



Serial No. N6902

NAFO SCS Doc. 19/01

SCIENTIFIC COUNCIL – 2019

**The Commission's Request for Scientific Advice on Management in 2020 and Beyond of
Certain Stocks in Subareas 2, 3 and 4 and Other Matters**
(COM Doc. 18-20)

Following a request from the Scientific Council, the Commission agreed that items 1, 2, 3, 4, and 12 should be the priority for the June 2019 Scientific Council meeting. Items 4 and 12 were identified as top priorities for Scientific Council subject to resources.

1. The Commission requests that the Scientific Council provide advice for the management of the fish stocks below according to the assessment frequency presented below. In keeping with the NAFO Precautionary Approach Framework (FC Doc. 04/18), the advice should be provided as a range of management options and a risk analysis for each option (rather than a single TAC recommendation) and the actual risk level should be decided upon by managers.

Yearly basis	Two-year basis	Three-year basis
Cod in Div. 3M Northern shrimp in Div. 3M	Redfish in Div. 3M Northern shrimp in Div. 3LNO Thorny skate in Div. 3LNO Witch flounder in Div. 3NO Redfish in Div. 3LN	American Plaice in Div. 3LNO American Plaice in Div. 3M Capelin in Div. 3NO Northern shortfin squid in SA 3+4 Redfish in Div. 3O Yellowtail flounder in Div. 3LNO Greenland halibut in Div. 2+3KLMNO Splendid alfonsino in SA 6

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

In 2019, advice should be provided for 2020 for Cod in 3M (subject to the outcomes of the Management Strategy Evaluation process) and Northern shrimp in 3M. With respect to Northern shrimp in 3M, SC is requested to provide its advice to the Commission prior to the 2019 Annual Meeting.

In 2019, advice should be provided for 2020 and 2021 for: Redfish in 3M, White hake in 3NO, and Northern shrimp in 3LNO.

In 2019, advice should be provided for 2020, 2021 and 2022 for: Northern shortfin squid in SA 3+4, and Redfish in 3O.



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 (currently 3LN Redfish and Greenland halibut 2+3KLMNO).

The Commission also requests the Scientific Council to continue to monitor the status of all other 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. In 2019, the Commission requests Scientific Council to conduct a full assessment of Witch Flounder in Div. 3NO. The advice should be provided for 2020 and 2021.
3. The Commission requests the Scientific Council to monitor the status of Greenland halibut in Subarea 2+Div 3KLMNO annually to compute the TAC using the agreed HCR and determine whether exceptional circumstances are occurring. If exceptional circumstances are occurring, the exceptional circumstances protocol will provide guidance on what steps should be taken.
4. The Commission requests the Scientific Council to implement the steps as described in the revised calendar (COM/SC Doc 18-02, Annex 4 relevant to the SC for progression of the 3M Cod Management Strategy Evaluation for 2019).
5. The Commission requests that Scientific Council continue its evaluation of the impact of scientific trawl surveys on VME in closed areas, and the effect of excluding surveys from these areas on stock assessments.
6. The Commission requests the Scientific Council to implement the steps of the Action plan relevant to the SC and in particular the tasks identified under section 2.2 of the Action Plan, for progression in the management and minimization of Bycatch and discards (COM Doc 17-26).
7. The Commission requests Scientific Council to conduct a full assessment on 3M golden Redfish in 2019 and, acknowledging that there are three species of redfish that exist in 3M and are difficult to separate in the catch, provide advice on the implications for catch reporting and stock management.
8. The Commission requests the Scientific Council to continue to refine its work under the Ecosystem Approach Road Map, including testing the reliability of the ecosystem production potential model and other related models, and to report on these results to both the WG –EAFM and WG- RBMS to further develop how it may apply to management decisions.
9. In relation to the assessment of NAFO bottom fisheries, the 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 significant adverse impacts and the risk of future adverse impacts;
 - 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.
10. Review the proposed revisions to Annex I.E, Part VI as reflected in COM/SC WG –EAFFM WP 18-01, for consistency with the taxa list annexed to the VME guide and recommend updates as necessary.
 11. The Commission requests Scientific Council to conduct a re-assessment of VME closures by 2020, including area #14.
 12. The Commission requests the Scientific Council to continue progression on the review of the NAFO PA Framework.
 13. According to the Scientific Advice for years 2019, 2020 and 2021, fishing should not be allowed to expand above current levels on Kükenthal Peak (Div. 6G, part of the Corner Rise seamount chain). To allow this recommendation to be enforceable the Commission requests the Scientific Council to provide the map and coordinates of the Kükenthal Peak.
 14. The Commission requests Scientific Council work with WG- BDS to identify areas and times where bycatch and discards of Greenland sharks have a higher rate of occurrence. This work will support WG-BDS in developing appropriate management recommendations, including safe handling practises for live release of Greenland sharks, for consideration by the Commission at its 2021 Annual Meeting.
 15. The Commission requests Scientific Council to monitor and provide regular updates on relevant research related to the potential impact of activities other than fishing in the Convention Area, such as oil exploration, shipping and recreational activities, and how they may impact the stocks and fisheries as well as biodiversity in the Regulatory Area.
 16. The Commission requests Scientific Council to take the first steps to develop a 3-5 year work plan, which reflects requests arising from the 2018 Annual Meeting, other multi-year stock assessments and other scientific inquiries already planned for the near future. The work plan should identify what resources are necessary to successfully address these issues, gaps in current resources to meet those needs and proposed prioritization by the Scientific Council of upcoming work based on those gaps.

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

The 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: $2/3 F_{msy}$, $3/4 F_{msy}$, $85\% F_{msy}$, $75\% F_{2018}$, F_{2018} , $125\% F_{2018}$,
- For stocks under a moratorium to direct fishing: F_{2018} , $F = 0$.

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(B2021 > B2017)
				P(F>F _{lim})			P(B<B _{lim})			P(F>F _{msy})			P(B<B _{msy})			
F in 2018 and following years*	Yield 2019 (50%)	Yield 2020 (50%)	Yield 2021 (50%)	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021	
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 ₂₀₁₈	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	
F ₂₀₁₈	t	t	t	%	%	%	%	%	%	%	%	%	%	%	%	
1.25 X F ₂₀₁₈	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} , $2/3 F_{max}$, $3/4 F_{max}$, $85\% F_{max}$, $75\% F_{2018}$, F_{2018} , $125\% F_{2018}$,
- For stocks under a moratorium to direct fishing: F_{2018} , $F = 0$.
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(B2021 > B2017)
				P(F.>F _{lim})			P(B<B _{lim})			P(F>F0.1)			P(F>F _{max})						
F in 2018 and following years*	Yield 2019	Yield 2020	Yield 2021	2019	2020	2021	2019	2020	2021		2019	2020	2021	2019	2020	2021			
F0.1	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 ₂₀₁₈	t	t	t	%	%	%	%	%	%		%	%	%	%	%	%		%	
F ₂₀₁₈	t	t	t	%	%	%	%	%	%		%	%	%	%	%	%		%	
1.25 X F ₂₀₁₈	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.