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SCIENTIFIC COUNCIL MEETING –MAY 2025

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Report of the NAFO Precautionary Approach Working Group (PA-WG)

May 06, 2025 (9:00AM, UTC -3), by WebEx

Chair: Fernando González-Costas

1. Opening

The meeting was opened by the Chair, Fernando González-Costas (European Union), at 09:01 hours (UTC/GMT -3 hours in Halifax, Nova Scotia) on Tuesday, 06 May 2025. The Chair highlighted that with the adoption of the new Precautionary Approach Framework (PAF; COM Doc. 24-25), it has become necessary to develop reference points for the stocks for which the Scientific Council provides advice. It was decided at the PA-WG in December 2024 that designated experts (DEs) with full assessments in a given year would work towards the development of reference points that can be used in the PAF that year (SCS Doc. 24/21). The working group had advised that DEs should try to use different methods to estimate their reference points, based on the ranking methods proposed by Scientific Council (SCS Doc. 23/07). The Chair thanked the DEs for their willingness to contribute to this work.

The Chair welcomed representatives from Canada, Denmark (in respect of Faroe Islands and Greenland), the European Union, Japan and the United Kingdom. A full participants list is presented in Appendix I.

a) Appointment of Rapporteurs

The NAFO Secretariat was nominated as rapporteur.

b) Adoption of Agenda

The Scientific Council Chair, Diana González-Troncoso (European Union), added an item under agenda item 5 (Other Matters) to discuss implementing the PAF in the case of multiple-years of advice. The agenda was amended and adopted (Appendix II).

2. Reference points for stocks with full assessments in June

a) 3M cod

Irene Garrido (European Union) provided an overview (SCR Doc. 25/03) of the recommended methods to estimate F_{msy} and B_{msy} (or their proxies), and highlighted that the approaches considered for NAFO Div. 3M cod included 1) directly estimating F_{msy} and B_{msy} from age-based models (using both the ICES eqsim package and a simulation equilibrium analysis approach), 2) using a production model analysis of stock biomass estimates, 3) estimation as a percent of maximum spawning potential (both $F_{30\%SPR}$ and $F_{35\%SPR}$), and 4) using yield per recruit (YPR) analysis (F_{max} and $F_{0.1}$). Other proxies of B_{lim} that were considered were B_{lim} as $B_{recovery}$ and B_{lim} as a percent of unfished biomass ($\%B_0$) based on life history characteristics of the stock. It was noted that the method that is recommended when age or length-based data are not available was not implemented, since these data exist for the stock. Similarly, the proxies for B_{lim} that were based on observed impaired recruitment and occasional good year classes were not used since these did not apply to Div. 3M cod.

Results showed that F reference points based on F_{msy} and stock recruit assumptions were quite different from the SPR and YPR analysis and the current F reference point. The fits to the stock recruit points were poor for this stock and the results based on these approaches had large uncertainties. The proposed reference points for Div. 3M cod were presented (Table 1). It was noted that the proposed F_{lim} reference point ($F_{35\%SPR}$) is more precautionary than the current one ($F_{30\%SPR}$), given that it is not clear whether Div. 3M cod should be characterized as a high or medium productive stock. Since there was not a clear stock recruit relationship, the author proposed to keep B_{lim} as a function of $B_{recovery}$, which was the previously accepted reference point, and noting that the probability of observing low recruitment increased substantially at levels below $B_{recovery}$. For B_{msy} the average of the B_{MSY} estimated by Knobi, BH and Ricker simulation approach was proposed.

Table 1. Proposed Precautionary Approach Framework reference points for Div. 3M cod

Flimit (F_{lim})	**Ftarget (F_{target})**	**Btrigger ($B_{trigger}$)**	**Blimit (B_{lim})**
$F_{msy}=F_{35\%}SPR$	$0.85F_{msy}$	$0.75B_{msy}$(=mean Knobi, BH, Ricker)	$B_{recovery}$

The working group asked for clarification regarding the period of the biological series used to calculate the SPR reference points. The authors clarified that the last three years were used since it was what was expected to occur in the near future. The period that was chosen for mean recruitment was from 2007 onwards, since this was expected to represent the long-term mean. The working group recommended that the reference points be calculated with the 2007-2023 average values of the biological parameters, and Partial Recruitment in order to be able to compare the differences between the productivity of this stock in the short and long term. The working group also recommended that the values estimated with the simulation equilibrium analysis presented at this meeting be reviewed with those presented in SCR 24/51. The working group asked for clarification in how often the reference points would be calculated, and it was noted that they would most likely be revisited every four to five years. Small changes are to be expected between each assessment since B_{lim} is based on $B_{recovery}$, which is a stock assessment model output and re-estimated every year.

The working group initially accepted the proposed reference points; their final approval is pending the SC June 2025 meeting when the estimated reference points will be presented with the 2007-2023 average values of the biological parameters and Partial Recruitment.

b) 3LNO yellowtail flounder

Laura Wheeland (Canada) provided an overview of the 2023 assessment for Divs. 3LNO yellowtail flounder, which had been assessed using a Bayesian Surplus production model (SCR Doc. 23/016). The model provides estimates of both F_{msy} and B_{msy} and this structure transfers into the new PAF. A comparison of the 2023 assessment results applied in the new PAF, and the previous PAF, showed little difference in both stock status and catch levels.

The working group accepted the reference points as presented, provided the Bayesian surplus production model is accepted as the assessment model for this stock at the 2025 June Scientific Council meeting.

c) 3O redfish

This agenda item was deferred to the 2025 June Scientific Council meeting.

d) 3NO white hake

The Chair noted that there is currently no DE for the Divs. 3NO white hake stock; however, Mark Simpson (Canada) took the lead on exploring potential reference points. It was noted that no stock assessment models are currently accepted, so that an index-based approach with $B_{lim}=B_{recovery}$ and historical proxies for F_{msy} was considered first. The lack of continuous Canadian surveys was noted as an issue and the EU-Spain survey is the only consistent survey available. The EU-Spain survey alone was used to define $B_{recovery}$. Concerns were also raised in relation to setting F_{msy} , since harvest rates when the stock was at high levels had occurred during periods of episodic recruitment. Instead, the average catch, where there was a relatively high value, was used. Additional catch-based methods (CMSY++) and a preliminary surplus production model in continuous time (SPiCT) that integrated all available survey indices were also used to derive reference points.

The working group noted that the various methods produced large differences in estimates of reference points, and it was suggested that this may be caused by the different scales used across the various approaches; however this would require further investigation to confirm. It was also suggested that fitting the models to abundance instead of biomass indices could potentially avoid problematic issues driven by rapid changes in weight for this fast-growing stock. The working group also suggested a further investigation into the CMSY++ and SPiCT *r* and *K* parameter estimates to get a better understanding of the differences between the approaches. The working group noted that the index-based approach was potentially limited since it did not include any information about Div. 3Ps, which was highlighted to contain more juveniles than the Divs. 3NO area. It was noted that implementing the index aggregating approach from the 2024 Divs. 3LN redfish assessment (SCR Doc.

24/048) had been considered; however, uncertainty in how to define the reference period made that approach unfeasible.

The working group concluded that no decisions on reference points could be made at this time. It flagged that the future DE should continue the work on the preliminary SPiCT as that provided the most promising approach to setting reference points for the stock, given that it integrated all the available information and allowed for explicit estimation of F_{msy} and B_{msy}.

The Chair and the working group expressed their appreciation to Mark Simpson for the quality and scope of work which he had done while not officially acting as the DE for the stock.

3. Reference points for stocks from Coastal state requests with full assessments

a) Greenland halibut, offshore

Kevin Hedges (Canada) provided an overview of the SPiCT that was accepted as the assessment model during the 2024 assessment of the stock (SCR Doc. 24/021). The model provides estimates of both F_{msy} and B_{msy}, and this structure transfers directly into the new PAF. A table showing a comparison of how the advice would have changed in 2024, given the new PAF, was presented; it was highlighted that the overall results were identical.

The working group commented that the risk table presented would need to be modified to include the additional leaf scenarios in order to provide advice consistent with the new PAF. The working group accepted the reference points as presented, provided the SPiCT is accepted as the assessment model for this stock at the June 2025 Scientific Council meeting.

4. Schedule for stocks with full assessment in September (Northern shrimp 3LNO and Northern shortfin squid SA 3 + 4)

The Chair noted that there is currently no DE for Northern shortfin squid in SA 3 + 4, so that this agenda item could not be discussed.

The Chair asked the working group when the best date would be to discuss reference points under the PAF for shrimp stocks (Divs. 3LNO, Denmark Strait and off East Greenland (ICES Divisions14b and 5a), and off West Greenland (NAFO Subarea 0 and Subarea 1). The first day of the 09 - 11 September 2025 Scientific Council and STACFIS Shrimp Assessment Meeting, or an interim PA-WG meeting were proposed as potential times. The working group noted that data are not available for some surveys until the second week of August, and there would be little time between then and the September meeting for an interim session. The working group also highlighted that due to the workload and capacity of the working group members, adding to the meeting schedule during that period was not feasible.

The working group agreed to discuss the reference points for shrimp during the 09 -11 September 2025 meeting. For the first stage, there would be no major problems with the Greenland shrimp stocks, since both are evaluated with a production model, while in the case of the Divs. 3LNO shrimp stock additional time may be needed to adopt reference points under the new PAF given that a new assessment model has recently been under development.

5. Other matters

a) Script for PAF template plots

The Chair raised that it would be good to have a template script available to produce plots for the PAF. The Secretariat agreed to tidy the script, and to house a standardized script for this purpose; they will present progress on this at the Scientific Council June meeting. The working group members were requested to send preliminary scripts to the Secretariat following the meeting and suggestions regarding PAF plots are welcome until June.

b) Implementing the PAF in the case of multiple-years of advice

The Scientific Council Chair posed the question to working group members of how to set F levels in the projections when providing advice for multiple years. Three options were proposed (for the case of two-year projections): 1) taking the F of 2024 and giving advice for two years, 2) taking the F of 2024 and the F of 2025 to provide advice for 2024 and 2025, respectively, and 3) using the F of 2024 in 2024 and then project the population in 2025 to determine the F in 2025. It was noted that option 1) represents the status-quo, i.e. what was used in the previous PAF, option 2) raised the problematic

issue that the advice in 2024 and 2025 are not linked, and option 3) can produce a biomass that may result in providing advice from a different zone than in the previous year.

The working group members discussed concerns with changing F levels within the projections (i.e. not keeping option 1) and that the risk table approved by the Commission could be interpreted as showing constant F projections. However, working group members highlighted that the PAF simulation testing was made under option 3) and automatically defaulted to F_{target} when the stock was in the healthy zone. It was also noted that setting levels other than F_{target} in the healthy zone could add appreciably more options that would all need to be reported. The working group agreed to discuss on the first day of the Scientific Council June meeting whether option 1) or 3) should be used to provide advice this year, and a more detailed discussion will be held at the July Joint Commission-Scientific Council WG-RBMS meeting regarding an approach for the future.

6. Adjournment

The Chair noted that he will no longer be acting as Chair following this meeting and discussions to find a replacement should be held at the upcoming Scientific Council June 2025 meeting.

The meeting adjourned at 11:59 hours.

APPENDIX I. LIST OF PARTICIPANTS

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APPENDIX II. AGENDA

NAFO Precautionary Approach Working Group (PA-WG)

May 06, 2025 (9:00AM, UTC -3), by WebEx

Chair: Fernando González-Costas

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