



Serial No. N6627

NAFO/FC Doc. 16/16
[Adopted]

38th ANNUAL MEETING – SEPTEMBER 2016

Fisheries Commission's Request for Scientific Advice on Management in 2018 and Beyond of Certain Stocks in Subareas 2, 3 and 4 and Other Matters

1. The 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).

<u>Yearly basis</u>	<u>Two year basis</u>	<u>Three year basis</u>
Northern shrimp in Div. 3LNO Cod in Div. 3M	American plaice in Div. 3LNO Redfish in Div. 3M Northern shrimp in Div. 3M Thorny skate in Div. 3LNO White hake in Div. 3NO Witch flounder in Div. 3NO	American plaice in Div. 3M Capelin in Div. 3NO Cod in Div. 3NO Northern shortfin squid in SA 3+4 Redfish in Div. 3O Witch flounder in Div. 2J+3KL Yellowtail flounder in Div. 3LNO

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

In 2017, advice should be provided for 2018 for Northern shrimp in NAFO Div. 3LNO and Cod in Div 3M*.

In 2017, advice should be provided for 2018 and 2019 for Redfish in 3M, Witch flounder in 3NO, Shrimp in 3M.

In 2017, advice should be provided for 2018, 2019 and 2020 for Cod in 3NO, American plaice in Div. 3M

Advice should be provided using the guidance provided in **Annexes A or B as appropriate**, or using the predetermined Harvest Control Rules in the cases where they exist.

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 bycatch in other fisheries, provide updated advice as appropriate.

2. The Fisheries Commission requests the Scientific Council to implement the steps of the work plan relevant to the SC for progression of the Greenland halibut Management Strategy Evaluation Review (FC Working Paper 16-11 Rev. 2 adopted at the NAFO 2017 annual meeting).
3. The Fisheries Commission requests that the Scientific Council continue its risk assessment of scientific trawl surveys impact on VME in closed areas, and the effect of excluding surveys from these areas on stock assessments.
4. The Fisheries Commission requests the Scientific Council, based on analysis of the 2016 haul by haul data and patterns of fishing activity, to examine relative levels of by-catch and discards of



3M cod/redfish, and stocks under moratoria in the different circumstances (e.g. fisheries areas, season, fleets, depths, timing).

5. The stock of redfish 3M covers catches of three *Sebastes* species and the scientific advice is based on data of only two species (*S. mentella* and *S. fasciatus*). Golden redfish, *Sebastes marinus* (a.k.a. *S. norvegicus*), represents part of the catch but has not yet been subject to a full assessment in NAFO. The Scientific Council is requested to conduct a full assessment on 3M golden redfish in June 2017. The Scientific Council is also requested to advice on the implications for the three species in terms of catch reporting and stock management.
6. In relation to the assessment of NAFO bottom fisheries, the Fisheries Commission endorsed the next re-assessment in 2021 and that the Scientific Council should:
 - Assess the overlap of NAFO fisheries with VME to evaluate fishery specific impacts in addition to the cumulative impacts;
 - Consider clearer objective ranking processes and options for objective weighting criteria for the overall assessment of risk;
 - Maintain efforts to assess all of the six FAO criteria (Article 18 of the FAO International Guidelines for the Management of Deep Sea Fisheries in the High Seas) including the three FAO functional SAI criteria which could not be evaluated in the current assessment (recovery potential, ecosystem function alteration, and impact relative to habitat use duration of VME indicator species).
 - Continue to work on non-sponge and coral VMEs (for example bryozoan and sea squirts) to prepare for the next assessment.
 - The SC further develops and compile identification guides for fishes (e.g. sharks and skates) that could be provided to observers.
7. The Fisheries Commission requests the SC to continue progression on the review of the NAFO PA Framework.
8. The Fisheries Commission requests the Scientific Council, by their 2018 annual meeting engage with relevant experts as needed, review the available information on the life history, population status, and current fishing mortality of Greenland sharks (*Somniosus microcephalus*), on longevity and records of Greenland shark bycatch in NAFO fisheries, and develop advice for management, in line with the precautionary approach, for consideration by the Fisheries Commission.
9. The Fisheries Commission requests the Scientific Council start working on and finalizing by SC 2018 a strategic scientific plan based on a Strength, Weaknesses, Opportunities and Threats (SWOT) analysis defining the strategy and the mid and long term objectives and tasks in view of NAFO's amended convention objectives. The plan should define for each strategic objective goals, tasks and measurable targets.

* *3M cod Benchmark process has been delayed at the request of the Fisheries Commission in favour of the Greenland halibut MSE work plan*

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
 - Catch to relative biomass
 - 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 with the following constant fishing mortality levels as appropriate:

- For stocks opened to direct fishing: $2/3 F_{msy}$, $3/4 F_{msy}$, $85\% F_{msy}$, $75\% F_{2016}$, F_{2016} , $125\% F_{2016}$,
- For stocks under a moratorium to direct fishing: F_{2016} , $F = 0$.

The first year of the projection should assume a catch equal to the agreed TAC for that year.

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.

				Limit reference points																		
				P(F>F _{lim})			P(B<B _{lim})			P(F>F _{msy})			P(B<B _{msy})			P(B2019 > B2016)						
F in 2017 and following years*	Yield 2018 (50%)	Yield 2019 (50%)	Yield 2020 (50%)	2017			2018			2019			2017			2018			2019			
				2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019				
$2/3 F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
$3/4 F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
$85\% F_{msy}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
F_{msy}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
$0.75 X F_{2016}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
F_{2015}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
$1.25 X F_{2016}$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
$F=0$	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	



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:
- 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 as appropriate:

- For stocks opened to direct fishing: $F_{0.1}$, F_{max} , $2/3 F_{max}$, $3/4 F_{max}$, $85\% F_{max}$, $75\% F_{2016}$, F_{2016} , $125\% F_{2016}$,
- For stocks under a moratorium to direct fishing: F_{2015} , $F = 0$.

The first year of the projection should assume a catch equal to the agreed TAC for that year.

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.

F in 2017 and following years*	Yield 2018	Yield 2019	Yield 2020	Limit reference points									P(B2019 > B2016)												
				P(F > F _{lim})			P(B < B _{lim})			P(F > F _{0.1})				P(F > F _{max})											
				2017	2018	2019	2017	2018	2019	2017	2018	2019		2017	2018	2019									
F _{0.1}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%			
F _{max}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		
66% F _{max}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
75% F _{max}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
85% F _{max}	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
0.75 X F ₂₀₁₆	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
F ₂₀₁₅	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1.25 X F ₂₀₁₆	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

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.

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.