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**FISHERIES COMMISSION'S REQUEST FOR SCIENTIFIC ADVICE ON MANAGEMENT  
IN 2007 OF CERTAIN STOCKS IN SUBAREAS 2, 3 AND 4**

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 2006 Annual Meeting, provide advice on the scientific basis for the management of the following fish and invertebrate stocks or groups of stocks in 2007:

Northern shrimp (Div. 3M, 3LNO)  
Greenland halibut (Subarea 2 and Div. 3KLMNO)

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 2006 Annual Meeting, provide advice on the scientific basis for the management of the following fish stocks on an alternating year basis:

Cod (Div. 3NO; Div. 3M)  
Redfish (Div. 3M; Div. 3LN; Div. 3O)  
Yellowtail flounder (Div. 3LNO)  
American plaice (Div. 3LNO; Div. 3M)  
Witch flounder (Div. 2J3KL; Div. 3NO)  
Skates (Div. 3LNO)  
White hake (Div. 3NO)  
Capelin (Div. 3NO)  
Northern shortfin squid (Subareas 3 and 4)

- In 2005, advice was provided for 2006 and 2007 for cod in 3NO, American plaice in 3LNO, witch flounder in 2J3KL, redfish in 3M, redfish in 3LN, redfish in 3O, white hake in 3NO and capelin in 3NO. These stocks will next be assessed in 2007.
- In 2006, advice will be provided for 2007 and 2008 for cod in 3M, American plaice in 3M, yellowtail flounder in 3LNO, witch flounder in 3NO, thorny skate in 3LNO and northern shortfin squid in SA 3&4. These stocks will next be assessed in 2008.

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 by-catches 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:
  - 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 management 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  $F_{2005}$  in 2007 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 management 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, management 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 TACs 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 2007 and subsequent years over a range of fishing mortality rates
    - (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  $B_{MSY}$ )
    - yield/biomass ratio as a proxy for fishing mortality (both absolute and relative to  $F_{MSY}$ )
    - 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 2006 Annual Meeting of the Fisheries Commission for all stocks under its responsibility requiring advice for 2007:
- 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 proposed 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 to 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  $B_{lim}$ , and  $F_{lim}$  and target  $F$  reference points selected by managers.
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.
7. Regarding pelagic *S. mentella* redfish in NAFO Subareas 1-3, the Scientific Council is requested to review the most recent information on the distribution of this resource, as well as on the affinity of this stock to the pelagic redfish resource found in the ICES Sub-area XII, parts of SA Va and XIV and to the shelf stocks of redfish found in ICES Sub-areas V, VI and XIV, and NAFO Subareas 1-3.

8. In accord with the recommendation from the 2002 NAFO Symposium on Elasmobranch Fisheries that “*the NAFO Scientific Council [be directed] to investigate the status and management needs of elasmobranchs in NAFO waters*”, the Scientific Council is requested to review all available information from both research vessel surveys and commercial catches on the stock structure, relative biomass, geographic distribution, life history, and size/age/sex composition of spiny dogfish (*Squalus acanthias*) occurring within the NAFO Regulatory Area. The Council is also requested to provide similar information on black dogfish (*Centroscyllium fabricii*) in the NRA and update the information on this species previously provided by the Scientific Council in 2001. For both species, the Council is requested to provide historical and recent information on catches and by-catches, and to identify those fisheries in which either of the two species are taken as bycatch.
9. In order to assist the Fisheries Commission in prioritizing the areas of ecological and biological significance and determining appropriate management measures to conserve vulnerable deep water habitats and sensitive areas, the following request is submitted to the Scientific Council:
- I Regarding the conservation of vulnerable deep-water habitats, the NAFO Scientific Council is requested to:
- a) Develop criteria for determining areas of marine ecological and biological significance, in particular areas associated with seamounts, hydrothermal vents, and cold-water corals in the NRA.
  - b) Provide information on the distribution of cold-water corals, hydrothermal vents, and seamounts in the NAFO Regulatory area. To the extent that information allows, differentiate among
    - i. Areas where there is information on which to evaluate the occurrence of corals;
    - ii. Areas where concentrations of corals (soft/hard) are known to occur; and
    - iii. Areas where concentrations of corals are unlikely to occur.
  - c) Recognizing the unique character and relatively easy identification of seamounts, develop a data collection protocol for any survey, exploratory, or commercial fishing activity on seamounts in the NRA, to enhance scientific council’s knowledge of these areas.
- II With view to assisting the Scientific Council’s work, the Secretariat will be asked to provide information to Scientific Council on historic and recent fishing effort in areas identified in a), b) and c) in a summary fashion, based on VMS and observer data. This information should then be evaluated by Scientific Council to determine levels of fishing activity in these areas, and its potential impact on these areas.
10. Noting the desire of NAFO to apply ecosystem considerations in the conservation and management of fish stocks in the NAFO area, the Scientific Council is requested to provide the Fisheries Commission at its next annual meeting in 2006 with an overview of present knowledge related to role of seals in the marine ecosystem of the Northwest Atlantic and their impact on fish stocks in the NAFO area, taking into account the work of other relevant organizations, including ICES and NAMMCO.
11. The Fisheries Commission requests advice from the Scientific Council as to the utility of introducing a scientific observer programme run by NAFO and aimed at enhancing the collection of data on the status of stocks. In this respect, a scientific observer programme is understood as meaning that the observer be tasked only to collect data/information for stock assessment to be used by the Scientific Council. Scientific observers will not conduct any activity related to control/enforcement and compliance.
- The Scientific Council is specifically asked to provide advice on the possible structure and coverage of such a programme. The Scientific Council should in this respect take into account the scientific observer programme which is being run by CCAMLR and assess if a similar system could be implemented in NAFO.
12. Taking into account that a reduction of mesh size in different type of trawls is an important element of harmonization of mesh size within and outside of 200-mile limit of the Canadian Zone in the target redfish fishery in Div. 30, the Fisheries Commission requests the Scientific Council to evaluate possible biological consequences of a reduction of mesh size to 90-100 mm, such as:
- Impact on other stocks in the vicinity of redfish
  - Merits of a minimum fish size
  - Effect on size composition of redfish catches
  - Catch efficiency of different size groups

and provide an advice on the appropriateness of mesh size reduction.