



**Report of the NAFO Precautionary Approach Working Group (PA-WG)
01 December, by Webex**

1.	Opening	2
a)	Appointment of Rapporteurs.	2
b)	Adoption of Agenda	2
2.	Apply the revised PA framework to selected NAFO stocks for illustrative purposes.	2
3.	Develop a small set of revised PA frameworks based on the conclusions of the workshop.	3
4.	Next steps	5
a)	Develop selected candidate frameworks and the management options table.	5
b)	Determine advice for demonstration stocks.	6
5.	Other matters	6
Appendix 1. Draft Agenda		7
Appendix 2. List of Participants		8

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NAFO Precautionary Approach Working Group (PA-WG)

December 1, 2022, by WebEx

Co-chairs: Fernando González-Costas and Steve Cadrin

1. Opening

The meeting was opened by the co-Chairs Fernando González-Costas (European Union) and Steve Cadrin (invited expert) at 08:30 hours (UTC/GMT -4 hours in Halifax, Nova Scotia) on Thursday, 1 December 2022.

The co-Chairs welcomed participants attending in person and virtually. This included representatives from Canada, the European Union, and the United States of America, as well as the NAFO Scientific Council (SC) Chair and invited experts on Precautionary Approach Framework on Fisheries Management. A full participants list is presented in Annex 2.

a) Appointment of Rapporteurs.

Scientific Council Coordinator Tom Blasdale was nominated as rapporteur of the meeting.

b) Adoption of Agenda

Before discussing the circulated agenda, Fernando González-Costas presented a summary of the agreements reached in different meetings related to the review of the NAFO PA framework, highlighting the conclusions of the PA framework Workshop which was held in 15-16 August 2022 (NAFO/COM-SC Doc. 22-07) as well as the following work required by the RBMS in order to formalize the proposals to review the current NAFO PA framework (NAFO/COM-SC Doc. 22-03):

- Develop a small set of revised PA frameworks based on the conclusions of the workshop. These revised PA frameworks would consider plausible choices for zones, reference/operational points, proxies, and probability levels based on the discussion and conclusions from the 1st PA framework workshop.
- Apply in an illustrative way the revised PA framework to selected NAFO stocks, and as much as possible examine how the SC advice may have differed under the revised PA frameworks.
- Select the revised PA frameworks and/or the key features within those frameworks that will need to be considered for the development of simulation testing (e.g. reference points, proxies, risk levels, HCRs, etc), as well as the generalized life histories that would be considered in the simulation testing exercise.

Subsequently, the SC agreed to the following stocks to apply in an illustrative way the alternative PA frameworks: yellowtail flounder Div. 3LNO, cod Div. 3M and redfish Div. 3M.

The Scientific Council Coordinator informed the group that the draft report of the PA workshop is expected to be finalized within a two weeks.

It was proposed and accepted to change the order of points two and three of the circulated agenda. The approved agenda is presented in Annex 1

2. Apply the revised PA framework to selected NAFO stocks for illustrative purposes.

The designated experts (DEs) for the stocks chosen to apply the alternative PA frameworks (yellowtail flounder Div. 3LNO, cod Div. 3M and redfish Div. 3M) presented the results of the last approved assessment as well as the process followed to produce the last advice approved by the SC of each stock. The presentation included the reference points approved by the SC for each stock.

In the discussion of these presentations, it was noted that the stock assessments of yellowtail flounder Div. 3 LNO and Cod Div. 3M have all the necessary elements (uncertainty, limit reference points, etc.) to implement

the current PA framework while in the case of redfish Div. 3M, important elements needed to apply the current framework are missing (limit reference points, uncertainty of estimates). It was also highlighted that in the case of the yellowtail flounder, it will be easier to estimate MSY reference points for alternative frameworks.

It was commented that when a framework based on uncertainty and risk is going to be developed, it should be possible, to estimate the uncertainty and the risk in the selected stock in order to apply the new framework; it would therefore be convenient for the SC to use models in the assessments that allow for these estimates. It was noted that it is preferable to progress in the development of new frameworks at this time, and subsequently to develop alternative measures for the assessments that cannot comply with these alternative frameworks, as has been done with the current framework.

3. Develop a small set of revised PA frameworks based on the conclusions of the workshop.

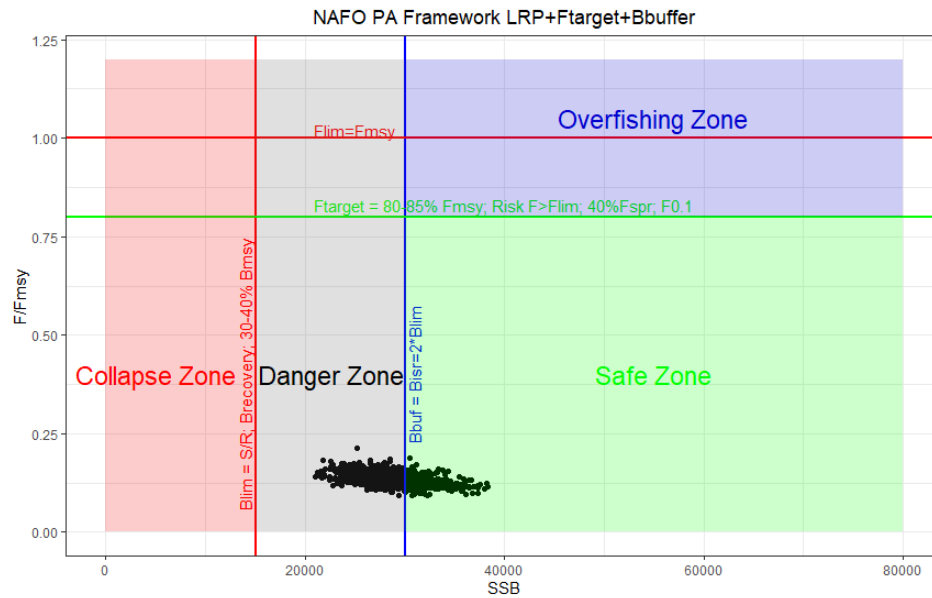
Fernando Gonzalez presented the conclusions reached in the workshop on the review of the current PA framework (COM-SC RBMS-WP 22-07), which should be the basis for developing alternative frameworks to illustrate the consequences that these have in the preparation of advice. A summary of them is presented below:

- The analysis of the current NAFO PA framework indicated that, if fully implemented, the current framework can deliver on many NAFO objectives. However, there may be ways to improve the current framework's effectiveness and better align it with the revised NAFO Convention.
- The conclusions of the PA Framework Revision workshop support the basic ideas of the current NAFO PA framework, in particular the definition of the boundary reference points (B_{lim} and F_{lim}) as well as the pre-agreed management actions that are conditional on stock status and fishing status.
- The workshop also discussed possible revisions, clarifications, and additions to the current framework such as: The establishment of a F_{target} as well as the possible implementation of an intermediate biomass reference point or multiple biomass reference points that are between B_{lim} and B_{msy} .
- The conclusions also recognize that stock recovery plans may be needed in some special cases, however, they should not be an explicit component of the framework.
- It was noted that different (or at least more flexible) approaches will be needed with respect to application of the PA framework for stocks with sporadic/episodic recruitments, both short-lived (e.g. capelin) and longer-lived (e.g. redfish) stocks.

It was pointed out that the alternative frameworks should be composed of their structure and the table of management measures to be taken within the different zones established in the framework structure.

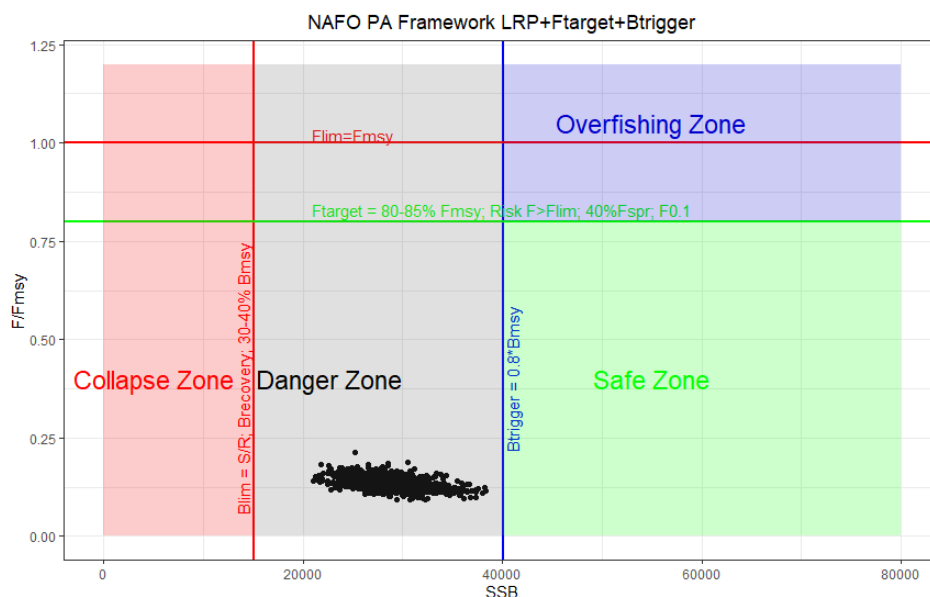
It was also noted that it would be convenient not to have too many alternative frameworks to develop (two or three) and that they should be as simple as possible.

The basic structures of the frameworks to be developed were agreed upon based on the recommendations made by the workshop. The agreed frameworks with one biomass intermediate reference point are the following:

Option 1: With an intermediate biomass reference point defined in order to avoid approaching B_{lim} .


Management Strategies and Courses of Action		
PA Zone	Qualitative management actions	harvest control rule (HCR)
Safe	F with low probability of exceeding F_{lim}	F with low probability of exceeding F_{lim}
Overfishing	Reduce F to equal/below F_{target} .	Reduce F to equal/below F_{target} .
Danger Zone	consider F expected to promote rebuilding	F with low risk of $B < B_{lim}$
Collapse Zone	F should be set as close to zero as possible.	F should be set as close to zero as possible.

Option 2: With an intermediate biomass reference point defined based on not moving away from the target biomass.



Management Strategies and Courses of Action		
PA Zone	Qualitative management actions	harvest control rule (HCR)
Safe	F with low probability of exceeding F_{lim}	F with low probability of exceeding F_{lim}
Overfishing	Reduce F to equal/below F_{target} .	Reduce F to equal/below F_{target} .
Danger Zone	consider F expected to promote rebuilding	F with low risk of $B < B_{lim}$
Collapse Zone	F should be set as close to zero as possible.	F should be set as close to zero as possible.

It was agreed to develop an additional framework with two intermediate reference points since the conclusions of the workshop refer to 'one or more' intermediate reference points. This framework will be developed following this meeting and will be a combination of the other two, with both a B_{buffer} with a low probability of biomass being below B_{lim} , and a $B_{trigger}$ similar to option 2.

4. Next steps

a) Develop selected candidate frameworks and the management options table.

It was agreed that the external experts, working by correspondence together with members of the SC PA-WG, will finalize the agreed options for the alternative frameworks, and develop; option 3, possible ranking to estimate proxies for the different reference points, management actions tables, risk values to be used, etc. The commitment is that the three alternative framework options are finalized by the end of February 2023.

It was also agreed that the DEs will begin to estimate the possible values of the reference points and their proxies and that if they have any problem in their estimation they will report it to the group as soon as possible to try to solve them.

A further meeting of this PA-WG will be required at the end of Feb in order to finish off this work.

b) Determine advice for demonstration stocks.

These alternative options will be presented to managers at the Spring 2023 extraordinary RBMS meeting. The DEs together with the PA-WG will work on the elaboration of the advice of the different alternative frameworks that will be presented, discussed and agreed at the June 2023 SC and will be presented to the RBMS at the July 2023 meeting.

5. Other matters

No other matters were discussed.

APPENDIX 1. DRAFT AGENDA

1. Opening.
 - a) Appointment of Rapporteurs.
 - b) Adoption of Agenda
2. Develop a small set of revised PA frameworks based on the conclusions of the workshop.

In the preliminary discussion, pending confirmation from the PA-WG, the SC (September 2022) recommends developing at most two alternative frameworks to the current one to apply to three stocks. WG members to come to the 1 December meeting with proposed candidate frameworks to include in the small set.
3. Apply the revised PA framework to selected NAFO stocks for illustrative purposes.

The three stocks that the SC considers appropriate are Cod 3M, Redfish 3M and Yellowtail flounder 3LNO or witch flounder 3NO. The idea is to invite the DEs of the different stocks chosen to participate in the meeting and they prepare a summary of the current assessment (data methods) and status for each of the demonstration stocks.
4. Next steps
 - a) Develop selected candidate frameworks and the management options table.
 - b) Determine advice for demonstration stocks
 - The final product will have to be presented to the managers for discussion at the July 2023 RBMS meeting to try to determine elements of the revised PA framework for simulation testing.
5. Other matters

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