NAFO Sub-area 2 & Divisions 3KLMNO - A Statistical Catch at Age Formulation to assess the Resource
SCR Doc 10/45	N5813	D. Orr, P. Veitch, D. Sullivan, J. Firth C. Peters and T. Inkpen	Groundfish by-catch within the northern shrimp fishery off the eastern coasts of Newfoundland and Labrador over the years 2007 – 2009
SCR Doc 10/46	N5814	D.C. Orr, P.J. Veitch and D.J. Sullivan	Divisions 3LNO Northern shrimp ( <i>Pandalus borealis</i> ) – Interim Monitoring Update
SCR Doc 10/47	N5816	J.M. Casas Sánchez	Division 3M Northern shrimp ( <i>Pandalus borealis</i> ) – Interim Monitoring Update
SCR Doc 10/48	withdrawn		
SCR Doc 10/49	N5818	A.A. Pavlenko, A.S. Ostrovskii and I.A. Skriabin	Preliminary review of data on selectivity of square mesh codend of pelagic trawl for redfish ( <i>Sebastes mentella</i> ) and value of by-catch in Russian pelagic fishing of redfish ( <i>Sebastes mentella</i> ) in Div. 3M of the NAFO Regulatory Area
SCR Doc 10/50	N5841	D.C. Orr, P.J. Veitch and D.J. Sullivan	The 2009 assessment of the Northern Shrimp ( <i>Pandalus borealis</i> , Kroyer) resource in NAFO Divisions 3LNO
SCR Doc 10/51	N5842	Michael C. S. Kingsley and Nanette Hammeken Arboe	A Provisional Assessment of the Shrimp Stock off West Greenland in 2010
SCR Doc 10/52	N5843	Michael C. S. Kingsley and Nikoline Ziemer	Calculating length- and sex-specific biomass in the West Greenland trawl survey
SCR Doc 10/53	N5844	Nanette Hammeken Arboe and Michael C.S. Kingsley	The Fishery for Northern Shrimp ( <i>Pandalus borealis</i> ) off West Greenland, 1970-2010
SCR Doc 10/54	N5845	Nanette Hammeken Arboe and Michael C.S. Kingsley	Catch Table Update for the West Greenland Shrimp Fishery
SCR Doc 10/55	N5846	Carsten Hvingel and Trond Thangstad	Catch, effort and derived biomass and mortality indices from the Norwegian fishery for northern shrimp ( <i>Pandalus borealis</i> ) in the Barents Sea and round Svalbard
SCR Doc 10/56	N5847	M. C. S. Kingsley	Correcting CPUE for fishery distribution in the assessment of the Northern Shrimp in Greenland waters
SCR Doc 10/57	N5848	Nikoline Ziemer, Michael Kingsley & Helle Siegstad	Results of the Greenland Bottom Trawl Survey for Northern shrimp ( <i>Pandalus borealis</i> ) Off West Greenland (NAFO Sub area I and Division 0A), 1988-2010
SCR Doc 10/58	N5849	Kaj Sünksen, Anja Retzel and Nikoline Ziemer	A preliminary estimate of Atlantic cod ( <i>Gadus morhua</i> ) biomass in West Greenland offshore waters (NAFO Subarea 1) for 2010 and recent changes in the spatial overlap with Northern shrimp ( <i>Pandalus borealis</i> )
SCR Doc 10/59	N5850	Helle Siegstad	Results of the Greenland Bottom Trawl Survey for Northern shrimp ( <i>Pandalus borealis</i> ) Off East Greenland (ICES Subarea XIV b), 2008-2010
SCR Doc 10/60	N5851	C. Hvingel, T. Thangstad and P. Lyubin	Research survey information regarding northern shrimp ( <i>Pandalus borealis</i> ) in the Barents Sea and Svalbard area 2004-2010
SCR Doc 10/61	N5852	C. Hvingel	Shrimp ( <i>Pandalus borealis</i> ) in the Barents Sea – stock assessment and precautionary approach and MSY based management considerations
SCR Doc 10/62	N5856	G. Søvik and T. Thangstad	The Norwegian Fishery for Northern Shrimp ( <i>Pandalus borealis</i> ) in Skagerrak and the Norwegian Deep (ICES Divisions IIIa and IVa east), 1970-2010
SCR Doc 10/63	N5857	J. M. Casas, E. Román, J. Teruel, G. Ramilo, E. Marull and E. López	Northern Shrimp ( <i>Pandalus borealis</i> , Krøyer) from Spanish Bottom Trawl Survey 2009 in NAFO Div. 3LNO
SCR Doc 10/64	N5858	J. M. Casas	Assessment of the International Fishery for Shrimp ( <i>Pandalus borealis</i> ) in Division 3M (Flemish Cap), 1993-2010

SCR Doc 10/65	N5859	S. Sirp	Shrimp ( <i>Pandalus borealis</i> ) catch rate of Estonian vessels in Divisions 3M and 3L in 2006-2010
SCR Doc 10/66	N5860	J. M. Casas	Northern Shrimp ( <i>Pandalus borealis</i> ) on Flemish Cap Surveys 2010
SCR Doc 10/67	N5861	G. Sjøvik and T. Thangstad	Results of the Norwegian Bottom Trawl Survey for Northern Shrimp ( <i>Pandalus borealis</i> ) in Skagerrak and the Norwegian Deep (ICES Divisions IIIa and IVa east) in 2010
SCR Doc 10/68	N5862	P. A. Lubin and D. V. Zakharov	Results of Russian investigations of the northern shrimp in the Barents Sea in 2004-2010
SCR Doc 10/69	N5863	N. Hammeken Arboe and H. Siegstad	The Fishery for Northern Shrimp ( <i>Pandalus borealis</i> ) in Denmark Strait / off East Greenland – 2010.
SCR Doc 10/70	N5864	S. Munch-Petersen, O. Eigaard, G. Sjøvik and M. Ulmestrand	The Northern shrimp ( <i>Pandalus borealis</i> ) Stock in Skagerrak and the Norwegian Deep (ICES Divisions IIIa and IVa East)
SCR Doc 10/71	N5869	A. Cogswell, E. Kenchington, C. Lirette, B. Brodie, G. Campanis, A. Cuff, A. Perez, A. Kenny, N. Ollerhead, M. Sacau, V. Wareham	GIS for WGEAFM Evaluating Sponge Encounter Thresholds through GIS Simulation of the Commercial Groundfish Fishery in the NAFO Regulatory Area
SCR Doc 10/72	N5871	Pierre Pepin, Andrew Cuff, Mariano Koen-Alonso, and Neil Ollerhead	Preliminary Analysis for the Delineation of Marine Ecoregions on the NL Shelves
SCR Doc 10/73	N5872	Alfonso Pérez-Rodríguez, Andrew Cuff, Neil Ollerhead, Pierre Pepin, and Mariano Koen-Alonso	Preliminary analysis towards the delineation of marine ecoregions in the Flemish Cap, Northwest Atlantic

**SCS Documents**

SCS Doc. 10/01 + addendum (2)	N5743		FC Request for Advice
SCS Doc. 10/02	N5744		Greenland Request for Advice
SCS Doc. 10/03	N5745		Canadian Request for Advice
SCS Doc. 10/04	N5747	NAFO	Report of the Scientific Council Meeting, March-April 2010
SCS Doc. 10/05	N5755	I.A. Skryabin and M.V. Pochtar	Russian Research Report for 2009
SCS Doc. 10/06	N5760	F. González-Costas, D. González-Troncoso , E. Román, M. Casas, G. Ramilo, C. Gonzalez, A. Vázquez and A. Gago	Spanish Research Report for 2009
SCS Doc. 10/07	N5761	J. Vargas, R. Alpoim, E. Santos and A. M. Ávila de Melo	Portuguese Research Report for 2009
SCS Doc. 10/08	N5763	M. Stein, H. Fock and A. Akimova	German Research Report for 2009
SCS Doc. 10/09	N5764	NAFO Secretariat	Index of Meeting Documents, 2009
SCS Doc. 10/10	N5769	Templeman	Canadian Research Report, 2009
SCS Doc. 10/11	N5772	K.A. Sosebee	United States Research Report for 2009
SCS Doc. 10/12	N5775	Greenland Institute of Natural Resources	Denmark/Greenland Research Report for 2009
SCS Doc. 10/13	N5777	NAFO Secretariat	List of Biological Sampling, 2009
SCS Doc. 10/14	N5778	NAFO Secretariat	List of Tagging
SCS Doc. 10/15	N5798	NAFO Secretariat	Historical Nominal Catches for Selected Stocks
SCS Doc. 10/16	N5803	M.Plikshs and E.Kruze	Latvian Research Report for 2009
SCS Doc. 10/17	N5805	E.A. Trippel	Report of the NAFO Scientific Council Working Group on Reproductive Potential
SCS Doc. 10/18	N5808	NAFO	Report of Scientific Council Meeting, 3-16 June 2010
SCS Doc. 10/19	N5815	NAFO	Report of the WGEAFM
SCS Doc. 10/20	N5819	NAFO Secretariat	Available Data from the Commercial Fisheries Related to Stock Assessment (2009) and Inventory of Biological Surveys Conducted in the NAFO Area in 2009 and Biological Surveys Planned for 2010 and Early-2011
SCS Doc. 10/21	N5820	NAFO	Report of the Scientific Council, September 2010
SCS Doc. 10/22	N5853		Report of NIPAG, October 2010
SCS Doc. 10/23	N5855	NAFO	Report of the Scientific Council, October 2010
SCS Doc. 10/24	N5868	NAFO	Report of the WGEAFM - December 2010
SCS Doc. 10/25	N5869	NAFO Secretariat	A Compilation of Research Vessel Surveys on a Stock-by-stock Basis

**LIST OF REPRESENTATIVES, ADVISERS, EXPERTS AND OBSERVERS, 2010**

**Meeting \***  
 A = March-April 2010  
 B = 3-16 June 2010  
 C = 20-24 September 2010  
 D = 20-27 October 2010

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**LIST OF RECOMMENDATIONS IN 2010**  
**SCIENTIFIC COUNCIL MEETING, 3-16 JUNE 2010**

**III. FISHERIES ENVIRONMENT**

The recommendations made by STACFEN for the work of the Scientific Council as **endorsed** by the Council, is as follows:

STACFEN **recommended** that *consideration of support for one invited speaker to address emerging issues and concerns for the NAFO Convention Area during the June Meeting.*

An important role of STACFEN, in addition to providing climate and environmental summaries for the NAFO Convention Area, is to determine the response of fish and invertebrate stocks to the changes in the physical and biological oceanographic environment. It is felt that a greater emphasis should be placed on these activities within STACFEN and therefore STACFEN **recommended** that *further studies be directed toward integration of environmental information with changes in the distribution and abundance of resource populations.*

STACFEN **recommended** that *Scientific Council to support a NAFO Co-Chair, keynote speakers, and an honorarium for consideration to the "ICES/NAFO Symposium on the Variability of the North Atlantic and its Marine Ecosystems during 2000-2009".*

**IV. PUBLICATIONS**

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

STACPUB **recommended** that *a sponge guide be published in the NAFO Studies Series in a waterproof format as well as an electronic format that would be available on the website.*

**V. RESEARCH COORDINATION**

The recommendation made by STACREC for the work of the Scientific Council as **endorsed** by the Council, is as follows:

STACREC **recommended** that *for 2011 the Secretariat draft a working paper describing all the catch related data available to Scientific Council (including weekly reporting, observer, VMS and discard data).*

In addition, STACREC **recommended** that *the Secretariat routinely send a reminder to Contracting Parties/countries by mid April and again by 2 May to those that have not submitted STATLANT 21A data and report to Scientific Council regarding the nature and extent of outstanding problems.* STACREC **recommended** that *DEs compile historical catch data in as finer scale (ideally by NAFO Division) and for as many years as possible.*

STACREC noted that in Scientific Council Reports references are made to STATLANT 21A data even though these data are updated for previous years when STATLANT 21B data become available. STACREC **recommended** that *reports and catch tables refer to STATLANT data as "STATLANT 21" data.*

STACREC noted that FAO 3-letter alpha codes are not available for most coral and sponges, either at the species or higher taxonomic levels, that occur in the NAFO area, The Secretariat advised that this is not a CWP issue and may require proposals to be submitted to FAO. STACREC **recommended** that *this issue be addressed by WGEAFM.*

The work of WGEAFM involves spatial analyses to identify and delineate areas with high concentration of VME-forming species (like corals and sponges). These analyses require unprocessed data (raw-data) e.g. from research surveys carried-out by different contracting parties combined in a single data set. There is no established practice for the sharing of raw data within NAFO.

STACREC **recommended** that *Scientific Council encourage research institutions from all Contracting Parties to share their survey data at the level of detail necessary for WGEAFM.* Equally important, STACREC **recommended**

*Scientific Council to instruct WGEAFM that any data shared as part of its work towards addressing Scientific Council requests should neither be distributed outside WGEAFM nor used for purposes other than addressing WGEAFM ToRs without documented permission from the institution where the data originated and properly cited in all documents produced.*

There is a need to established protocols for the sharing of aggregated and/or raw data among NAFO Contracting Parties and Scientific Committees.

STACREC **recommended** that *the NAFO Secretariat prepare a document for presentation at the next meeting of STACREC on (1) "Guidelines for data acquisition from Contracting Parties" and (2) a draft pro-forma MOU between NAFO and the data-owners (here taken to usually be the national research labs who collected the data) to cover data use agreements.*

To facilitate the compilation of overviews of research and data needs for NAFO stocks, STACREC **recommended** that *DEs compile this information for their stocks and forward to the Secretariat for inclusion in a future SCS document/working paper.*

## VI. FISHERIES SCIENCE

The Council **endorsed** recommendations specific to stock considerations and they are highlighted under the relevant stock considerations in the STACFIS Report in Appendix IV.

In order to expedite the work of the Scientific Council, STACFIS **recommended** that *all Contracting Parties take measures to improve the accuracy of their reported nominal catches and present them as far in advance of future June Meeting as possible.*

STACFIS **recommended** that *catch estimate, including discards, from national sampling programs be provided.*

## X. MEETING REPORTS

### 4. Working Group on Reproductive Potential, March 2010

Scientific Council was pleased that a workshop on ‘Implementation of Stock Reproductive Potential into Assessment and Management Advice for Harvested Marine Species’ is planned for the spring of 2011. Council noted the importance of this workshop to the improvement of scientific advice and **recommended** that *Designated Experts attend the workshop*

## STACFIS

### 1. Greenland Halibut (*Reinhardtius hippoglossoides*) in SA 0, Div. 1A offshore and Div. 1B-F

#### f) Research Recommendation

STACFIS **recommended** that *catch rates in the gillnet fisheries in Div. 0A and 0B and trawl fishery from Div. 0A from 2009 and 2010 should be made available before the assessment in 2011.*

### 4. Demersal Redfish (*Sebastes spp*) in SA 1

STACFIS reiterated the **recommendation** that *the species composition and quantity of redfish discarded in the shrimp fishery in SA 1 be further investigated.*

### 5. Other Finfish in SA 1

#### d) Research Recommendations

STACFIS reiterated the **recommendation** that *the species composition and quantity of other finfish discarded in the shrimp fishery in SA 1 be further investigated.*

STACFIS reiterated the **recommendation** that *the distribution of these species in relation to the main shrimp-fishing grounds in SAI be investigated, in order to further discover means of reducing the amount of discarded bycatch.*

## **6. Cod (*Gadus morhua*) in Div. 3M**

### ***i) Research Recommendations***

Taking into account that the stock is changing rapidly and this could lead to considerable change in the maturity ogive, STACFIS **recommended** that *the maturity ogives be updated to include data for the years 2007-2009.*

## **7. Redfish (*Sebastes mentella* and *Sebastes fasciatus*) in Div. 3M**

### **d) Current and Future Studies**

STACFIS **recommended** that *an update of the Div. 3M redfish bycatch information be compiled on an annual basis, including the estimated weights and numbers of redfish caught annually in the Div. 3M shrimp fishery as well as their size distribution.*

STACFIS **recommended** that *an update of the recent Div. 3M golden redfish fishery information be compiled on an annual/fleet basis, including estimated catch and size distribution of the golden redfish catches.*

## **8. American Plaice (*Hippoglossoides platessoides*) in Div. 3M**

### **d) Research Recommendations**

Average  $F$  in recent years has been very low relative to  $M$ . Therefore STACFIS reiterates its **recommendation** that *the utility of the XSA must be re-evaluated and the use of alternative methods (eg. Survey-based models or stock production models) be attempted in the next full assessment of Div. 3M American plaice.*

Because ages below 3 are not well selected in the EU survey series STACFIS also reiterates its **recommendation** that *exploratory runs of the XSA should be done with the input data starting at age 3 or 4.*

## **14. Capelin (*Mallotus villosus*) in Div. 3NO**

### **e) Research Recommendations**

STACFIS reiterates its **recommendation** that *initial investigations to evaluate the status of capelin in Div. 3NO should utilize trawl acoustic surveys to allow comparison with the historical time series.*

## **15. Redfish (*Sebastes mentella* and *Sebastes fasciatus*) in Div. 3O**

### **e) Recommendations**

STACFIS noted that although previous attempts at applying surplus production models to this stock were unsuccessful, additional data may improve model fits. STACFIS **recommended** that *additional work be undertaken to explore the application of surplus production model to this stock.*

## **16. Thorny Skate (*Amblyraja radiata*) in Div. 3LNO and Subdiv. 3Ps**

### **d) Recommendations**

STACFIS **recommended** that *further work be conducted on development of a quantitative stock model.*

## 17. White Hake (*Urophycis tenuis*) in Div. 3NO and Subdiv. 3Ps

### d) Research Recommendations

STACFIS **recommended** that *the genetic analyses of Div. 3NO versus Subdiv. 3Ps be continued; in order to help determine whether Div. 3NOPs white hakes comprise a single breeding population.*

STACFIS **recommended** that *the collection of information on commercial catches of white hake be continued and now include sampling for age, sex and maturity to determine if this is a recruitment fishery.*

STACFIS **recommended** that *age determination should be conducted on otolith samples collected during annual Canadian surveys (1972-2009+); thereby allowing age-based analyses of this population.*

STACFIS **recommended** that *survey conversion factors between the Engel and Campelen gear be investigated for this stock.*

## 18. Roughhead Grenadier (*Macrourus berglax*) in SA 2+3

### e) Recommendations

STACFIS recommended in 2009 to explore the use of production models in this stock. A non-equilibrium surplus production model incorporating covariates (ASPIC) was applied to nominal catch for roughhead grenadier in NAFO Subarea 2 and 3 from 1992-2009 and survey biomass indices. Several runs were carried out to investigate the sensitivity of the model to various input specifications. All of the tried runs show a poor fit of the model due to the lack of contrast in the data used.

STACFIS **recommended** that *further investigation on recruitment indices for roughhead grenadier in Subareas 2 and 3 will be carried out.*

## 20. Greenland Halibut (*Reinhardtius hippoglossoides*) in SA 2 + Div. 3KLMNO

### i) Research Recommendations

STACFIS **recommended** *further study of the data available to assess this stock as well as the data series included in the analytical assessment.* This could include methods to construct a single age-disaggregated commercial CPUE index. Any relevant results from the ageing workshop for Greenland halibut that is planned for 2011 should be considered.

STACFIS **recommended** *ongoing investigations into the assessment methods used.* This should include further explorations of the statistical catch at age model investigated this year.

STACFIS **recommended** that *research continue on age determination for Greenland halibut in Subarea 2 and Div. KLMNO to improve accuracy and precision.*

Previous survey experiments have noted that the depth distribution of Greenland halibut extends beyond 1500m, the maximum depth of the survey information currently available to assess this stock. Considering that very few age 10+ fish are captured in either commercial fisheries or in trawl surveys, STACFIS reiterated its **recommendation** that *exploratory deep-water surveys for Greenland halibut in Subarea 2 and Div. 3KLMNO be conducted using gears other than bottom trawls to complement existing survey data.*

Tagging experiments could provide information on movement, growth rates and validate the current aging methods. STACFIS **recommended** that *tagging experiments of Greenland halibut in Subarea 2 and Div. 3KLMNO be conducted.*

Recognizing that the available survey series, taken individually or in combination, do not cover the entire range of this stock, STACFIS **recommended** that *a synoptic survey of Greenland halibut in Subarea 2 and Div. 3KLMNO be conducted over a series of years, to the maximum depth possible.*

## 21. Northern Shortfin Squid (*Illex illecebrosus*) in SA 3+4

### d) Research Recommendations

For Northern shortfin squid in Subareas 3+4, STACFIS **recommended** that *abundance and biomass indices from the Canadian multi-species bottom trawl surveys conducted during spring and autumn in Div. 3LNO, beginning with 1995, be derived using the two subsets of strata listed in SCR Doc. 06/45 in order to improve the precision of the indices.*

## SCIENTIFIC COUNCIL MEETING, 20-27 OCTOBER 2010

### V. OTHER MATTERS

#### 1. Catch and Effort Analysis using VMS Data

Scientific Council reiterates its previous recommendation in more general terms for consideration of all commercial fisheries, and **recommended** that *the catch and effort data from other sources, for example VMS and/or Observer data, continue to be investigated to validate commercial data obtained from summarized logbooks or STATLANT data.*

### NIPAG

#### 1. Northern Shrimp on Flemish Cap (NAFO Div. 3M) - NAFO Stock

##### g) Research Recommendations

NIPAG **recommended** that *biological and CPUE data from all fleets fishing for shrimp in the area, be submitted to Designated Experts by 1 September 2011.*

NIPAG **recommended** that *for northern shrimp in Division 3M investigations be conducted into methods for demographic analyses of fishery CPUE.*

#### 2. Northern Shrimp (Div. 3LNO) – NAFO Stock

##### f) Research Recommendations

NIPAG **recommended** for Northern shrimp in Div. 3LNO:

- *biological and CPUE data from all fleets fishing for shrimp in the area be submitted to the Designated Expert, in the standard format, by 1 September 2011.*
- *NIPAG recommended that research continue into fitting production models to data for northern shrimp in Div. 3LNO including studies of stock structure.*
- *Continued investigation of stock assessment models for *Pandlus borealis* in NAFO Divisions 3LNO. This may help provide estimations of  $B_{msy}$  and  $F_{msy}$ .*

#### 3. Northern shrimp (Subareas 0 and 1) – NAFO Stock

##### f) Research recommendations

NIPAG **recommended** that

- *the estimate of the biomass of Atlantic cod from the W. Greenland trawl survey should be explicitly included in the stock-production model used for the assessment;*
- *estimating weight-length curves from length-sample data alone, and using them for partitioning the estimated stock biomass, should be further compared with the method based on weighing individuals and its usefulness and reliability further evaluated.*

- *numbers at length for all the components of the stock identified by modal analysis should be tabulated, to allow confirmation that they tally to the estimated survey total numbers at length;*

*demographic analyses of past survey data should be thoroughly revised, including adjustment for the 2005 gear change, with a view to obtaining a consistent series.*