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SCIENTIFIC COUNCIL MEETING - 2013

FISHERIES COMMISSION'S REQUEST FOR SCIENTIFIC ADVICE ON MANAGEMENT IN 2014 AND BEYOND OF CERTAIN STOCKS IN SUBAREAS 2, 3 AND 4 AND OTHER MATTERS

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 2013 Annual Meeting, for the management of Northern shrimp in Div. 3M, 3LNO in 2014. The advice should be provided as a range of management options and a risk analysis for each option (rather than a single TAC recommendation) in accordance to Annex A or B as appropriate.
2. Fisheries Commission requests that the Scientific Council provide advice for the management of the fish stocks below according to the assessment frequency presented below. The advice should be provided as a range of management options and a risk analysis for each option (rather than a single TAC recommendation).

Two year basis

American plaice in Div. 3LNO
 Capelin in Div. 3NO
 Cod in Div. 3M
 Redfish in Div. 3LN
 Redfish in Div. 3M
 Thorny skate in Div. 3LNO
 White hake in Div. 3NO
 Yellowtail flounder in Div. 3LNO

Three year basis

American plaice in Div. 3M
 Cod in Div. 3NO
 Northern shortfin squid in SA 3+4
 Redfish in Div. 3O
 Witch flounder in Div. 2J+3KL
 Witch flounder in Div. 3NO

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

In 2013, advice should be provided for 2014 and 2015 for Capelin in Div. 3NO, Cod in Div. 3M, Redfish in Div. 3M, White hake in Div. 3NO and Yellowtail flounder in Div. 3LNO and for 2014, 2015 and 2016, Cod in Div. 3NO, Northern shortfin squid in SA 3+4, Redfish in Div. 3O and Witch Flounder in div. 2J+3KL.

Advice should be provided using the guidance provided in Annexes A or B as appropriate.

The Fisheries Commission also 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 Fisheries Commission adopted in 2010 an MSE approach for Greenland halibut stock in Subarea 2 + Division 3KLMNO (FC Working Paper 10/7). This approach considers a survey based harvest control rule (HCR) to set a TAC for this stock on an annual basis. The Fisheries Commission requests the Scientific Council to:
 - a) Monitor and update the survey slope and to compute the TAC according to HCR adopted by the Fisheries Commission according to Annex 1 of FC Working Paper 10/7.
 - b) Advise on whether or not an exceptional circumstance is occurring.
4. 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})
5. Fisheries Commission requests the Scientific Council to examine the consequences resulting from a decrease in mesh size in the mid-water trawl fishery for redfish in Div. 3LN to 90mm or lower.
 6. The Fisheries Commission requests the Scientific Council to provide B_{msy} and F_{msy} for cod in Div. 3M.
 7. Recognizing the work accomplished by the Scientific Council in 2012 on sea pens and sponges, Fisheries Commission requests the Scientific Council to complete request 17 of 2011 by making recommendations for encounter thresholds and move on rules for small gorgonian corals, large gorgonian corals, sea squirts, erect bryozoans, crinoids and cerianthid anemone which are VME indicator species that meet the FAO Guidelines for VME and SAI. Consider thresholds for 1) inside the fishing footprint and outside of the closed areas and 2) outside the fishing footprint in the NRA, and 3) for the exploratory fishing area of seamounts if applicable. In the case of sea pens and sponges make recommendations for encounter thresholds and move on rules for the exploratory fishing area of seamounts.
 8. In the medium term, the Fisheries Commission requests the Scientific Council to continue research on the productivity of 3NO Cod and define MSY reference points.
 9. With regards to witch flounder in Div. 3NO, the Fisheries Commission requests the Scientific Council to provide reference points or proxies, including Blim.
 10. The Fisheries Commission requests the Scientific Council to use Annex 1.E.V of the NCEM to guide development of their workplan related to reassessment of fishing activity with respect to Significant Adverse Impact (SAI) on VME and would note that this assessment is a single component of the broader EAF Roadmap being developed separately by SC.
 11. With regards to witch flounder in Div. 3NO, the Fisheries Commission requests the Scientific Council to provide estimates for exploitable biomass and for spawning stock biomass, or appropriate proxies, as well as smoothing, as appropriate.
 12. With regards to stocks without reference points and that cannot be developed, the Fisheries Commission requests the Scientific Council to provide advice on:
 - a) considerations for reopening stocks under moratorium.
 - b) what would constitute a sustainable harvest rate for healthy stocks.
 13. Report on the progress of the "Roadmap for developing an Ecosystem Approach to Fisheries for NAFO" regarding:
 - a) The general progress of the Roadmap;
 - b) Further developments on the stock interactions studies between cod, redfish and shrimp in the Flemish Cap by applying multi species models and by quantifying potential yield and biomass tradeoffs with different fishing mortalities in the multispecies context. The predation of cod over cod juveniles should be taken into account;
 - c) Developments on stock interaction studies for the Grand Banks (NAFO Divisions 3KL and 3NO). The spatial overlap between these stocks should be considered.

These developments should be considered as exploratory and be part of the progress on the "Roadmap for developing an Ecosystem Approach to Fisheries for NAFO".
 14. The Scientific Advice for 3LNO shrimp is based on the assessment of fishable biomass and the trends of exploitation rates. The basic assumption is that exploitation levels are driving the dynamic of this stock. However, interactions between stocks-are likely to occur and may substantially contribute to the total mortality of shrimp.

The Fisheries Commission requests the Scientific Council to incorporate as much as possible information on stock interaction between these stocks in the management advice of 3LNO shrimp and to provide sustainable exploitation rates on that basis.

15. The Fisheries Commission requests the Scientific Council to comment and advise on whether the Sargasso Sea provides forage area or habitat for living marine resources that could be impacted by different types of fishing; and on whether there is a need for any management measure including a closure to protect this ecosystem. The polygon to be considered is the following:

-46.844711060999884 35.722427393000203,-46.32415425899984 35.369106151000096,-
 45.844178761598414 35.0,-62.202511155429988 35.0,-62.632567558331232 35.258234148636177,-
 63.27235558926961 35.512762148873321,-63.959640559567163 35.669259149019013,-
 64.673394560231941 35.722388149068536,-65.385178560894815 35.670316149019982,-
 66.072834561535274 35.514837148875188,-66.875051562282238 35.198759148580848,-
 67.211147449541443 35.0,-71.448964644661828 35.0,-71.377610283999786 35.483190472000047,-
 70.697710570999789 35.847831353000117,-69.78132949999856 36.285738255000183,-
 68.818622663999804 36.688934769000298,-67.810633268999936 37.057011529000135,-
 66.767771029999835 37.386320105000095,-65.000031260999833 37.838698970000223,-
 63.160524424999892 38.183166102000087,-61.276399190999882 38.41419272700017,-59.376124598999866
 38.528701613000123,-57.575810995999859 38.528867480000258,-55.796226233999846
 38.422925564000195,-54.062624079999807 38.211871163000239,-52.399638263999805
 37.898770146000288,-50.826090381999791 37.487278854000067,-49.360484950999876
 36.981801336000103,-48.028343332999839 36.39115303900013,-46.844711060999884 35.722427393000203

16. Assessment of risk of significant adverse impacts on VME indicator aggregations and VME elements in the NAFO RA

Fishing effort is not uniformly distributed throughout the NAFO Regulatory Area (NRA) and within the fishing footprint there is considerable variation in the intensity of fishing effort. Defining and mapping the high intensity fishing areas within the NRA would by definition represent low risk areas in terms of significant adverse impacts and therefore encounter protocols and move on rules would have little utility in these areas. Furthermore, an understanding of the relationship between the high intensity fishing areas and the environmental characteristics could be used to identify potential new low risk fishing areas. Further categories of risk should be assessed in relation to known and potential mapped VME areas and the maps of fishing intensity to support a risk based spatial management approach for all areas.

- a) The Fisheries Commission requests the SC for an analysis of fishing effort (VMS data) in the NRA to define areas of different levels of fishing intensity (e.g a map of 90%, 80%, 70%... effort) and assess these in conjunction with habitat data in order to map out areas where fishing activities would therefore have no or little significant adverse impact on VMEs and where encounter protocols and move on rules would therefore have little utility. To achieve this, high resolution data is required, (derived from the 2003-present time series of VMS records and logbook records of fishing activity provided by the secretariat and NEREIDA data). The Fisheries Commission requests therefore to the Executive Secretary to provide to the Scientific Council anonymous VMS data and logbook records of fishing activity from 2003 to present.
- b) In view of the area management currently implemented and to facilitate evaluation of the need for further protective measures in response to UNGA 61/105, the SC is requested to provide an assessment of risk of significant adverse impacts on VME indicator aggregations and VME elements in the NAFO RA. This assessment should consider spatial and temporal distribution of fishing activity (derived from the 2003-present time series of VMS records and logbook records of fishing activity provided by the secretariat), and the best available knowledge on the spatial distribution of VME indicators and VME indicator elements.

ANNEX A: Guidance for providing advice on Stocks Assessed with an Analytical Model

The Fisheries Commission 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:

1. For stocks assessed with a production model, the advice should include updated time series of:

- Catch and TAC of recent years
- Relative Biomass
- Relative Fishing mortality
- Stock trajectory against reference points
- And any information the Scientific Council deems appropriate.

Stochastic short-term projections (3 years) should be performed under the following conditions:

- For stocks opened to direct fishing:
 - Projections based on constant fishing mortality at: $2/3 F_{MSY}$, $3/4 F_{MSY}$, $85\% F_{MSY}$, F_{SQ} (*status quo*);
 - Projections based on constant yield at: Current TAC and relevant percentage above and/or below the current TAC;
- For stocks under a moratorium to direct fishing: F_{SQ} , $F = 0$.

Results from stochastic short term projection should include:

- The 10%, 50% and 90% percentiles of the yield and total biomass;
- The risks of stock population parameters increasing above or falling below available biomass and fishing mortality reference points. The table indicated below should guide the Scientific Council in presenting the short term projections.

*y = First year of the projections

Constant fishing mortality levels or yield as indicated above**	Yield in y* (50%)	Yield in y+1 (50%)	Yield in y+2 (50%)	Limit reference points						By+2 > By-2**										
				F<F _{lim}			B>B _{lim}				F<F _{msy}			B>B _{msy}						
				y	y+1	y+2	y	y+1	y+2		y	y+1	y+2	y	y+1	y+2				
F or Yield Options	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

** y-2 = Last year of the stock assessment

The Scientific Council might consider other projection options.

2. For stock assessed with an age-structured model, information should be provided on stock size, spawning stock sizes, recruitment prospects, historical fishing mortality. Graphs and/or tables should be provided for all of the following for the longest time-period possible:

- Catch and TAC of recent years
- historical yield and fishing mortality;
- spawning stock biomass and recruitment levels;
- Stock trajectory against reference points

And any information the Scientific Council deems appropriate

Stochastic short-term projections (3 years) should be performed with the following constant fishing mortality levels:

- For stocks opened to direct fishing:
 - Projections based on constant fishing mortality at: $F_{0.1}$, F_{MAX} , F_{MSY} , F_{SQ} ;
 - Projections based on constant yield at: Current TAC and relevant percentage above and/or below the current TAC;
- For stocks under a moratorium to direct fishing: F_{SQ} , $F = 0$.

Results from stochastic short term projection should include:

- The 10%, 50% and 90% percentiles of the yield, total biomass, spawning stock biomass and exploitable biomass for each year of the projections
- The risks of stock population parameters increasing above or falling below available biomass and fishing mortality reference points. The table indicated below should guide the Scientific Council in presenting the short term projections.

Constant fishing mortality levels or yield as indicated above*	Yield in y	Yield in y+1	Yield in y+2	Limit reference points						By+2 > By-2						
				F < F_{lim}			B > B_{lim}				F < $F_{0.1}$			F < F_{max}		
				y	y+1	y+2	y	y+1	y+2		y	y+1	y+2	y	y+1	y+2
F or Yield Options	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%
	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%

*y = First year of the projections

** y-2 = Last year of the stock assessment

The Scientific Council might consider other projection options.

ANNEX B Guidance for providing advice on Stocks Assessed without a Population Model

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 and include risk considerations as much as possible.

The following graphs should be presented, for one or several surveys, for the longest time-period possible:

- a) time trends of survey abundance estimates
- b) an age or size range chosen to represent the spawning population
- c) an age or size-range chosen to represent the exploited population
- d) recruitment proxy or index for an age or size-range chosen to represent the recruiting population.
- e) fishing mortality proxy, such as the ratio of reported commercial catches to a measure of the exploited population.
- f) Stock trajectory against reference points

And any information the Scientific Council deems appropriate