Northwest Atlantic                    Fisheries Organization

## 39th ANNUAL MEETING OF NAFO - SEPTEMBER 2017

## The Commission's Request for Scientific Advice on Management in 2019 and Beyond of Certain Stocks in Subareas 2, 3 and 4 and Other Matters

Following a request from the Scientific Council, the Commission agreed that items 1, 3, 4, 5, and 12 should be the priority for the June 2018 Scientific Council meeting.

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. The advice should be provided as a range of management options and a risk analysis for each option (rather than a single TAC recommendation).

| Yearly basis | Two-year basis | Three-year basis |
|---|---|---|
| Cod in Div. 3M | American plaice in Div. 3LNO | American plaice in Div. 3M |
| | Redfish in Div. 3M | Capelin in Div. 3NO |
| | Northern shrimp in Div. 3M | Cod in Div. 3NO |
| | Northern shrimp in Div. 3LNO | Northern shortfin squid in SA 3+4 |
| | Thorny skate in Div. 3LNO | Redfish in Div. 3O |
| | White hake in Div. 3NO | Witch flounder Div. 2J+3KL |
| | Witch flounder in Div. 3NO | Yellowtail flounder in Div. 3LNO |
| | Redfish 3LN | Greenland halibut 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 2018, advice should be provided for 2019 for Cod in Div. 3M and shrimp in Div. 3M.

In 2018, advice should be provided for 2019 and 2020 for, American Plaice in 3LNO, and Thorny Skate in 3LNO.

In 2018, advice should be provided for 2019, 2020 and 2021 for Yellowtail Flounder in 3LNO, Cod in 3NO, and Capelin in 3NO and for alfonsino stocks in the NAFO Regulatory Area.

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.  The management strategy for Greenland halibut in Subarea 2+Div. 3KLMNO will be implemented initially for 6 years beginning in 2018. Acknowledging that an Exceptional Circumstances Protocol is will be developed for this stock in 2018 (see item 3 below), the Commission requests the Scientific Council to monitor the status annually to determine whether exceptional circumstances are occurring. Scientific Council should also perform an "update assessment" in 2020. If either the annual monitoring or the update

assessment indicates that exceptional circumstances are occurring, the exceptional circumstances protocol will provide guidance on what steps should be taken.

3. The Commission requests the Scientific Council conduct a full assessment of 3LN Redfish to evaluate the effect of the removals.

4. The Commission requests the Scientific Council to develop criteria for the identification of exceptional circumstances under the Greenland halibut 2+3KLMNO management strategy, this should take into account the issues noted by the WG-RBMS (COM-SC WP 17-06), to support the development of an exceptional circumstances protocol and provide its recommendations to the WG-RBMS meeting planned for August 2018.

5. The Commission requests the Scientific Council to implement processes to conduct a full benchmark assessment of the 3M Cod in line with the work plan (FC-SC Doc. 17-02, Annex 3) and the steps of the work plan relevant to the SC for progression of the 3M Cod Management Strategy Evaluation for 2019.

6. 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.

7. The Commission requests the Scientific Council to implement the steps of the Action plan relevant to the SC for progression in the management and minimization of Bycatch and discards (COM WP 17-35).

8. The Commission requests the 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.

9. The Commission requests the Scientific Council provide further guidance on the implementation of an ecosystem approach and application of the Ecosystem Road Map, through examples of how advice compares to single species stock assessment, including additional factors to be considered and integrating trophic level interactions and climate change predictions.

10. 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.

11. The Commission requests the Scientific Council to continue progression on the review of the NAFO PA Framework.

12. The Commission requests the Scientific Council, by their 2018 annual meeting engage with relevant experts as needed, review additional information beyond what was provided in 2017, 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 Commission.

13. The Commission requests the Scientific Council continue on a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis. The strategy and the mid and long-term objectives and tasks in view of NAFO's amended convention objectives should be developed jointly with the Commission. The plan should define for each strategic objective goals, tasks and measurable targets.

**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% $F_{2017}$, $F_{2017}$, 125% $F_{2017}$,

- For stocks under a moratorium to direct fishing: $F_{2017}$, 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 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | $P(F>F_{lim})$ | | | $P(B<B_{lim})$ | | | | $P(F>F_{msy})$ | | | $P(B<B_{msy})$ | | | | $P(B2020 > B2016)$ | |
| F in 2017 and following years* | Yield 2018 (50%) | Yield 2019 (50%) | Yield 2020 (50%) | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | | |
| $2/3$ $F_{msy}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| $3/4$ $F_{msy}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| 85% $F_{msy}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| $F_{msy}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| 0.75 X $F_{2017}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| $F_{2017}$ | t | t | t | % | % | % | % | % | % | | % | % | % | % | % | % | | % |
| 1.25 X $F_{2017}$ | 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% $F_{2017}$, $F_{2017}$, 125% $F_{2017}$,
- For stocks under a moratorium to direct fishing: $F_{2017}$, 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 | $P(F.>F_{lim})$ | | | $P(B<B_{lim})$ | | | $P(F>F0.1)$ | | | $P(F>F_{max})$ | | | $P(B2020 > B2016)$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | 2018 | 2019 | 2020 | |
| F0.1 | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| $F_{max}$ | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| 66% $F_{max}$ | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| 75% $F_{max}$ | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| 85% $F_{max}$ 0.75 X $F_{2017}$ | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| $F_{2017}$ 1.25 X $F_{2017}$ | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |
| | t | t | t | % | % | % | % | % | % | % | % | % | % | % | % | % |

Limit reference points

**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.